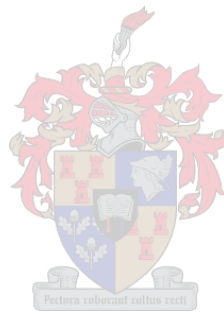*An inquiry into the competitiveness of the South African stone fruit industry*

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Thesis presented in partial fulfilment of the requirements for the degree of

Master in Agriculture (Agricultural Economics) in the Faculty of Agricultural Sciences at Stellenbosch University

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Declaration

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Abstract

The purpose of this study was to undertake an inquiry on the competitive performance of the South African stone fruit industry since the early 1960s, with an emphasis on the more recent years since the mid-1990s, when the industry was deregulated. A comprehensive approach was applied in reaching conclusion in this study by employing a five-step analytical framework, built on well-established approaches by Balassa (revealed comparative advantage, RCA), Vollrath (relative trade advantage, RTA) and the Porter Diamond Model, adapted to accommodate innovative statistical methods to reflect differences in opinions and views more accurately.

Competitiveness in this study is defined to give effect to the global trade orientation of the industry as the sustained ability of the South African 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.

Five phases were identified in the competitive performance of the South African stone fruit industry since 1961, showing the fluctuating nature of the performance of this industry:

- Phase I (1961-1982): Increasingly regulated competitiveness
- Phase II (1983-1990): Politically constrained competitiveness
- Phase III (1991-1999): Economic deregulation and internal rivalry
- Phase IV (1999-2007): Towards international competitiveness
- Phase V (2007 – present): Increasingly sustained competitiveness

The RTA calculations, including both exports and imports, showed that the industry is highly competitive, both internationally – in the Southern Hemisphere where this industry is only out-performed by Chile and locally – compared to other South African (SA) horticultural crops, with plums consistently claiming the top position when individual stone fruit types in the SA deciduous fruit category are analysed.

Through the Stone Fruit Executive Survey (SFES), views and opinions of prominent industry role-players were critically employed to interrogate the topic under discussion. A total of 84 factors affecting the competitiveness of the industry were identified, and these were rated on a five-point Likert scale (where 5 were most enhancing and 1 was most constraining).

This study expanded the analytical framework used in recent agri-competitiveness studies to verify and cross-check the results and findings through statistical procedures, such as cluster analyses, principle component analyses and Cronbach's alpha. This broadened the scope of analysis by accommodating the variance in opinion statements from the respondents. As different cluster groupings based on functional value chain positions were analysed, it became clear that there were significant differences between the respondents involved in the primary production and packing/processing of stone fruit and the

respondents involved in activities lower down the value chain, such as in pack houses/processors and exporters/marketers. Further down the value chain the respondents expressed more optimistic views and positive statements on competitiveness than those exposed to primary production risks and uncertainties. This confirms the importance to expand competitive analysis to different points in the value chain

The rated factors were grouped into Porter's six determinants and the general scored ratings yielded the two most enhancing determinants, being business strategy, structure and rivalry (3.55 out of 5) and related and supporting industries (3.14 out of 5). Production factor conditions (2.81 out of 5) and demand/market factors (2.76 out of 5) were identified as being less enhancing determinants. Chance factors (2.66 out of 5) and government support and policy (2.35 out of 5) were identified as the two most constraining determinants.

The current approach is that the framework of Esterhuizen (2006) is applied to agriculture-related competitiveness studies. This study, however, investigated the extension of the conventional model by adapting the Porter diamond model within the frameworks of the Institute for Management Development's World Competitiveness Yearbook (WCY) and the World Economic Forum's Global Competitiveness Report (GCR), which generally focus on the macro-economic situation. It was confirmed that the stone fruit industry is integrated into and forms part of the 'broader economic picture'.

The results and findings of this study were discussed in a number of focus sessions with industry role players. A strategic planning framework was drafted, which consisted out of eleven industry level strategic proposals. Some of the most important strategic improvements to enhance competitive performance argued for in this study are improved industry-based lobby discussions, i.e. to build and strengthen the necessary communication between industry role players and government agencies through an improved strategic intelligence database, by focusing on aspects such as trade agreements, international market development and policy development.

Opsomming

Die doelwit van hierdie studie was om 'n ondersoek van die mededingende prestasie van die Suid-Afrikaanse steenvrugbedryf sedert die vroeë 1960's te onderneem, met die klem op die meer onlangse tydperk sedert die middel-1990's, toe die bedryf gedereguleer is. 'n Omvattende benadering is ingespan deur gebruik te maak van 'n vyfstap- analitiese raamwerk wat geskoei is op die goed gevestigde benaderings van Balassa (onthulde vergelykende voordeel – *revealed comparative advantage - RCA*), Vollrath (relatiewe handelsvoordeel – *relative trade advantage - RTA*) en die Porter-diamantmodel, wat aangepas is om innoverende statistiese metodes te akkommodeer om verskille in gesigspunte beter te weergee.

Mededingendheid in hierdie studie word gedefinieer om effek te gee aan die globale handelsoriëntasie van die bedryf as die volhoubare vermoë van die Suid-Afrikaanse steenvrugbedryf om belegging te lok deur sy produkte mededingend in die globale mark te verhandel, terwyl daar voortdurend gestreef word om opbrengste te verdien wat groter is as die geleentheidskoste van die skaars hulpbronne gebruik.

Vyf fases in die mededingendheid van die Suid-Afrikaanse steenvrugbedryf is sedert 1961 geïdentifiseer en toon die wisselende aard van die prestasie in hierdie bedryf:

- Fase I (1961-1982): Toenemend gereguleerde mededingendheid
- Fase II (1983-1990): Polities beperkte mededingendheid
- Fase III (1991-1999): Ekonomiese deregulering en interne mededinging
- Fase IV (1999-2007): Op weg na internasionale mededingendheid
- Fase V (2007 – vandag): Toenemend volhoubare mededingendheid

Die RTA-berekenings, wat uitvoere en invoere insluit, het aangetoon dat die bedryf hoogs mededingend is, beide internasionaal – waar die industrie slegs die Chili oortref word en plaaslik – in vergelyking met ander Suid-Afrikaanse (SA) hortologiese gewasse, met pruime wat voorop staan wanneer individuele steenvrugsoorte in die SA sagtevrugtebedryf geanaliseer is.

Deur die Steenvrug Uitvoerende Opname (*Stone Fruit Executive Survey (SFES)*) is die sienings en opinies van vooraanstaande rolspelers krities gebruik om die onderwerp te ondervra. 'n Totaal van 84 faktore wat die mededingendheid van die bedryf beïnvloed, is geïdentifiseer, en hierdie is op 'n vyfpunt-Likertskaal geëvalueer (met 5 as die mees versterkend en 1 as die mees stremmend).

Hierdie studie het die analitiese raamwerk wat in onlangse agri-mededingendheidstudies gebruik is, uitgebrei om die resultate deur middel van statistiese prosedures te verifieer en te kruiskontroleer, naamlik deur bondelanalises, hoofkomponent-ontledings (*principle component analyses*) en Cronbach se alfa. Dít het die strekking van die analise verbreed deur die verskillende opinies van die respondente te akkommodeer. Soos verskillende bondels op grond van funksionele posisies in die waardeketting

geanaliseer is, het dit duidelik geword dat daar noemenswaardige verskille was tussen die respondente in die primêre produksie en verpakking/verwerking van steenvrugte en die respondente betrokke in aktiwiteite laer af in die waardeketting, soos in pakhuise/verwerkers en uitvoerders/bemarkers. Verder af in die waardeketting het die respondente meer optimistiese opinies en positiewe stellings oor mededingendheid uitgespreek as dié wat aan primêre produksierisiko's en onsekerhede blootgestel was. Dit bevestig die belangrikheid daarvan om mededingende analise na verskillende punte in die waardeketting uit te brei.

Die gemete faktore is in Porter se ses determinante verdeel en die algemeen aangetekende skattings het die twee mees versterkende determinante opgelewer, naamlik sakestrategie, struktuur en mededinging (3.55 uit 5) en verwante en ondersteunende bedrywe (3.14 uit 5). Produksiefaktortoestande (2.81 uit 5) en vraag/markfaktore (2.76 uit 5) is geïdentifiseer as minder versterkende determinante. Toevallige faktore (2.66 uit 5) en regeringsondersteuning en -beleid (2.35 uit 5) is geïdentifiseer as die twee mees stremmende determinante.

Die huidige benadering is dat Esterhuizen (2006) se raamwerk op landbou-verwante mededingendheidstudies toegepas word. Hierdie studie het egter die uitbreiding van die konvensionele model ondersoek deur die Porter-diamantmodel binne die raamwerke van die *Institute for Management Development* se *World Competitiveness Yearbook* (WCY) en die *World Economic Forum* se *Global Competitiveness Report* (GCR) aan te pas. Hierdie dokumente fokus oor die algemeen op die makro-ekonomiese situasie. Daar is bevestig dat die steenvrugbedryf in die 'breër ekonomiese situasie' geïntegreer is en daarvan deel is.

Die resultate en bevindings van hierdie studie is in 'n aantal fokussessies met bedryfsrolspelers bespreek. 'n Strategiese beplanningsraamwerk was opgestel wat bestaan uit elf industrie-vlak strategiese voorstelle. Van die belangrikste strategiese verbeterings om mededingende prestasie te verhoog, waarvoor daar in hierdie studie geargumenteer is, is verbeterde "drukgroepgesprekke", m.a.w. om die nodige kommunikasie tussen bedryfsrolspelers en die regering te bou en te verstrek deur 'n verbeterde strategiese intelligensie- databasis wat o.a. fokus op aspekte soos handelsooreenkomste, internasionale markontwikkeling en beleidsontwikkeling.

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- My wife, Niana, for her constant devotion, support, patience and love.

- And last but not least, our Heavenly Father, for giving me the ability, strength, insight and perseverance to finish the task at hand.

Dedications

This thesis is dedicated to my late grandfathers, Albertus Johannes du Toit, Johannes Frederik Loubser and Willem Johannes Boonzaaier, and their farms in Tulbagh, Vindoux, La Rhone, Kleinberg, Duikersdrif and Olyfboom, and Goedgevonden in Wolseley, from whom and where my passion for agriculture was inherited and inspired.

Thank you

Johann Du Toit Loubser Boonzaaier

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List of abbreviations

ACP	Agricultural Costs of Production
DFB	Deciduous Fruit Board
DFPT	Deciduous Fruit Producers' Trust
DRC	Domestic Resource Cost
FAO	Food and Agricultural Organization of the United Nations
FAOSTAT	FAO Statistical Database
FPEF	Fresh Produce Exporters' Forum
FSA	Fruit South Africa
GCI	Global Competitiveness Index
GCR	Global Competitiveness Report
GDP	Gross Domestic Product
GLM	Grubel-Lloyd Measure
HS	Harmonised System product coding
IMD	Institute for Management Development
ITC	International Trade Centre
NES	Not Elsewhere Specified
NH	Northern Hemisphere
NRLCV	Non-redundant Least Correlated Variables
NSSD	No Statistically Significant Differences
NXI	Net Import Index
PAM	Policy Analysis Matrix
PCA	Principle Component Analysis
PPP	Purchasing Power Parity
PDM	Porter Diamond Model
PPECB	Perishable Products Export Control Board
R&D	Research and Development
RCA	Revealed Comparative Advantage

RER	Real Exchange Rate
RHC	Redundant Highly Correlated
RMA	Relative Import Advantage
RSA	Republic of South Africa
RTA	Relative Trade Advantage
RXA	Relative Export Advantage
SA	South Africa
SACGA	South African Cherry Growers' Association
SASPA	South African Stone Fruit Producers' Association
SATI	South African Table Grape Industry
SCB	Social Cost Benefit
SFES	Stone Fruit Executive Survey
SH	Southern Hemisphere
SPSS	Statistical Package for Social Scientists
SSA	Statistics South Africa
SSD	Statistically Significant Differences
WCC	World Competitiveness Centre
WCY	World Competitiveness Yearbook
WEF	World Economic Forum

Glossary

Fruit types[1]   Refers to the type of fruit, where cultivar refers to the same general fruit
                            type, but another variety within the same type

Deciduous fruit   Category grouping for the following fruit types: pome fruit, stone fruit
                            and table grapes

Pome fruit   Category grouping for the fruit types apples, pears and quinces

Stone fruit   Refers to members of the genus *Prunus*, namely plums (*Prunus salicina*
                            L., Japanese plum), peaches (*Prunus persica*), nectarines *(Prunus
                            nucipersica*), apricots (*Prunus armeniaca*), prunes – often called sloes
                            (*Prunus domestica* L, European plum), cherries (*Prunus avium*) and
                            almonds (*Prunus amygdalus*)

Tropical fruit   Include the following fruit types: avocados, mangos and mangosteens,
                            guavas, granadillas (or passion fruit), pineapples, litchis, bananas and
                            kiwifruit

Exotic fruit   Include the following fruit types: persimmons, pomegranates and figs

Citrus   Comprises oranges, lemons and limes, grapefruit and soft citrus or easy
                            peelers

Nuts & NES   Refers to nuts and any other fruit product type that has not been
                            specified elsewhere

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[1] All listed fruit type groupings were accounted for with assistance from HORTGRO (Smit, 2014).

Chapter 1: Introduction

1.1. Background

The economic growth of the Republic of South Africa's agricultural sector is of considerable importance to the country's realisation of key economic and development objectives (National Planning Commission, 2011; Strauss, Meyer & Kirsten, 2010). For this reason, competitiveness must be viewed as an important feature and it was indeed identified as one of the cornerstones of South African agricultural policy – in the Agricultural Sector Plan (2001) and, more recently, in the National Development Plan (National Planning Commission, 2011). This point is also argued extensively by Esterhuizen (2006), Van Rooyen, Esterhuizen and Stroebel (2011), and Van Rooyen and Esterhuizen (2012). Furthermore, the Republic of South Africa today functions as an integral part of the global free market-orientated economy. A higher level of competitiveness is thus essential to operate successfully in this environment by trading more efficiently and effectively, with better quality products at strategically selected price points, produced through more productive practices (Smit, 2010).

Popescu and Seban (2014) stress that the current global economic environment puts pressure on all economic activities, hence all industries, to improve their competitiveness and innovativeness in a sustainable way. This is reiterated by the Global Competitiveness Report (WEF, 2013) and the World Competitiveness Yearbook (WCC, 2013).

The studies of *competitiveness* as a field of economic knowledge started to enjoy close attention from practitioners and researchers across a wide range of industries at the beginning of the 1980s (Flanagan et al., 2007). However, it is has been built on and drawn from various economic theories and concepts over time, from the mercantile system of the 1500s to the more recent competitiveness theory of Michael Eugene Porter (Porter, 1990;1998; Peukert, 2012).

Competitiveness is a useful concept that is frequently used in economic strategic thinking, as it links various components relevant to the economic system in a systematic manner (Popescu & Seban, 2014). One of its key contributions is to enhance classical- and neo-classical economic theories with recent thinking on economics, i.e. that competitiveness encompasses the economic (including business) consequences of non-economic issues, including education, science, political stability, value systems and more (Garelli, 2003). The concept of competitive advantage was derived largely from the classical concept of comparative advantage (David Ricardo, 1772–1823), made applicable to an ever-increasing and fast-moving economically integrated global environment (Heertje, 2012; Porter, 1990; Pugel, 2012).

The field of economic competitiveness has drawn substantial attention from governments and business communities for the past two decades (Waheeduzzaman & Ryans, 1996; Ketels, 2006). The concept of economic competitiveness was also highly influenced by business literature, where it forms the basis for strategic analysis and meeting business goals and objectives (Lall, 2001). As a result,

economic academic interest in this area has increased, also locally, especially with South Africa entering the globalised trade and competitive environment in the 1990s. Competitiveness is also applied to the discipline of agricultural economics, as illustrated by a series of studies over the past 15 years in the field of "competitiveness in South African agriculture" (see, among others, Vink, Kleynhans & Street, 1998; Du Toit, 2000; Van Rooyen, Kirsten & Van Rooyen, 2001; Esterhuizen, 2006; Mashabela & Vink, 2008; Van Rooyen, 2008; Van Rooyen *et al*., 2011; Van Rooyen & Esterhuizen, 2012; Jafta, 2014).

This study builds upon those works and focuses on the "competitiveness performance of the South African stone fruit industry". Trends will be determined to assess the impact over the past 20 years, including references to the deregulation of the industry and the lifting of trade sanctions in the mid-1990s; the ever-increasing globalisation of the international trade environment; the global economic 'meltdown' of the late 2000s; and the fluctuation of the value of the Rand over the past two decades. In this context it must be noted that the stone fruit industry is highly focused on global trade, with exports increasing from 18 766 tons in 1991/1992, at a value of R 72.17 million, to R 908.79 million in the 2012/2013 production/export season, when 76 462 tons of fresh South African stone fruit were exported.

The significance of this industry for economic growth and development is also found in matters such as employment creation, regional development, and promoting the international image of South Africa – all in the context of realising economic and development objectives, as noted by Strauss *et al*. (2010). Competitive performance in the global environment thus is vital for this industry.

1.2. The research problem defined

1.2.1. The problem statement

The South African stone fruit industry, as an export- and trade-orientated industry, is increasingly confronted with forces of change that affects its global competitive performance, in particular through its ability to trade in this environment (HORTGRO, 2014a). International competitiveness must be considered as a highest priority for participating firms and for the industry as a whole. Karaan (2006) indicated that the acquisition of distinct features by world markets directs the space and nature of competition and, ultimately, survival, growth and sustainability. Various elements affecting this industry are nestled in the production environment, such as technologies, variable climates, soil qualities, regulatory standards, etc. Other factors that are external to the production environment are however also important– factors such as the ever-changing market trends and conditions driving consumer preferences, vicissitudes in the environment supporting this industry, research and development (R&D), financial services, regulatory frameworks, government policies and fluctuating exchange rate dynamics, to list a few (Esterhuizen, 2006). Many of these factors are also not directly controlled by industry- and farm-level producers. A larger, more comprehensive systems view thus applies to a study of competitive performance, where this performance is investigated, tracked and analysed.

The challenge in this industry remains to develop strategies and interventions for the total stone fruit business environment that would combat constraining factors and promote enhancing factors in the competitive performance of the South African stone fruit industry. The identification, understanding and analyses of these factors therefore become important components in the research problem attended to in this study.

1.2.1.1. Primary objective

The primary objective of this study was to (a) conduct a systematic description and comprehensive analysis of the competitive performance of the South African stone fruit industry in a global context, and to (b) generate strategies to combat constraining factors whilst promoting enhancing factors with long-term sustainability in mind.

1.2.1.2. Secondary objectives

With the aim of reaching the primary objective, a number of secondary objectives had to be met, viz.:

- Define the competitive performance of the South African stone fruit industry in the global context.

- Conduct a comprehensive empirical measurement for the competitive performance of the South African stone fruit industry over time.

- Determine the wider set of rudiments/factors that affect the competitiveness of the South African stone fruit industry.

- Analyse such factors and establish the major determinants affecting competitive performance.

- Propose industry-level strategies and institutional incentives to support and augment the level of competitiveness of the South African stone fruit industry.

1.2.2. The research questions

From 1.2.1. it is clear that the competitiveness of the South African stone fruit industry is largely driven by its export tradability. There thus are a range of factors that could influence its competitive performance. Consequently, the research questions to be answered are:

- How competitive did the South African stone fruit industry perform compare to other local fruit industries, and among others, to that of its international competitors?

- What is competitiveness performance in this global trade-orientated industry and how can it be defined?

- How can competitiveness be measured?

- What factors drive competitiveness?

- How can the South African stone fruit industry compete successfully on a sustainable basis within the global environment?

To deal with the above questions, the following five points are relevant:

- To consider the theoretical foundations of competitiveness and develop an applicable definition to direct the analysis of competitive performance as applicable to the South African stone fruit industry.

- To develop, from this definition, an analytical framework for measuring and identifying the factors influencing and analysing the competitiveness of the South African stone industry.

- To measure the competitive status and trends in competitiveness of the South African stone fruit industry.

- To determine major constraints and enhancements to the competitive success of the South African stone fruit industry.

- To apply this analysis and industry intelligence to develop strategies to enhance the competitiveness of the South African stone fruit industry.

1.3. Hypothesis

The following hypothesis was formulated to guide the analyses and the interpretation of the results and findings:

The competitive performance of the South African stone fruit industry is determined by a range of factors, some not under the direct control of the role players in the stone fruit industry i.e. not one factor alone dominates competitive performance in the South African stone fruit industry, but rather a range of factors that includes productivity, market strategy, trade, exports and local sales, firm strategy, the strength of the institutional support system, government support policy and the international value of the South African Rand (ZAR).

1.4. Analytical framework and research methodology

Channelled by the research questions and objectives, this study utilised an enquiry system using both qualitative and quantitative methods. A step-wise framework for analysing and commenting on the competitiveness of the South African stone fruit industry, which will be illuminated in Chapters 2 and 3, is enumerated accordingly:

Step 1: Defining competitiveness as it applies to the stone fruit industry in the Republic of South Africa (RSA).

Step 2: Measuring the competitive status and performance of the SA stone fruit industry.

Step 3: Identify factors affecting the competitive performance of the SA stone fruit industry.

Step 4: Establishing the major determinants of competitiveness.

Step 5: Proposing strategies to enhance the competitiveness of the South African stone fruit industry.

This study used a number of well-proved and conventional methods (ISMEA, 1999; Esterhuizen, 2006; Van Rooyen, et al, 2011; Van Rooyen and Esterhuizen, 2012; Jafta, 2014) to analyse competitive performance, ranging from quantitative to qualitative measures. However, some analytical innovations and refinements in the statistical analysis methods and the clustering of views and opinions from industry role players to obtain a more circumspect position on such measures will be introduced in this study.

1.5. The importance of the study

The international competitiveness of countries, industries/sectors and companies/firms is an ever-growing concern for, *inter alia*, governments, industries and firms. It thus provides an interesting and potentially useful topic for scientific enquiry by academic scholars, generating potentially useful economic and business intelligence applicable to the industry (Ketels, 2006).

Various industries have enjoyed attention in the context of competitiveness studies as a field of economic intelligence, with more specific focus on agricultural studies, vis-à-vis research and academic output. These include industries like pome fruit and grapes (Kalaba & Henneberry, 2001), deciduous fruit (Mashabela & Vink, 2008), apples (Du Toit, 2000; Beukes, 2009), wine (Esterhuizen & Van Rooyen, 2006; Van Rooyen *et al*., 2011), citrus (Ndou & Obi, 2011), wheat (Vink *et al*., 1998; Mahlanza, Mendes & Vink, 2003), oilseed (Jooste & Van Schalkwyk, 2001; Hallatt, 2005), cut flowers (Van Rooyen *et al*., 2001) and potatoes (Stroebel *et al*., 2011). Stone fruit, however, have not yet been attended to in this context.

With an approximate value of production of R1 761.03 million and an exporting value of R 908.79 million, it is clear that the South African stone industry is of great importance to the agricultural sector as a strategic fruit type to be produced in dedicated climatic areas, outperforming many industries as a receiver of foreign currency (DAFF, 2013; PPECB, 2013; HORTGRO, 2014b; 2014c). A study concentrating on the specific issues of competitiveness faced by the decision makers in the South African stone fruit industry therefore will be of significance and of value to all the industry's stakeholders and also will expand the enquiry into its competitive performance in the RSA agricultural sector.

This study furthermore will introduce a number of 'evolutionary innovations' to the approaches followed in most of the listed studies to date, in an endeavour to expand the system of competitiveness enquiry in South African agriculture.

1.6. Delimitations of the study

This study is demarcated accordingly with regard to the following:

- The analysis was done on the competitiveness of the South African stone fruit industry (apricots, plums, prunes/sloes, peaches, nectarines and cherries) only, not on the entire deciduous fruit industry, although this industry is highly integrated at farm- and market-level decision making.

- The focus is on the fresh fruit, in particular the percentage traded, with attention paid to the exported produce.

- Due to the availability of data for the measurement of competitive performance, the time period on which this study was based ranged from 1961 to 2011/2012, with emphasis on the post-deregulation phase (since mid-1990).

- Whereas a full value chain analysis will be undertaken, only certain factors listed by the stakeholders will be attended to – no references will be made to volume and income flows within the competition chain.

- Firm level analysis was not undertaken, as that level of data was not obtained, and the focus was rather just at the global and industry level.

- The study essentially deals with a historical analysis, only drawing some relevant conclusions for the future of the industry. No 'futuristic' analysis, for example the construction of an index to predict/project future business confidence (as presented by Esterhuizen, 2006), was attempted.

1.7. Outline of the study

The study is structured into six main chapters, as follows: **Chapter one** has presented the introduction to the research problem and the logical framework behind the issues to be addressed, arranged according to objectives, including the hypotheses and delimitations. **Chapter two** reviews the broad theory base relevant to the analysis of competitiveness and its applications in a South African agricultural context. The chapter defines competitiveness, identifies a number of measuring methods and decision-making models, and pronounces on those to be used in this study. Previous studies in the field of competitiveness studies will be reviewed and evaluated in terms of their different measures, and criticisms will be pointed out.

In **Chapter three**, the research design and the analytical framework that guide the methodology applied will be presented. The data used and the data analysis hence will be accounted for in this chapter. An argument will be made for new approaches and innovations in the analysis. **Chapter four** provides an overview of the South African stone fruit industry in relation to apricots, peaches, nectarines, plums, prune/sloes and cherries. Relevant industry trends and statistics, market structures and information, and the nature of the industry pre- and post-deregulation will be illuminated.

Chapter five presents the results – a description and interpretation of the data, findings and results. **Chapter six** concludes the study with reference to the 'step-wise' analytical framework, pronouncing on the stated hypotheses and providing possible industry-level strategies and strategic incentives to enhance the competitive performance of the South African stone fruit industry.

Chapter 2: Literature review

2.1. Introduction

Competitiveness is a multidimensional concept that can be observed from three different levels: global and country/national level, industry/sector and company/firm/farm level (Ambastha & Momaya, 2004). Spies (1999) and Cho and Moon (2002) state that competitiveness emerges from a societal condition that cultivates its intent and processes, a condition/state that is inherently sustainable due to the fact that it is poised between economic and social development, with personal attributes, entrepreneurship and innovation.

This chapter situates this study in the context of an overview of relevant theories and applications. It firstly reviews the evolution of competitive theory, from Adam Smith (1776) to the recent statements by Michael Porter (1990; 1998) and extensions and criticisms thereof. From this, a definition of competitiveness as it would apply to an analysis of the South African stone fruit industry will be formulated, followed by a discussion of the measurement of competitiveness. Reference also will be made to the application of competitiveness studies in the South African agricultural economy.

There is not only one measurable proxy for competiveness (Cho & Moon, 2002; Peleckis *et al*., 2013; Siudek & Zawojska, 2014) in the global economic context, and of these a number of relevant quantifiable methods and measures (Önsel et al., 2008; Siudek & Zawojska, 2014) will be highlighted in this chapter and deliberated on in the chapters to follow. A two-legged approach[2] – the "What do we do?" vs. the "How do we do it?" will be exemplified, with the latter referring to *cost vs. benefit measures* and the first denoting *trade-based measures* (Latruffe, 2010). In the context of the South African stone fruit industry, "What do we do?" could be referred to as the business in which the industry operates – selling/trading stone fruit and related products, whilst the "How do we do it?" refers to the strategic concepts and determinants incorporated to achieve/maintain a certain level of competitive performance or improve on it.

2.2. Broad theory base

2.2.1. Historical overview of competitiveness

The history of competitiveness, presented in Table 2.2.1, emphasises the path from Adam Smith to Michael Porter *vis-à-vis* the fruition of competitiveness theories. Although Smith was the predecessor of the classical economists – Thomas Malthus, Jean-Baptiste Say, David Ricardo and John Stuart Mill, to name but a few – his ideas were built on the foundations laid by the *Physiocrats*[3] in the 18th century.

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[2] Latruffe (2010) identified two types of competitiveness measures, namely *trade measures* and *strategic measures.*

[3] The Physiocrats were a group economists whose period of greatest activity was between 1756 and 1774 (D'Adabal, 2012).

In this table, competitiveness thinking is traced from the 1700s (the Physiocrats) to recently, viz. the Porter period. In this history it is interesting to note that thinking until the mid-1900s largely linked competitiveness to concepts of absolute advantage, comparative advantage and factor endowments, emphasising economic concepts useful for policy applications. Such thinking was challenged from the mid-1900s by Peter Drucker (1909–2005), and in particular by a new paradigm presented by Porter (1990), which differentiated competitive advantage from comparative advantage (a more business strategy-orientated concept) and the expansions of this paradigm, namely the Double Diamond Model (Rugman & D'Cruz, 1993), the Nine-Factor Model (Cho, 1994) and the Generalised Double-Diamond Model (Moon, Rugman & Verbeke, 1998).

Table 2.2.1 The evolution of competitiveness thinking

Theorist	Thoughts	*Magnum Opus*
Adam Smith (1723–1790)	Identification of four input factors: land, capital, natural resource and labour	*An Inquiry into the Nature and causes of the Wealth of Nations*, 1776
David Ricardo (1772–1823)	Law of Comparative Advantage, which underlines how countries should compete	*Principles of Political Economy and Taxation*, 1817
Karl Marx (1818–1883)	Impact of the socio-political environment on economic development. Communist idea that changing the political context should precede economic performance	*Capital: A Critique of Political Economy*, 1867
Max Weber (1864–1920)	Relationship between values, religious beliefs and the economic performance of nations	*Ethic of Protestantism and the Spirit of Capitalism*, 1905
Joseph Schumpeter (1883-1950)	Emphasis on the role of the entrepreneur as competitive factor, underlining that progress is the result of disequilibria, which favour innovation and technological improvement	*Capitalism, Socialism and Democracy*, 1942
Alfred P. Sloan (1875-1965) & Peter Drucker (1909-2005)	Further developed the concept of management as key input factor of competitiveness, enhancing both the business- and policy-level applications	Sloan *My Years with General Motors*, 1963; Drucker: *The Age of Discontinuity*, 1969
Robert Solow (1924 -)	Studied the factors underlying economic growth in the USA (1948–1982). Highlights importance of education, technological innovation and increased know-how.	*Technical Change and the Aggregate Production Function*, 1957
Nicholas Negroponte (1943 -)	Redefining the concept of "knowledge" as the most recent input factor in competitiveness	*Being Digital*, 1995
Michael Porter (1947 -)	Envisaging to aggregate all these ideas into a systemic model, called the Competitiveness Diamond, with application in economic and business strategy development	*The Competitive Advantage of Nations*, 1990

Source: adapted from Garelli (2003)

Masters (1995) and Cho and Moon (2002) set out the evolution of competitiveness theory chronologically, from *Mercantilism* to the modern competitiveness theories. A brief overview will

follow to discuss the various schools of thought regarding competitiveness and its association with trade and business applications.

Transition from traditional trade theory to competitiveness theory

The traditional trade theories, namely Mercantilism, Classical and Neoclassical, continue to exist today (Masters, 1995; Esterhuizen, 2006), and the pioneering economic views illustrated in Table 2.2.1 pave the way from *pre-Mercantilism* times to modern-day applications by Porter (1990). Traditional trade theories remain useful in understanding many of today's international, industrial and trade policies. As international trade is becoming the key to directing the global economic and political landscape, global production and consumption result in complex trading networks and policies in which no single theory is sufficient to explain modern-day international trade and competitiveness (Nicita, 2013; Fan et al., 2014).

These various traditional theories, in particular as they relate to trade – both local and international – set the foundation and formed the building blocks from which modern-day theories on trade and competitiveness derive and from where they are expanded. The global economy in which firms and agribusinesses operate differs a lot from the past. Several important variables have to be considered simultaneously in determining a trade or competitiveness formula. One recent, important development that addresses this issue is Michael Porter's diamond model (Porter, 1990; 1998).

2.2.2. Porter's diamond model of competitiveness

The Competitive Advantage Analysis, as described by Porter (1990), consists of examining case studies of successful industries to identify why they are located in particular countries. Porter, (2013:144) stated that: "We need a new perspective and new tools – an approach to competitiveness that grows directly out of an analysis of international successful industries, without regard to traditional ideology or current intellectual fashion. We need to know, very simply, what works and why." Porter (1990) studied 100 firms in ten developed nations to learn if a nation's prominence in an industry can be explained more adequately by variables other than only the factors of production on which the theories of comparative advantage and Heckscher-Ohlin model (Ohlin, 1933) are based (Cho & Moon, 2002).

According to Porter (1990: 1998), national prosperity is created, not inherited. It does not grow from a country's natural endowments (labour pool, interest rate or currency value), as classical economics insists. A nation's competitiveness depends on the capacity of its industry to innovate and upgrade. Companies gain advantage against the world's best competitors because of pressure and challenge. Porter argues further that countries benefit from having strong domestic rivals, aggressive home-based suppliers and demanding local customers.

Porter (1990) criticised the traditional doctrine, which is at best incomplete and at worst incorrect. Around the world, companies that have achieved international leadership employ strategies that differ from each other in every respect. While every successful company will employ its own strategy, the underlying mode of operation, the character and trajectory of all successful companies, is fundamentally the same.

Companies achieve competitive advantage through acts of innovation that revolutionise the business. Companies approach innovation in its broadest sense, including both new technologies and new ways of doing business. They perceive a new basis for competing or find better means for competing in old customs. Innovation can be manifested in a new product design, a new production process, a new marketing approach or a new way of doing business.

Esterhuizen (2006) asks three questions with regard to the competitiveness of a business:

- Why are certain companies, based in certain nations, capable of consistent innovation?

- Why do they ruthlessly pursue improvements, seeking an ever more sophisticated source of competitive advantage?

- Why are they able to overcome the substantial barriers to change and innovation that so often accompany success?

According to Porter (1990), the answer to the questions by Esterhuizen (2006) lies in four broad attributes/determinants of a nation, attributes/determinants that individually and as a system constitute the diamond of national advantage, the playing field that each nation establishes and operates for its industries, namely *factor conditions*, d*emand conditions*, r*elated and supporting industries*, and *firm strategy/structure and rivalry*. These attributes/determinants are illustrated in Figure 2.2.1. However, there are two added criteria or attributes/determinants that also shape the environment in which firms compete and promote the creation of a competitive advantage, namely *government* and *chance*. These two additional attributes/determinants or criteria are circled in Figure 2.2.1.

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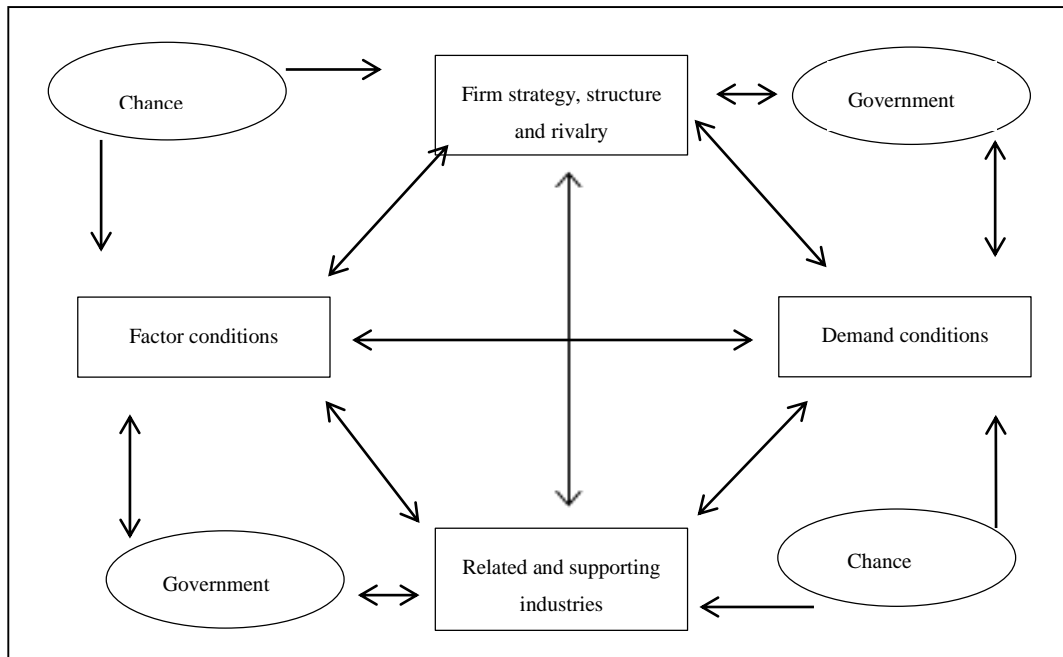
Figure 2.2.1 Porter's diamond model of competitiveness

Source: Porter (1990; 1998)

The four attributes/determinants or criteria of the Porter diamond (Porter, 1990) can be explained and described as follows:

- *Factor conditions.* The nation's position in the factors of production, such as skilled labour or infrastructure, that are necessary to compete in a given industry.

- *Demand conditions***.** The nature of home-market demand for the industry's products or service.

- *Relating and supporting industries***.** The presence or absence in the nation of supplier industries and other related industries that are internationally competitive.

- *Firm strategy, structure and rivalry***.** The way companies are created, organised and managed, as well as the nature of domestic rivalry.

According to Porter (1990), these determinants and their underlying sets of variables or factors, create the national environment in which companies are born and learn how to compete. Each point on the diamond, and the diamond as a system, affect essential ingredients for achieving international competitive success. The availability of the resources and skills necessary for competitive advantage in an industry is critical. The information that shapes the opportunities that companies perceive and the directions in which they arrange their resources and skills is of the utmost importance (Fagerberg, Srholec & Knell, 2007). As are the goals of the owners/share- and stakeholders, managers and

individuals in the companies, and most importantly, the constant pressure of companies to invest and innovate.

Porter (1990) add these and also includes two outside variables (additional attributes or criteria - determinants) in the model, which were mentioned above and circled in Figure 2.2.1., namely the role of chance and the role of government.

Chance events are occurrences that have little to do with the circumstances in a nation, and often are outside the power of firms and (sometimes) the national government to influence. Examples include new inventions, major new technologies such as biotechnology, and discontinuities in input costs such as the energy crisis, financial market shifts, foreign government decisions, wars and changing weather patterns/conditions (Kandulu *et al*., 2012). A more practical example, relevant to stone fruit producers in South Africa, might be when their biggest competitor, Chile, encounters unfavourable weather conditions, like black frost, floods, etc., which result in much lower yields than expected. This occurrence might influence the supply to the European market, with a possible increase in the price of stone fruit, accompanied by the demand shifting to produce exported from South Africa. Such events can invalidate sources of competitive advantage and create new ones. The ability of an industry, sector or firm to respond will depend upon the status of other 'edges' of the competitive diamond. The latter also affects the environment for invention and entrepreneurship, and hence where these aspects will occur (Esterhuizen, 2006).

The role of government is best viewed in terms of its influence on the four determinants of competitiveness, rather than as a separate determinant per se. Porter explicitly rejects trade intervention, arguing that it only guarantees markets for inefficient businesses (Porter, 1990). Porter further argues that government's proper role is as a catalyst and challenger, to encourage, or even push, companies to raise their aspirations and move to higher levels of competitive performance, even though this process may be inherently unpleasant and difficult. Government cannot create competitive industries, only companies can do that. Government plays a role that is inherently partial. Government's role of transmitting and amplifying the forces of the diamond is a powerful one. Government policies that succeed are those that create an environment in which companies can gain a competitive advantage, rather than those that involve government directly in the process (Ortmann, 2000). According to the well-known Laissez faire view by Adam Smith (Viner, 1927). Government has an indirect, rather than direct, role. Government plays a pivotal and enabling role in the competitiveness of nations and industries alike, as argued extensively by Acemoglu and Robinson (2013).

A comprehensive version of the two determinants, namely the role of government and chance, are summarised by Van Rooyen (2008:15) as follows:

- *Government attitude and policy.* Government plays a vital role. Government can influence each of the above determinants, either positively or negatively, through policy and operational capacity.

- ***The role of chance***. Chance events are occurrences largely beyond the power of firms (and often the national government). Such events can nullify sources of competitive advantage and create new ones.

2.2.3. Contextualising Porter's model of competitiveness

In order to place Porter's model of competitiveness into context, it is important to refer to the World Competitiveness Yearbook (WCC, 2013) and the Global Competitiveness Index (WEF, 2013). The prominence of Porter's model of competitiveness (Porter, 1990) is evident within the frameworks of the World Competitiveness Yearbook (WCY) – see Figure 2.2.2 and the Global Competitive Index (GCI) – see Figure 2.2.3 to determine a nation's competitiveness. The fitting of a particular industry's competiveness within the broader scope of determining a nation's competitiveness is illustrated in Figure 2.2.4.

Balkyte and Tvaronavičiene (2010) classify the areas of competitiveness research into six categories of analysis, namely companies (firm-level competitiveness), sector competitiveness, regional competitiveness (area, place, locality, territorial, city), national or country competitiveness, bloc competitiveness, and international competitiveness (global, external).

An industry refers to the grouping of businesses or companies with the same economic activities. Garelli (2003) distinguishes between the competitiveness of nations and the competitiveness of firms/enterprises by placing an emphasis on where the creation of economic value takes place. *The increasing co-operation among firms*[4] has been an anticipated result of technological advances (particularly information technology), changing consumer preferences, increased competition in both local and international markets due to globalisations and trade liberalisation, whilst aspiring to reduce costs (Ortmann, 2001; Trienekens, 2011).

The industry, holistically seen as sets of interconnected linkages through the value and supply chain, can be assessed by the application of the Porter diamond model of competitiveness (Porter, 1990; 1998) within the scope and nature of a particular nation's competitiveness and to the business environment in the context of this study.

2.2.3.1. Institute for Management Development: World Competitiveness Yearbook

The Institute for Management Development's World Competitiveness Centre (WCC) has been a forerunner in the field of the competitiveness of nations and enterprises since 1989 (WCC, 2011). The World Competitiveness Yearbook analyses and ranks how nations and enterprises manage the totality of their competencies to achieve increased prosperity (WCC, 2011). It features 59 industrialised and

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[4] "The increasing co-operation among" firms can be translated as "The evolution of supply chains" (Ortmann, 2001).

developing countries, which are compared on 331 criteria (see Appendix A). These criteria are grouped into four competitiveness factors in Figure 2.2.2. The hard data are taken from international, national and regional organisations and private institutes, and survey data are drawn from the annual Executive Opinion Survey of 4 935 respondents. A fair measure of accuracy is achieved and maintained through its collaboration with 54 partner institutes worldwide, and data are aggregated over a five-year period (WCC, 2011). According to the World Competitiveness Yearbook (WCC, 2013), world competitiveness is a field of economic theory that analyses the facts and policies that shape the ability of a nation to create and maintain an environment that sustains value creation for its enterprises and more prosperity for its people.
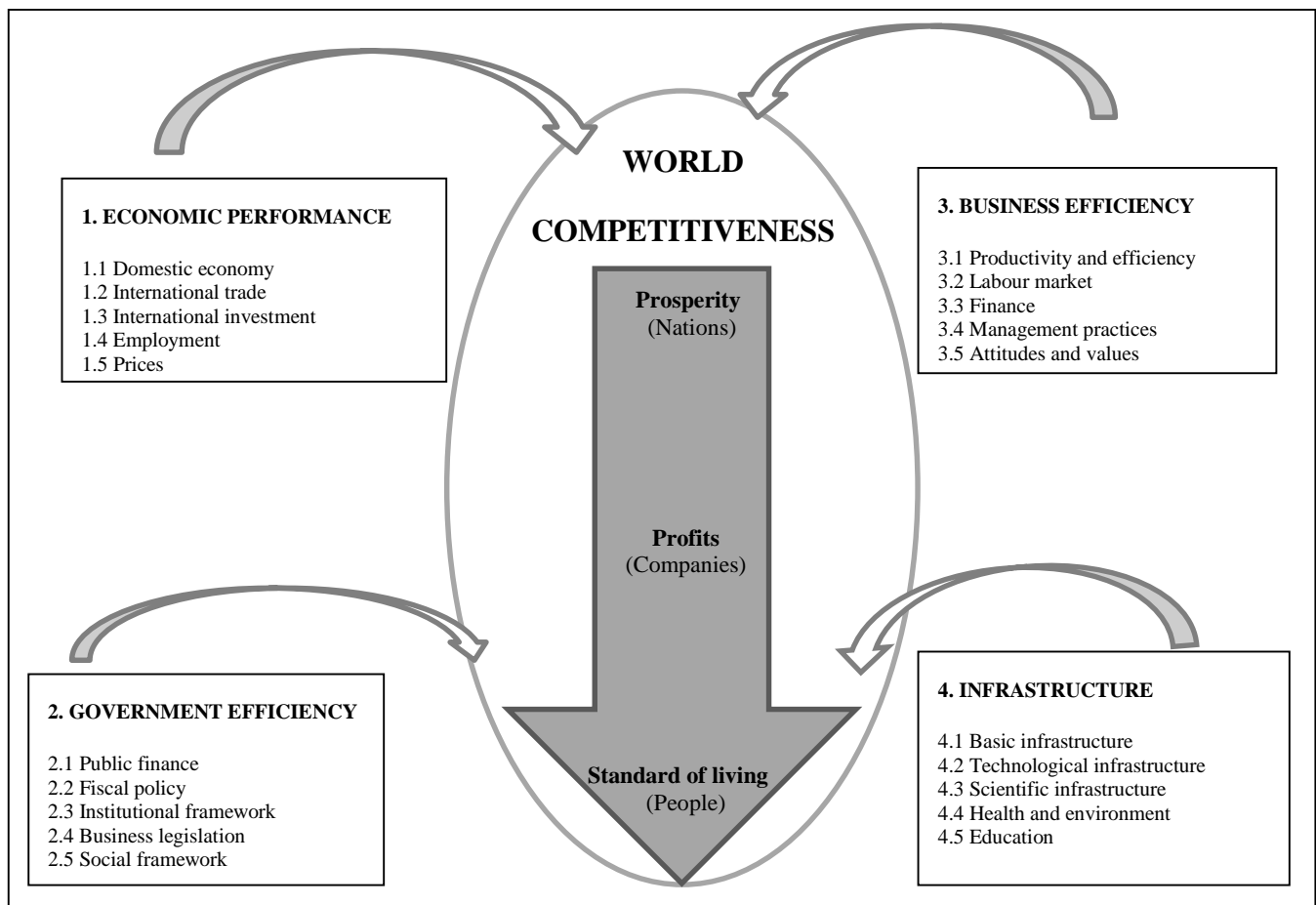
Figure 2.2.2 World competitiveness – Four-factor grouping

Source: IMD World Competitiveness Yearbook (WCC, 2011)

Regarding national competitiveness ratings, South Africa was ranked 52nd for the year 2014, a drop from 50th position in 2012 (IMD, 2014).

2.2.3.2. World Economic Forum: Global Competitiveness Index

For the past three decades, the World Economic Forum's annual Global Competitiveness Reports have studied and benchmarked the many factors supporting national competitiveness. From the start, the aim has been to provide insight into and stimulate discussion among stakeholders on the best strategies and policies to assist nations to the overcome the impediments to improving competitiveness (WEF, 2013).

However, since 2005, the WEF has based its competitiveness analysis on the GCI. The GCI is a comprehensive tool that measures the microeconomic and macroeconomic fundamentals of national competitiveness. Whilst many determinants drive productivity and competitiveness, the conceptualising of the factors behind this process has occupied the minds of economists for centuries – from Adam Smith to Porter (1990; 1998) (see Table 2.2.1). Among others, the focus of individual economists has varied from specialisation and the division of labour, to investment in physical capital and infrastructure and, lately, to emphasis on other mechanisms, such as education and training, technological process, macroeconomic stability, firm sophistication, market efficiency, good governance, etc. All of these mentioned influences/factors/elements are likely to be crucial for competitiveness and growth; they are not mutually exclusive – two or more may be significant simultaneously, as noted by the authors of the Global Competitiveness Report (WEF, 2013).

The degree to which these factors, indirectly and directly, affect the functioning and cohesion of one another has been captured within the GCI by including a weighted average of many different components, each measuring a different aspect of competitiveness. These components are accordingly grouped into 12 pillars of competitiveness (see Appendix B and Figure 2.2.3.)

Although the ratings of the 12 pillars in the Global Competitiveness Index are reported separately, it is imported to bear in mind that they are not independent; they tend to reinforce each other, so that a weakness in one area would have a negative impact in another area. The pillars are aggregated into a single index, and, the measures are reported individually to provide the details of and a sense of specific areas that a nation can address to improve its national competitiveness (WEF, 2013). Within this assessment framework of national competitiveness, South Africa was rated 56th in 2014, dropping four places from the 2012 rating (WEF, 2014).

To encompass the stages of development, three levels have been identified, in which the 12 pillars are grouped into three sub-indices - see Figure 2.2.3.
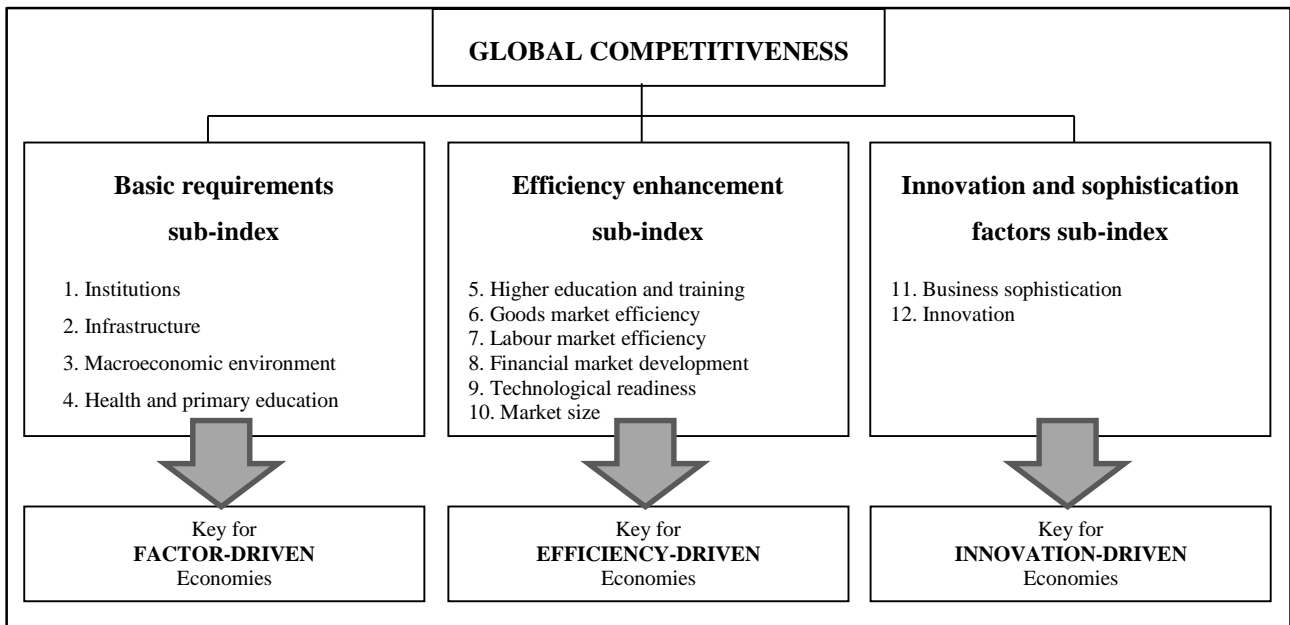
Figure 2.2.3 The 12 pillars of global competitiveness

Source: WEF (2013)
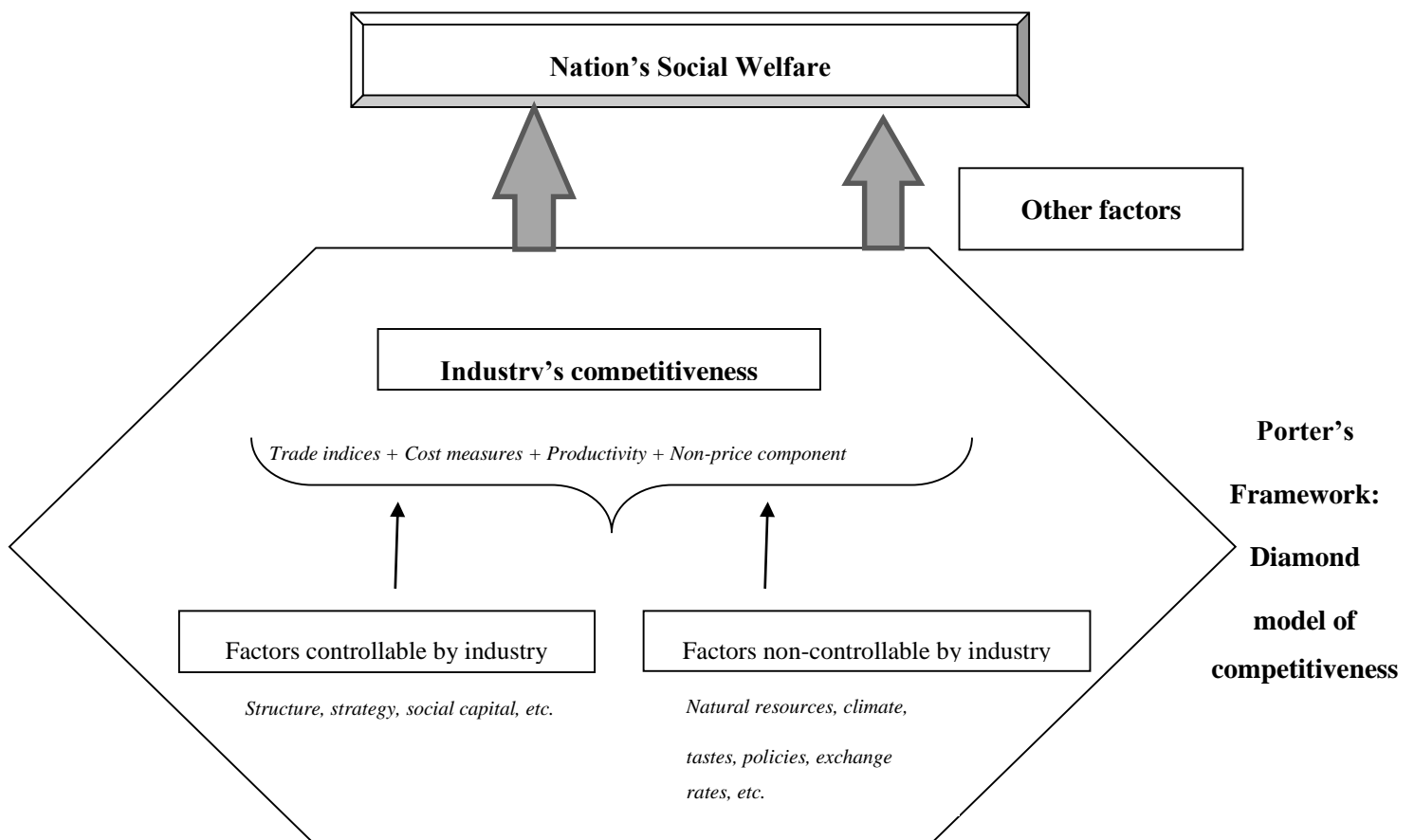
Figure 2.2.4 Industry's competitiveness within national social welfare

Source: Adapted from Latruffe (2010)

The hexagon in Figure 2.2.4 encapsulates the six conditions of Porter's competitive model (1990) within the context of a nation's social welfare. The factors that are controllable and non-controllable by industries proposes various measures for competitiveness – differentiating between trade-based measures and cost vs. benefit measures. In order to identify an appropriate measurement for competitiveness, it is crucial that a sufficient definition be stated to direct an applicable measurement.

2.2.3.3. Critique against Porter

From Figure 2.2.5 and Table 2.2.1 it is evident that Porter's theory (1990) of competitiveness is not without criticism, e.g. by Rugman & D'Cruz (1993), leading to extensions thereof (Moon *et al.*, 1998), but for the purposes of this study, the debates surrounding Porter's theory (1990) will only be noted, as the Porter model provides a comprehensive framework for the competitiveness determinants influencing the competitiveness of entities – which have been applied in various agriculture-related competitiveness studies (among others by Esterhuizen & Van Rooyen, 1999; Venter & Horsthemke, 1999; Du Toit, 2000; Van Rooyen *et al.*, 2001; Madima, 2009; Dennis, 2011; Ndou & Obi, 2011; Van Rooyen *et al.*, 2011). This proves that the Porter diamond model continues to serve as the foundational framework for evaluating the competitiveness of firms, industries, sectors and countries.
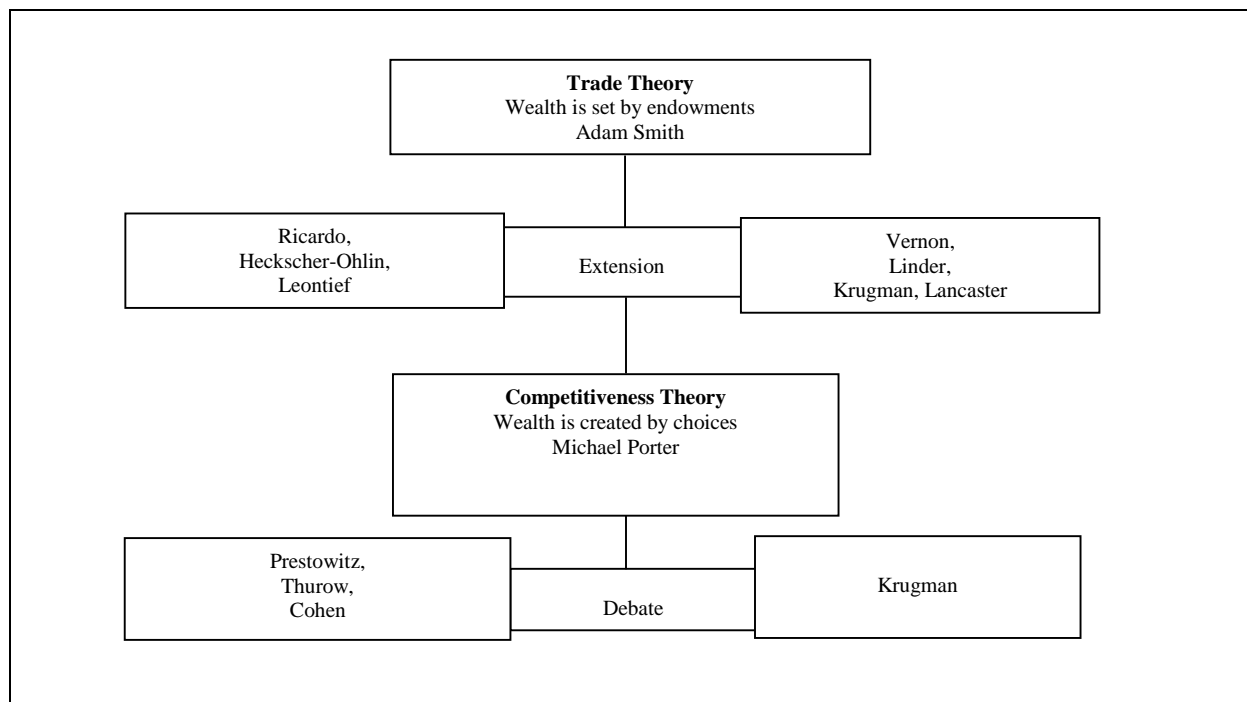
Figure 2.2.5 Evolution from trade theory to competitiveness theory

Source: Cho & Moon (2002)

2.3. Definition of competitiveness (Step 1)

The term "competitiveness" originated from the classical Latin word *petere*, meaning to seek, attack, aim at, and the Latin prefix *con-*, meaning together.

The volume of literature on competitive performance and its definition expanded rapidly in the fields of economic and business studies. Lengyel (2004) argues that competitiveness is a complex notion that can be applied to all economic units – company, industry, sector, region, nation and macro-region, but that there also is some disagreement on what the term "competitiveness" means. Evidently there has been no shortage of definitions for "competitiveness" or explanations for why some countries/nations, industries, sectors, firms and different farming enterprises (different farming-investment opportunities) perform competitively and others not (Reiljan, Hinrikus & Ivanov, 2000; Esterhuizen, 2006; Vukovic, Jovanovic & Djukic, 2012; Siudek & Zawojska, 2014).

According to Feurer and Chaharbaghi (1994), when determining a definition for competitiveness it is important to question the *raison d'être*[5] of an organisation and the key players who determine its survival. These authors provided a conceptual framework to develop a definition for competitiveness in the business environment, which employs the following assumptions:

- For an organisation to exist, a demand for products/services on offer are required.
- The definitive goal of an organisation is to make profit to satisfy its shareholders and achieve continuous growth while rewarding the concerns of other stakeholders such as employees.
- Competition arises when several organisations endeavour to make profit by satisfying the same demand.

Momaya (1998) argued that competitiveness needs to be defined clearly at the appropriate level due to the multifaceted nature of the research term, taking into account the views of important stakeholders. Balkyte and Tvaronavičiene (2010) categorised competiveness research into six categories (see Section 2.2.3). Popescu and Seban (2014) contextualised three orientations regarding a proposed definition of competitiveness based on the OECD (2001) on the basis of the different levels of aggregation, leading to different meanings of competitiveness:

- *Company/firm level* – The ability or capacity of companies to compete in international markets, with a satisfactory rate of return (OECD, 2001); the firm's share in the competitive market (Ambastha & Momaya, 2004).
- *Industry level* – The ability to compete, particularly in international markets, with satisfactory performances in a certain industry (OECD, 2001).
- *National level* – The degree to which a nation, under free and fair market conditions, produces goods and services that meet the test of international markets, while simultaneously maintaining

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[5] The most important reason or purpose for someone's or something's existence.

and expanding the incomes of its citizens (US Senate: Committee on Finance, 1985) over the longer term (Barker & Köhler, 1998).

The definition referring to the national level is criticised by Ajami (1992), who states that "free and fair market conditions" do not exist – comparing at the national level therefore is highly problematic and "free and fair market conditions" is only a theoretical economic concept.

Garelli (2003:702) distinguishes between two types of definitions in the context of national competitiveness, namely:

- *Academic/theoretical definition*: "Competitiveness of nations is a field of economic knowledge which analyses the facts and policies that shape the ability of a nation to create and maintain an environment that sustains more value creation for its enterprises and more prosperity for its people."
- *Business definition*: "Competitiveness of nations/firms looks at how nations/firms create and maintain an environment which sustains the competitiveness of its enterprises. Thus, competitiveness of nations focuses on the policies implemented by nations to shape the environment around enterprises."

In this academic or theoretical definition of Garelli (2003), "value creation" and "prosperity for its people" are quite vague concepts, therefore a more business-orientated definition will fit this study more appropriately.

Freebairn (1987) took a novel approach by basing his definition on economic principles through the concept of opportunity cost, emphasising the importance of considering competitiveness in a wider context than only that of a single product/commodity/sector, but rather referring to all related activities competing for scarce resources – hence the economic concept of "opportunity cost". According to the definition of Freebairn (1987:79), international competitiveness is "the ability to deliver goods and services at the time, place and form sought by overseas buyers at prices as good as or better than those of other potential suppliers whilst at least opportunity cost[6] returns on resources employed".

Freebairn (1987) iterates that a competitive agricultural export industry is about marketing as well as production costs; it is about all farm and off-farm costs of delivering products to overseas buyers; it is about beating alternative suppliers; and it is couched in a dynamic world of changing buyer preferences, advancing technology, and changing relative input costs.

Bearing abovementioned in mind, Esterhuizen, Van Rooyen and Doyer (2002), Esterhuizen (2006) and Van Rooyen and Esterhuizen (2012) conceptualised the term "competitiveness" from an

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[6] Gittinger (1982:489) describes opportunity cost as follows: "the benefit forgone by using a scarce resource for one purpose instead of for its next best alternative use"

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agribusinesses perspective and orientation, and underpinned by the definition of Freebairn (1987:79), and Van Rooyen (2008:2) identified three stages of competitiveness in agriculture.

- *Surviving* – The lowest level of competing; it refers to the ability to adapt passively or reactively to "changes in the approach the game is being played".

- *Competing* – The intermediate level of competing; it refers to the ability to respond proactively to "changes in the approach in which the game is being played" by improving the qualities and activities of the business by being more efficient and flexible.

  Winning[7] – The topmost level of competing; it refers to the ability to defeat your rivals by influencing the "changes in the approach in which the game is being played" through more efficient operation, innovation and enhanced qualities than rivals (see footnotes below).

Van Rooyen (2008:2) defined 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 this and for the purpose of this study, a definition of competitiveness for the South African stone fruit industry, with its great reliance on global trade, is proposed as: The sustained ability of the South African stone fruit industry to attract investment by competitively trading its produce within the global marketplace, whilst continuously striving to earn returns greater that the opportunity cost of scarce resources engaged.

2.4. Measuring competitiveness

Cameron (1963:70) said: *"Not everything that counts, can be counted and not everything that can be counted, counts."* If Cameron (1963:70) may be rephrased as "Not all that counts, can be measured and not all that is measured, counts", it might be applicable to the measuring of competitiveness. The above definition creates a broad framework for such measurement. The sections below shed some light on the issue at hand by identifying various comparisons and measures for competitiveness (Buckley, Pass & Prescott, 1988; Frohberg & Hartmann, 1997; Korom & Sagi, 2005; Neary, 2005; O'Rourke, 2008; Latruffe, 2010; Cetindamar & Kilitcioglu, 2013; Siudek & Zawojska, 2014).

2.4.1. Levels of competitiveness

A comprehensive study by Siudek and Zawojska (2014) characterised a variety of measures of competitiveness into three different levels of analysis, namely:

- *Macro- and mega-perspective*: On the global, national and regional levels.

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[7] Van Rooyen (2008) quantified winning as "constantly defeating your competitors successfully in order to achieve sustainable profits and growth".

- *Meso[8]-perspective:* On the economic sector and industry levels.
- *Micro-perspective:* On the firm, company and business levels.

The view of Siudek and Zawojska (2014) also fits the orientation of this study, i.e. macro/mega and meso-perspectives, with relatively restricted references to the micro-firm level perspective.

The model of O'Rourke (2008; 2013) focuses more specifically on competitiveness in the horticultural industry,[9] and provides an interesting and respected approach; it classifies 22 competitiveness criteria of the World Apple Review into three main categories (Table 2.4.1), namely

- *Production efficiency*
- *Industry and infrastructure inputs*
- *Financial and market factors*

The O'Rourke (2008; 2013) model, however, focuses more on the micro- or farm-level application, thus includes only selected farm-level performance discipline measures and operational matters. It must also be noted that, according to this approach, exchange rate fluctuations, policy and government attitude/support framework, chance occurrences and resource situations are not included directly in the analyses, whilst Porter's diamond model encapsulates these and other factors, i.e. provides a more comprehensive approach to competitiveness analysis. This O'Rourke model, however, offers value to the relevant industries as it compares competitors – firms, farms, etc. – on some basic, standardised set of principles, thus providing adequate comparisons to be investigated further as they relate to firm-level strategies – one of the Porter model's determinants of competitiveness.

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[8] Meso-perspective refers to middle or intermediate perspectives.

[9] The framework for comparative measures of O'Rourke (2013) is limited to the following horticultural industries: pome fruit, sweet cherries and kiwi fruit.

Table 2.4.1 Comparative measures employed in the O'Rourke model

Production efficiency	Industry and infrastructure inputs	Financial and market factors
1. % Change in production	7. Adequacy of storage	15. Interest and lending rates
2. Relative variability of production	8. Modern packing facilities	16. Inflation rates
3. % of area non-bearing	9. Efficient distribution	17. Capital availability
4. % of production that is newer varieties	10. Marketing system	18. Security of property rights
5. Planting density in trees/ha	11. Land availability	19. Product quality covered
6. Average yield/ha	12. Water availability	20. % of production exported fresh
	13. Labour availability	21. Average export price (US$ per metric ton)
	14. Input costs	22. Average distance to market

Source: O'Rourke (2008)

From the above, it is clear that the selection of the Porter model provides a more suited framework for the purpose of this study.

2.4.2. Trade-based measures

Competitiveness as defined above emphasises the "ability to trade". Banterle (2005) characterises the competitiveness of a particular industry, such as the food sector, as meaningful by considering economic theory references and, subsequently, the sources of the competitiveness concept.

Industry boundaries are defined and accepted and the competitive rules of the game are known in the 'market space', where entities try to outperform their rivals for a greater share of existing demand. Entities that understand the 'rules of engagement' and play the game of 'out-trading' the best will be frontrunners to compete for resources across nations and economic sectors. Thus it always will be important to navigate successfully in this market space by outcompeting the rivals, as an entity's ability to trade is viewed as the foundation of competitive performance (Freebairn, 1987; Kirsten, 1999; Kim & Mauborgne, 2005a; Farole, Reis & Wagle, 2010).

The core theoretical concepts for competitiveness are based on comparative and competitive advantage positions and prospects. The framework of comparative advantage, described by the Heckscher-Ohlin theory (Stolper & Samuelson, 1941) stipulates that, in international trade, resource endowment is a key factor for comparative advantage (Pugel, 2012), and the framework for competitive

advantage is described by the Porter approach and the attributes/determinants of industry competitiveness, viewed from a business and trade perspective.

2.4.2.1. Revealed comparative advantage and derived indicators

The concepts of competitive advantage as the basis for the measurement of competitiveness were advanced by Balassa (1965; 1977) in terms of the revealed comparative advantage (RCA). This was modified by Vollrath (1991) to avoid double counting between pairs of countries. In the literature on the RCA it is often referred to as the Balassa index.

Vollrath (1991) offered an alternative specification of RCA, resulting in analyses of international competitiveness in agriculture from an open world economy perspective. The relative trade advantage (RTA), which takes both imports and exports into account as a more comprehensive indicator of revealed comparative advantage, is calculated as the difference between relative export advantage (RXA), which is equal to the Balassa index, and its counterpart, the relative import advantage (RMA).

RTA is formulated accordingly below:

Equation 2.4.1

$$RTA_{ij} = RXA_{ij} \; - \; RMA_{ij}$$

for the *i*-th nation and *j*-th commodity, where a positive value of RTA reflects a status of competitive advantage.

The RXA measure, which is grounded in exports, calculates the ratio of a nation's export share of a commodity in the international market to the nation's export share of all other commodities.

Equation 2.4.2

$$RCA_{ij} = RXA_{ij} = \left[\frac{X_{ij}}{X_{ik}}\right] / \left[\frac{X_{nj}}{X_{nk}}\right]$$

where *X* are exports, *k* denotes all commodities other than *j*, and *n* denotes all other countries than *i*.

A RCA index greater than 1 indicates that the country has a comparative advantage in the commodity under consideration. Hence it reveals a higher state of competitiveness, since it has a strong export sector.

Vollrath (1991) proposed the RMA index, which is similar to the above-mentioned RXA, but relates to imports (*M*), rather than exports.

Equation 2.4.3

$$RMA_{ij} = \left[\frac{M_{ij}}{M_{ik}}\right] / \left[\frac{M_{nj}}{M_{nk}}\right]$$

In this case, a RMA index of less than 1 indicates revealed comparative advantage and thus higher competitiveness.

By considering both imports and exports, the RTA indicator implicitly weighs the revealed competitive advantage by calculating relative export and relative import competitive advantages. Therefore it is not dominated by extremely small export or import values for the commodity "measured", which means that this RTA is a more wide-ranging (all-inclusive) and superior measure of competitiveness (Esterhuizen, 2006).

2.4.2.2. Export- and import-related measures of competitiveness

Comparative advantage proposes that trade flows are the result of differences in production factors/endowments among countries and that a country will specialise in the production of a good in which it has a cost advantage (Latruffe, 2010; Pugel, 2012).

In addition to the RCA and RTA, other trade-based measures are also applied in the assessment of competitiveness – see Table 2.4.2. However, it must be noted that these measures/indicators have a very direct focus, taking only specific factors into consideration, and may be viewed as somewhat limited and less-encompassing in the context of this study.

Table 2.4.2 Summary of additional trade-based measures of competitiveness

Measuring techniques	Description	Author(s) applicable
Real exchange rate (RER)	The ratio of the price index of tradeable commodities to that of non-tradeable inputs. Where the demand for the currency of a competitive nation is high, the nation's exchange rate is strengthened – so for the inverse too.	Brinkman (1987) and Frohberg and Hartmann (1997)
Purchasing power parities (PPP)	A measure for comparing different countries' relative prices. The number of units[10] in the domestic currency that would be required to purchase the amount of the domestic industry's good for one unit of the second country's currency.	Ball *et al.* (2010)
Export market share (EMS)	EMS can be measured in terms quantity or in terms of value.	Dosi, Grazzi & Moschella (2013)
Net export index (NEI)	An entity's (nation, sector, industry or agribusiness) exports minus its imports, divided by the total value of trade.	Banterle and Carraresi (2007)
Grubel-Lloyd measure (GLM)	Assesses the health of exports, by taking into account that a product is often imported and exported simultaneously (known as intra-industry trade).	Banterle and Carraresi (2007)

Source: Adapted from Latruffe (2010)

2.4.3. Cost vs. benefit measures

Within this framework, competitiveness is shown by way of performance indicators (Zairi, 1994), such as benchmarking (BFAP, 2012), cost superiority, profitability, productivity and efficiency – which are often cited as measures or indicators of competitiveness (Spies, 1999; Latruffe, 2010). The notion of opportunity costs (refer to the selected definition above) is also attended to within these indicators or measures (Gittinger, 1982:489; Freebairn, 1987:79). However, the most intuitive concept of competitiveness is that of price competitiveness (Ball *et al.*, 2010), which forms an integral part of the reflexion on measures for competitiveness shown in Table 2.4.3.

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[10] Inputs and outputs

Table 2.4.3 Summary of various cost vs. benefit measures for competitiveness

Measured Factor	Measuring Technique	Description	Author(s) applicable
Cost	Domestic resource cost (DRC) ratio	Compares the opportunity costs[11] of domestic production with the value added it generates.	Gorton *et al.* (2001) and Liefert (2002)
	Social cost-benefit (SCB) ratio	The ratio of the sum of domestic (non-tradeable) input cost to the price of the considered product.	Masters and Winter-Nelson (1995)
	Agricultural costs of production (ACP)	Itemised costs for various agricultural activities.	Cesaro *et al.* (2008), Brunke *et al.* (2009) and Omela and Värnika (2009)
Profitability	Gross margin	The difference or ratio between incomes and costs.	Thorne (2004)
Productivity, Efficiency and Technological change	Total factor productivity (TFP)[12]	Ratio relating to the aggregation of input to the aggregation of outputs.	Coelli *et al.* (2005)
	Mathematical representation of efficiency	The measurement of the potential input reduction, or output increase, relative to a reference with the construction of efficiency frontier.[13]	Farrel (1957), Aiger, Lovell and Schmidt (1977); Charnes, Cooper and Rhodes (1978) and Coelli *et al.* (2005)
	Index number approach	Proposes explicit methods for the aggregation[14] of various inputs and outputs to measure efficiency and technological change.	Coelli *et al.* (2005)
	Production function estimation	Econometric estimation of a production function.	Heady, Johnson and Hardin (1956)
	Malmquist indices	Provides a decomposition of the productivity change into efficiency change and technological change.	Caves, Christensen and Diewert (1982)

Source: Adapted from Latruffe (2010)

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[11] Gittinger (1982:489) describes opportunity cost as follows: "the benefit forgone by using a scarce resource for one purpose instead of, for its next best alternative use".

[12] Also referred to as, and sometimes called, multi-factor productivity (MFP).

[13] The function that describes this frontier is unknown. Techniques for defining the frontier can be categorised as non-parametric measures (data envelopment analysis – DEA), and parametric measures (stochastic frontier model – SFM).

[14] Several methods of aggregation lead to different TFP indices, e.g. Laspeyre, Paacshe, Fisher, Tornqvist and Eltetö-Köves-Szulc (Latruffe, 2010).

2.4.4. Concluding remarks on measurements of competitiveness

A number of significant measures to assess the measurement of competitive performance were discussed in Section 2.4. However, these measures and/or indicators for competitiveness may be viewed as somewhat "restricted", as not all of them are relevant to the definition proposed for competitiveness relating to the international framework in which the South African stone fruit industry operates, which depends highly on exports. Recent international and local studies were reviewed to assess the applied measurements and competitive frameworks in an agricultural context, taking forward the stepwise framework to evaluate competiveness for this study.

The abovementioned measurement techniques and measures were taken into account and considered to best fit the analyses of this thesis. The RTA measure was identified as the most comprehensive measure in the context of this study.

2.5. Some applications of competitiveness analysis in agriculture

Competitiveness studies in the agricultural arena have enjoyed worldwide attention recently, also in the South African agricultural context. The agricultural industries in South Africa were analysed with the application of various measurement and different frameworks.

2.5.1. An international review

Competitiveness is an international concern for governments, sectors, industries and individual companies, firms and businesses alike. There subsequently is a significant volume of recent studies focused on the competitiveness of the agricultural industries or sectors. The important benchmark study by ISMEA (1999), which piloted the approach of RTA and Porter's diamond model to analyse competitive performance of countries and industries in the expanding European Economic Union (EEC) of the mid-nineties, must be viewed as the benchmark. In this study, two methods, namely Porter's diamond model (1990) and competitiveness indicators as originally developed by Balassa (1977), were prioritised to determine the competitiveness of the European Union food chain in a global environment.

In Table 2.5.1., some other important international studies are listed. If notions can be singled out, what is apparent throughout are the emphasis on trade; whether trade productivity is enhanced – to trade better quality goods more efficiently; and the important role of agricultural related policies per se – to improve trading and innovation in the depicted international industries or sectors.

Table 2.5.1 Recent international agricultural competitiveness studies

National industry or sector researched	Authors or researchers	Proxies for measurements and/or models/frameworks applied	Verdicts or conclusions
Hungarian agricultural-food sectors	Fertő and Hubbard (2002)	RCA and RTA	Hungary has a comparative advantage for 11 of the 22 aggregated product groups.
Agricultural enterprises in Slovakia	Bielik and Rajèániová (2004)	Resource cost ratio (RCR)	Businesses and companies are more competitive than co-operatives. The better the soil quality, the more competitive these businesses.
Namibian table grape production	Thomas (2007)	Porter diamond model	The Namibian table grape chain is relatively competitive in the international arena. Primary production in becoming more competitive.
Milk production in Ireland	Hopps and Maher (2007)	Profitability and costs of production (benchmarking)	Irish cash costs per litre are competitive in Europe. Charges for owned land, capital and family labour led to a lesser competitive advantage.
Estonian milk production	Omela and Värnika (2009)	Opportunity cost approach; domestic resource cost	Declining competitiveness of both small-scale and large-scale producers.
Livestock product exports from India	Kumar (2010)	Export and import analysis – nominal protection coefficient (NPC)	India is competitive in the export of meat products, except poultry.
China's agricultural products	Qiang, Yong-Sheng and Xiao-Yuan (2011)	RCA and trade coefficient specialisation (TCS)	Ability of direct factors is strong in terms of transformation from cost advantage and price advantage into competition advantage.
Poultry production in the Czech Republic	Belová *et al.* (2012)	Trade-related comparisons – Lafay Index (LFI)	The comparative disadvantage deepens in relation to European Union countries.
Global Pear Market	Valenciano, Giancinti and Uribe (2012)	RCA	Geography plays a main role in competitiveness with nearby markets, as happens in markets with free trade.
Tobacco sub-sector in the Republic of Macedonia	Tuna, Georgiev and Nacka (2013)	RCA and Porter diamond model	The republic of Macedonia has favourable conditions and a competitive advantage for producing tobacco.
Orange juice chain in Brazil	Neves, Trombin and Kalaki (2013)	In-depth analysis of qualitative fieldwork observations	The orange juice sector will probably not realise the same future growth as other

			important sectors of Brazilian agribusiness if a few drastic steps are not taken.
Canadian wheat, beef and pork sectors	Sarker and Ratnasena (2014)	RCA and normalised revealed comparative advantage (NRCA)	Canada has enjoyed international competitiveness in the wheat sector, but not in the pork sector, whilst the beef sector has grown rapidly since 1992.

Source: Author's own research based on literature overview

2.5.2. South African applications

There evidently is no absence of recent research focused on the concept of competitiveness in the milieu of a deregulated South African agricultural sector since the mid-1990s. Relevant publications in selected journals are shown in Table 2.5.2. The research is listed chronologically, stating the authors, sector or industry, alongside the proxies employed for measurements of competitiveness, as discussed in Section 2.3., with a brief conclusion.

Table 2.5.2 Summary of agricultural competitiveness studies related to South Africa

Authors and researchers	Industry (sector)	Proxies for measurements	Frameworks applied	Verdicts or conclusions
Vink *et al*. (1998)	Western Cape wheat industry	Agricultural costs of production	International and RSA cost comparisons	Declining value of Rand provides short-term relief and production practices need to be adapted.
Venter and Horsthemke, (1999)	Southern African sheep meat industry	Profitability and costs of production	Porter's diamond model framework	Industry/value chain is less competitive than that of Australia.
Blignaut (1999)	RSA dairy industry	RCA Low cost and differentiation comparisons	Porter five competitive factors[15]	Not internationally competitive, but primary milk producers are relatively effective.
Esterhuizen and Van Rooyen (1999)	RSA food commodity chain	RTA	Porter diamond model framework	16 selected food commodity chains. Majority of chains are marginally competitive, except for the maize, pineapple and apple chains. Index decreases when moving from primary to processed products.
Du Toit (2000)	RSA apple industry	Comparative analysis: Production and related costs	Porter's diamond model framework	RSA less competitive than Chile.

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[15] Five competitive forces: 1 – The entry of new competitors, 2 – Bargaining power of suppliers, 3– Bargaining power of buyers, 4 – Threat of substitutes, 5– Rivalry among the existing competitors (Porter, 1985).

Authors and researchers	Industry (sector)	Proxies for measurements	Frameworks applied	Verdicts or conclusions
Jooste and Van Schalkwyk (2001)	RSA primary oilseeds industry	DRC ratio	Comparisons of economic advantages (CEA)	Where agro-ecological conditions are poor – improved-yield cultivars will determine comparative advantage. Distortionary policies on input side are a main factor influencing comparative advantage.
Van Rooyen *et al*. (2001)	RSA flower industry	RCA, DRC and private cost ratio (PCR)[16]	Porter diamond model framework and PAM	Overall, RSA has a competitive advantage over Australia, except when using the Porter analysis, where certain determinants are stronger, i.e. government support and the role of chance determinant.
Kalaba and Henneberry (2001)	Fruits (grapes and pome fruit) in the EU market	Trade-based models: Import demand model [Restricted source-differentiated almost ideal demand system (RSDAIDS)]	Trade-related comparisons	RSA fruit exports are least competitive among Chile, the United States, Argentina and Turkey.
Esterhuizen, Van Rooyen and Van Zyl (2001)	RSA agricultural input industry	RTA	Trade-related comparisons	RSA manufacturing of farming requisites is relatively marginally competitive. Competitiveness of machinery industry is improving. Fertiliser industry is becoming more competitive. Pesticide industry is decreasing in its competitiveness.
Mahlanza *et al*. (2003)	Organic wheat production in Western Cape	SCB and DRC ratios	PAM	Weak comparative advantage for conventional wheat in WC, except for certain areas of Swartland. Would be an improvement if wheat could be produced under organic practices.
Mosoma (2004)	RSA agricultural exports	RTA	Trade-related comparisons	Marginally competitive internationally.
Hallatt (2005)	RSA oilseed industry	RCA, NXI and RTA	Trade-related comparisons	RSA secondary oilseed industry is struggling with a competitive disadvantage against Argentina, whilst

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[16] Private cost ratio (PCR) is a measure to compare the competitiveness of different systems with one another (Van Rooyen *et al*., 2001).

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Authors and researchers	Industry (sector)	Proxies for measurements	Frameworks applied	Verdicts or conclusions
				primary industry is more competitive than Argentina.
Esterhuizen and Van Rooyen (2006)	RSA wine industry	RTA	GCR (WEF)	Industry enjoys a sustained improvement in competitiveness.
Mashabela and Vink (2008)	RSA deciduous fruit supply chains	RTA	Trade-related comparisons	RSA enjoys a relative global competitive advantage. Increased competitiveness further up the chain.
Van Rooyen (2008)	RSA agribusiness sector	RTA	Porter diamond model framework	Can be classified as generally marginal in terms of global competitiveness.
Madima (2009)	RSA deciduous fruit canning industry	RTA	Porter diamond model framework	Industry is internationally competitive in the following areas: labour costs, product quality, efficient production technology and regulatory standards.
Beukes (2009)	RSA apple industry	Production efficiency, industry and infrastructure inputs, financial and market factors	O'Rourke framework	RSA less competitive than Chile and New Zealand. Production is area of best competitive performance for RSA.
Ndou and Obi (2011)	RSA citrus industry	Constant market share (CMS)	Porter diamond model framework	Industry is competitive
Dennis (2011)	RSA sunflower industry	RCA and RTA	Porter diamond model framework	Value-added sunflower products struggle with a competitive disadvantage.
Van Rooyen et al., (2011)	RSA wine industry	RTA	Porter diamond model framework	RSA wines are increasingly internationally competitive, with a positive trend since 1990s.
Van Rooyen and Esterhuizen, (2012)	RSA agribusiness sector	RTA	Porter diamond model framework	The sector is marginally competitive, but constrained by an increasingly negative trend since 2004.
Jafta (2014)	RSA apple industry	RCA and RTA	Porter diamond model framework	RSA apple industry is marginally competitive in the international market.

Source: Author's own research based on literature overview.

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The application of trade-based measures as proxies for competitiveness is clearly evident, where the RTA measure, noticeably in conjunction with the Porter diamond model of competitiveness, was used as a framework to mobilise expert views and opinions to assess the competitive performance of the depicted agricultural industries in South Africa.

An evolution from basic quantitative analyses – only RTA – to the incorporation of qualitative information gained from executive surveys along with these trade data analyses is thus more apparent.

When analysing *qualitative information*,[17] it is observed that 'averaged-out' scores customarily are generally utilised to present authoritative statements (through executive-level surveys) on competitiveness (Esterhuizen, 2006; Madima, 2009; Van Rooyen *et al*., 2011; Jafta, 2014).

Such 'average-based' statements may be highly misleading, however – what does an 'averaged-out' opinion rating mean, especially when there are significant differences in responses? More refined statistical analysis methods, such as principle component analyses (PCA) (Wold, Esbensen & Geladi, 1987; Barge-Gil & Modrego, 2011), could be considered to obtain more representative groupings or opinion clusters. This will allow the identification of the respective scores of the most agreed-to statements and enable clustering of opinions in terms of significance, i.e. to sketch a more realistic/accurate picture of the competitiveness and address issues and opportunities at hand to complement the empirical measurement. The application of this aspect will be attended to further in Chapter 3.

2.6. Conclusion

Competitiveness as a field of economic study, with applications in the business strategy environment, has come a long way from the early economic philosophers to modern-day theories by Porter (1990) and extensions thereof, which are still being developed. Currently, the Porter (1990; 1998) framework of competitiveness continue to serve as the foundational framework for evaluating the competitiveness at the business/company, industry/sector and national/international level for many industries, including agriculture. Even in the competitiveness frameworks of the IMD and WEF, which are directed to assess the national competitiveness of nation, the collective grouping of factors in the respective determinants of competitiveness, used by Porter, is clearly visible and features prominently.

Firstly, a clear definition of competitive performance had to be derived from the wide range of theoretical constructs to best fit the South African stone fruit industry. Accordingly, the definitions of competitiveness by Freebairn (1987), Esterhuizen (2006) and Van Rooyen (2008), serving the notion of the economic discipline as captured in the principles of 'opportunity costs' and 'scarce resources', and linking the notion of trade and doing business in the globalised environment, provide the foundation of

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[17] Qualitative information – statements/perceptions on relevant competitiveness issues.

a definition, viz.: The sustained ability of the South African stone fruit industry to attract investment by competitively trading its produce within the global marketplace, whilst continuously striving to earn returns greater that the opportunity cost on scarce resources engaged.

From this definition, the need to measure trade over time empirically is apparent. Measuring competitiveness or tracking the competitive performance of a selected business, industry or nation may be a daunting task, however, partly due to the fact that numerous measures exist and are available for application, but also due to a reluctance of firms to release empirical data and sensitive business intelligence to enable such measurements This measurement, however, remains important to study competitiveness, and to identify and clarify trends. Some of the measures used as a proxy to measure performance at an industry level and establish trends were identified and discussed in this chapter, viz. RCA (Balassa, 1965; 1977) (see Equation 2.4.2) and the more embracing RTA (Vollrath, 1991) (see Equation 2.4.1). RTA calculations have the ability to compare export industries with each other within the same country and, more importantly, to compare the same export industries of different countries across the board, for the reason that the RTA measurement applies the concept of relativity to all measured factors.[18] Conversely, some of the measures may be more restricted or serve a symptomatic utility, like RER, PPP, EMS, NEI and GLM – categorised under trade-based measures, and DRC, SCB, ACP, productivity, profitability and efficiency measures – categorised under selective performance discipline measures.

An in-depth inquiry into the magnitude of the RTA formula revealed that various economic factors are encapsulated. Domestic consumption is a derived indicator of production plus imports minus exports, which reflects on the local economy and henceforth on the competitiveness of a particular crop. Holistically it could be argued that the RTA formula indirectly accounts for the measures presented earlier in this chapter. The measures presented in Sections 2.4.2. 2.4.3. integrally form part of the more comprehensive RTA measure, as productivity, profitability, cost, etc. measures affect a business's or industry's ability to trade its produce.

These other 'proxies' mentioned in Section 2.4. may be viewed as somewhat restricted, as they emphasise single or some factors affecting competitiveness at best, while a more comprehensive view is required to accommodate the complexities of global trade, including the reality of 'unequal economic playing fields' in the global markets from an agribusiness viewpoint.

The empirical measurements were also verified and trends were considered through industry participation and opinion analysis, the grouping of such views and opinions in the relevant factors, and the main determinants of competitiveness as defined by Porter in the diamond model.

This study's analytical framework was based on the theoretical constructs of Porter (1990; 1998) in relation to competitiveness, in conjunction with the RTA (Vollrath, 1991) measure for competitiveness,

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[18] Import and export total values for the world and individual countries (Balassa, 1965; Vollrath, 1991).

noting its broad-based application to comprehensively assess and track the competitiveness and competitive performance of businesses and industries/sectors (national framework) trading globally in an agricultural context.

Some refinements, derived from the literature analysis in this chapter also will be introduced into this framework. Analytical innovations and improvements in the empirical analysis methodology will be introduced. These will be discussed further in Chapter 3, which will include the notions of opportunity costs, differentiated opinion analysis, comprehensiveness and the differentiated commodity grouping notion.

Chapter 3: Research design and methodology

3.1. Introduction

The objective of this chapter is to provide a framework for analysis, the choice of the research models, data gathering and analysis and information processing to deal with the proposed research questions, hypotheses and definition proposed.

3.2. Research design

The problem as stated in Chapter 1 needs to be designed rationally to direct the research process methodically in order to address the issues at hand (Leedy & Ormrod, 2010).

Chapter 2 provided an appropriate definition and broad analytical considerations for this study by, firstly, considering the concept of competitiveness in the holistic context of the economy, secondly, contextualising competitiveness within the structure of the export-orientated South African stone fruit agricultural industry and, lastly, devising appropriate definitions and measurements for competitiveness analyses and assessments.

The main objective of this chapter is to develop an applicable analytical framework and methodology, best fitted to measure, analyse and track the competitive performance of the South African stone fruit industry.

3.3. Analytical framework

Esterhuizen (2006) elucidates three very important aspects that need to be addressed when developing a theoretical framework to analyse a sector or industry's competitive status:

1. Determine the current and past competitive performance of a sector/industry
2. Identify the key success factors that established such a competitive advantage
3. Investigate the sustainability of the sector's/industry's competitiveness

Considering these aspects, an analytical framework consisting of five steps was developed to answer the questions and meet the study objectives (Esterhuizen, 2006; van Rooyen, ey al, 2011 and 2012; Jafta, 2014).

3.3.1. Analytical framework: Five steps

The five steps are the following: (see Figure 3.3.1.).

3.3.1.1. Step 1 - Defining competitiveness

In the first step, the question "How is competitiveness defined and measured?" for a trade based agri-industry, is explored. In Chapter 2 it was noted that competitiveness can be defined on various levels and from various points of view. Nevertheless, it was of the utmost importance that an appropriate and unequivocal definition of competitiveness be adopted within an agricultural trade framework to apply an applicable and valid measure to be utilised as a proxy for the evaluation of competitiveness. Esterhuizen (2006) highlights that competitiveness is a tool to exploit and investigate the local and/or global market reality for relative gains from trade compared to other competitors. Ideas were also drawn from Gittinger (1982), Freebairn (1987), Van Rooyen (2008) and Jafta (2014).

As in Chapter 2 competitiveness within the milieu of this study is defined as the sustained ability of the South African stone fruit industry to attract investment by competitively trading its produce within the global marketplace, whilst continuously striving to earn returns greater that the opportunity cost on scarce resources engaged.

3.3.1.2. Step 2 – Measuring the competitive status and performance of the South African stone fruit industry

In Chapter 2.4. various methods for the empirical measurement of competitiveness were deliberated on and applied to the South African stone fruit industry. Methods that describe only certain aspects of competitiveness will provide restricted and partial results, i.e. measures relating to, for example, only productivity, efficiency, effectiveness and benchmarking. The definition used requires a comprehensive view and, as this industry is strongly linked to global trade – exports and imports ,[19] the extended method of RCA (Balassa, 1965; 1977) and the RTA formula (see Equation 2.4.1 on page 24) of Vollrath (1991) were applied to measure and track the competitive performance of this industry.

The chosen method, viz. RTA, relates to the measurement of applied comparative advantage and the costs of factors influencing trade.

The RTA formula also allows for time series analyses based on data recorded over an extended time period to enable the identification of possible trends of competiveness performance.

3.3.1.3. Step 3 – Identify factors affecting the competitive performance of the South African stone fruit industry

To determine and track the competitive performance of the South African stone fruit industry, it is imperative that the factors enhancing and constraining competitiveness be determined and identified.

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[19] Global trade - as relating to exports and imports.

Step 2 utilised quantitative time-series data from 1961 to track competitive performance trends, with RTA serving as a proxy. Step 3 employs qualitative information to confirm and explain such trends though industry-based opinions and perceptions from the Stone Fruit Executive Survey (SFES), complemented by industry-based workshops and personal discussion with experts in the various fields.

The aim of this step is to determine the key enhancing factors and the constraining factors that affect the competitiveness of the stone fruit industry, primarily as viewed by industry and firm level decision makers, i.e. those with strategic responsibilities in the sector and to systematically rank and structure such factors related to their impact.

3.3.1.4. Step 4 - Establish the major determinants of competitiveness (Porter diamond analyses)

Step 4 complements Step 3, as it encapsulates and categorises sets of factors identified by the industry stakeholders into constellations or clusters of determinants for competitiveness. The methodology developed by Porter (1990) was applied and the *captured information*[20] from the SFES was interpreted within the six broad competitiveness determinants or attributes within which an industry (or nation) operates (Porter, 1990; 1998).

The Porter diamond model of competitiveness was complemented by frameworks focusing on the wider socio-economic and welfare rating of competitive performance, i.e. the frameworks of the IMD World Competitiveness Yearbook (WCC, 2011) and the WEF annual Global Competitiveness Report (WEF, 2013).

This study applied the SFES to these additional two frameworks to ensure that the required re-grouping of factors (from the Porter diamond determinant groupings) is meaningful. This was done through the Cronbach's alpha test (Cronbach, 1951).

3.3.1.5. Step 5 –Propose strategies to enhance the competitiveness of the South African stone fruit industry

The data findings and the information gathered in the previous steps were employed in Step 5 to propose strategies for the South African stone fruit industry to perform competitively. The information gained through a range of interactions – workshops and personal interviews – was moulded into knowledge and intelligence to provide direction for the development of strategies to enhance the future competitive performance of the stone fruit industry.

The proposed analytical framework to measure, analyse and assess the competitiveness of this industry is itemised schematically in Figure 3.3.1.

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[20] Captured information – constructed in a matrix.
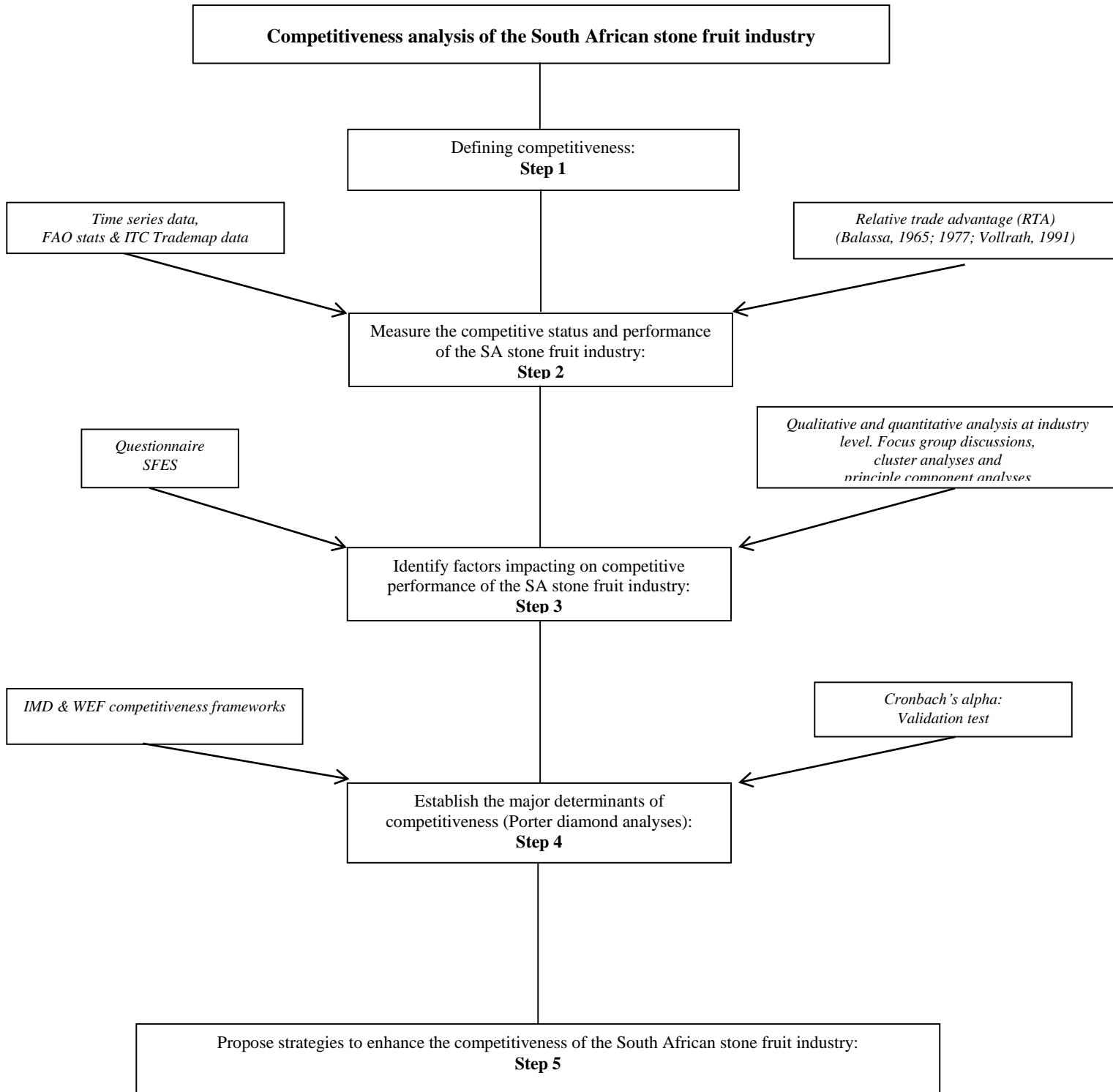
Figure 3.3.1 Framework for analysing the competitiveness of the South African stone fruit industry

Source: Adapted from Esterhuizen (2006) and Jafta (2014)

3.4. Data used

3.4.1. Trade data: Food and Agricultural Organisation statistics (FAOSTAT) and International Trade Centre (Trademap)

Trade data was employed in the measurement of competitiveness. Both primary and secondary data collection was used in this study, where secondary trade data refers to trade figures and international export destinations (DAFF, 2013; PPECB, 2013; FAO, 2014; HORTGRO, 2014b; 2014c; ITC, 2014). Available export and import data were obtained from the FAOSTAT database (http://www.faostat.fao.org/) and the ITC database (http://www.trademap.org/).

3.4.1.1. Food and Agricultural Organisation statistics

FAOSTAT agriculture provides statistics on land use, crops, livestock, irrigation, trade data, etc. Trade data (time series data) was available at the time of this study for the period 1961 to 2011, providing statistics for nearly 400 *agricultural related*[21] products traded from 245 countries. The data is available for the volume and value exported and imported over the period mentioned. Bearing this in mind within the context of the RTA measure, the FAOSTAT data were utilised to compile the Agricultural Based Competitiveness Index (FAO, 2014). Only agricultural related trade is provided here – not trade data from alternative economic activities, such as mining, manufacturing or energy, to name a few, and this compromises the application of the analysis according to the agreed definition to some extent, as FAOSTAT employs a more restricted but focussed database, hence a restricted, but agriculturally more focussed view of concepts such as opportunity cost and scarce resources.

3.4.1.2. International Trade Centre (TRADEMAP) data

The data from International Trade Centre (ITC)-Trademap, which covers statistics of 5 300 HS-coded[22] products traded from 220 countries over the period 2001 to 2011, provides import volumes and values, export volumes and values, growth rates, market share for produce traded across all economic sectors. Therefore this ITC data was utilised to compile the Multi-sector-based Competitiveness Index, as ITC statistics take into account products traded in all sectors of an economy (ITC, 2014). The South African stone fruit industry does indeed not only compete within the whole economy to attract scarce resources, be they capital, human, land, etc. Hence it was noteworthy to compile the broader based Multi-sector-based Competitiveness Index for comparison with the more focused Agricultural Based Competitiveness Index.

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[21] Agricultural related – includes food and non-food products.

[22] HS – coded nomenclature for product groupings.

3.4.2. The Stone Fruit Executive Survey (SFES)

Primary information on the factors that determine the competitiveness of the stone fruit industry was gathered from prominent executive-level industry stakeholders – producers, consultants, technicians, exporters, fruit marketers, fruit/food processors, chemical and fertiliser experts, financial advisors/providers, input providers, etc. – using a questionnaire and personal interviews (Mouton, 2001; Hofstee, 2006).

A questionnaire (see Appendix C) was sent to 254 stakeholders[23] in the stone fruit industry via HORTGRO (Horticultural Growers Association of RSA). The questions were structured as both open-ended and close-ended and the responses were captured within a matrix, which will be referred to as the Stone Fruit Executive Survey (SFES). Responses were discussed at a number of industry meetings and with experts in the industry.

This electronic questionnaire (see Appendix C) was used because it was inexpensive and allowed for anonymity, which may result in more honest responses and eliminate bias. The coding and abbreviations of questions to be analysed statistically are listed in Appendix C (SFES: Coding of questions and abbreviations).

Five open spaces were allocated to a unique set of questions, developed and tested/piloted in consultation with prominent industry role players and HORTGRO. From this pilot, 84 statements, on factors impacting on the competitiveness of the stone fruit industry, were formulated. The questionnaire was structured within the framework of the Porter diamond model to facilitate the analyses. The respondents then indicated and expressed their perceptions by rating their answers using a five-point Likert-type scale (Likert, 1932), where a rating of 1 indicated a negative impact on competitiveness and 5 indicated a strong positive impact on competitiveness. Each individual question was allocated the same weighting. This questionnaire was finally used to capture perceptions from industry stakeholders.

Questionnaires are valid instruments to capture perceptions (Devlin, 2002), and perceptions are arguably reality (Jackson, 2011), or rather perceive a positive relation to reality. Therefore, the SFES captured knowledge via perceptions from prominent stakeholders, whilst allowing for confidentiality, as participants otherwise might have been reluctant to provide private information.

The SFES was also applied by restructuring/repositioning, but without rephrasing, the questions in the applicable frameworks of the IMD World Competitiveness Yearbook (WCC, 2011) and the WEF Global Competitiveness Report (WEF, 2013). This allowed an evaluation and validation of responses from the South African stone fruit industry. This also enabled the drafting of a method complementary to the Porter diamond model.

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[23] Stakeholders refer to the grouping of input or service providers, producers, processors and exporters/marketers.

In essence, this five-step framework allows for a vertical movement in the knowledge hierarchy (Figure 3.4.1) as described by Fricke (2008), that is fundamental to encompassing the objectives detailed in Chapter 1.2. gathering data and utilising this data to broaden the base of information, capturing information[24] to support the understanding of this particular industry, and contemplating the issues faced by the stone fruit industry.

Wisdom

Knowledge

Understanding

Information

Data
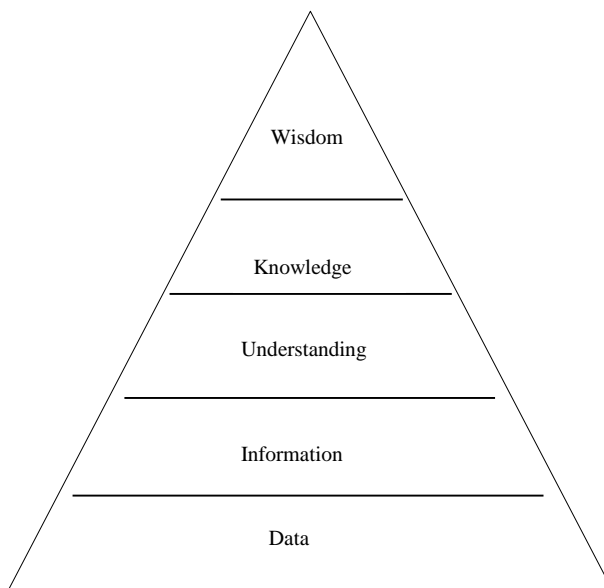
Figure 3.4.1 Knowledge hierarchy

Source: Adapted from Fricke (2008)

This analytical framework facilitated the investigation of the stated hypothesis on the factors influencing the competitive performance of the stone fruit industry. The competitive performance of fruit types belonging to the stone fruit category could also be compared with other, related industries, e.g. apples, one of the biggest deciduous fruit products (volume produced, areas under production, the amount of resources spent on and allocated to research, market development, etc.), which are competing directly with stone fruit.

3.5. Sampling method

The questionnaire was designed within the application of the Porter diamond model (1990; 1998), recording responses in such a manner that factors and their impacts could be noted and analysed according to the Porter determinants of competitiveness.

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[24] Stakeholder knowledge from the industry.

The focus population was input and service providers to the industry, farm producers, processors and exporters/marketers. After the questionnaire (Appendix C) had been tested and modified in collaboration with key industry role players, it was sent to selected stakeholders – selected by a non-probability method, and compiled in a matrix named the SFES (Stone Fruit Executive Survey). Prior to the distribution, the validity of the questionnaire was verified by testing the responses of a financial input provider and two esteemed stone fruit producers. The questionnaire was distributed through the official database of HORTGRO reaching 254 possible respondents.

The relative low response rate of 21% (53 responses) was not left unconsidered, and was viewed from within a scientific research approach. The questions were addressed and assessed by envisaging the identification of possible shortcomings and uncertainties, which could have reflected an unclear framework for the questionnaire. This was not the case; however, it was also observed that the official list of HORTGRO is not up to date, as the contact details of members, affiliates and stakeholders change from time to time. The questionnaire was also sent soon after the end of the harvest season – a time when many respondents were out of office for a holiday break or on international business.

A qualitative response was received from stakeholders in the South African stone fruit value chain. This representative[25] response consisted of prominent producers, marketers, input suppliers and processors, who responded fruitfully and expressed in-depth knowledge and wisdom about the South African stone fruit industry, which was captured in the matrix of the SFES (Kotzé, 2014).

From the 53 responses, only 50 were used in the SFES. Three of the respondents focused solely on the processed industry, and their views were considered to constrain the analysis. The different role players and their relative value chain positions are analysed in Chapter 5.

3.6. Data analysis

The primary data for this study was gathered through the SFES by questionnaires.

The first stage of statistical data analysis was to formulate the raw data to be analysed from a renowned computable format. The database was generated in the format in which the information was collected, namely Microsoft Excel spreadsheets, within a matrix. Descriptive statistics were applied to analyse the collected/gathered data in the form of three indicators/techniques:

- Principle component analysis (PCA)
- Cronbach's alpha test
- Cluster analysis

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[25] According to the respondents' relative value ascribed to production, distribution, product handling, marketing, etc.

One of the descriptive indicators employed was mean values, although ***Principle Component Analysis*** (Wold *et al*., 1987) was applied to consider the variation in distribution of the respondents. This was done to improve the weight of responses to reach a more representative base than that of a "conventional average indicator" used in the most recent South African competitiveness studies (Van Rooyen *et al*., 2001; Esterhuizen, 2006; Madima, 2009; Ndou & Obi, 2011; Jafta, 2014).

Responses to statements within the six determinants of Porter's diamond model of competitiveness were subjected to principle component analysis (PCA)[26] using ones (1) as prior communality estimates; the principle axis method was applied to extract the components, which was followed by a *varimax* rotation. PCA is a multivariate technique that analyses a certain data table in which observations are described by several inter-correlated quantitative dependent variables. The objective is to extract the significant information from the table, to represent it as a set of new orthogonal variables, named principle components, and to display the pattern of similarity of the observations, and of the variables, as points in map. PCA depends upon the *Eigen*-decomposition of positive semi-definite matrices upon singular value decomposition of rectangular matrices (Abdi & Williams, 2010). Meaningful components had *Eigen* values larger than 1 and were retained for rotation. 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 (Rencher, 2002).

PCA was applied to identify highly correlated (redundant) variables in the data set regarding the statements relating to the six determinants of the Porter diamond model of competitiveness. The objective of the analysis was to yield a data set containing a smaller number of uncorrelated variables.

The ***Cronbach's alpha*** test is the most common measure of internal consistency ("reliability") in order to test that the indicators/factors are well grouped based on their low individual uniqueness (Cronbach, 1951). This test is most commonly used when multiple Likert-type questions (Likert, 1932) in a questionnaire form a scale with the desire to determine if the scale is reliable.

Accordingly, the questionnaire, which was constructed within the Porter diamond model framework, was reorganised and restructured to fit the two above-mentioned models, and substantiated with Cronbach's alpha. The Cronbach's alpha reliability coefficient determines the extent to which the Porter diamond model factors are validly grouped together into the six determinants, and if the restructuring/repositioning of the 84 factors is reliably "grouped" within the two additional competitiveness frameworks of the IMD and WEF.

Cluster analysis was applied to group observations based on distances across a series of variables – the respondents' perceptions and their positions in the stone fruit value chain. Cluster analysis is a technique used to classify objects into relatively homogenous groups, termed clusters, methodically so

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[26] As this study was presented at the IFAMA 2014 conference in Cape Town, the proposal for PCA application was vouched for by international academics during the discussion period (Boonzaaier, Van Rooyen & Rabe, 2014)

that the objects within the various clusters tend to be similar and dissimilar to objects in other clusters. The basis for cluster analysis is the rationale that objects that are closer together should be allocated to the same group, while objects that are further apart should be allocated to different groups, as stakeholder perceptions vary among factors impacting on competitiveness (Vermeulen, 2004; Kaufman & Rousseeuw, 2005).

The three indicators or techniques mentioned above were used within the Microsoft Excel and the International Business Machines: Statistical Package for Social Scientists (IBM: SPSS for Windows 22.0), and applied to run the collected data from the questionnaires, with all results included in Appendix E and investigated and analysed in Chapter 5, in collaboration with industry stakeholders.

Industry/focus group workshops and *personal interviews* were organised with the assistance of and in collaboration/cooperation with HORTGRO and its Chief Executive Officer (CEO), the Fresh Produce Exporters Forum (FPEF) – including their CEO, the Produce Marketing Association (PMA), the Department of Agriculture: Western Cape, financial institutions, service and input suppliers, exporters, producers/growers/farmers and industry stakeholders to encompass the dynamics surrounding the South African stone fruit industry. Issues and factors discussed and interrogated were related to factors that impacted positively and negatively on the competitive performance of the stone fruit industry, such as international relationships and competitors, farm-level and industry-level diversification and decision-making, financial and operational strategies, lucrative markets – domestic and foreign, etc. (BLES, 2014; Industry Workshop, 2014; Joint Marketing Forum, 2014; Kotzé, 2014; PMA & FPEF, 2014; Rabe *et al*., 2014; Smit, 2014).

3.7. Expanding the conventional framework

Various innovations and notions will be introduced to the conventional, well-established analytical framework. These applied in this study are highlighted:

1. *Differentiated commodity group notion:* Individual stone fruit types can be grouped to form an internationally renowned commodity. In this study, individual products within this commodity group are also analysed separately. In recent similar studies, wine (Van Rooyen *et al*., 2011), apples (Du Toit, 2000; Beukes, 2009; Jafta, 2014), sunflowers (Dennis, 2011) and potatoes (Stroebel *et al*., 2011) were attended to on only a commodity level. These groupings will also be compared with other competitive commodities, for example in the deciduous fruit group.

2. *Opportunity cost notion:* Competition for scarce resources in the unabridged international multi-sector economy, where the individual results from the FAO STAT can be compared with findings from ITC-based trade data.

3. *Comprehensiveness notion:* Porter was the competitiveness pioneer of the 20th century; however, two additional competitive frameworks are employed, as they focus on national

competitiveness – IMD's World Competitiveness Yearbook and the WEF's Global Competitiveness Report.

4. ***Differentiated opinion analysis notion:*** Applying measurements, based on averages, may result in biased figures and could produce misleading statements; hence the considering of more sophisticated statistical analysis such as the principle component analysis (PCA) methodology.

5. ***Functional value chain position analysis notion***: Industries consist of several functional positions throughout a value chain. As linkages and the stakeholders in the value chain are inter-dependent and related to each other, this holistic approach compares the value chain positions individually and in relevant corresponding groupings via cluster analysis.

3.8. Conclusion

Issues surrounding the competitiveness of the South African stone fruit industry, particularly relating to exports, are multi-layered, with no "quick fix" to solve the problem at hand. The proposed analytical framework and selected methods guided and directed this study. The conjoint analysis of quantitative trade data with the exemplification of the RTA formula and the qualitative industry information gathered were examined and evaluated to shape and direct possible strategies to enhance the competitive performance of the South African stone fruit industry.

Not only was international trade data on agricultural related products (FAOSTAT) merged with this analysis, but an innovation application of ITC data (TRADEMAP) also was included, which covered trade in all competing economic sectors. This application of multi-sector international trade data is harmonised with the comprehensive definition of competitiveness proposed in this study, presenting provocative arguments on this illusive concept of competitiveness.

For the purpose of interpreting the qualitative information, cluster analyses were employed to record different opinion cluster groupings between the stakeholder positions in the value chain.

From the application of the five-step framework of analysis, a comprehensive picture of the competitive performance of the South African stone fruit industry will be possible, supporting recommendations on future strategic decisions and allowing a pronouncement on the stated hypothesis.

Chapter 4: Overview of the South African stone fruit industry

4.1. Introduction

The purpose of this chapter is to provide a descriptive overview of the South African stone fruit industry in context of the competitiveness focus of this study. This chapter will set the historical background and discuss how the industry developed chronologically, highlighting production and trade trends and distribution from the post-deregulation period, through the mid-1990s to modern-day capacities.

4.2. Establishment of the South African stone fruit industry

The development of the South African stone fruit industry has to viewed holistically and synonymous with the development of the South African deciduous fruit industry. The dawn of the commercial South African fruit industry was essentially the result of international exchange and interaction. The Dutch East India Company (*Vereenigde Oost-Indische Compagnie,* or VOC) established a trading station and shipment depot at the Cape of Good Hope in 1652 (Aucamp, 1986; De Beer, Paterson & Olivier, 2003). The honour of being the first person to import into and establish fruit orchards and vines in South Africa falls to Jan van Riebeeck. It also could be claimed that the South African deciduous fruit industry was born on 24 August 1652, when Jan van Riebeeck noted in his diary: "planted some medlar[27] and quince[28] pips" (Stander, 1983:3).

The first consignment of fruit trees, consisting of apple and orange trees, arrived from St. Helena in 1654, and on many subsequent occasions, various other fruit types were dispatched from the island of St. Helena, *inter alia* peaches, to the recently established refreshment station at the Cape. In 1655, more vines and gooseberries were imported from the Netherlands and, in 1656, a large consignment of grafted fruit trees, including species like peach, cherry, plum, pear, apple, quince and medlar, and rootstocks were received from Europe (Black, 1952).

In years to follow, Van Riebeeck noted in his diary: "Today, praise to God, wine was made for the first time from Cape grape" (2 February 1659); the first ripe cherry was picked on 13 December 1659, the first two lemons on 25 July 1661, and the first two ripe Dutch apples on 17 April 1662, all in the Company's nursery garden (Du Toit, 1981).

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[27] Medlar (*Mespilus germanica* L, 'Dutch fruit', *Rosaceae* family) is a small deciduous tree/shrub (Glew *et al*., 2003).

[28] Quince fruit (*Cydonia oblonga* Miller, *Rosaceae* family) is a pome fruit type with numerous seeds (Silva *et al*., 2004).

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Over the following two centuries, a wide variety of imported[29] fruit species, like apricots, strawberries, almonds, olives, pineapples, bananas, raspberries, guavas, brambles, mulberries, apples, walnuts, paw paws and citrus flourished at the Cape, but the industry was very small, and remained so for quite some time, due to the fact that the infrastructure was poor and the local market had little potential (Black, 1952).

At the end of the nineteenth century, Europe expressed a demand for fruit during the winter months. During this period, the wine and grain industries retrogressed due to pests and diseases. Producers and fruit growers accordingly were in search of alternative crops (Black, 1952; Aucamp, 1986).

From 1888, various trial consignments of fruit and grapes were sent to England, but the first real successes with exports were achieved in 1892. Percy Molteno, the son of the premier of the Cape, Sir John Molteno, can be regarded as the founder of the deciduous export industry (Stander, 1983; De Beer *et al*., 2003). In February 1892, he exported the well-known 14 trays of dessert peaches that were shipped to Great Britain and sold at the London Covent Garden market at prices ranging from 6 pence to 2/3[30] per peach (Molteno, 1892). Eighteen years later, in 1910, the industry began to export larger volumes of fresh deciduous fruit to British and European markets. The completion of the railway line through Mitchell's Pass formed a direct link from Ceres to Cape Town, streamlining the logistics and shortening the transport period to the harbour (Stander, 1983).

Towards the end of the 19th century it was obvious that the prospects for a fruit market were good, although the fruit industry at the time was not equipped for trade on a large scale, which led to the subsequent commissioning in 1892 of Harry Pickstone, a prominent fruit grower and nurseryman, to advise and assist with the development of the fruit industry. Pickstone elicited Cecil John Rhodes's interest in the great possibilities of the fruit-exporting industry, which resulted in Pickstone being assigned in 1896 and 1897 to purchase 29 farms between Wellington, Franschhoek and Tulbagh, adding a great deal of unforeseen production stability to the industry (Black, 1937; 1952; Aucamp, 1986; De Beer *et al*., 2003).

Important developments, such as the erection of a fruit exporter association, the Western Province Fruit Exporters Association, in 1899, and the construction of pre-cooling facilities at Cape Town harbour in 1902, inevitably led to deciduous fruit exports growing from 155 tons in the 1898/1899 season to 6 452 tons in the 1913/1914 season (Putterill, 1937). World War I started in 1914 and lasted until 1918, and exports dropped severely during this period; however, from 1920 exports started escalating – from 3 723 tons to 71 109 tons during the 1933/1934 season (Putterill, 1937). Before the outbreak of World War II in 1939, 92 500 tons of deciduous fruit were exported, but this unfortunately came to an end

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[29] Imported from Europe and the East (Central Asia); could be regarded as the natural origin of *Prunus*, the stone fruit genus (Davis, 1928; Roberts, 2001).

[30] Two shillings, three pence (2s/3d), or rather 2/3.

during the war, from 1939 to 1945, and only resumed when the war ended (Black, 1952; Hurwitz & Williams, 1962). It was only after World War II that exports, especially to Great Britain, recommenced, starting the deciduous fruit industry's dramatic growth (Du Toit, 1981).

The post-war years were a period of progress on all fronts for the industry. Extensive research was carried out, which led to the development of new and improved cultivars, more effective methods of pest and disease control, new irrigation techniques, and significant advances in production methods, which coincided with improved management skills in the industry. These technological improvements resulted in an increase in deciduous fruit production and, accordingly, an increase in exports to European and UK markets (Du Toit, 1981; Stander, 1983; Bestbier, 1987).

4.3. Path to deregulation

The regulation of agricultural industries, and the subsequent regulated marketing of agricultural production in South Africa, has a long history, dating back to the late 1650s, when the so-called *free-burghers*[31] were allowed farming for private gain, but not without austere economic restrictions – producers were only allowed to sell their produce to, and at prices set by, the VOC, and a set of monopoly contract (*pachts*) were imposed that permeated all sectors of the economy (Fourie, 2012).

As highlighted by Kruger (2000), the periods of conflicts in Europe and Britain during WWI and WWII, which resulted in a considerable decease in the South African fruit industry's exports, paved the way for a regulatory body to manage the deciduous fruit industry. Hence, the Deciduous Fruit Board (DFB) was established under the Deciduous Fruit Scheme, published by Proclamation No. 230 of 1939[32] under Sir Patrick Duncan, Governor-General of the Union of South Africa in terms of the Marketing Act No. 26 of 1937,[33] for which Act No. 59 of 1968 has since been substituted (Van Deventer, 1969). The Marketing Act of 1968 set fixed guidelines for the DFB and its associated fruit schemes, with the key function to ensure the organised marketing, exports and sales of controlled deciduous fruits – apricots, nectarines, peaches, plums, prunes, apples, pears and grapes – on export markets and in the RSA (Van Deventer, 1969; Stander, 1983; Kirsten, 2000; Kruger, 2000).

From 1937 to 1996, various acts and amendments within a statutory framework regulated the functioning of the DFB, which determined, with the Minister's approval, the maximum volume of deciduous fruit that could be delivered within a predetermined period earmarked for exports. The DFB appointed agents who controlled the international marketing on its behalf. On 1 March 1990, the power of attorney were delegated from the DFB to the Universal Fruit Trade Cooperative (Unifruco, Limited),

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[31] In 1657, Jan van Riebeeck released nine VOC servants to become free-burghers, or rather "settlers" (Fourie, 2012).

[32] This was superseded by proclamations number 134 of 1951 and R.288 of 1962 (Van Deventer, 1969).

[33] The National Marketing Council was 'the pivotal body', according to government officials (Schirmer, 2001).

to be solely responsible for the distribution, marketing and export of fresh produce until 1996 (Kirsten, 2000; Kruger, 2000).

The call for the abolishment of all control boards and the deregulation of agriculture ultimately came from the Report of the Kassier Committee of Inquiry into the Marketing Act (1992), which paved the way for deregulation of the deciduous fruit industry, which eventually started when the 1968 Marketing Act was revoked and replaced by the Marketing of Agricultural Products Act, No. 47 of 1996, promulgated on 1 January 1996 with effect from 1 January 1997, resulting in the sovereignty of deciduous fruit producers, allowing them to use and export through any marketing channel available (President's Office, 1996; Bayley, 2000; Ministerial Committee to Review Agricultural Marketing, 2006; NAMC, 2010).

The founding of the Deciduous Fruit Producers' Trust, on 1 October 1997, by producers who deliver produce to the fresh markets, was the first step to create a comprehensive structure to bring economic progress/survival to the deciduous fruit industry in this new, free, deregulated market environment.

This is how the South African stone fruit industry evolved, coinciding with the development of the deciduous fruit industry and growing from humble beginnings in the Cape during the 1650s, through periods of economic fluctuations and the dismantling of regulated one-channel marketing, to the internationally recognised industry it is today.

4.4. Industry institutional structures today

After the deregulation process, which started in the mid-1990s, coupled with the abolishment of the statutory framework of the DFB, several new organisations and associations representative of the industry were established. There were many new export opportunities and all key decision-makers on the operational and strategic level, throughout the value chain, required effective/efficient competitive-gearing to compete in the international playing field, hence an innovative organisational structure for the South African fruit industry was inevitable.

4.4.1. Fruit South Africa (FSA)

The pinnacle of the organisation of the South African fruit industry is Fruit South Africa (FSA), a non-profit organisation formed by the Fresh Produce Exporters' Forum (FPEF) and four growers' associations: the Citrus Growers' Association of Southern Africa (CGA); the South African Subtropical Growers' Association (SUBTROP), representing the avocado, litchi, mango and macadamia industries; and the South African Table Grape Industry (SATI) (see Figure 4.4.1), with the joint purpose to address common issues in relation to all aspects of the fruit industry in South Africa. The objective of FSA is to provide support to the five members and their principal members in relation to the following: market and product development, transformation and training, market access (local and international), information, and logistics (FSA, 2014).

4.4.2. Fresh Produce Exporters' Forum (FPEF)

The FPEF was registered in 1998 as a voluntary, non-profit organisation and, to date, its 120 members account for nearly 90% of fresh fruit produce exported from South Africa. Its role is to provide leadership and services to its members,[34] the international buying community and the fresh fruit export industry as a whole. As the official fresh fruit export council in South Africa, the FPEF provides a pivotal link between government and the industry regarding market access and related matters (FPEF, 2014).

The FPEF intends to create value for its members by helping to ensure a profitable, sustainable and globally competitive fresh fruit export environment relating to two determinants of competitiveness: related and supporting industries, and firm/industry strategy, structure and rivalry (Porter, 1990; 1998) (also see Section 2.2.2)

4.4.3. Horticultural Growers (HORTGRO)

In order to contextualise HORTGRO, it is noteworthy to consider the establishment of the DFPT in 1997 by three primary fresh fruit producer organisations, namely the South African Stone Fruit Producers' Association (SASPA), the South African Apple and Pear Producers' Association (SAAPA) and the South African Table Grape Association (SATPA). On 1 October 2009, however, a new entity, HORTGRO, took over the operational services and functions of the deciduous fruit industry for a range of industry-representative bodies, serving as an umbrella organisation. DFPT is still maintained to ensure that a range of contracts and agreements are upheld. SATPA has since been established as a parallel industry organisation, known as the South African Table Grape Industry (SATI) (Meintjies, 2009; Kotzé, 2014).

The three members of HORTGRO are SASPA, SAAPA and DFTS (Dried Fruit Technical Services), where SASPA is the association of interest for the purpose of this study (see Figure 4.4.1).

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[34] FPEF members consist of fruit exporters, producer-exporters, export and marketing agents, pack houses, logistics and other service providers. Although membership is voluntary, strict accreditation criteria and a code of conduct apply (FPEF, 2014).
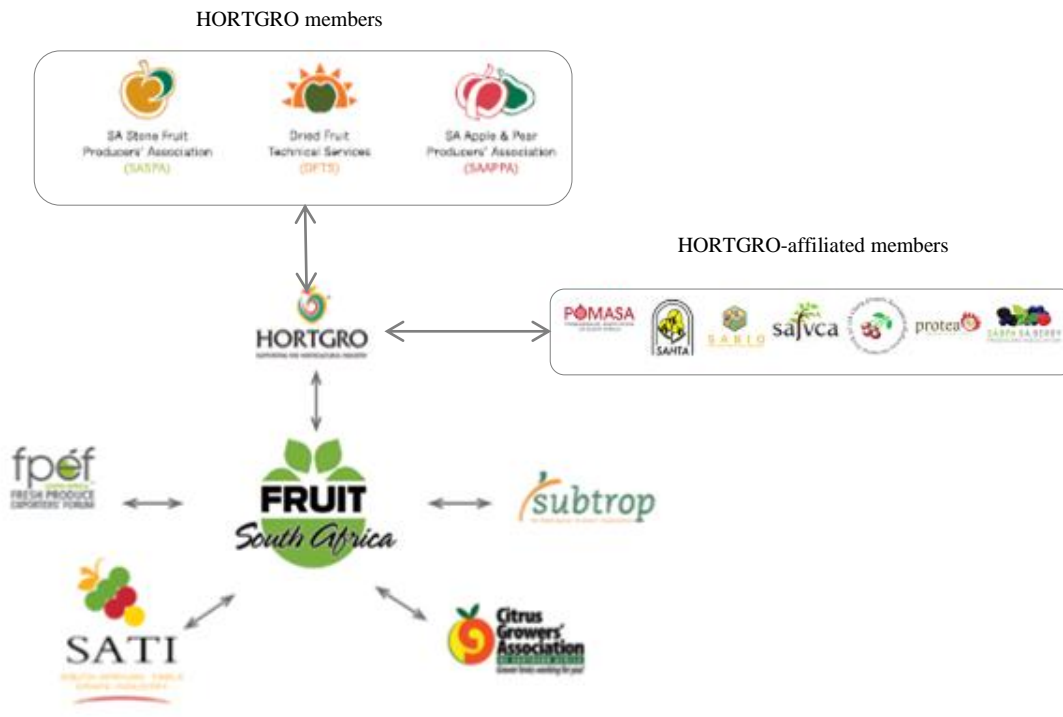
Figure 4.4.1 Structure of the South African fruit industry

Source: HORTGRO (2013, 2014b) & SATI (2014)

HORTGRO also functions as an umbrella organisation for several industry associations, among others the SA Cherry Growers' Association (SACGA) – the only affiliated member association of interest for this study (see Figure 4.4.1 and http://www.hortgro.co.za/ for a complete list of the six other affiliated members) (HORTGRO, 2014d).

HORTGRO serves as the horticultural knowledge-creation group, facilitating an umbrella communication platform for various horticultural industries and co-ordinating many activities focusing on market and demand factors, as well as a range of industry value and supply chain functions. HORTGRO has the objective to inform and assure stakeholders and consumers on the social, environmental and economic dimensions of a range of high-quality products produced by growers (HORTGRO, 2014a).

Referring to the Porter diamond model of competitiveness, HORTGRO succinctly supports the growers and producers of fruit to be successful in a globally competitive environment, specifically in the context to the factor firm/industry strategy, structure and rivalry (see Section 2.2.2).

4.4.4. Stone fruit-related associations

The two associations representing stone fruit producers in the RSA are the SA Stone Fruit Producers' Association (SASPA), which is a member of HORTGRO, and the SA Cherry Growers' Association (SACGA), which is an affiliated member of HORTGRO, which acts as secretariat for SACGA.

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4.4.4.1. South African Stone Fruit Producers' Association (SASPA)

In August 1990, the Nectarine and Peach Producers' Association and the Plum Producers' Association amalgamated to establish the South African Stone Fruit Producers' Association (SASPA). In 1997, SASPA was converted into a Section 21 (non-profit) company (HORTGRO, 2014e).

The functions of SASPA include the following:

- The promotion of common interests and the specific needs of stone fruit producers in the RSA, and to act as their official agent and representative.
- The rationalisation and promotion of the production and marketing of stone fruit and stone fruit products.
- To encourage and pursue constructive dialogue and mutual collaboration with government and other stakeholders.
- To foster mutual trust and long-term relationships amongst stakeholders.
- To establish and promote a reciprocal information system on which to base informed market decisions.

SASPA is committed to engage in orderly, responsible and viable production practices that are sustainable over the long term, whilst stimulating and encouraging new product development and variety. Another focus area is strengthening adherence to the disciplines and standards that ensure quality, food safety and environmental protection. SASPA facilitates the following initiatives, among others: research, communication, liaison and representation, market development, trade and market access, training and economic development (HORTGRO, 2014e).

The core role of SASPA is to enhance the industry's competitive position in the international trading arena by supporting and building industry strengths, shaping and strengthening industry practices and disciplines, and encouraging solidarity and unity amongst stakeholders. This core role is a key attribute within the firm/industry strategy, structure and rivalry factor of Porter's diamond model (see Figure 2.2.1 and Section 2.2.2).

4.4.4.2. South African Cherry Growers' Association (SACGA)

In 2001, the South African Cherry Growers' Association (SACGA) was established and registered as a Section 21 (non-profit) company to provide structure to the industry through the promotion of the common interests of local cherry producers and addressing common issues that concern the collective industry (SACGA, 2014).

The main objectives of SACGA include the following:

- Ensure an economically viable and sustainable cherry industry via co-ordinated joint actions as agreed from time to time.
- Establish uniform grading regulations for cherries produced in the RSA.

- Liaise with other cherry-related organisations in the world to exchange information of mutual benefit.

- Investigate the promotion of sale and consumption of cherries on the local and export markets.

- Facilitate research on the growing, packing, storing and marketing of cherries.

- Create and circulate knowledge on the production, packing and marketing aspects of cherries.

- Ensure the availability of certified plant material.

The main objectives unilaterally envision maintaining and enhancing the competitive performance of the RSA cherry industry on both the export and international markets (SACGA, 2014). Due to product similarity and the joint visions and shared missions of the SACGA and SASPA, SACGA might be incorporated into SASPA in the foreseeable future (Kotzé, 2014).

4.5. Stone fruit production in South Africa

South Africa is situated between the 22°S and 35°S longitudes, east of the prime meridian, and between the 16°E and 33°E latitudes on the tropic of Capricorn. Subsequently, South Africa is known for its diverse climatic and favourable weather conditions, which enable the production of virtually all fruit types countrywide (CIA, 2014; FAO, 2014).

Due to the difference in chilling requirements[35] for stone fruit cultivars to perform under normal conditions, stone fruit are produced in all nine provinces, but mainly produced in the Western Cape. Figure 4.5.1 illustrates the major production areas, which are centralised in the south-western and northern parts of the country, with scattered pockets of production nationwide.

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[35] Measured in Infruitec units: Very low < 250; Low 250-400; Medium 400-800; High > 800 (HORTGRO, 2014f).
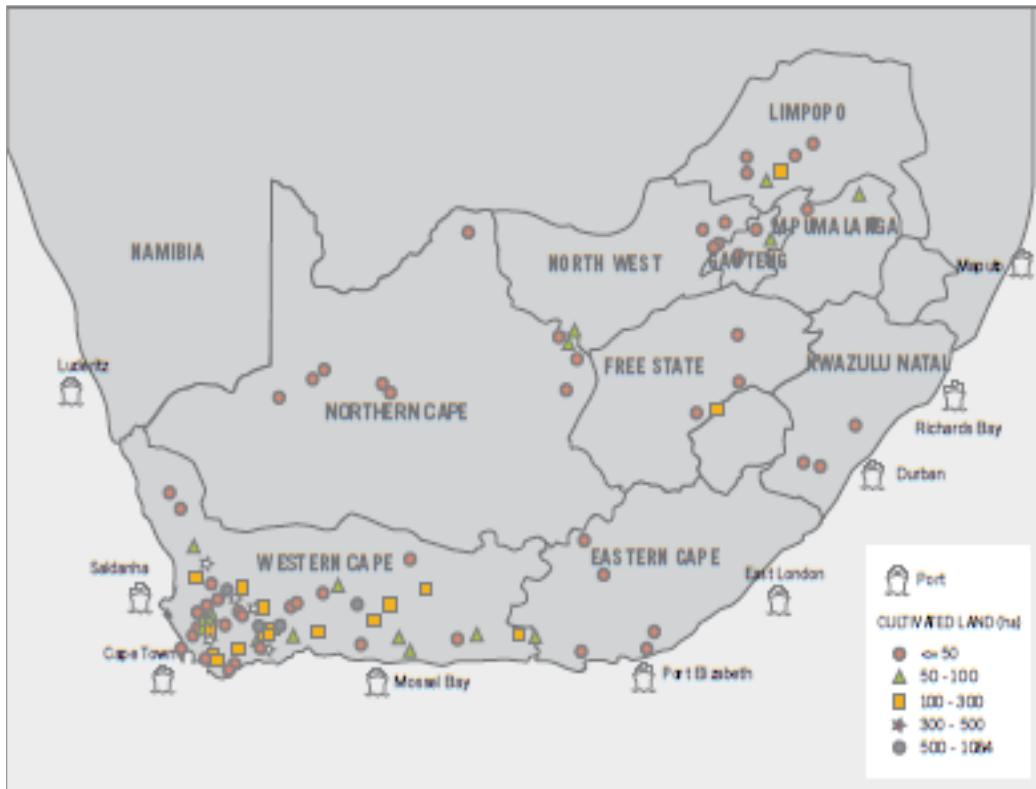
Figure 4.5.1 Geographical distribution of stone fruit production

Source: HORTGRO (2013)

According to HORTGRO (2013; 2014a) there are a total 18 098 ha of stone fruit cultivated by 1 058 production units (see Figure 4.5.2). This figure excludes the number of cherry-production units; however, the importance of stone fruit as a strategic crop being produced along with pome fruit and grapes is illustrated in Figure 4.5.2 and accounts for the majority of cherry production units (13 additional units may be added).
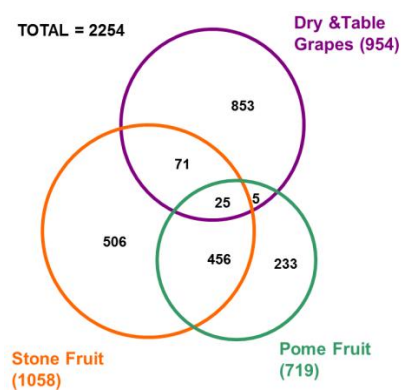
Figure 4.5.2 Deciduous fruit production units

Source: HORTGRO (2013)

Table 4.5.1 SA deciduous fruit production – 2013

Deciduous fruit types	Ha	%
Grapes	26 631	33.60%
Apples	22 501	28.39%
Pears	12 034	15.18%
Peaches	7 442	9.39%
Plums	4 895	6.18%
Prunes	277	0.35%
Apricots	3 020	3.81%
Nectarines	2 239	2.82%
Cherries	225	0.28%
Total	79 264	100.00%
Total ha stone fruit cultivated and produced	**18 098**	**22.83%**

Source: HORTGRO (2014a)

South Africa produces about 16.12% of deciduous fruit produced in the Southern Hemisphere and, from Table 4.5.1, it is clear that, whilst the total stone fruit area under production in South Africa is 18 098 ha, it is 22.83% of the deciduous fruit basket produced nationally, which amounts to a total of 330 402 tons of stone fruit produced in the RSA (see Figure 4.5.4). The ability of stone fruit to be produced and accordingly marketed in conjunction with other deciduous fruit crops is evident in Figure 4.5.2, thus highlighting the strategic importance of stone fruit crops and varieties. Figure 4.5.3 illustrates the composition of stone fruit hectares under production relative to the 18 098 ha produced nationwide. It is important to state that, although the peach crop comprises 41% of stone fruit plantings, at 7 442 ha, it can be divided into two sub-divisions: dessert peaches (1 752 ha) – mainly for fresh consumption, and cling peaches (5 690 ha) –utilised predominantly for processed/canning products. Although prunes and cherries comprise 2% and 1% of the total stone fruit area under production respectively, their overall contribution should not be overlooked. Plum plantings of 4 895 ha are followed by apricots, with 3 020 ha, and nectarines, with 2 239 ha.
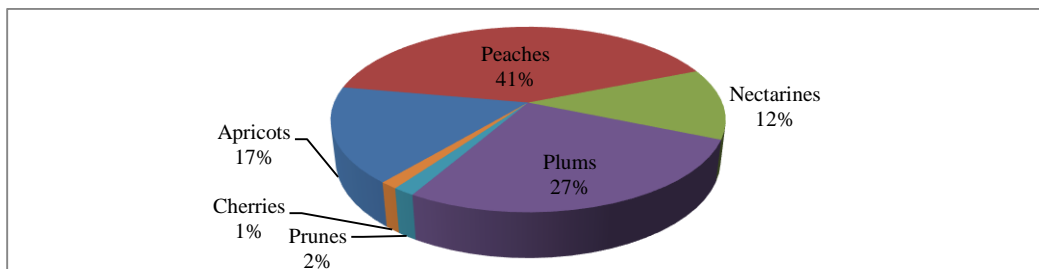
Figure 4.5.3 Stone fruit types (% of stone fruit ha – 2013)

Source: HORTGRO (2014a)

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In Table 4.5.2, the five largest production areas and the five major cultivars for all stone fruit-related crops are summarised, relative to the area under production. It is clear that, regarding several stone fruit types, the production area is centralised in the Boland region, where the majority of stone fruit production takes place, with the exception of cherries, in which regard the Free State and Mpumalanga are prominent cultivation areas besides Ceres.

Table 4.5.2 Individual stone fruit types: Major production areas & cultivars (ha - 2013)

Stone fruit type	Apricots		Dessert peaches		Cling peaches		Nectarines		Plums		Prunes		Cherries	
Largest five production areas	Areas	Ha	Areas	Ha	Areas	Ha	Areas	Ha	Areas	Ha	Areas	Ha	Areas	Ha
1	Klein Karoo	2 317	Ceres	346	Klein Karoo	2 779	Ceres	899	Klein Karoo	1 303	Wolseley/ Tulbagh	125	Ceres	85
2	Langkloof East	121	Piketberg	271	Ceres	1049	Wolseley / Tulbagh	286	Paarl	982	Ceres	105	Free State	82
3	Ceres	115	Northern Area	260	Wolseley/ Tulbagh	453	Paarl	237	Wolseley/ Tulbagh	452	Klein Karoo	18	Mpumalanga	22
4	Piketberg	101	Klein Karoo	230	Southern Cape	361	Northern Area	221	Ceres	424	Hex Valley	12	Piketberg	16
5	Hex Valley	84	Wolseley/ Tulbagh	180	Worcester	337	Klein Karoo	188	Stellenbosch /Franshhoek	699	Lower Orange River	8	Northern Province	10
Rest of production areas	Other	281.7	Other	464.6	Other	711.1	Other	408	Other	1 035	Other	9	Other	10
Largest five areas	%	90.67	%	73.48	%	87.50	%	81.78	%	78.85	%	96.75	%	95.56
Stone fruit type	Apricots		Dessert peaches		Cling peaches		Nectarines		Plums		Prunes		Cherries	
Major cultivars/varieties	Cultivar	Ha	Cultivar	Ha	Cultivar	Ha	Cultivar	Ha	Cultivar	Ha	Cultivar	Ha	Cultivar	Ha
1	Bulida	1 540	Transvalia	186	Keisie	1 401	Alpine	324	Laetitia	597	Van Der Merwe	197	Bing	49.5
2	Soldonne	326	Summersun	98	Kakamas	865	Experimental	127	Songold	548	Erfdeel Prune D'Agen	53	Royal Dawn	27
3	Imperial/ Palsteyn	273	Witzenberg	79	Sandvliet	696	August Red	124	Sapphire	364	French Prune	10	Lapins	15.75
4	Bebeco	240	Temptation	78	Oom Sarel	527	May Glo	92	Angeleno/ Suplumsix	329	Janand	6	Royal Lee	15.75
5	Supergold	172	Sunsweet	72	Western Sun	417	Margaret's Pride	60	African Delight	335	Tulare Giant	3	Early Sweet	13.5
Rest of varieties	Other	469	Other	1 238	Other	1 814	Other	1 512	Other	2 722	Other	7	Other	103.5
Major five % of total	%	84.47	%	29.30	%	68.29		32.47	%	44.39	%	97.46	%	54.00

Source: HORTGRO (2014a; 2014b)

Table 4.5.3 Stone fruit orchard age distribution – 2013

Stone fruit type	0-2 years	3-5 years	6-15 years	16-18 years	18+ years
Apricots	4.31%	7.92%	39.45%	11.56%	36.77%
Dessert peaches	10.16%	24.96%	39.40%	6.19%	19.29%
Cling peaches	4.86%	8.72%	51.57%	9.79%	25.05%
Nectarines	9.62%	21.89%	52.27%	3.13%	13.09%
Plums	9.63%	22.89%	37.52%	9.93%	20.03%
Prunes	1.81%	9.78%	25.36%	1.09%	61.96%
Cherries	5.23%	26.80%	56.21%	1.31%	10.46%

Source: HORTGRO (2014b; 2014c)

Stone fruit orchards reach their full-bearing capacity in the fourth year after establishment. During years one to three after planting the trees are pruned and shaped to accommodate the desired yield and market objectives. Orchards may be productive for 30 years, but are usually replaced after 20 years, when yields start to decline more rapidly. Table 4.5.3 arranges the individual stone fruit types according to their relative age distribution. Dessert peaches, nectarines and plums indicate healthy substitution capabilities, whilst a large proportion of apricot, cling peach and prune orchards are older than 18 years. The majority, with the exception of prune orchards, are between three and 18 years old, resembling healthy full-bearing productive orchards, the ultimate backbone of production abilities.

The harvesting of stone fruit, charted in Table 4.5.4, starts as early as late in October in the earliest production regions (Riebeeck-Kasteel, Grahamstown, etc.) and lasts until the middle of November for the so-called later production areas (Klein Karoo, etc.).

Table 4.5.4 Stone fruit maturity chart

Month/ fruit type	October			November			December			January			February			March		
	Early	Mid	Late	Early	Mid	Late	Early	Mid	Late	Early	Mid	Late	Early	Mid	Late	Early	Mid	Late
Apricots				■	■	■	■	■	■	■	■	■	■					
Peaches		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Nectarines		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
Plums						■	■	■	■	■	■	■	■	■	■	■	■	■
Prunes										■	■	■	■	■	■	■	■	
Cherries					■	■	■	■	■	■	■	■						

Source: PPECB (2013); FPEF (2014); HORTGRO (2014b)

The total production of stone fruit is presented in Figure 4.5.4, indicating the contribution of all stone fruit types included in this study. It is relevant to note that the production figures for peaches and nectarines are group together by HORTGRO, DAFF and the FAO (DAFF, 2013; FAO, 2014; HORTGRO, 2014b; 2014c).
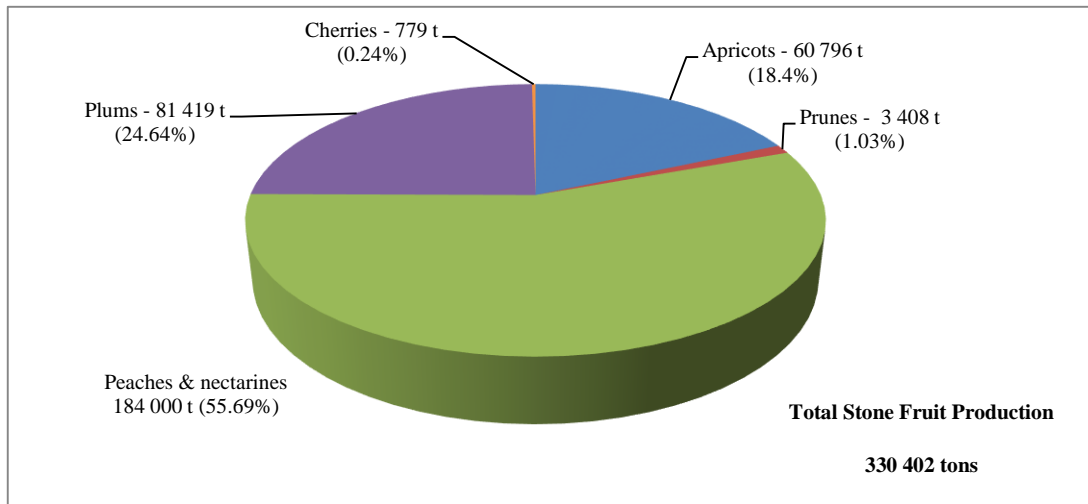
Figure 4.5.4 Stone fruit production: 2012/2013 (tons)

Source: HORTGRO (2014b; 2014c)

In Figure 4.5.4, the total production of stone fruit in South Africa is presented. The datasets of the DAFF (2013) and the FAO (2014), as presented in Figure 4.5.5.have a correlation factor of 0.992 for the period from 1961 to 2012. It is important to note that the DAFF (2013), which mentions only peaches, also takes peach and nectarine figures into account. Since 1961, the production of stone fruit has increased gradually, but not without periods associated with sharp declines, such as in the early to mid-1980s. From 1987 until the period of the first democratic elections in 1994, production levels showed no major fluctuations, and sharp increases in production are evident from the post-deregulation period in 1997. However, this post-deregulation era is accompanied by regular major production variations.
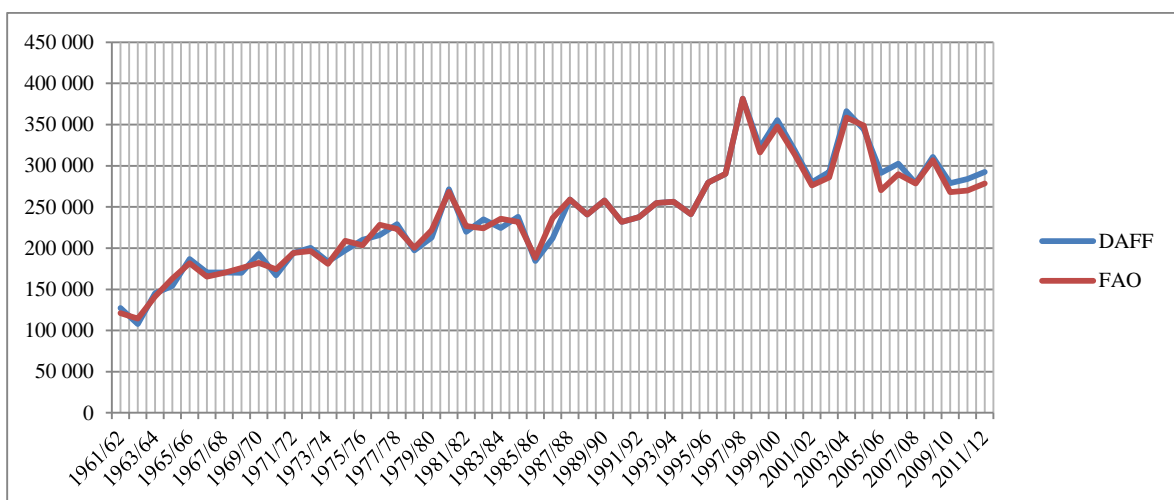
Figure 4.5.5 South African stone fruit production: 1961–2012 (tons)

Source: DAFF (2013); FAO (2014)

The more recent production period, ranging from 2002/2003 to 2012/2013, is presented in Figure 4.5.6. From 365 344 tons produced in the 2002/2003 season, the production level decreased marginally to a level of 278 467 tons, slightly regaining some composure in the most recent (2012/2013) season[36] (data from HORTGRO, 2014a). A correlation factor of 0.999 is calculated between the datasets of the DAFF (2013) and HORTGRO (2014a) for the period 2002/2003 to 2012/2013, with a lag of one year between the datasets being taken into account, accentuating the validity of the data.
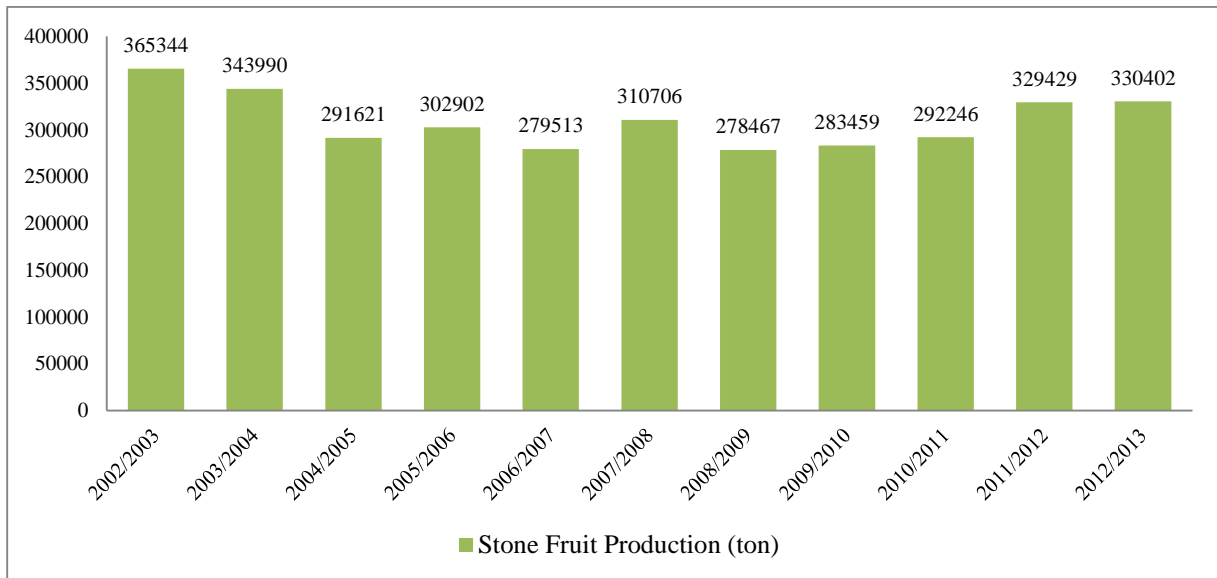
Figure 4.5.6 South African stone fruit production (2002/2003–2012/2013)

Source: HORTGRO (2014a)

4.5.1. Apricot production

South Africa produces roughly 60 796 tons of apricots (see Figure 4.5.4), representing 1.33% of global apricot volumes and 50.24% of the volume produced in the South Hemisphere (FAO, 2014; HORTGRO, 2014b). The production of apricots resides mainly in the Klein Karoo region, with 2 317 ha, which accounts for 76.6% of the total area planted with apricots. Langkloof East, Ceres, Piketberg and Hex Valley combined account for 13.9% of the plantings, and the other areas not listed in Table 4.5.2 for the remainder, of 9.33%. Apricots are harvested from early in November to late January/ early February (see Table 4.5.4). Bulida is the single most planted apricot cultivar, with 1 540 ha (51% of total plantings), which are mainly used for canning/processing purposes (HORTGRO, 2014b). The top five apricot cultivars account for nearly 85% of the current area under production, which represents not a wide range in the volume of cultivars produced.

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[36] Data are subject to change.

4.5.2. Peach and nectarine production

Due to product similarity, peaches and nectarines are grouped together in the databases of the FAO, HORTGRO and ITC (2014); however, where possible, a differentiation is made between these two stone fruit crops. South Africa's production of peaches and nectarines for the 2012/2013 production season amounted to roughly 184 000 tons (see Figure 4.5.4), which accounted for 0.83% of global production and 19.54% of production in the Southern Hemisphere (FAO, 2014; HORTGRO, 2014b). Table 4.5.4., indicates that peaches and nectarines are harvested from middle/late October until middle/late March.

Dessert peaches are produced mainly in the Western Cape, with the exception of the northern area. These areas are responsible for nearly three-quarters of the total hectares planted to dessert peaches. Transvalia is the single most planted cultivar, with 186 hectares under production; however, the top five most planted cultivars account for only 29.3% of the total area planted, which shows the high number of dessert peach cultivars produced in South Africa (HORTGRO, 2014b).

Cling peaches are largely planted in the Klein Karoo, Ceres, Wolseley/Tulbagh, Southern Cape and Worcester regions, amounting to 87.5% of all cling peaches planted in RSA (see Table 4.5.2). The dual-purpose[37] cultivar, Keisie, singlehandedly accounts for 24.5% of all cling peaches planted, where the top five most planted cultivars represent 68.29% of the total area under production, highlighting the lower production spread in the number of cling peaches produced in RSA (HORTGRO, 2014b).

Nectarine production takes place largely in the Ceres/Tulbagh/Wolseley area, followed by the Paarl, Northern Area and Klein Karoo region, with other areas responsible only for the remainder of 18.22% of the nectarine orchards planted. The Alpine, August Red and Experimental cultivars, together with May Glo and Margaret's Pride orchards, represent 32.47% of nectarine plantings, indicating a wide spread of cultivars produced in South Africa (see Table 4.5.2).

4.5.3. Plum and prune production

Plums and prunes/sloes are grouped together in the databases of the FAO, HORTGRO and ITC (2014) because of their product similarity; however, where possible, differentiations are made between these two stone fruit types. Plums are harvested from middle November to late March, and prunes from early January to middle March (see Table 4.5.4). The combined production figures of plums and prunes/sloes represents 0.56% of global, and 11.3% of Southern Hemisphere, production (FAO, 2014).

The 81 419 tons of plums produced (see Table 4.5.2 and Figure 4.5.4) are centralised in the Klein Karoo, Ceres/Wolseley/Tulbagh, Paarl/Stellenbosch/Franschhoek area, accounting for 78.85% of the areas planted to plums. The top five most planted cultivars, namely Laetitia, Songold, Sapphire, Angeleno and African Delight, are responsible for almost 45% of the total areas planted to plums,

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[37] Canning and exporting.

representing a relatively wider cultivar spread in the number of varieties produced in the RSA (HORTGRO, 2014b).

Virtually all 3 490 tons of prunes are produced in Tulbagh/Wolseley/Ceres, the Klein Karoo, Hex Valley and Lower Orange River areas, with only 3.25% of the hectares produced in other areas. The two cultivars Van der Merwe and Prune D'Agen represent a total of 90.25% of the prune orchards planted in the RSA, although other prune cultivars are noted. There evidently is a very narrow spread in the number of cultivars produced (HORTGRO, 2014b).

4.5.4. Cherry production

The production of 779 tons of cherries in South Africa is mostly consolidated at Ceres and in the Free State, accounting for 74, 22% of the 225 ha planted (2012/2013 figures) to cherry cultivars in South Africa. Mpumalanga, Piketberg, the Northern Province and Worcester represent the remainder of 58 ha (see Figure 4.5.4 and Table 4.5.2). South Africa produces only a fraction, at 0.01% of global production volumes, and 0.27% of Southern Hemisphere volumes (FAO, 2014). Typically, cherries are harvested from the middle of November to the middle of January (see Table 4.5.4). Bing and Royal Dawn, together with Lapins, Royal Lee and Early Sweet, represent 54% of the total cherry orchards planted, indicating a relatively narrow cultivar spread of the number of varieties produced.

4.6. International stone fruit production

The respective share of production volume is indicated in Table 4.6.1, from where it is apparent that the largest portion of global stone fruit production takes place in Europe, the Middle East, China and the USA. The Southern Hemisphere (SH) countries combined account for a total share of production of 2.58% for apricots, 5.27% for peaches and nectarines, 4.80% for plums and prunes and 3.24% for cherries.

Table 4.6.1 International production statistics: 2013 (tons)

Stone fruit type	Global production (t)	Largest		2nd largest		3rd largest		SH	Chile	SA
Apricots	4 111 076	Turkey	19.74%	Iran	11.12%	Uzbekistan	10.46%	2.58%	0.34%	1.33%
Peaches & nectarines	21 638 953	China	55.24%	Italy	6.48%	Spain	6.15%	5.27%	1.71%	0.83%
Plums & prunes	11 528 337	China	53.11%	Serbia	6.40%	Romania	4.45%	4.80%	2.66%	0.56%
Cherries	3 643 083	Turkey	18.50%	USA	11.93%	Iran[38]	8.43%	3.24%	2.49%	0.01%

Source FAO (2014)

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[38] Islamic Republic of Iran

4.7. Market structure of stone fruit

The South African stone fruit industry's crop distribution from 2002/2003 to 2012/2013 is presented in Figure 4.7.1. Although the volume of the processed segment exceeded that of the export segment, the export segment indicated growth in volumes relative to the total production, increasing from 15.35% of total production in 2002/2003 to 23.14% of total production in 2012/2013. These figures emphasise the importance of exports for this industry, and the industry's emphasis and shifting focus on international trade. The current market for, and accordingly the production distribution of stone fruit produced in South Africa, are set out in Table 4.7.1. The production volumes are segregated between the local and export markets, and processed and dried fruit markets. The export market segment is the area of focus of this study.
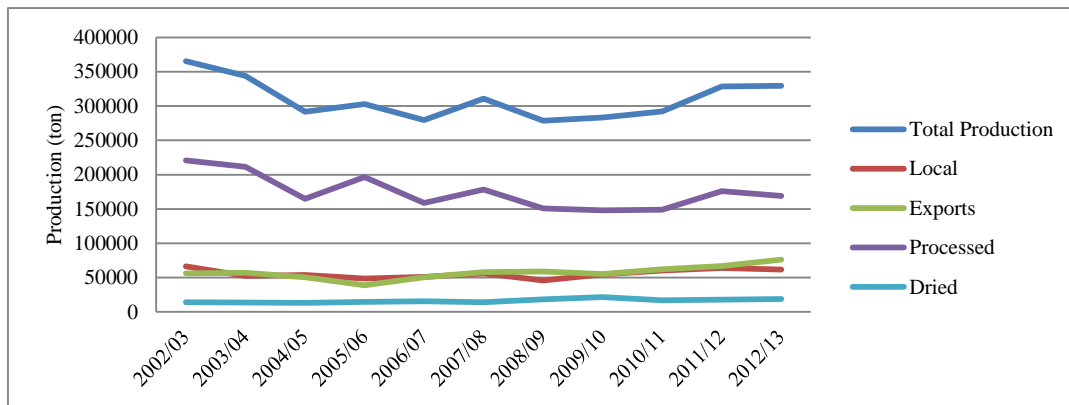
Figure 4.7.1 Historical crop distribution of SA stone fruit

Source: HORTGRO (2014a)

Table 4.7.1 Recent stone fruit crop distribution (2012/2013 figures)

Type	Total production (ton)	Local market (ton)	Exports (ton)	Processed (ton)	Dried (ton)
Apricots	60 796	2 934	5 197	44 370	8 295
Prunes	3 408	Not available	Not available	Not available	Not available
Peaches & nectarines	184 000	40 301	11 639	12 539	10522
Plums	81 419	18 504	59 593	3 322	Not available
Cherries	779	670	33	35	Not available
Total (ton)	330 402	62 409	76 462	169 266	18 817

Source: HORTGRO (2014a)

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4.7.1. Apricot crop distribution

Regarding the total production volume of apricots in South Africa, the processed segment was responsible for an average allotment of 75.11% over the period 2002/2003 to 2012/2013, which is depicted in Figure 4.7.2. The export segment's share remains relatively small over the 11-year period, averaging 7.88%. The dried and local market segments account for the remainder of the allocation, at 13% and 4% respectively over the given period (HORTGRO, 2014b). The period from 2002/2003 to 2007/2008 is associated with production fluctuations, primarily directed by the demand for processing tonnage. From 2007/2008 onwards there is a gradual increase in production.
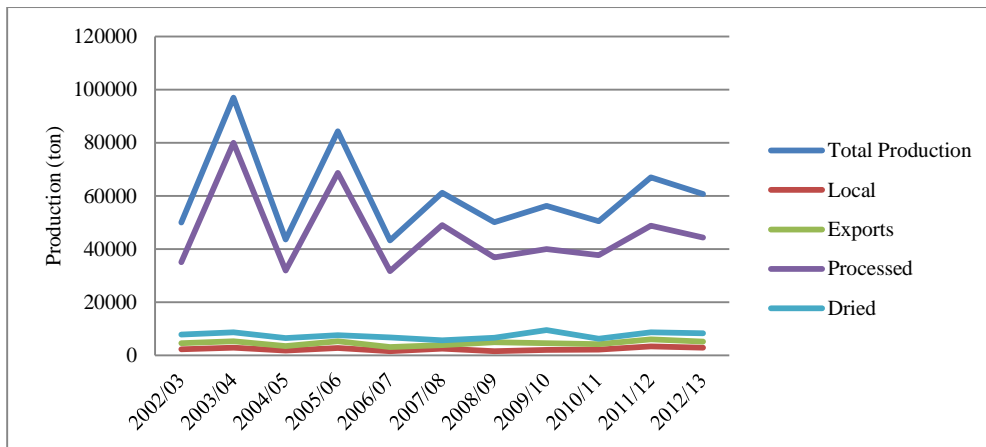
Figure 4.7.2 Apricot crop distribution (2002/2003 to 2012/2013)

Source: HORTGRO (2014a)

4.7.2. Peach and nectarine crop distribution

The processed market segment of the peach and nectarine crop distribution over the period stated in Figure 4.7.3 accounts for 68.85% on average The export market share averages out at 4.59% for the depicted period, whilst the dried and local market allotments account for 4.88% and 21.68% respectively from 2002/2003 to 2012/2013. With an initial drop in production, volumes remained relatively constant between levels of 160 000 tons and 195 000 tons (HORTGRO, 2014b).
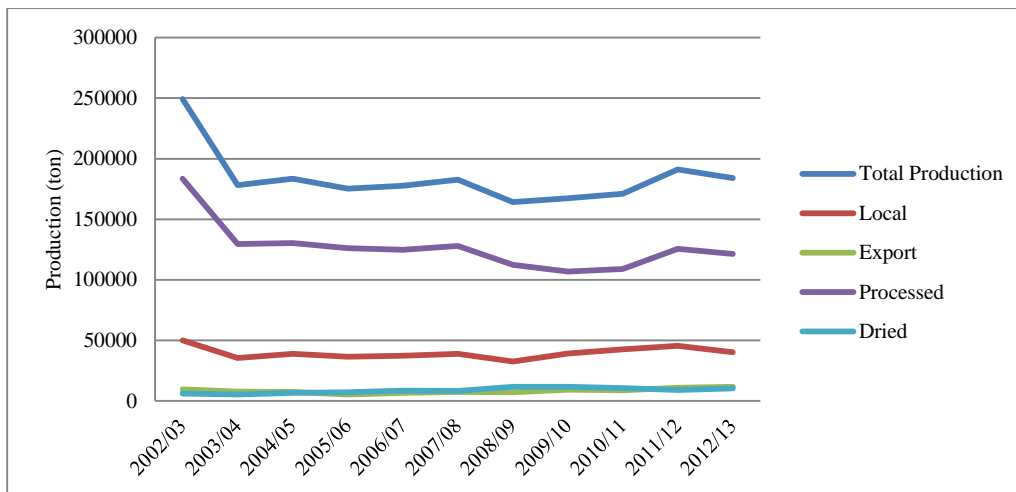
Figure 4.7.3 Peach and nectarine crop distribution (2002/2003 to 2012/2013)

Source: HORTGRO (2014a)

4.7.3. Plum and prune crop distribution

Export volumes of plums and prunes accounted for an average of 63.47% in 2002/2003 and gradually increased to a level of 70.25% of the total volume produced over the period shown in Figure 4.7.4. The other segments – local market and processed –accounted for an average allotment of 21.81% and 3.92% respectively, which remained virtually constant over the given period, which iterating the fact the international demand for plums and prunes from South Africa was behind the growth in production figures (HORTGRO, 2014b).
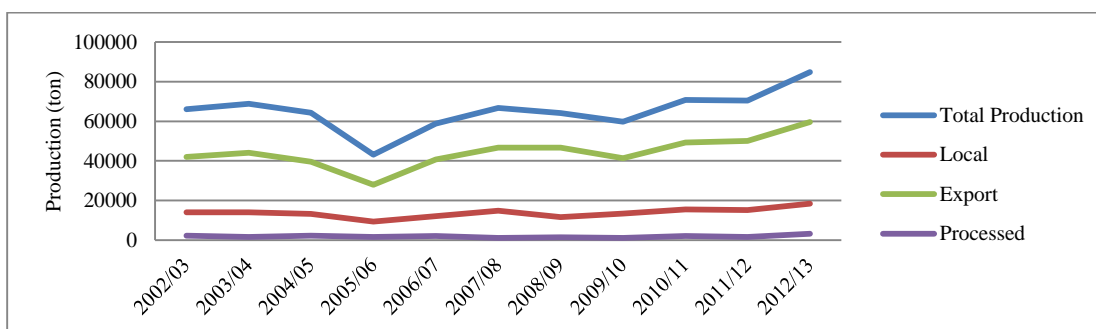
Figure 4.7.4 Plum and prune crop distribution (2002/2003 to 2012/2013)

Source: HORTGRO (2014a)

4.7.4. Cherry crop distribution

The local cherry market competed hard for the procurement of 86.1% of the total cherry crop produced in the 2012/2013 season, arguably driven by weighted average prices realised on the fresh produce markets (accounting for 30% of total local volume) of R46 890 per ton for the 2011/2012 season (HORTGRO, 2014c). A relative small fraction is exported – 5.76% averaged for the 2011/2012 and 2012/2013 figures, as illustrated in Figure 4.7.5.
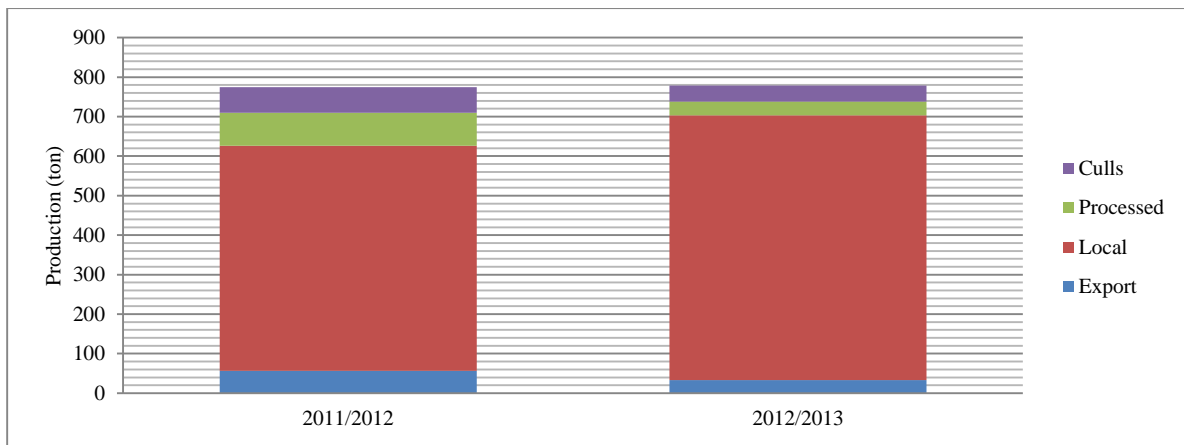
Figure 4.7.5 Cherrie crop distribution

Source: HORTGRO (2014b)

4.8. Export market

When considering Figure 4.8.1 it is clear that, after international sanctions were lifted in the early 1990s, the volume of South African stone fruit exported increased dramatically, although not without fluctuations in the following periods as this industry adapted to international demands and trends. The volume of stone fruit exported[39] is dominated by plums (including prunes), as depicted in Figure 4.8.1 and Figure 4.8.2.
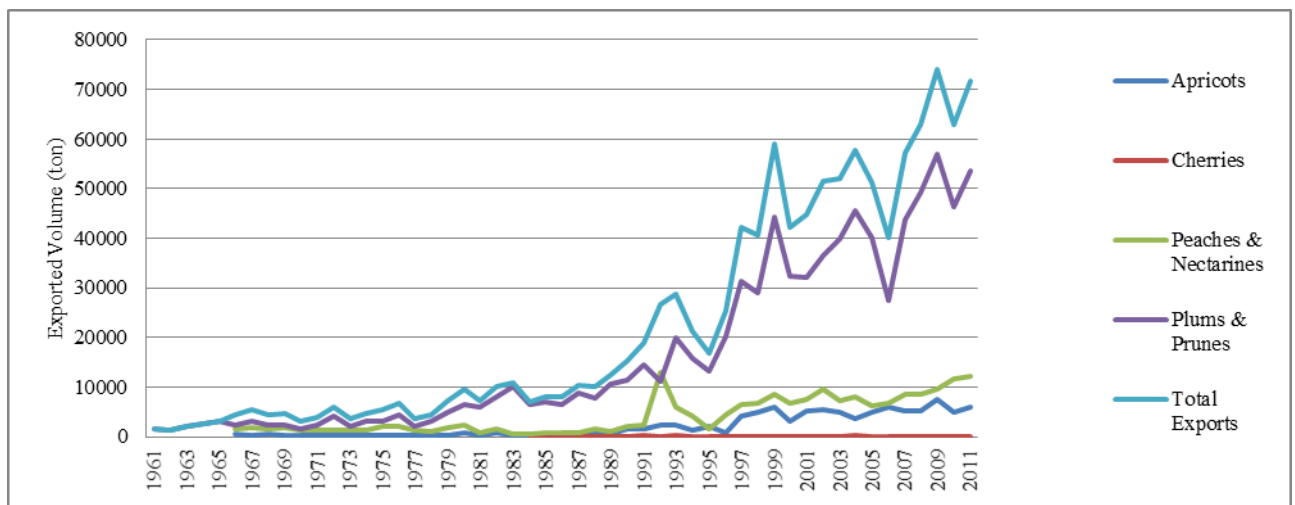
Figure 4.8.1 Stone fruit exports (1961 to 2011)

Source: FAO (2014)

The period following deregulation in 1997 is clearly illustrated in Figure 4.8.1., where it is evident in an increased volume of stone fruit exported from South Africa, and the period 2005/2006 is associated

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[39] According to the FPEF (2014), 53 companies facilitate exports of stone fruit from South Africa.

with a decreased volume of exports. However a gradual increase is observed in the seasons to follow (FAO, 2014; HORTGRO, 2014b; 2014c).

	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13
Apricot	4638	5376	3501	5326	3114	3865	4922	4637	4190	6097	5197
Peaches & Nectarines	9535	7740	7477	5524	6745	7416	7359	9350	8815	11009	11639
Plums & Prunes	41922	44109	39633	27906	40689	46639	46713	41353	49331	50014	59593
Cherries	89	233	19	12	12	14	59	51	70	56	33
Total Exports	56184	57458	50630	38768	50560	57934	59053	55391	62406	67176	76462

Figure 4.8.1 Stone fruit export volumes (2002/03 to 2012/13)

Source: FAO (2014); HORTGRO (2014b)

In the two figures above (Figure 4.8.1 and Figure 4.8.2), the chronological trends in stone fruit exports are illustrated for the period from 1961 to 2012/2013. Focusing on Figure 4.8.1, plum (including prune) exports accounted for an average of 77.07% over the 11 seasons, whilst peaches and nectarines amounted to 14.61%, apricot exports were responsible for an average of 8.22%, and cherries accounted for less than 1%.

The South African stone fruit industry realised an estimated value of R908.79 million in the 2012/2013 season for produce exported, indicating steep growth patterns from 2005/2006 onwards – as presented in Figure 4.8.2, and palpably the largest contributor to the exported volume of stone fruit over the 11-year period is plums.
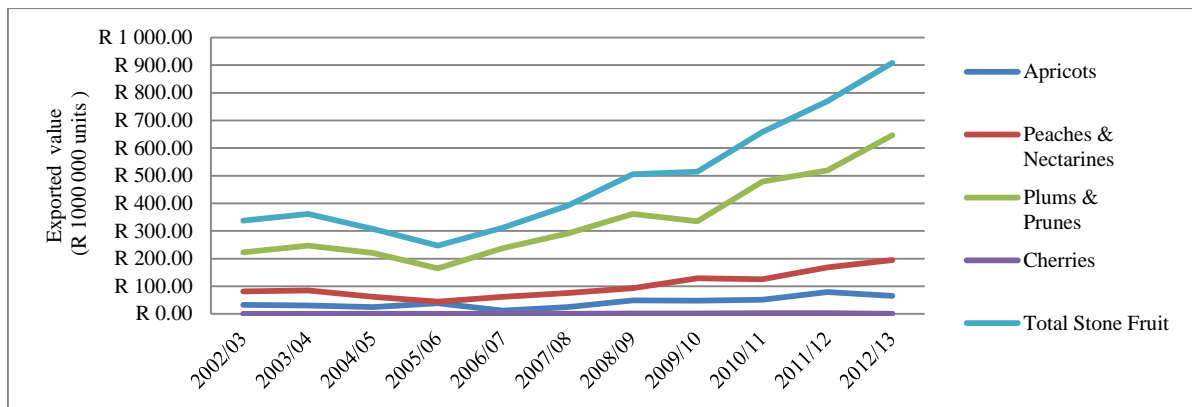
Figure 4.8.2 Value of stone fruit exported[40] (2002/2003 to 2012/2013)

Source: HORTGRO (2014a)

In contrast, when analysing relative average prices[41] from HORTGRO (2014a) for each of the marketable segments, interesting results are yielded. The volumes distributed per segment (local market, export market and processing) from the 2002/2003 to 2012/2013 production season are correlated with the net realisation in monetary value per ton of the three individual crop distribution segments in the same season for the three individual stone fruit types, for which the relevant data is shown in Table 4.8.1. The export segment calculates the highest correlation value for the change in volume exported relative to the price realised per ton, iterating the argument that the stone fruit industry is export-price driven.

Table 4.8.1 Price and volume correlation per distributed segment (2002/2003 to 2012/2013)

Correlation factors	Local	Export	Processed
Apricots	0.0508	0.534	-0.0829
Peaches & nectarines	-0.112	0.782	-0.279
Plums & prunes	0.342	0.738	0.125

Source: Author's own calculations from HORTGRO data (2014a)

The exported volumes (cartons) for the individual stone fruit types are presented in Figure 4.8.3 for the period 2008/2009 to 2012/2013. Plums evidently are the *de facto* leader of the total volume of stone fruit exported from South Africa, with figures above 11.3 million cartons for the past season of 2013. Nectarine exports increased from around two million cartons in 2008/2009 to 3.2 million cartons in 2012/2013. Apricots and peaches exported totalled 1.1 million and 1.3 million cartons respectively for the past season.

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[40] Nominal values

[41] The value and volumes of exports were provided in this section to investigate the analyses of average product prices for exports.

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	2008/09	2009/10	2010/11	2011/12	2012/13
Apriocts (4.75 kg Equivalent Cartons)	1031234	976187	882100	1283656	1111097
Peaches (2.5 kg Equivalent Cartons)	942804	1134344	997526	1197427	1382637
Nectarines (2.5 kg Equivalent Cartons)	2000718	2605845	2528509	3535866	3272810
Plums (5.25 kg Equivalent Cartons)	8878610	7876810	9396301	9526529	11351017
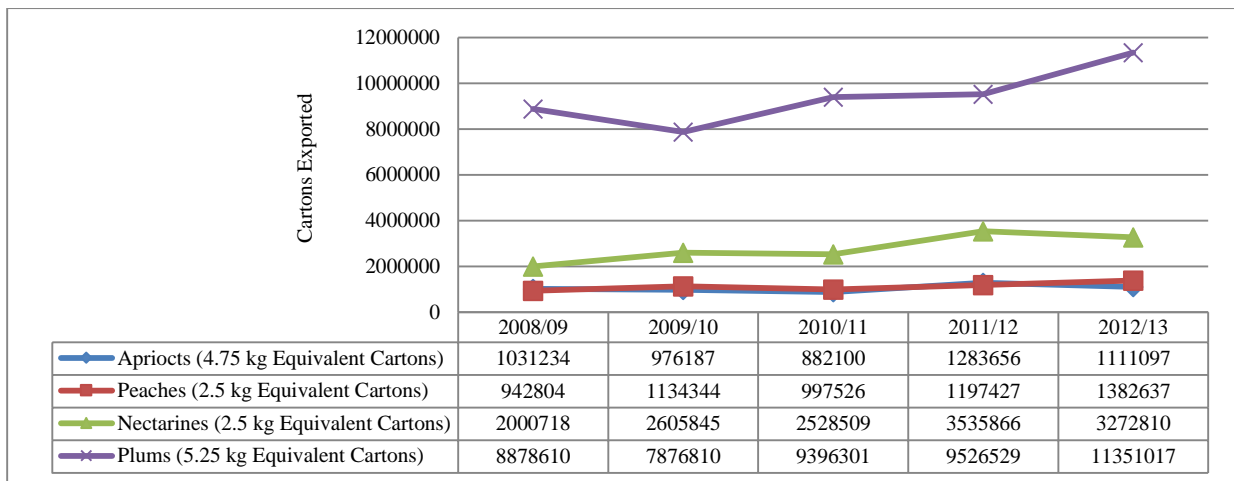
Figure 4.8.3 Stone fruit cartons exported

Source: HORTGRO (2014a)

Regarding the export destinations of stone fruit, it is evident that Europe and Russia[42], the Middle East and the United Kingdom imported the vast majority of stone fruit exported from South Africa from 2001 onwards, as illustrated in Figure 4.8.4. A substantial decrease was experienced in the traditional export markets from 2004 to 2006, although this has improved gradually composure since, illustrating the increased volume and value (see Figure 4.8.5) exported. It is noteworthy that Africa's demand for stone fruit increased sharply from 2011, bearing in mind the relatively short shelf life of stone fruit, along with the accompanying logistical challenges in Africa.

The Far East and Asia, the Indian Ocean Islands, Africa, the USA and Canada, when combined, comprise less than 10% of the total exported stone fruit crop (see Table 4.8.2). However, with an increase in expendable GDP and upward movement into higher living standard measurement groupings, coupled with population growth, these "new" markets are demanding ever more produce from South Africa, giving rise to lucrative export opportunities.

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[42] In this section, as per HORTGRO (2014) figures, European and Russian imported volumes from RSA are combined.
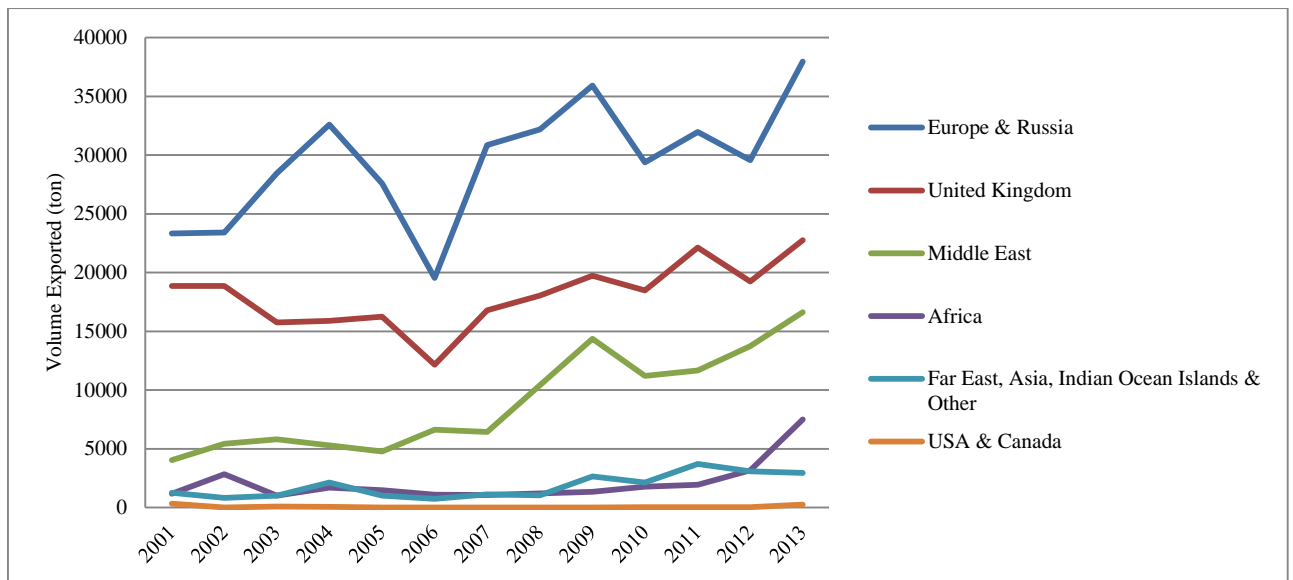
Figure 4.8.4 Combined volume (ton) of exported stone fruit (2001 to 2013)

Source: ITC (2014)

Table 4.8.2 Stone fruit export destinations (2012/2013 season)

Stone fruit type	Middle East	EU & Russia	United Kingdom	Far East & Asia	Indian Ocean Islands	Africa	USA & Canada
Apricots	31%	47%	21%	1%	< 1%	< 1%	< 1%
Peaches	43%	13%	36%	1%	5%	2%	< 1%
Nectarines	27%	19%	47%	2%	2%	2%	1%
Plums & prunes	16%	52%	25%	5%	1%	1%	< 1%
Cherries	54%	0%	35%	5%	0%	6%	0%

Source: PPECB (2013); HORTGRO (2014b; 2014c)

When a correlation value was calculated between the corresponding volumes and values exported amongst the datasets in Figure 4.8.4 and Figure 4.8.5 for the individual export destinations, the Middle East had a value of 0.93, whilst Europe and Russia had values of 0.79 and the United Kingdom had a slightly lower value of 0.77. These correlation values might indicate that, during periods of decreased supply, the relative prices do not fluctuate to the same level as the volume exported, indicating that the export market may be sensitive to an over-supply of demand.

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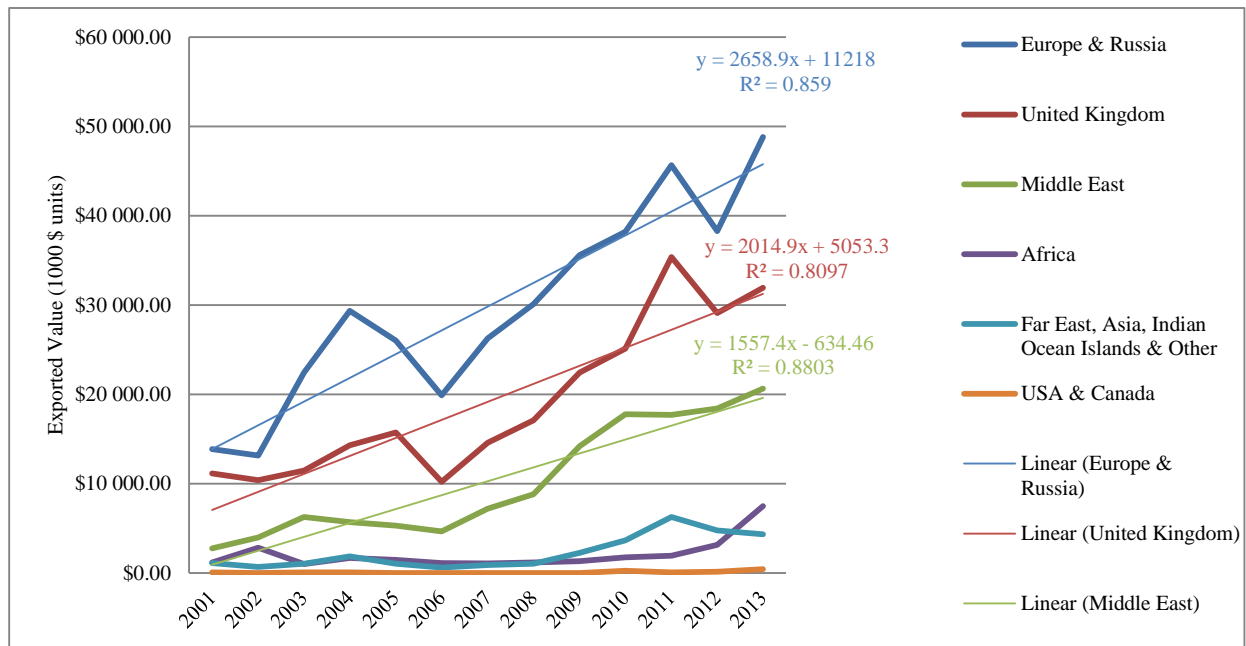
Figure 4.8.5 Value of stone fruit exported per destination (2001 to 2013)

Source: ITC (2014)

The linear trend lines illustrated in Figure 4.8.5 for the major Stone Fruit export markets present a R² value of 0.8 and above, indicating sustained increases in value received for exported produce. Though it may be a diagnostic approach, the recent studies carried out by BFAP (2014), utilises prognostic intelligence to project fluctuations for other agricultural industries and within the foreseeable future stone fruit industry will be incorporated in these studies.

This section has illustrated exports and growth from a South African point of view. However, in Table 4.8.3, other international stone fruit producers' total stone fruit export volumes[43] for 2013 are shown, along with their share of the respective market destinations. Chile, South Africa's major competitor in the Southern Hemisphere, featured prominently, with exports to Asia and both North and South America. European producers' exports remained almost completely within the European continent. Australasian producers exported largely to Asian, Far East Asian and Indian Ocean island countries. China and Turkey are the only listed countries outside of the Middle East to export feasible volumes to the Middle East This occurrence of regional trade is contextualised by Fulponi, Shearer and Almeida (2011) and Baumann and Ng (2012).

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[43] Includes export volumes for all stone fruit types – apricots, peaches and nectarines, plums and prunes, and cherries - HS 0809 (ITC, 2014).

Table 4.8.3 Export statistics from other stone fruit-producing countries

Country	Export volume (ton)	Europe & Russia	United Kingdom	Middle East	Africa	USA & Canada	Asia[44]	Americas[45]
Chile	257 610	13%	4%	1%	< 1%	31%	30%	21%
Turkey	153 762	71%	1%	26%	< 1%	0%	2%	0%
Uzbekistan	137 462	< 1%	0%	0%	0%	0%	99%	0%
Argentina	12 490	11%	7%	1%	< 1%	2%	4%	75%
France	109 367	99%	0%	< 1%	< 1%	0%	< 1%	0%
Spain	909 007	86%	8%	1%	1%	< 1%	< 1%	3%
USA	243 123	< 1%	< 1%	< 1%	0%	41%	37%	21%
China	51 974	17%	0%	83%	0%	0%	0%	0%
Australia	15 940	2%	< 1%	21%	0%	< 1%	76%	0%
New Zealand	3 144	2%	4%	< 1%	0%	3%	91%	0%
Italy	380 459	96%	0%	2%	1%	< 1%	< 1%	< 1%
Romania	4 445	100%	0%	0%	0%	0%	0%	0%
Iran[46]	60 771	7%	< 1%	91%	0%	0%	2%	0%
South Africa	88 005	43%	26%	19%	8%	<1%	3%	<1%

Source: ITC (2014)

4.9. The South African stone fruit value chain

The focus of supply chain management is to enhance the performance of marketing, production and value chain systems through improved producer responsiveness to changing consumer and market demands, which leads to a reduction of costs (Ortmann, 2001). This notion of value chains of Ortmann (2001) fundamentally affects and has effects on the competitiveness performance of industries. Within the Porter (1990) diamond model of competitiveness, the factor pertaining to relating and supporting industries has had an impact, not only hitherto, but continuously, on an industry's/sector's ability to compete in the international market.

Swinnen (2014) noted that AFVC are a fundamental component of developing countries' growth potential, which could increase incomes and poverty reduction – a notion noted in the definitions of competitiveness in Section 2.4. The importance of value and supply chains surrounding the concept of and affecting competitiveness in the South African stone fruit industry supply chain is presented in Figure 4.9.1.

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[44] Includes Australasia, Far East Asian and Indian Ocean Island countries.

[45] Includes South American countries and North American countries, excluding the United States of America and Canada.

[46] Only 2011 figures are available for Iran (ITC, 2014).
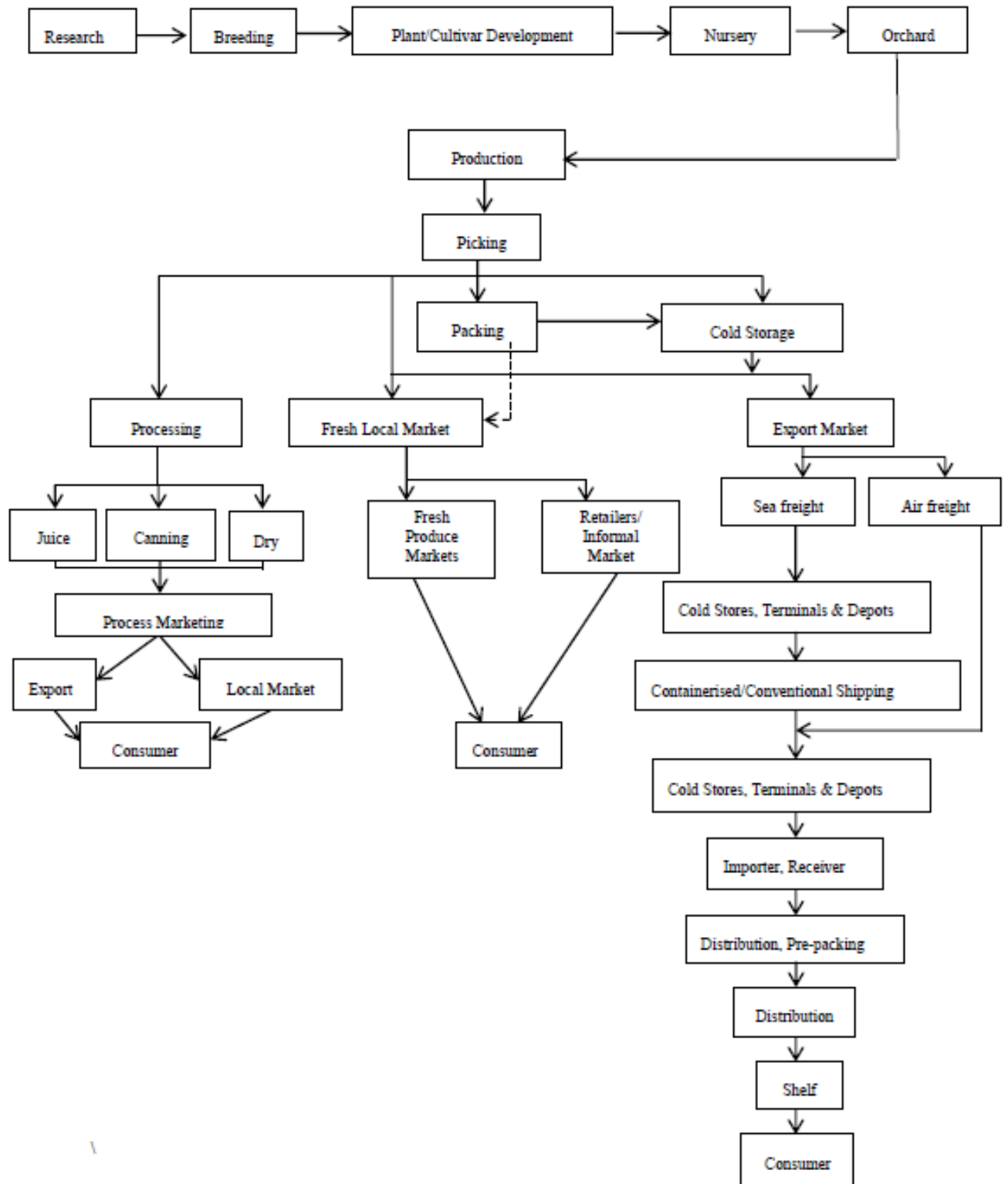
Figure 4.9.1 South African stone fruit value chain mapping

Source: DAFF (2012a; 2012b; 2012c) and adapted from Van Wyk and Maspero (2004)

The supply and value chain is a complex linkage of various production and operational (and strategic) stakeholders[47] (DAFF, 2012a). In Figure 4.9.1[48], a wide range of interconnected linkages between primary and secondary agricultural stakeholders and non-agricultural stakeholders are represented by black lines, and by arrows where the linkages are connected by activities, which include the following: logistic and transport functions, produce forwarding, information technology, research and development, specialised technical services and consultancy services (DAFF, 2012b).

To shape an improved understanding of the stone fruit industry's challenges and opportunities, this value chain guides the inclusion of key decision makers' perceptions across various disciplines of issues surrounding competitiveness to be included in the Stone Fruit Executive Survey (Appendix C).

4.10. The South African stone fruit industry's contribution to the economy

Within the South African economic framework, the agricultural, forestry and fisheries sector contributes 2.3% of the total gross domestic product (SSA, 2014). In contrast, this 2.3% only indicates agriculture's primary production value at market prices received, and not secondary agricultural activities throughout the value and supply chains, which create numerous economic and financial linkages, stimulating economic growth through all economic sectors.

At the heart of the agricultural sector is the horticultural industry, especially the deciduous fruit industry, of which the stone fruit industry forms a key strategic and economic contribution to the economy as a net receiver of foreign currency, increasing the demand for the South African currency, the Rand (ZAR). Ultimately, the South African stone fruit industry contributes positively to the net trading balance on the national trading account.

The value of the collective South African stone fruit industry's contribution to the South African economy indicated steady upsurges from the 2005/2006 season to a total value of R 1 761.03 million in the past production season (2012/13), as depicted in Figure 4.10.1. The major contributors in the 2012/2013 season in monetary terms were peaches and nectarines, and plums (including prunes), with a respective share of 46.2% and 42.4%, whilst apricots constituted a share of 10.5% and cherries less than 1%.method

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[47] Stakeholders include, among others, producer organisations, financial institutions, exporters/marketers, logistical service providers, cultivar developers/breeders, producers, input suppliers, consumers, etc. (DAFF, 2012c).

[48] From this figure it looks like if in some cases stone fruit may be exported without being packed, however this occurs only in special circumstances for specific consignments and is not the prevailing method/process (SFES, 2014).
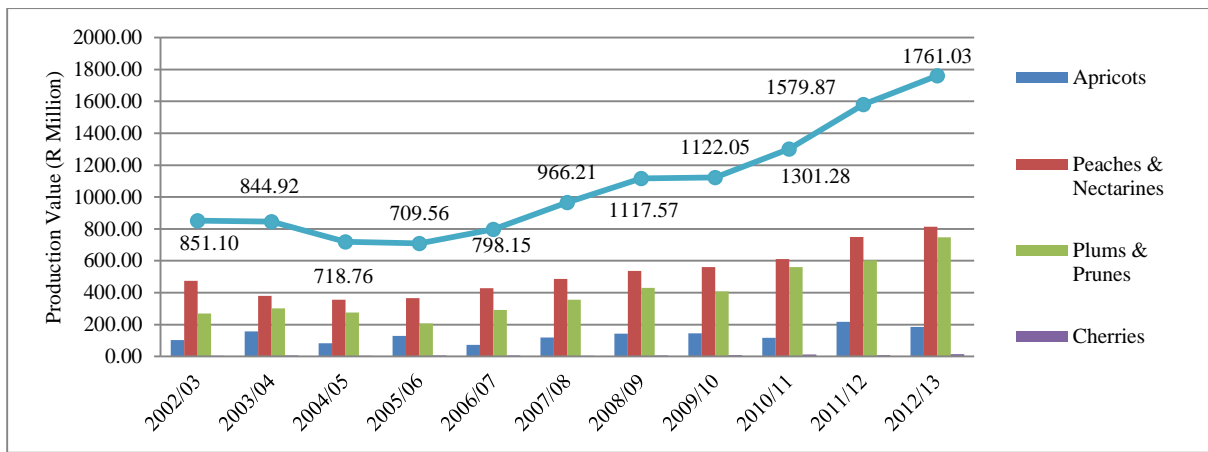
Figure 4.10.1 Nominal value of stone fruit production (2002/2003 to 2012/2013)

Source: DAFF (2013); HORTGRO (2014b; 2014c)

The focus of this study was on the stone fruit export segment, as this segment fundamentally affects the competitiveness in the milieu of key measurements applied to assess the competitiveness of this related area and industry of interest. According to HORTGRO (2014a), the total stone fruit export value – collectively apricots, plums (including prunes), peaches, nectarines and cherries – amounted to a monetary value of R908.79 million during the 2012/2013 production/export season, representing a contribution of 51.61% to the total value of South African stone fruit production, although 23.14% of this total volume produced was exported during the same period.

From a social/ethical point of view, the stone fruit industry employs, at the primary production farm level, roughly 24 000 labourers,[49] who have approximately 95 000 dependants (HORTGRO, 2014b; 2014c). Most of the economic activities kick-started by the primary production of stone fruit, not only in the immediate production vicinities, but also right up the value chain and down the supply chain, give rise to employment opportunities and business ventures that are created, thereby adding stability to local economies.

There is no shortage of statistical information regarding; areas under production, export market destinations, average prices for the relevant distribution segments, geographical production zones, varieties/cultivars planted and produced, production costs, establishment costs, etc. for the SA stone fruit industry. However aspects surrounding strategic planning and strategic intelligence for the SA stone fruit industry are not widely published and available to be applied by all stakeholders in functional value chain positions in the formation of industry-, and farm level strategies.

The strategic positioning of the RSA stone fruit industry is currently driven by the fruit industry plan (FIP) (Fruit Industry Plan Project Team, 2006) and the Fruit Industry Social Compact (Fruit South Africa, 2013). These strategic industry statements are however rather broad based and do not necessarily

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[49] Permanent equivalent (seasonal labour converted to permanent equivalent)

address the stone fruit industry individually with its own unique set of challenges. Quality, consistency and continuity (Rabe et al., 2014; SFES, 2014) stand central to these industry statements.

4.11. Conclusions

The stone fruit industry in South Africa has come a long way since the establishment of the deciduous fruit industry in the 17th century. Over the following two centuries, various types of stone fruit, along with other fruit types – pome and grapes – were imported and experimented with. From 1888, various trial consignments of fruit were sent to England, with a real success in 1892, followed by increasing volumes exported.

After deregulation in 1997, and due to the removal of politically motivated sanctions in 1991, more international markets opened their ports and harbours for produce from South Africa, with more lucrative export opportunities. Despite symptoms of recession in overseas markets, the stone fruit industry regained its composure, supplying top-quality fruit in a marketing window period unique to the conditions of South African producers.

The exported value increased significantly from the 1991/1992 season, when 18 766 tons were exported at a value of R 72.17 million, to 48 671 tons, amounting to a value of R 232.98 million, exported in the 1998/1999 season. This amount increased again in the 2005/2006 season, when 38 768 tons were exported at a value R 47.67 million. The 2012/2013 export value represents a contribution of 51.61% to the total value of South African stone fruit production, although only 23.14% of this total volume produced was exported during the same period, which indicates a dynamic trading environment.

When it comes to the analysis of stone fruit exports, plums[50] clearly dominate the local scene, with a share of 77.94% in the 2012/2013 season. However, the joint attributed value of peaches, nectarines, apricots and cherries cannot be left unrecognised.

The status of strategic intelligence for the SA stone fruit industry will be investigated in Chapter 5 and this intelligence generated will be applied to propose possible strategies to improve the competitiveness performance of the SA stone fruit industry.

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[50] Including prunes

Chapter 5: Analysis, findings and results

5.1. Introduction

This chapter will consider the results of Steps 2, 3 and 4 of the analytical framework (see Figure 3.3.1.), and make some important findings and draw conclusions on the measurement of competitive performance, trends and the factors impacting on this performance and the clustering of the main determinants as per the Porter diamond model. The development of industry-level strategies, based on these results, will be attended to in Chapter 6.

5.2. Measuring competitiveness (Step 2)

The business survival of the South African stone fruit industry is highly dependent on the ability to export produce to lucrative international markets. The various measurement techniques for competitiveness and accompanying formulas, along with three applicable competitiveness frameworks to capture trade performance, were considered in Chapter 2. The RTA formula of Vollrath (1991) was firstly applied to measure and chronologically track the competitive performance trends of the South African stone fruit industry. This measurement technique tracked the competitive advantages of individually traded products or product groupings.

The fact that FAOSTAT uses only agriculture-related data initiated 'more restricted' trade analyses, for the reason that any particular agricultural industry competes not only within the broader agricultural (food and fibre, for example) milieu, but also competes within the whole economy, viz. other industries and sectors, for particular scarce resources. The relative 'stickiness' of agricultural resource allocations, especially within a particular industry group such as stone fruit, however, renders this FAOSTAT-based measurement realistic in the operational agribusiness environment.

The ITC database, on the other hand, gathers and compiles trade data and information from all sectors of the economy of different countries in the form of the universal HS codes. When applying these ITC values in the same RTA formulas, the total value traded of all other commodities indicates traded total values from all economic sectors (ITC, 2014). The employment of this ITC trade data therefore provides a more comprehensive measurement of competitive performance in a global environment within the context of opportunity costs.

In the context of this study, the ITC (2014)-related RTA calculations are referred to as the Multi-sector-based Competitiveness Index, whereas the FAO (2014)-related RTA calculations are referred to as the Agricultural-based Competitiveness Index. In the sections to follow, RTA calculations for both FAO and ITC will be presented.

5.2.1. RTA calculations: South African stone fruit industry

The competitiveness performance of the South African stone fruit industry within an agricultural environment was calculated for the period 1961 to 2011. This was done from 1961 onwards using FAOSTATS, and from 2001 also with ITC data, due to the availability of the relevant data sets (see Table 5.2.1). In Figure 5.2.1, the performance is illustrated graphically, from which it is clear that the movement of the regression line is towards the upper 'north-east', indicating that this industry expressed more competitive behaviour from 1961 onwards, although not without fluctuations.

Table 5.2.1 RTA scores of SA stone fruit industry (FAO & ITC data)

Years	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973
SA stone fruit (FAO)	0.57	0.41	0.70	0.72	0.86	1.39	1.22	1.06	1.17	0.84	1.04	0.99	0.63
Years	**1974**	**1975**	**1976**	**1977**	**1978**	**1979**	**1980**	**1981**	**1982**	**1983**	**1984**	**1985**	**1986**
SA stone fruit (FAO)	0.78	0.50	1.32	0.64	0.76	1.07	1.46	1.24	2.19	2.50	1.72	1.25	1.14
Years	**1987**	**1988**	**1989**	**1990**	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**
SA stone fruit (FAO)	1.50	1.52	1.59	2.19	2.39	4.78	4.78	3.05	2.08	2.31	3.82	3.30	5.61
Years	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	
SA stone fruit (FAO)	3.20	3.07	2.92	3.11	3.85	2.96	2.08	2.97	2.66	3.38	3.27	4.25	

Years	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
SA stone fruit (ITC)	3.79	4.29	4.06	5.10	4.06	2.60	3.05	2.99	4.80	4.21	4.40	3.95

Source: Author's own calculations based on data from FAO (2014) and ITC (2014)

Regarding the South African stone fruit industry's competitive performance, calculated within the macro-economic setting from 2001, an average score of around 4 was calculated. Although there was rapid decline in the competitive scoring from 2004 to 2006, this industry regained some balance onwards (see Table 5.2.1 and Figure 5.2.2).

The chart shows: y = 0.0684x + 0.2776, R² = 0.6279
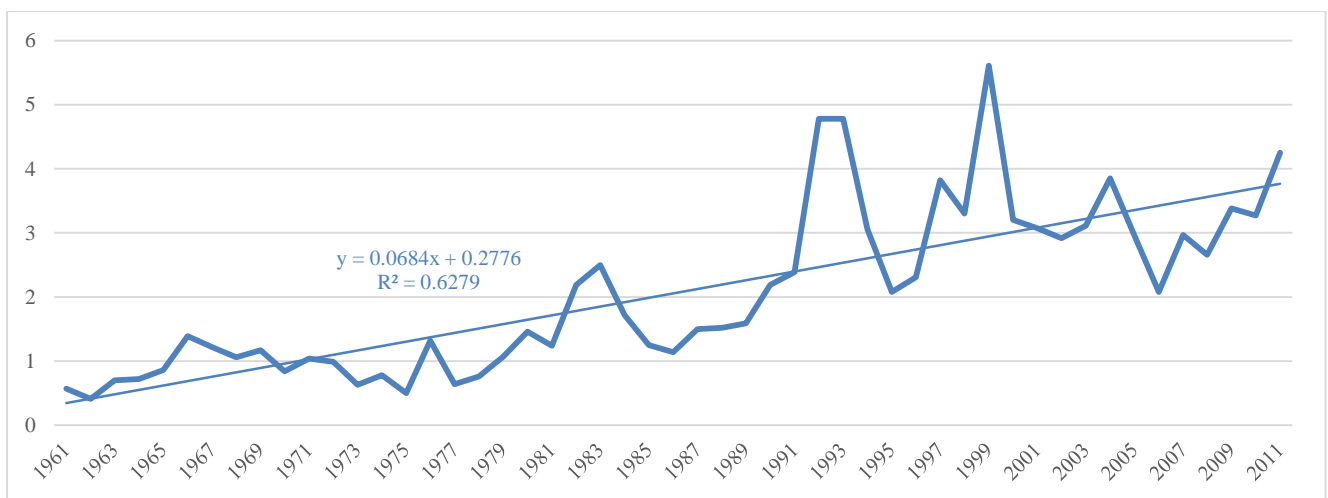
Figure 5.2.1 RTA performance of SA stone fruit industry (FAO data)

Source: Author's own calculations based on data from FAO (2014)

RTA values above 1, calculated from 1961 to 2012, indicate that this industry is competitive. When the two respective datasets of the FAO (2014) and ITC (2014) are depicted for the period from 2001 to 2011, the period for which corresponding RTA calculations from both datasets would be available, both trends follow the same movement, but with varying magnitude (Figure 5.2.2). A correlation factor of 0.79 was calculated for this period. This also indicates that the SA stone fruit industry measures as being marginally more competitive within the multi-economic sector index, viz. agriculture-based competitiveness.

From this it can be concluded that there is a 'relatively' more intense competition between agricultural products/commodities. These products/commodities compete for a common set of resources in a more 'sticky resource mobility' environment, i.e. the major competing internationally traded alternatives are found within the direct agricultural production alternatives to stone fruit, such as other deciduous fruit – apples, pears and grapes, citrus, exotic fruits and vegetable groups. Within an only 'agricultural environment', stone fruit thus are considered somewhat less competitive, while this industry outcompetes many more industries when non-agricultural alternatives are considered in the measuring process. Difference between the respective RTA dataset calculations were not analysed in depth, however, and further research is needed to express a broader statement on these results, i.e. varying measurements.
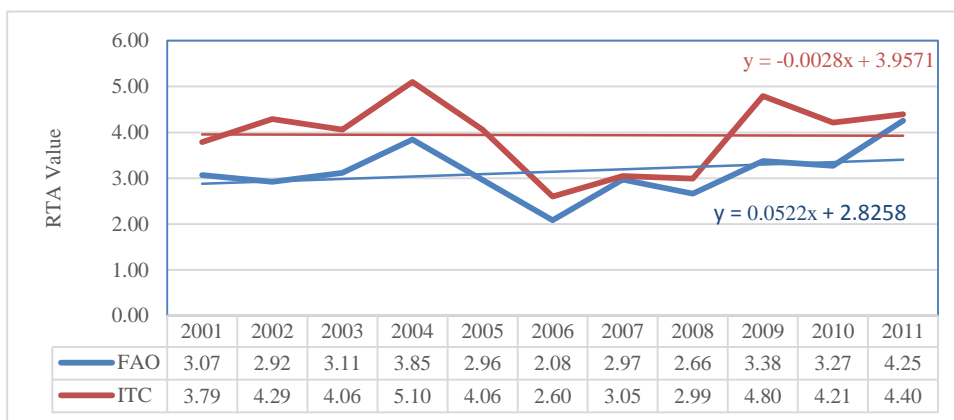
Figure 5.2.2 Respective RTA comparisons of SA stone fruit industry (2001–2011)

Source: Author's own calculations based on data provided from FAO (2014) and ITC (2014)

5.2.2. Trend analysis: The phases of the stone fruit industry's competitive performance

The historical competitive performance of the trend from 1961 to 2011 is presented in Figure 5.2.3. Although this index depicts the analysis within an agricultural milieu, as mentioned earlier, the trends' movements of both indices correlate with a factor loading of 0.79, as presented in Figure 5.2.2. The different phases were identified accordingly, and are termed below, during a focus group discussion

with industry leaders. They are illustrated in Figure 5.2.3 (Rabe *et al*., 2014). This analysis can also be viewed as part of Step 3, as industry opinion is captured to help explain the trends established from the RTA measurements.

To analyse and identify trends, correlation factors between the RTA calculations of both the ITC and FAO, and variables to assist in defining different phases of competitive performance, are portrayed in Table 5.2.2.

Table 5.2.2 Phases of competitive performance and correlation variables

Correlation Array 1 and Array 2	1961–1982	1983–1990	1991–1999	2000–2007	2008 – present
RTA FAO and Total Volume Exported	0.810	0.562	0.704	0.609	0.647
RTA FAO and Total Stone Fruit Production	0.523	0.155	0.302	0.529	-0.558
RTA FAO and Total Area Harvested	0.469	0.647	0.323	0.208	-0.527
RTA FAO and ZAR (Rand) / GBP (£)			0.325	-0.219	-0.746
RTA FAO and ZAR (Rand) / USD ($)			0.315	-0.092	-0.631
RTA FAO and ZAR (Rand) / EUR (€)				-0.247	-0.621
RTA ITC* and Total Volume Exported				0.568	0.765
RTA ITC* and Total Stone Fruit Production				0.512	-0.948
RTA ITC* and Total Area Harvested				0.300	-0.969
RTA ITC* and ZAR / EUR				-0.211	-0.406
RTA ITC* and ZAR / GBP				-0.109	-0.714
RTA ITC* and ZAR / USD				0.138	-0.181

* ITC data only available from 2001

Source: Author's own calculations based on data from FAO (2014) and ITC (2014)
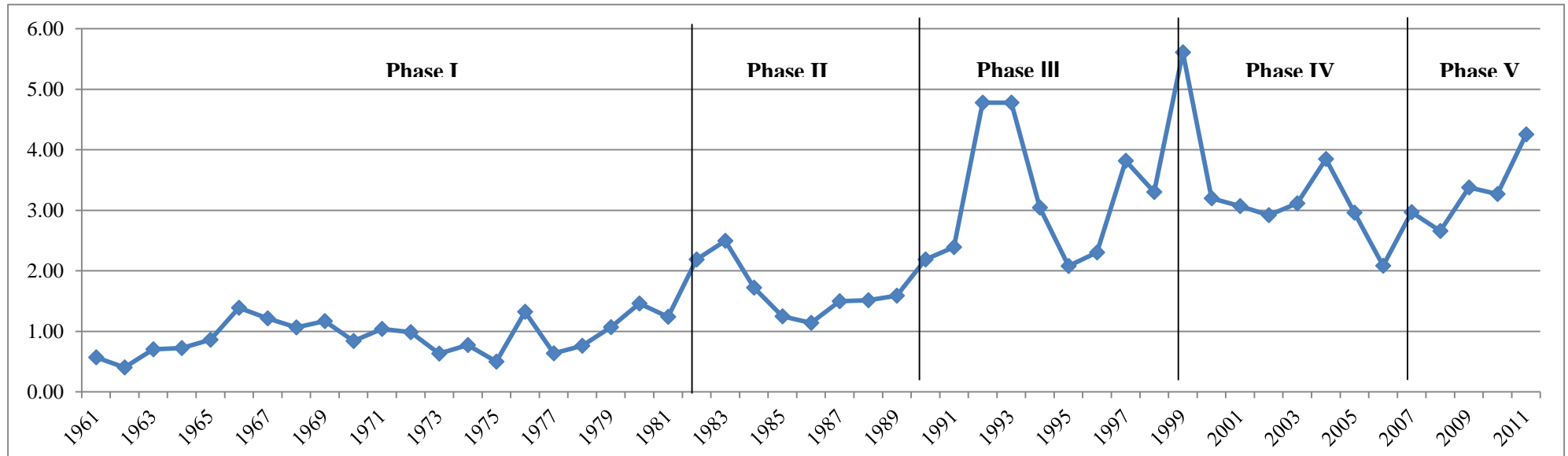
Figure 5.2.3 Phases of competitive performance of SA stone fruit industry

Source: Author's own calculations based on data from FAO (2014)

Five phases of competitive performance were determined through industry consultation, using descriptions to typify each phase (Rabe *et al*., 2014):

- Phase I (1961–1982): *Increasingly regulated competitiveness*
- Phase II (1983–1990): *Political constrained competitiveness*
- Phase III (1991–1999): *Economic deregulation and internal rivalry*
- Phase IV (2000–2007): *Towards international competitiveness*
- Phase V (2008 – present): *Increasingly sustained competitiveness*

Increasingly regulated competitiveness (1961 to 1982): During Phase I, the array that correlates best with RTA performance from 1961 to 1982 is the total volume of stone fruit exported (see Table 5.2.2), highlighting the dependence of competitiveness on volume exported. This period was associated with a highly regulated one-channel export marketing system, where producers were mere price takers from only one officially designated exporter – the South African Deciduous Fruit Board, with little producer interaction with other players in the value chain. Competitiveness ranking gained momentum from commencement, around a marginal index marker of 0.5 to increasing performance at an index of 2.5 in 1983.

Political constrained competitiveness (1983 to 1990): The general decrease in competitiveness during Phase II (1983 to 1990), although with a slight gain at the end of this period, shows the high level of the impact of politically motivated international trade sanctions on RSA due to its 'apartheid policies orientation. Fewer markets associated with market resistance were the order of the day. In this phase, the array for total area harvested showed the highest correlation factor, at 0.647 (see Table 5.2.2), resembling a notion that total productions area (hectares) was adapted downwards[51] during this phase, due to the reduced trade as a result of the politically unfavourable global trade environment for SA produce.

Economic deregulation and internal rivalry (1991 to 1999): Phase III, stretching from 1991 to 1999, introduced political and economic freedom of all RSA citizens and political parties and, even more eminently, the scrapping of trade sanctions and the economic deregulation of agricultural marketing (Mather & Greenberg, 2003). A fluctuating movement in the trend is clear during this phase, where, again as in Phase I, the array of total volume exported (FAO values) showed the highest the correlation value with RTA (see Table 5.2.2). Sanctions, including trade sanctions, were lifted, hence RSA enjoyed unrestricted access to international markets, with newer, more lucrative, export opportunities apparent, as noted by McDonald and Punt (2001), where an all-time high index marker since 1961 – of 5.61 – was reached during 1999. The exchange rate at the beginning of 1991 was R2.56 (ZAR) to the US Dollar (US $), which gradually weakened to a rate of R6.13 (ZAR) to the US $ at the end of 1999 (Walters & De Beer, 1999).

During this period, many opportunists actions caused disparities in the value chain, before eventually leading to the survival of only the most prominent and effective export producers and exporter/marketers

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[51] The SA stone fruit areas under production dropped form 23 090 ha in 1983 to 20 426 ha in 1990 (FAO, 2014).

of SA stone fruit (Tregurtha & Vink, 2002). According to the PPECB (2014), there were about 270 registered exporter accounts for deciduous fruit in 2005, and around 250 accounts at the end of 2014.[52]

The high point reached in 1999 – the end of this phase – can also be ascribed to the industry's better understanding of doing business in the global market, combined with "the Madiba Magic" period in South African agriculture (Esterhuizen, 2006; Van Rooyen *et al.*, 2011), when international agricultural trade reaped the benefits of political democratisation and agricultural deregulation.

Towards international competitiveness (2000 to 2007): During Phase IV (2000 to 2007), the stone fruit industry, although learning the business and culture to compete better internationally, found that global conditions increasingly experienced a decline – culminating in the 2007/2008 'economic meltdown', and the novelty of the South African "Rainbow nation" and "Madiba magic" started to wear off. In this sense, the trade environment somehow normalised after the competitive spike during the 1999/2000 period. During this phase, the Rand (ZAR) also experienced a strengthening that inhibited the international trade of stone fruit. Towards 2006, the exchange rate declined again, promoting exports. The decline and fluctuation in RTA values during this phase clearly relates to exchange rate fluctuations. However, more stringent technical and environmental standards had to be complied with, which hindered some producers from entering the export market, as they first had to gear their operational units accordingly (BLES, 2014; Industry Workshop, 2014; Rabe *et al.*, 2014).

During this phase, the share of other Southern Hemisphere producers[53] (annual %) in global exports dropped, whilst Spain's share increased, despite other Northern Hemisphere producers, like the USA, Italy and France experiencing a decrease in their share of global exports.

The index marker for South Africa dropped from 5.61 in 2000 to 2.08 in 2006. Phase IV is known for an improved understanding of business to operate in the international playing field, in comparison with the previous phase. However, some opportunism by agents was still apparent, especially with the favourable exchange rate during the early part of this phase (Rabe *et al.*, 2014). The dependence of RTA on total volume exported (FAO values) is again shown by a correlation value calculation of 0.609 that related the best to RTA during this period (see Table 5.2.2).

Increasingly sustained competitiveness (2008 onwards): From 2008 to the present it is apparent that the industry's competitiveness gained control during Phase V, increasing to an RTA index market of

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[52] Around 100 members of the FPEF account for approximately 95% of all deciduous fruit exported (FPEF, 2014; PPECB, 2014).

[53] Chile, Argentina, New Zealand and Australia

4.25. The industry gained momentum, and irregularities were ironed out (Rabe *et al*., 2014) to fit a better export drive, increasing the industry's competitive performance from 2.66 in 2008 to 4.25 in 2011.

One of the important notions is that the exchange rate is one, but not the only, factor affecting competitiveness performance.

5.2.3. RTA: Comparisons with SA horticultural crops

As there is intense competition for scarce resources among agricultural products/commodities in the horticultural and fruit sectors, it is relevant to contextualise the competitive performance of the stone fruit industry (Figure 5.2.4 and Figure 5.2.5) in terms of individual stone fruit types and also relative to other horticultural industries in SA.

The stone fruit industry in SA outranks several agri-industries, such as the tropical, exotic and nut industries, is a middle-level performer, is outranked by the pome fruit and grape (table grape) industries, and is virtually on par with the SA wine industry (Figure 5.2.4 and Figure 5.2.5).

The RTA performance of individual stone fruit types – plums (including sloes), apricots, peaches and nectarines, and cherries – is compared with other fruit types belonging to the SA deciduous fruit grouping and in Figure 5.2.6 and Figure 5.2.7. The calculations are illustrated in Appendix D (Table D3 and Table D4).

From this, the stone fruit type plums (including sloes/prunes) can be crowned the *de facto* leader of the SA deciduous fruit industry, as it was on the frontline of competitive performance in the most recent production season. When analysing Figure 5.2.6 from an agricultural framework (FAOSTAT data), it is clear that the stone fruit industry's top achiever, plums again, outpaced all the other industries presented from 1997 onwards, among others the wine industry and apple[54] industry, which enjoyed considerable attention in recent competitiveness studies (see Chapter 2.5.2. The same phenomenon is relevant in Figure 5.2.7, from 2008 onwards, where the respective fruit types are analysed within the multi-economic sector milieu (ITC data). Other represented stone fruit types yielded RTA ratings above 1 (one), except for cherries, illustrating the positive, albeit relatively marginal, competitive performance of these stone fruit types – apricots, peaches and nectarines.

As stone fruit grouping consist of complementary and related fruit types – plums and prunes, apricots, cherries, peaches and nectarines, and different cultivars/varieties of each fruit type, it is apparent that the phases that were identified above are relevant to describe the industry as a whole, due to correlations[55] in the movements of the individual stone fruit types' RTA graphs - Figure 5.2.6, and Figure 5.2.7.

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[54]An interesting quote from George du Maurier (1834-1896) reads: "An apple is an excellent thing…until you have tried a peach" (Barret, E. & Mingo,J., 2002:4)

[55] Correlation factors calculated between various sets of stone fruit types yielded indicators of 0.70 and above for the period 1961 to 2011.
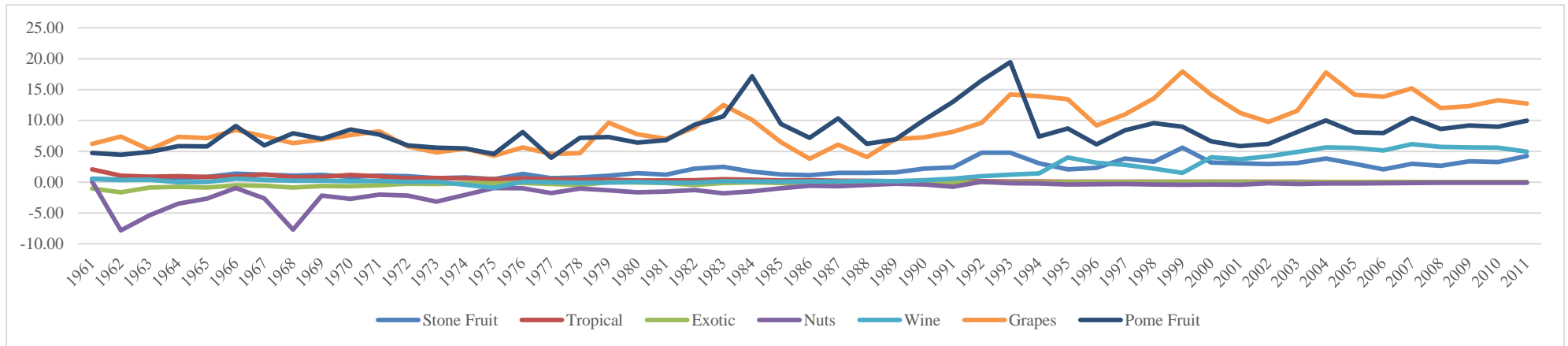
Figure 5.2.4 Stone fruit FAO RTA trends compared to other horticultural industries (1996 to 2011)

Source: Author's own calculations based on data from FAO (2014)
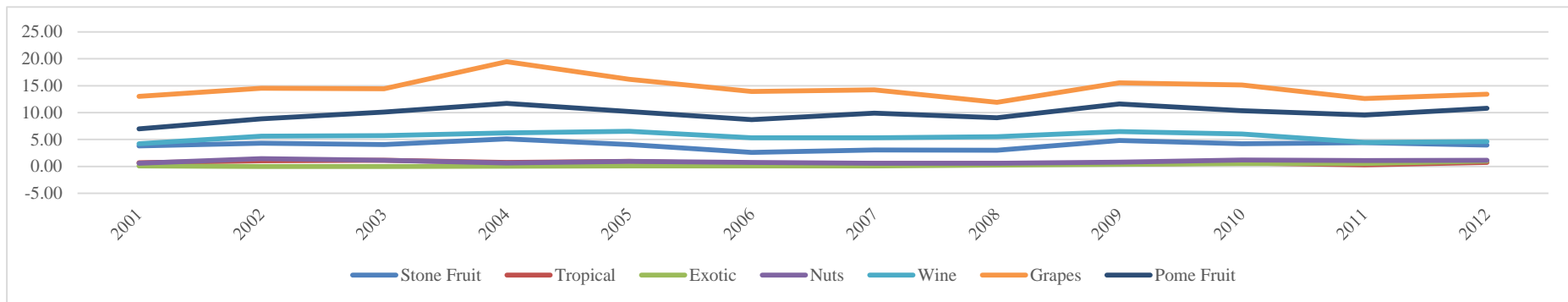
Figure 5.2.5 Stone fruit ITC RTA trends compared to other horticultural industries (2001 to 2012)

Source: Author's own calculations based on data from ITC (2014)
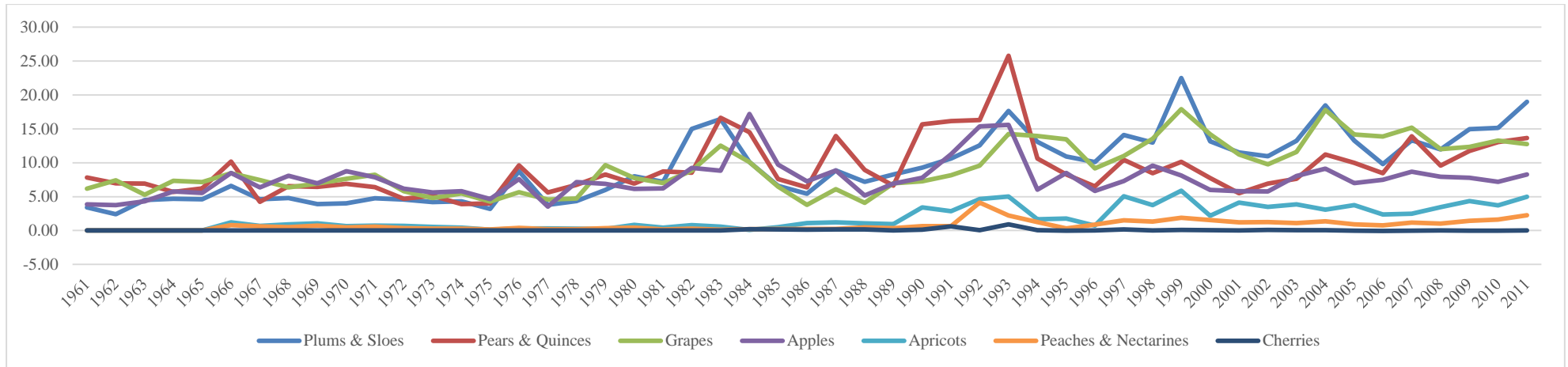
Figure 5.2.6 Comparison of deciduous fruit types: FAO RTA trends (1996 to 2011)

Source: Author's own calculations based on data from FAO (2014)
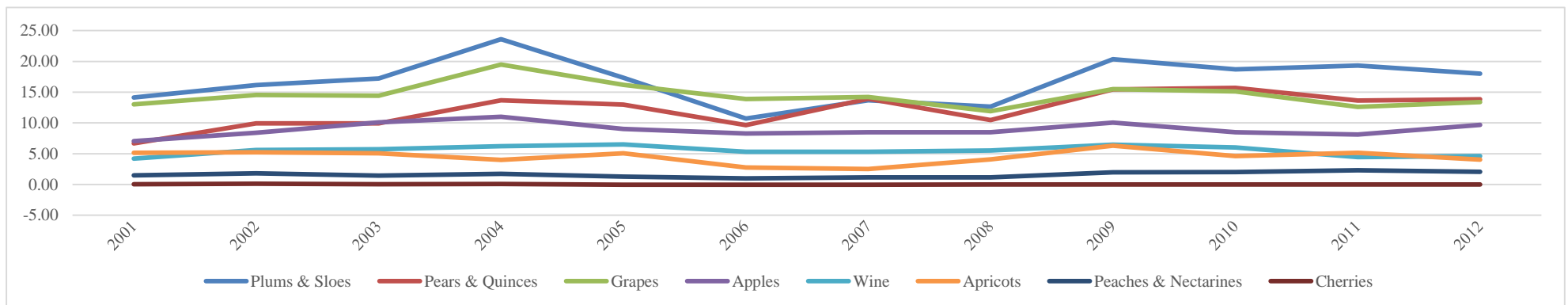
Figure 5.2.7 Comparisons of deciduous fruit types: ITC RTA trends (2001 to 2012)

Source: Author's own calculations based on data from ITC (2014)

5.2.4. RTA: Global stone fruit comparison

The South African fruit industries are highly dependent on sustained exports to maximise and ascertain profit margins throughout the value chain. There is also no shortage of intense competition in the global agricultural markets. When relevant RTA values are compared globally, South Africa's stone fruit industry's competitive position in the Southern Hemisphere (SH) lies below that of Chile, which clearly dominates the scene, as depicted in Figure 5.2.8. Nevertheless, the RSA, when analysing stone fruit industries within the global multi-sector economic index as illustrated in Figure 5.2.9, can be described as either the runner-up in the 'first league', or the *de facto* leader in the 'second league' of global competitors when compared with SH countries; Argentina (ARG), Australia (AUS), Brazil (BRZ), and New Zealand (NZ). In contrast, important competitors other than Chile and New Zealand indicate an increasing competitive disadvantage.

The South African stone fruit industry also features prominently in the comparison with Northern Hemisphere (NH) countries, although in counter-production seasons, when it is only outclassed by Spain (ESP), (see Appendix D, Figures D3 and D4), and parallel to the likes of Italy (ITA) and outranking France (FRC) – both prominent fruit producers in Europe (see Figure 5.2.9).
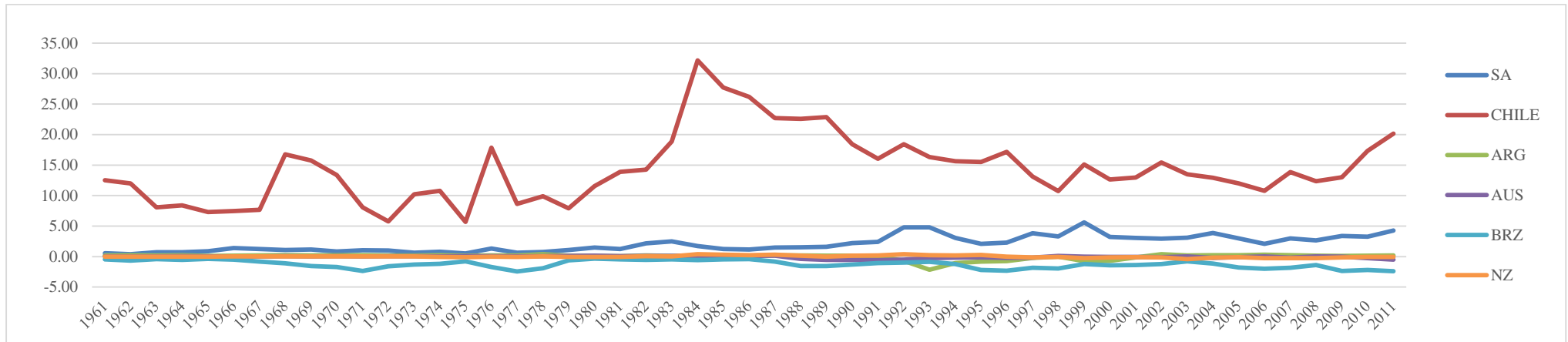
Figure 5.2.8 Stone fruit FAO RTA trends: SA compared with SH countries (1961 to 2011)

Source: Author's own calculations based on data from FAO (2014)
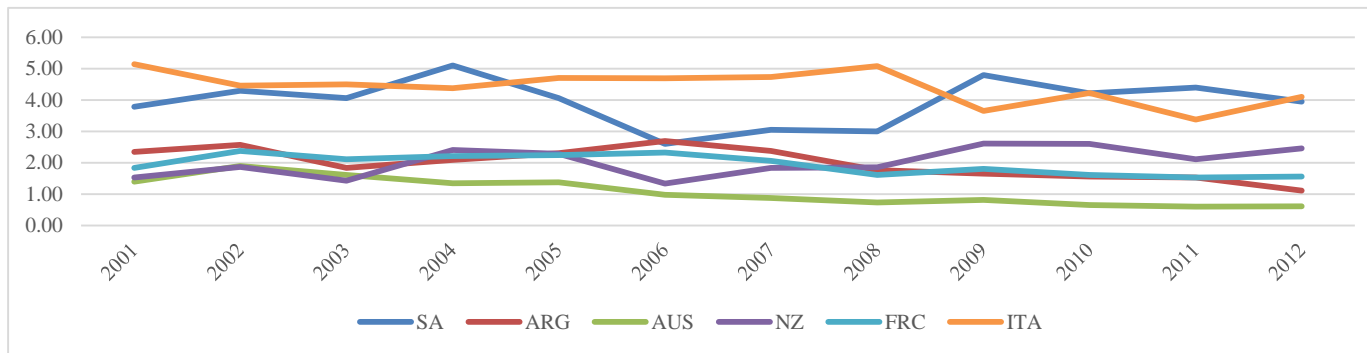
Figure 5.2.9 Stone fruit ITC RTA trends: SA compared with SH and NH countries (2001 to 2012)

Source: Author's own calculations based on data from ITC (2014)

5.2.5. RTA: Deciduous fruit – global comparisons

As the SA stone fruit industry is highly integrated within the SA deciduous fruit industry, it is worthwhile to evaluate the competitive performance of this industry, as the individual stone fruit crops expose the strategic importance of diversification and the minimisation of risk in an ever-changing agricultural environment. Hence, with reference to the agriculture-based RTA competitiveness index, Figure 5.2.10., shows that South Africa clearly outpaced several deciduous fruit-exporting countries; Argentina (ARG), New Zealand (NZ), United States of America (USA), Spain (ESP), and Italy (ITA) from 1997 onwards, with the exception of Chile, which has not been included because of the dwarfing effect it presents. However, Chile is included in the multi sector-based competitiveness index for deciduous fruit illustrated in Figure 5.2.11.
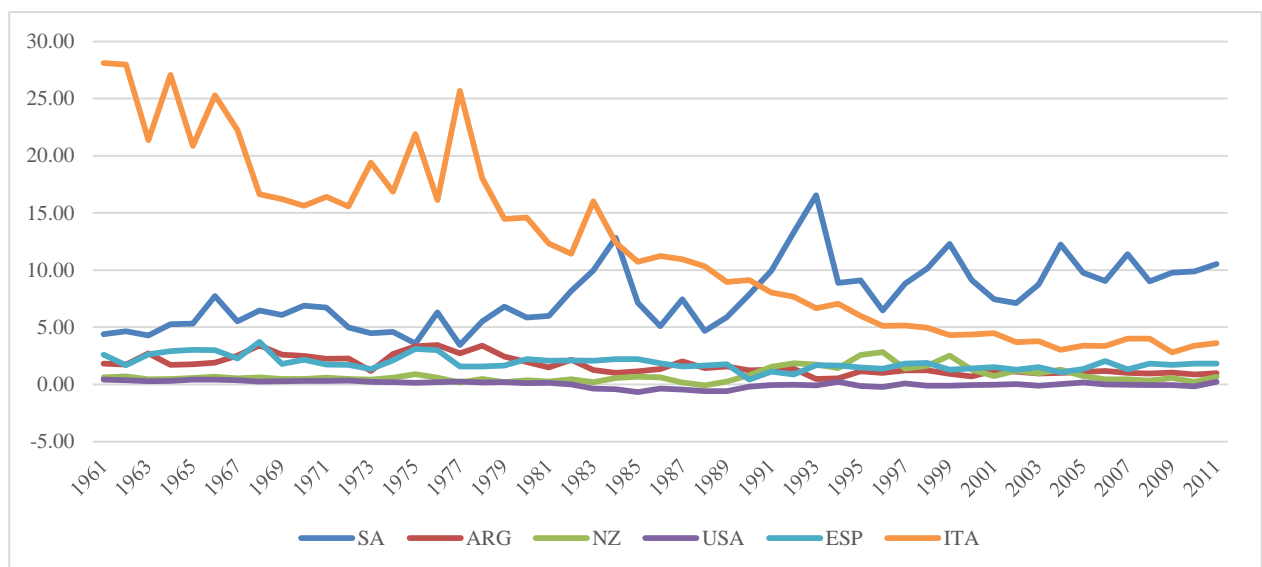
Figure 5.2.10 Deciduous fruit FAO RTA trends: SA compared globally (1961-2011)

Source: Author's own calculations based on data from FAO (2014)

Both Southern Hemisphere producers – South Africa and Chile – outrank their competitors, not only within the same production periods, but also in the counter-production seasons of Northern Hemisphere countries.

90
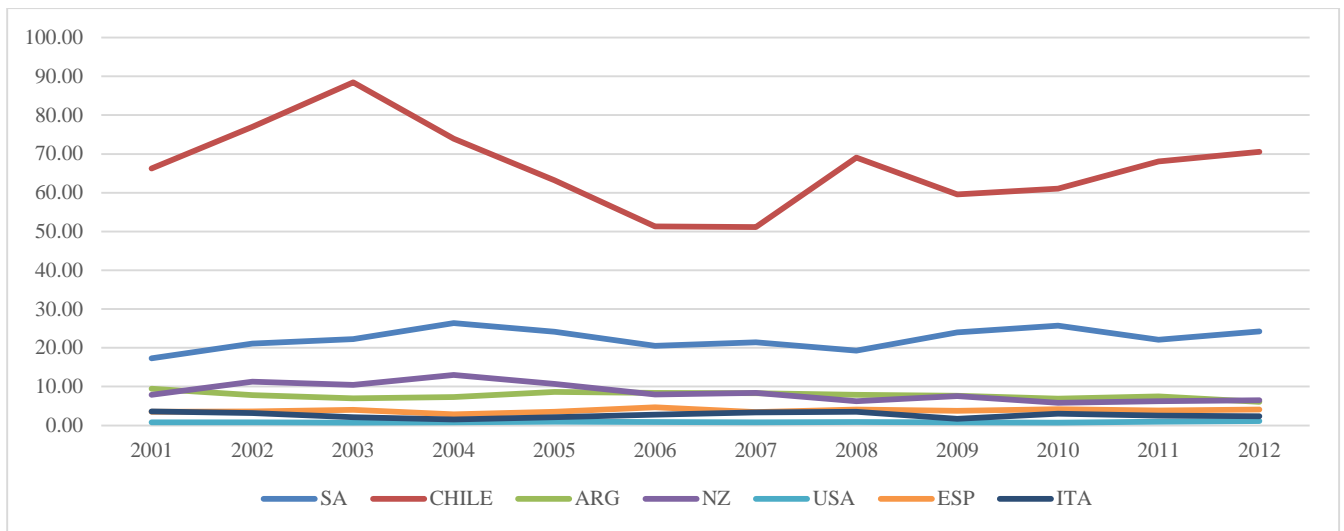
Figure 5.2.11 Deciduous fruit ITC RTA trends: SA compared globally (2001 to 2012)

Source: Author's own calculations based on data from ITC (2014)

Stone fruit belong to the fruit category grouping of deciduous fruit, hence analyses of this fruit grouping provide noteworthy results, as several industry stakeholders are involved in value chain positions in the fruit grouping as a holistic entity. In Figure 5.2.12 and Figure 5.2.13 it is apparent that the SA citrus industry leads the production of South African fruit and wine products. A huge contributing factor is that RSA is the world's second largest exporter of citrus, where a relatively larger percentage (21% for 2011 volumes) of total produce amounts for fresh exports FAO (2014). Nevertheless, the deciduous fruit industry is the runner-up, and outperforms other industries such as the wine, tropical fruit, exotic fruit and nut[56] industries.

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[56] Includes fruits that have not been specified elsewhere.
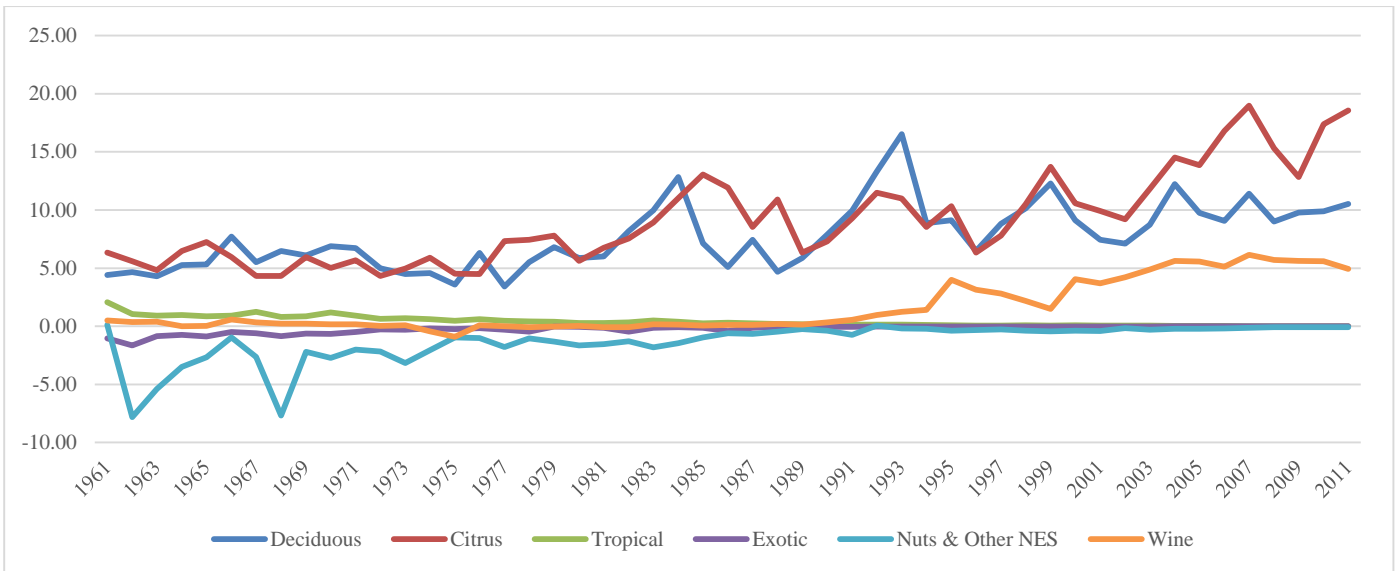
Figure 5.2.12 SA fruit and wine FAO RTA trends (1961 to 2011)

Source: Author's own calculations based on data from FAO (2014)
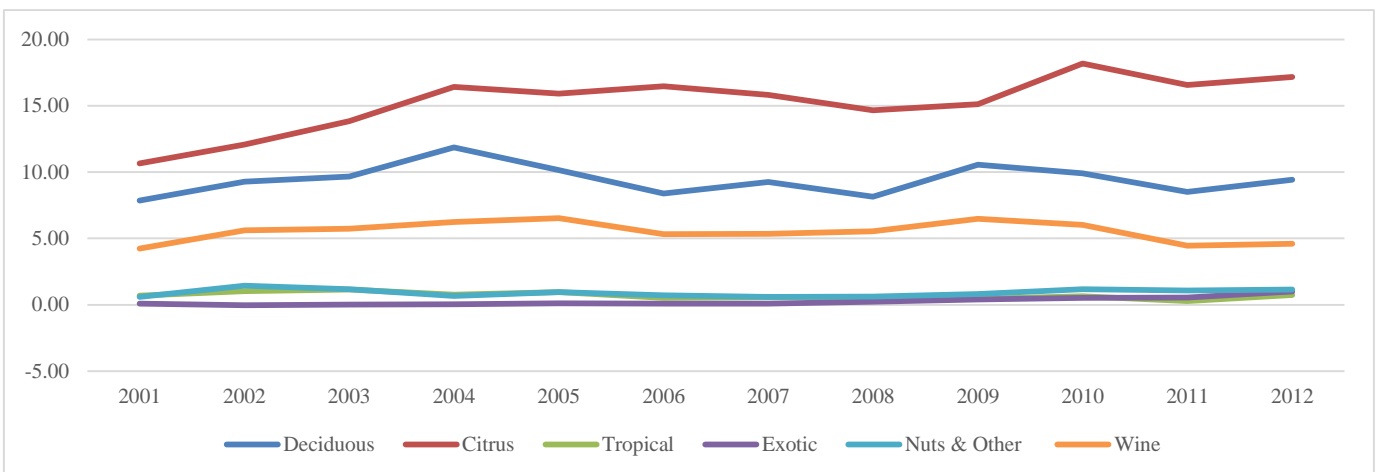
Figure 5.2.13 SA fruit and wine ITC RTA trends (2001-2012)

Source: Author's own calculations based on data from ITC (2014)

5.2.6. Conclusion on RTA

The South African plum industry outranks all competitors in the RSA deciduous fruit basket. As of 1997 (post-deregulation), the performance of plums has been on a par with that of pears, but since 2008 plums outrank all other deciduous fruit types in both the agricultural index (FAOSTAT data) and the multi-sector index (ITC data).

The RSA stone fruit industry furthermore competes on a lower level than the pome fruit and table grape industry, but still outranks fruit industries such as the tropical fruit, exotic fruit and nut industries, and operates on par with the SA wine industry.

In the international field of stone fruit competitiveness, the SA industry is the runner-up in the first league behind Chile – the clear leader in this environment. As stone fruit form part of the deciduous fruit grouping within the larger fruit and nut grouping, SA can be considered as a major competitor in this broad set of industries, not only in the SH, but also in NH countries.

5.3. The factors influencing the competitive performance of the SA stone fruit industry (Step 3)

In this section, the findings from and results of the Stone Fruit Executive Survey (SFES) (Appendix C) are considered to identify the major factors affecting the competitive performance of the industry in both a constraining and enhancing manner.

5.3.1. Descriptive analyses

Table 5.3.1 describes the demography of the SFES respondents, i.e. differentiates between fruit type, value chain position, functional role players, stakeholder types and sizes, to clarify the nature of the respondents and to identify the major determinants.

Table 5.3.1 Demographic description of SFES sample

Fruit type involved	Frequency	Percentage (n = 50)
Plums	43	86.0
Peaches	36	72.0
Nectarines	32	64.0
Apricots	20	40.0
Prunes	10	20.0
Cherries	10	20.0
Peaches & nectarine combined	37	74.0
Plums & prunes combined	43	86.0
Cherries & apricots combined	22	44.0

Industry activities involved	Frequency	Percentage (n = 50)
Fresh	50	100.0
Dried & other processing combined	12	24.0
Processing	9	18.0
Dried	6	12.0

Value chain position	Frequency	Percentage (n = 50)
Producer	34	68.0
Pack house / processor	20	40.0
Exporter / marketer	14	28.0
Input / service provider	11	22.0

Value chain roles;	Frequency	Percentage (n = 50)
Producer & pack house / processor	14	28.0%
Producer only	13	26.0%
Input supplier only	9	18.0%
Exporter / marketer only	7	14.0%
Producer & pack house / processor & exporter / marketer	5	10.0%
Input supplier & producer & pack house / processor	1	2.0%
Input supplier & producer	1	2.0%

Size of primary (farm) producers	Frequency	Percentage (n = 34)
< 5 ha	3	8.8%
6–15 ha	7	20.6%
16–25 ha	5	14.7%
26–50 ha	9	26.5%
> 50 ha	10	29.4%

Size of pack house / processor	Frequency	Percentage (n = 20)
< 100 t	1	5.0%
100 t – 1 000 t	11	55.0%
1000 t – 10 000 t	5	25.0%
> 10 000 t	3	15.0%

Size of exporter / marketer	Frequency	Percentage (n = 14)
< 100 000 cartons	6	42.9%
100 000–500 000 cartons	1	7.1%
500 000–1 000 000 cartons	1	7.1%
> 1 000 000 cartons	6	42.9%

Source: SFES (2014) and SPSS calculations (2014)

From Table 5.3.1 it is apparent that 86% of the respondents are involved with the plum industry – the top performer, followed by peaches, with 72%, and nectarines with 64%. All of the respondents are involved with fresh stone fruit. As most of the respondents claim involvement in more than one functional role in the value chain, the combined functional positions in the chain with their respective frequency percentages are illustrated. The relevant size (or capacity) of producers, pack

houses/processors and exporters/marketers are also presented, indicating a relatively balanced response pattern, with a slight bias towards larger farming sizes.

5.3.2. The competitiveness factors

In this section, the factors influencing the competitiveness of the SA stone fruit industry are listed in Figure 5.3.1, according to their rating in the SFES (average ratings of respondents' scores per factor).

Differences in the views of role players will be considered through a cluster analysis, where; **Cluster 1** contains a larger share of role players who are 'input suppliers only', 'exporter/marketer only', as well as 'producer and pack house/processor' and 'exporter/marketer', hence referred to as the *Agribusiness orientated* cluster. **Cluster 2** (Producer orientated) contains a larger share of role players who are 'producers only', as well as 'producers and pack house/processors combined', and referred to as the *Producer orientated'* cluster. **General industry** refers to the combined (entire) stone fruit responses irrespective of the functional value chain position claimed and the scores/ratings for this category grouping are presented as the *Industry average* scores.
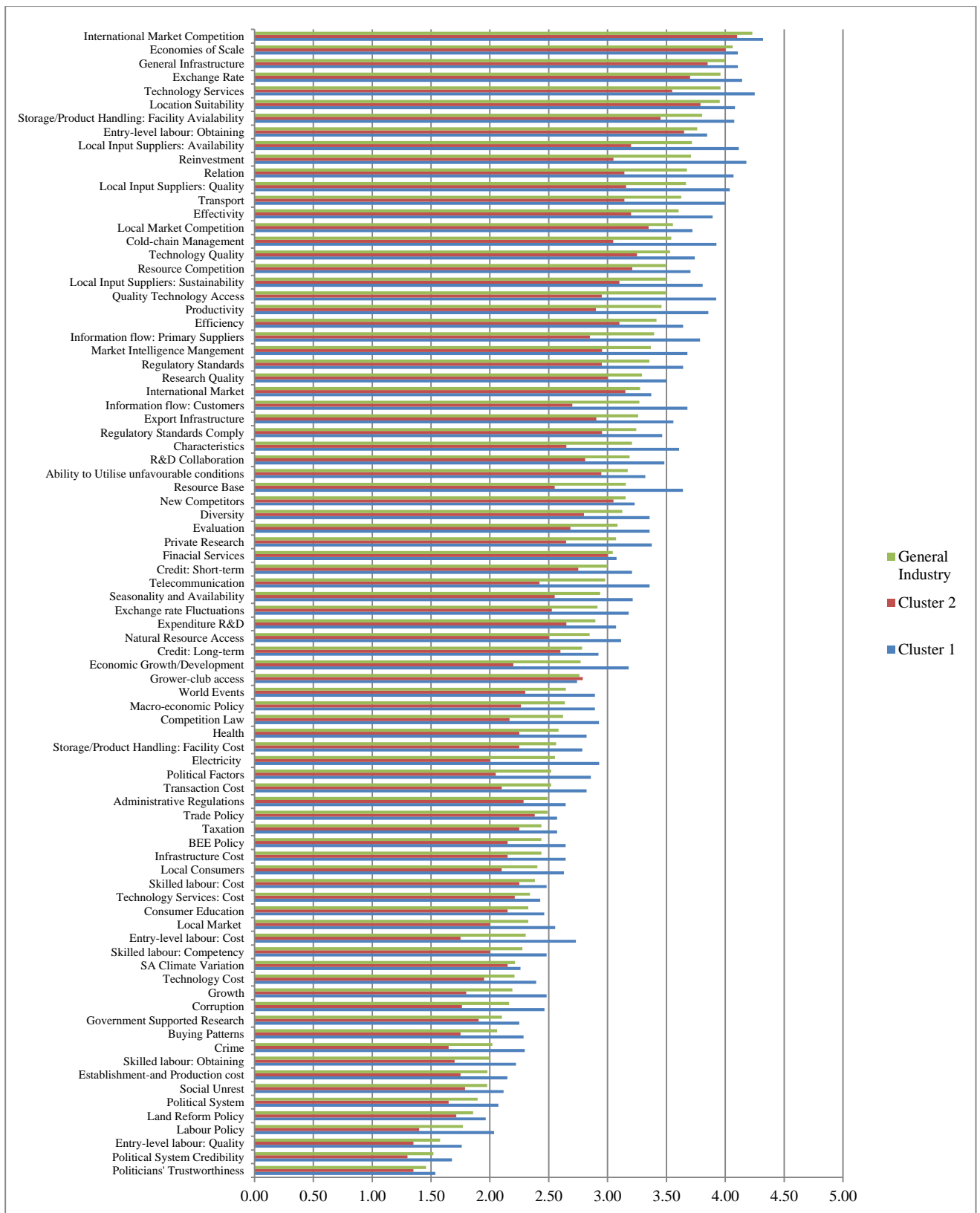
Figure 5.3.1 Rating of factors influencing the stone fruit industry's competitive performance

Source: SFES (2014) and SPSS calculations (2014)

Notes:

Cluster 1 =Agribusiness orientated; Cluster 2 =Producer orientated; General industry =Industry average

Scores/ratings: 0 = most constraining, 3 = neutral rating, and 5 = most enhancing

A total of 84 factors were identified. The most enhancing factor for competitiveness in the industry was international market competitiveness, rated with a factor of 4.23 out of 5. The most constraining factor – political trustworthiness, was rated 1.46 out of 5, where 1 indicates most constraining.

Table 5.3.2 portrays the distribution of the respective scores, namely the share of factors that scored within the relevant frontiers – above 3, at 3, and below 3 – for each cluster. Less than 2.5% of the factors scored a rating of 3 – accentuating that the questionnaire was validated by the relevance and spread of responses regarding their impact on competitive performance, hence eliminating indecisiveness.

Table 5.3.2 Distribution of responses according to rating – Questionnaire validation

Rating of 84 factors	Cluster 1	Cluster 2	Industry average
Factors scoring a rating above 3	54.76%	26.19%	46.43%
Factors scoring a rating at 3	0.00%	2.38%	1.19%
Factors scoring a rating below 3	45.24%	71.43%	52.38%

Source: SFES (2014) and SPSS calculations (2014)

The top 10 factors and the bottom 10 factors are listed in Table 5.3.3 as general industry averages.

Table 5.3.3 Most enhancing and most constraining factors

Top 10 enhancing factors	Industry Average score	Top 10 constraining factors	Industry Average score
International market competition	4.23	Politicians' trustworthiness	1.46
Economies of scale	4.06	Political system credibility	1.52
General infrastructure	4	Entry-level labour: Quality	1.58
Technology services: Availability	3.96	Labour policy	1.77
Devaluating exchange rate	3.96	Land reform policy	1.86
Location suitability	3.95	Political system	1.92
Storage/product handling: Facility availability	3.8	Establishment and production cost	1.98
Entry-level labour: Obtaining	3.76	Skilled labour: Obtaining	2
Local input suppliers: Availability	3.72	Social unrest	2.02
Reinvestment	3.71	Crime	2.04

Source: SFES (2014) and SPSS calculations (2014)
Notes:
Scores/ratings: 0 = most constraining, 3 = neutral rating, and 5 = most enhancing

Most of the enhancing factors, with the exception of the positive impact of a devaluating exchange rate, relate to aspects that can be dealt with internally by firms and industry bodies, i.e. referring to firm-level strategies and collective industry/government action. The listing of being competitive in the international market as the most important driver in the industry's ability to compete confirms Porter's views on the relevance of rivalry for competitive performance (Porter, 1990).

When considering the constraints it can be noted that factors outside the direct industry and/or firm-level control feature prominently. Politicians' trustworthiness and political system credibility indicate serious trust and confidence issues for the industry that have to be addressed with government and political groupings, including related matters such as government policies, labour relationships and land reform. The *Political system* factor in this study refers to the political system in the broad-spectrum (in general) and the capacity to which it impacts on competitiveness (enhancing or constraining, in this context, constraining). The listing of social unrest and crime as the most constraining also point to relationship problems within the greater economic environment.

5.3.3. Cluster analyses

In order to consider possible differences in views on competitiveness between the functional role players in the value chain, a cluster analysis was carried out to determine whether significant opinion groupings exist and whether these correlate with different functions in the value chain, i.e. functional opinion cluster analysis. The results of the cluster analysis are shown in Table 5.3.4., where the percentages for Cluster 1, Cluster 2 and the General industry refers to the corresponding share(%) for each item/activity/type/form in the row.

Table 5.3.4 Cluster analysis

Fruit type	Cluster 1	Cluster 2	General industry	Chi-square	df	p	Comment
Fruit type: Peach	67.9%	76.2%	71.4%	0.408	1	.523	NSSD
Fruit type: Plum	92.9%	76.2%	85.7%	2.722	1	.099	Significantly higher share of cluster 1 involved in plum production (p < 0.1)
Fruit type: Prunes	25.0%	9.5%	18.4%	2.862	2	.239	NSSD
Fruit type: Nectarine	60.7%	66.7%	63.3%	0.183	1	.669	NSSD
Fruit type: Apricot	46.4%	28.6%	38.8%	1.612	1	.204	NSSD
Fruit type: Cherry	28.6%	4.8%	18.4%	4.537	1	.033	Significantly higher share of cluster 1 involved in cherry production (p < 0.05)

Product form (segment)	Cluster 1	Cluster 2	General industry	Chi-square	df	p	Comment
A6_1_Form_Fresh	100.0%	100.0%	100.0%	N/A	N/A	N/A	NSSD
A6_2_Form_Dried	17.9%	5.0%	12.5%	1.763	1	.184	NSSD
A6_3_Form_Processed	17.9%	20.0%	18.8%	0.035	1	.851	NSSD
A6_Form_Dried And Processed	21.4%	28.6%	24.5%	0.331	1	.565	NSSD

Value chain position	Cluster 1	Cluster 2	General industry	Chi-square	df	p	Comment
A7_1_SC_position_Input_service	28.6%	10.0%	20.8%	2.44	1	.118	NSSD
A7_2_SC_position_producer	53.6%	95.0%	70.8%	9.692	1	.002	Significantly higher share of cluster 2 is producers (p < 0.01)
A7_3_SC_position_Packhouse_processor	35.7%	50.0%	41.7%	0.98	1	.322	NSSD
A7_4_SC_position_Exp_marketer	39.3%	14.3%	28.6%	3.675	1	.055	Significantly higher share of cluster 1 is exporters / marketers (p < 0.1)

Producer size	Cluster 1	Cluster 2	General industry	Chi-square	df	p	Comment
< 5 ha	0.0%	15.8%	8.8%	3.431	4	.488	NSSD
6–15 ha	20.0%	21.1%	20.6%				
16–25 ha	13.3%	15.8%	14.7%				
26–50 ha	26.7%	26.3%	26.5%				
> 50 ha	40.0%	21.1%	29.4%				
Total	100.0%	100.0%	100.0%				

Pack house / processor size	Cluster 1	Cluster 2	General industry	Chi-square	df	p	Comment
< 100 t	0.0%	10.0%	5.0%	8.073	3	.045	Cluster 1 has significantly larger capacities than cluster 2
100 t – 1 000 t	30.0%	80.0%	55.0%				
100 t – 10 000 t	40.0%	10.0%	25.0%				
> 10 000 t	30.0%	0.0%	15.0%				
Total	100.0%	100.0%	100.0%				

Exporter / marketer size	Cluster 1	Cluster 2	General industry	Chi-square	df	p	Comment
< 100 000	36.4%	66.7%	42.9%	1.131	3	.770	NSSD
100 000–500 000	9.1%	0.0%	7.1%				
500 000–1 000 000	9.1%	0.0%	7.1%				
> 1 000 000	45.5%	33.3%	42.9%				
Total	100.0%	100.0%	100.0%				

Source: SFES (2014) and SPSS calculations (2014)

The cluster analysis was conducted in terms of the average scores for all the statements on the competitiveness of the South African stone fruit industry (Figure 5.3.1). Two clusters were identified. Cluster 1 generally expressed higher scores, i.e. more enhancing, for numerous statements – 61 out of 84 factors, in comparison with Cluster 2 (see Appendix E, Table E.6 and Appendix E.8). In Table 5.3.5, the functionality related to the value chain roles of the two clusters is shown.

Both cluster express similar involvement in peaches, prunes, nectarines and apricots. Both clusters are largely involved with fresh fruit activities, but Cluster 1 is more involved with plums and cherries than Cluster 2. Cluster 1 contains a larger share of exporters/marketers, whilst Cluster 2 contains a larger

share of primary producers and related functions. Hence, Cluster 1 refers mainly to respondents who are involved in marketing and/or export activities of SA stone fruit, i.e. agribusiness-orientated role players in the downstream value-adding functions of the value chain; whilst Cluster 2 contains respondents who are more involved with the producing and packing/processing of stone fruit in South Africa, i.e. farm production and the related up-stream side of the value chain.

Table 5.3.5 Cluster 1 and Cluster 2 analysed in terms of combined supply chain roles

Combined supply chain role(s):		Cluster 1	Cluster 2	Total sample	Chi-square	df	p
Producer only	Count	4	9	13			
	%	30.80%	69.20%	100.00%			
Producer & pack house/processor	Count	6	8	14			
	%	42.90%	57.10%	100.00%			
All three	Count	4	1	5			
	%	80.00%	20.00%	100.00%	11.288	4	0.024
Input only	Count	7	1	8			
	%	87.50%	12.50%	100.00%			
Exporter/Marketer only	Count	6	1	7			
	%	85.70%	14.30%	100.00%			
Total sample	Count	27	20	47			
	%	57.40%	42.60%	100.00%			

Source: SFES (2014) and SPSS calculations (2014)

From the analyses of the information in Table 5.3.5, it is apparent that a statistically significant difference ($p < 0.05$) is expressed in terms of the following;

- Cluster 1 (Agribusiness orientated) contains a larger share of role players who are 'input suppliers only', 'exporter/marketer only', as well as 'producer and pack house/processor' and 'exporter/marketer'.
- Cluster 2 (Producer orientated) contains a larger share of role players who are 'producers only', as well as 'producers and pack house/processors combined'.

Important differences are depicted in Figure 5.3.1. From these findings, an analysis of the 10 most enhancing and most constraining factors for the two respective clusters are illustrated in Table 5.3.6.

Table 5.3.6 Most enhancing and most constraining factors for the two clusters

CLUSTER 1: Agribusiness orientated			
Top 10 enhancing factors	**Average score cluster 1**	**Top 10 constraining factors**	**Average score cluster 1**
International market competition	4.32	Politicians' trustworthiness	1.54
Technology services	4.25	Political system credibility	1.68
Reinvestment	4.18	Entry-level labour: Quality	1.76
Exchange rate	4.14	Labour policy	2.04
Local input suppliers: Availability	4.12	Land reform policy	1.96
General infrastructure	4.11	Political system	2.07
Economies of scale	4.11	Social unrest	2.12
Location suitability	4.08	Establishment and production cost	2.15
Storage/product handling: Facility availability	4.08	Skilled labour: Obtaining	2.22
Relation	4.07	Crime	2.30
CLUSTER 2: Primary producer orientated			
Top 10 enhancing factors	**Average score cluster 2**	**Top 10 constraining factors**	**Average score cluster 2**
International market competition	4.10	Politicians' trustworthiness	1.35
Economies of scale	4.00	Political system credibility	1.30
General infrastructure	3.85	Entry-level labour: Quality	1.35
Location suitability	3.79	Labour policy	1.40
Exchange rate	3.70	Land reform policy	1.71
Entry-level labour: Obtaining	3.65	Political system	1.65
Technology services	3.55	Social unrest	1.79
Storage/product handling: Facility availability	3.45	Establishment and production cost	1.75
Local market competition	3.35	Skilled labour: Obtaining	1.70
Technology quality	3.25	Crime	1.65

Source: SFES (2014) and SPSS calculations (2014)
Notes:
Scores/ratings: 0 = most constraining, 3 = neutral rating, and 5 = most enhancing

There is some level of alignment between the top 10 most enhancing factors for both clusters, with the exception of reinvestment in stone fruit operations,– which is more relevant in Cluster 1, and also the importance of relationship management with international clients. Cluster 2, on the other hand, shows that entry-level labour is more easily obtained (Cluster 1 requires more scarce-skills labour than entry-level labour), and local market competition is more intense. The top 10 most constraining factors are ranked in exactly the same order by both clusters; however, the average scores differ slightly.

This all indicates a strong alignment in the industry as a whole and provides a strong platform for collaboration relating to the particularly constraining factors mentioned above that require industry-level actions. The abovementioned analysis also implies that primary producers and/or pack houses/processors are generally somewhat more pessimistic and express less positive statements on factors affecting competitiveness in the South African stone fruit industry. The respondents further are

integrated vertically in the value chain the more they seem to be less negative on factors related to competitiveness. This phenomenon is analysed further below in terms of the Porter diamond (Step 4), and could be relevant in the development of industry strategies to improve competitive performance (Step 5).

5.3.4. Analyses of variance of ratings

To test whether the average rating scores or statements differed significantly for different role players in the value chain and also in relation to the size of the business, ANOVA (analyses of variance) was employed (Keller & Warrack, 2000).

Primary producers were grouped as Producer < 26 ha and Producer > 26 ha. ANOVA found few statistically significant differences between smaller and larger producers. Smaller producers were more positive about the competitiveness impact factors, referring to costs of infrastructure and technology, and transaction cost. On the other hand, larger producers were positive about businesses' collaboration in R&D activities, and willingness to reinvest in stone fruit operations. The issues brought forth by the role of government were also viewed more positively by the larger producers. Economic growth and development were seen in a more positive light by the larger producers (see Appendix E, Table E.2). It could be deducted that larger producers have more scope to assist with the positioning of the industry and that smaller producers rather are 'fighting for survival' – a cost strategy vs. a positioning strategy (Furceri & Karras, 2007; Conradie, 2008; Liapis, 2011).

Pack houses and/or processors were grouped as up to 1 000 tons and more than 1 000 tons. ANOVA again resulted in very few statistically significant differences between smaller and larger pack houses/processors. However, the larger pack houses or processors were more positive about access to quality technology, the cost of entry-level labour and their level of efficiency. They were also generally more positive about issues surrounding the factors involved in relating and supporting industries. The larger producers were less negative about the competition law of SA and they complied more easily with the regulatory standards. The exchange rate, regardless of its fluctuation, was viewed as more enhancing by the larger pack houses and/or processors (see Appendix E, Table E.3). Larger pack houses or processors could thus be viewed as more robust and resilient, as they could attract scarce resources more efficiently and effectively by positively exploiting the 'rules of the game'.

Exporters and/or marketers were grouped according to whether they handled less or more than 500 000 cartons, as few statistically significant differences previously were found between smaller and larger exporters/marketer on the basis of ANOVA. The smaller exporters generally were more positive about the quality of technology, the size and growth in the local market, and consumers' product interaction in the local market than the larger exporters. However, the larger role players were positive about the cost of skilled labour, their relationship with overseas clients, telecommunications services and the notion of the SA stone fruit industry's ability to utilise the impact of unfavourable weather

patterns on competitors (see Appendix E, Table E.4). It could be deduced that larger marketers/exporters were exposed more to the export environment and focused less on the local market.

The phrase, "size does not really matter except where it matters", was investigated in an empirical study by Furceri and Karras (2007), whose results suggested very strongly that the relationship between country size and business cycle volatility is negative and statistically significant – implying that smaller countries are subject to more volatile business cycles than larger countries. To draw this finding into the context of this study of the stone fruit industry – the same result is apparent in that smaller businesses in the industry are considered more vulnerable to volatile business cycles in the stone fruit industry than larger businesses.

5.3.5. Principle component analysis

Principle component analysis (PCA) was applied to identify redundant (highly correlated) variables, i.e. factor ratings in the data set for which individual responses were very similar/ concentrated – to be viewed as consensus factors, as well as uncorrelated variables, i.e. factors to which respondents gave a more variable range of rating values – to be viewed as variation factors. The objective of this analysis was to yield a dataset containing information to ease strategic planning processes, i.e. to differentiate between variation and consensus factors as basis for industry level discussions and actions.

The ranking of factors was based on their individual scores in the SFES. However, the scoring of some factors may represent a higher consensus rating, with many respondents agreeing, whilst others may show a lower consensus rating i.e. not many agreeing to the same score. In order to determine the degree of correlation and consensus per rating of each SFES factor, a PCA was conducted. The results of these analyses are given below.

The overall average scores are illustrated in Table 5.3.7 in the format of the Porter diamond model of competitiveness. The six determinants of the model are rated separately. The questions within each section/factor are ranked from most enhancing to most constraining. The top 10 most enhancing determinants and the top 10 most constraining factors are presented in Table 5.3.3 (see Appendix E Table E.2 for the whole list, ranked top to bottom).

The coupled PCA result per question and per the six Porter determinants is illustrated accordingly in Table 5.3.7. In the PCA, most of the extraction values were high, thus indicating the variance in each variable accounted for by the components. The extraction components represent the variables well. An item/question was interpreted as loading on a given component (i.e. not being highly correlated) if the factor loading was 0.40 or greater and less than 0.40 for the other. (See Chapter 3.6. Appendixes E1, E2, E3, E4, E5 and E6 for the detailed PCA results.) This principle component analysis was also conducted for the factors within each of the determinants of the Porter diamond model – in Step 4 below.

Table 5.3.7 PCA scores of SFES factors in terms of internal consistency

	Porter determinant: Production factor conditions			
	Specific question	**Number of observations**	**Average rating score by entire sample**	**PCA**
B1	General infrastructure	48	4.00	NRLCV
B17	Location suitability	43	3.95	NRLCV
B13	Entry-level labour: Obtaining	46	3.76	NRLCV
B21	Effectivity	48	3.60	*RHC*
B5	Technology quality	47	3.53	NRLCV
B6	Quality technology access	46	3.50	NRLCV
B20	Productivity	48	3.46	*RHC*
B22	Efficiency	48	3.42	*RHC*
B4	Research quality	48	3.29	NRLCV
B9	Credit: Short-term	44	3.00	NRLCV
B16	Natural resource access	46	2.85	NRLCV
B8	Credit: Long-term	46	2.78	NRLCV
B3	Transaction cost	48	2.52	NRLCV
B2	Infrastructure cost	48	2.44	NRLCV
B12	Skilled labour: Cost	47	2.38	NRLCV
B15	Entry-level labour: Cost	46	2.30	NRLCV
B11	Skilled labour: Competency	47	2.28	NRLCV
B19	SA climate variation	48	2.21	NRLCV
B7	Technology cost	47	2.21	*RHC*
B10	Skilled labour: Obtaining	47	2.00	NRLCV
B18	Establishment and production cost	47	1.98	NRLCV
B14	Entry-level labour: Quality	45	1.58	NRLCV

	Porter determinant: Demand, market factors			
	Specific question	**Number of observations**	**Average rating score by entire sample**	**PCA**
C10	Relation	49	3.67	NRLCV
C5	International market	47	3.28	NRLCV
C9	Characteristics	48	3.21	NRLCV
C6	Diversity	48	3.13	NRLCV
C8	Seasonality and availability	48	2.94	*RHC*
C2	Local consumers	47	2.4	NRLCV
C4	Consumer education	46	2.33	NRLCV
C1	Local market	46	2.33	NRLCV
C3	Growth	47	2.19	NRLCV
C7	Buying patterns	48	2.06	*RHC*

Porter determinant: Related and supporting industries			
Specific question	**Number of observations**	**Average rating score by entire sample**	**PCA**
D10	Technology services: Availability	48	3.96	*RHC*
D15	Storage/product handling: Facility availability	46	3.80	*RHC*
D12	Local input suppliers: Availability	46	3.72	NRLCV
D17	Transport: Reliability	45	3.67	*RHC*
D13	Local input suppliers: Quality	48	3.63	NRLCV
D18	Cold-chain management	48	3.54	NRLCV
D14	Local input suppliers: Sustainability	46	3.50	NRLCV
D19	Export infrastructure	46	3.26	*RHC*
D7	R&D collaboration	48	3.19	*RHC*
D4	Evaluation	47	3.09	NRLCV
D2	Private research	41	3.07	NRLCV
D1	Financial services	46	3.04	NRLCV
D9	Telecommunication	47	2.98	NRLCV
D6	Expenditure R&D	48	2.90	*RHC*
D5	Grower-club access	46	2.76	NRLCV
D16	Storage/product handling: Facility cost	48	2.56	NRLCV
D8	Electricity	47	2.55	*RHC*
D11	Technology services: Cost	47	2.34	NRLCV
D3	Government research	49	2.10	NRLCV

Note: the first column above contains the question codes D10, D15, D12, D17, D13, D18, D14, D19, D7, D4, D2, D1, D9, D6, D5, D16, D8, D11, D3.

Porter determinant: Business strategy, structure and rivalry			
Specific question	**Number of observations**	**Average rating score by entire sample**	**PCA**
E6	International market competition	48	4.23	NRLCV
E7	Economies of scale	48	4.06	NRLCV
E8	Reinvestment	48	3.71	NRLCV
E4	Local market competition	45	3.56	NRLCV
E10	Resource competition	46	3.50	NRLCV
E1	Information flow: Primary suppliers	48	3.40	NRLCV
E3	Market intelligence Management	49	3.37	NRLCV
E2	Information flow: Customers	48	3.27	NRLCV
E9	Resource base	45	3.16	*RHC*
E5	New competitors	46	3.15	NRLCV

Porter determinant: Government support and policy				
	Specific question	**Number of observations**	**Average rating score by entire sample**	**PCA**
F9	Regulatory standards	48	3.35	NRLCV
F10	Regulatory standards comply	49	3.24	*RHC*
F4	Macro-economic policy	47	2.64	NRLCV
F5	Competition law	45	2.62	NRLCV
F1	Trade policy	48	2.52	*RHC*
F13	Political factors	49	2.49	*RHC*
F11	Administrative regulations	49	2.49	NRLCV
F6	BEE policy	48	2.44	NRLCV
F12	Taxation	48	2.44	NRLCV
F14	Corruption	49	2.16	*RHC*
F2	Land reform policy	49	1.86	NRLCV
F3	Labour policy	48	1.77	NRLCV
F7	Political system credibility	48	1.52	NRLCV
F8	Politicians' credibility	48	1.46	NRLCV

Porter determinant: Chance of opportunity factors				
	Specific question	**Number of observations**	**Average rating score by entire sample**	**PCA**
G1	Exchange rate	49	3.96	NRLCV
G3	Ability to utilise unfavourable conditions	48	3.17	NRLCV
G2	Exchange rate fluctuations	48	2.94	NRLCV
G8	Economic growth/development	49	2.78	NRLCV
G9	World events	49	2.65	NRLCV
G7	Health	49	2.59	NRLCV
G4	Social unrest	48	2.04	NRLCV
G6	Crime	46	2.02	NRLCV
G5	Political system	49	1.92	NRLCV

Source: SFES (2014) and SPSS calculations (2014)
Notes:
RHC = Redundant Highly Correlated
NRLCV = Non-least-correlated Variables

With PCA it is apparent that the respondents, regardless of their position in the value chain or relative size, perceived a few highly correlated variables (consensus), with other variables less correlated (a greater variation in opinions). These are presented in Table 5.3.7 and listed as RHC (highlighted).

To contextualise the findings of the PCA (consensus vs. variation on statements), the 84 factors were grouped according to their individual rating, with enhancing scores above 3.0 and constraining scores of 3.0 and below, as shown in Table 5.3.8 - setting the platform for strategies to be proposed to enhance the competitive performance of the stone fruit industry in Chapter 6.

Table 5.3.8 Strategic planning matrix: Enhancing and constraining (consensus/variation) factors

Porter determinant	Enhancing: Consensus (10)	Enhancing: Variation (29)	Constraining: Consensus (8)	Constraining: Variation (37)
Production factor conditions	Effectivity	General infrastructure	Technology cost	Credit: Short-term
	Productivity	Location suitability		Natural resource access
	Efficiency	Entry-level labour: Obtaining		Credit: Long-term
		Technology quality		Transaction cost
		Quality technology access		Infrastructure cost
		Research quality		Skilled labour: Cost
				Entry-level labour: Cost
				Skilled labour: Competency
				SA climate variation
				Skilled labour: Obtaining
				Establishment and production cost
				Entry-level labour: Quality
Demand, market factors		Relation	Seasonality and availability	Local consumers
		International market	Buying patterns	Consumer education
		Characteristics		Local market
		Diversity		Growth
Related and supporting industries	Technology services: Availability	Local input suppliers: Availability	Expenditure R&D	Telecommunication
	Storage/product handling: Facility availability	Local input suppliers: Quality	Electricity	Grower-club access
	Transport: reliability	Cold-chain management		Storage/product handling: Facility cost
	Export infrastructure	Local input suppliers: Sustainability		Technology services: Cost
	R&D collaboration	Evaluation		Government research
		Private research		
		Financial services		
Business strategy, structure and rivalry	Resource base	International market competition		
		Economies of scale		
		Reinvestment		
		Local market competition		
		Resource competition		
		Information flow: Primary suppliers		
		Market intelligence management		
		Information flow: Customers		
		New competitors		
	Regulatory standards comply	Regulatory standards	Trade policy	Macro-economic policy

Government support and policy			Political factors	Competition law
			Corruption	Administrative regulations
				BEE policy
				Taxation
				Land reform policy
				Labour policy
				Political system credibility
				Politicians' trustworthiness
Chance of opportunity factors		Exchange rate		Exchange rate fluctuations
		Ability to utilise unfavourable conditions		Economic growth/development
				World events
				Health
				Social unrest
				Crime
				Political system

Source: SFES (2014) and SPSS calculations (2014)

5.4. Identifying and analysing the Porter diamond determinants (Step 4)

5.4.1. The Porter diamond model

The next step in the competitiveness analysis of the South African stone fruit industry pertains to the application of the Porter diamond model to identify the determinants of competitive performance. Appendix E contains the complete list of statements for each such factor in Table E.6.

Analysing the 84 factors of competitiveness within the framework of the Porter diamond model of competitiveness first required the grouping of these factors as sets into the Porter diamond model, viz. production factor conditions; demand/market factors; relating and supporting industries; firm-level business strategy structure and rivalry; government support and policy; and chance of opportunity factors.

Second, the respective SFES scores for the factor sets grouped into each determinant (aggregated out of five for each determinant) were calculated. A score closer to 5 represents more enhancing impact on competitive performance, whereas a score closer to 1 represents a more constraining impact on competitive performance for the purpose of the study. The general as well as the cluster scores are shown in Table 5.4.1 and the Porter determinants are rated out of five (the aggregated scores of all the factors in a particular cluster calculated out of 5). With this method, each Porter determinant carries an equal weight. The determining of realistic weightings was not possible from the SFES. This should however be investigated in further studies of this nature.

Table 5.4.1 Porter diamond model of competitiveness: Clusters and total scores

Porter determinants of competitiveness	Cluster 1	Cluster 2	General industry
Business strategy, structure and rivalry	3.81	3.22	3.55
Relating and supporting industries	3.39	2.80	3.14
Production factor conditions	3.08	2.45	2.81
Demand market factors	3.01	2.42	2.76
Chance of opportunity factors	2.90	2.33	2.66
Government support and policy	2.56	2.07	2.35

Source: SFES (2014) and SPSS calculations (2014)
Notes:
Scores/ratings: 0 = most constraining, 3 = neutral rating, and 5 = most enhancing

In Table 5.4.1, the respective score for each of the factors of competitiveness is rated from highest to lowest, where it is evident that the determinant depicting business strategy, structure and rivalry scores the best and the accompanying role of government scores the lowest. If a rating of 3 is considered neutral, with no constraining or enhancing effects, the SA stone fruit industry is like a six cylinder engine that is not running on full capacity. Four 'cylinders' enhance competitive performance but need improvement, but two 'cylinders' need dedicated attention.

When comparing the three graphs in Figure 5.4.1, Cluster 1, Cluster 2 and the General industry, it shows similarities in their views and experiences. The ranking of the respective determinants for each cluster and the general industry scores are similar, but there are differences in their relevant intensities towards more versus less enhancing and more versus less constraining. The primary producers in Cluster 2 experienced more constraining factors, as they are exposed more to the primary risks of production and fluctuations in climate, markets, etc. than the respondents integrated in and further up in the value chain. This depicts the different decision-making environments in which the respondents are operating. The similarity in patterns, however, clearly links these players to an industry-level decision-making environment, as shown in the radar graph (Figure 5.4.1).
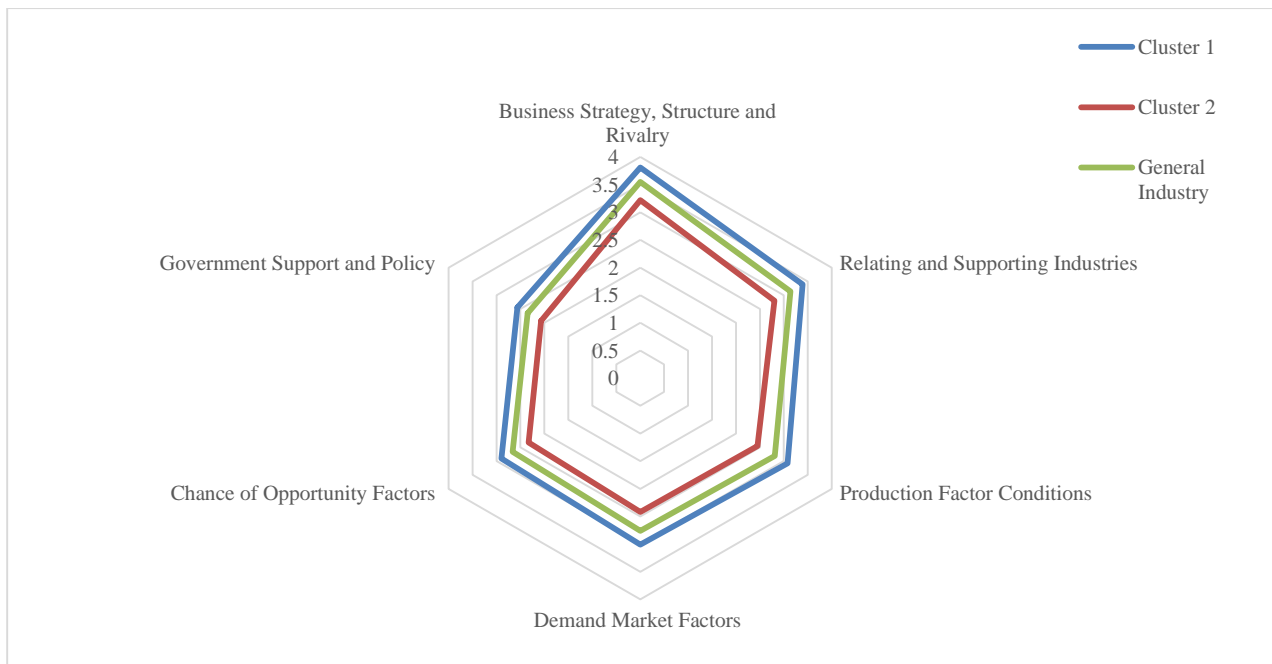
Figure 5.4.1 Porter determinants of competitiveness: Comparing clusters

Source: SFES (2014) and SPSS calculations (2014)

5.4.2. Analysing each of the Porter diamond determinants

The South African stone fruit industry is an agribusiness environment that is constantly challenged with a vast array of dynamics and elements that affect the decision-making environment of this industry for stakeholders, producers, marketer/exporters, input and service providers, product handlers and processors. From the SFES and industry consultation (BLES, 2014; FRUDATA, 2014; Industry Workshop, 2014; Joint Marketing Forum, 2014; PMA & FPEF, 2014; Rabe et al., 2014; SFES, 2014) it can be concluded that this industry and its stakeholders rely on the intricate management of trans-disciplinary issues, linkages and factors, viz. profit margins, value chain, mechanisation, yields, pack outs, price, land reform, climate risks and soil, inflation, transformation, energy, skills, innovation, cultivars, demand, tastes and preferences, productivity, economies of scale, quality, conservation, etc., to name but a few, to claim the position of preferred supplier of stone fruit globally.

In this section, each determinant is considered by investigating the factors impacting on competitiveness. The extended application of the PCA (the degree to which there is either a level of consensus or variation) to the factor groupings within each determinant for scores of above 3 and below 3 for each factor, as presented in Table 5.3.8., will direct the proposal of possible strategies for Step 5.

5.4.2.1. Production factor conditions

Twenty-two factors from the SFES are included in this determinant (Figure 5.4.2). Statements on general infrastructure, location of production, access to quality technology, ease of obtaining short-term

credit and entry-level labour, and productivity, efficiency and effectivity generally scored higher values. From the PCA, the constraining factor pertaining to technology cost, a high degree of consensus was recorded among respondents, where enhancing factors like effectivity, productivity and efficiency also recorded a high degree of consensus.

The following constraining factors, showing a high degree of variation in their ratings, will have to be investigated on a deeper level to consider a greater degree of agreement on strategic proposals: credit short term, natural resources access, credit long term, transaction cost, infrastructure cost, skilled labour cost, skilled labour competency, SA climate variation, skilled labour obtaining, establishment and production costs. Although there are be similarities between businesses and farming units, no two are generic (nor the same), as their capital structure, financial setup, entrepreneurial spirit, appetite for risk, investment portfolio, etc. are unique with its own challenges and opportunities and therefore the perception surrounding factors impacting on competitive performance might differ.
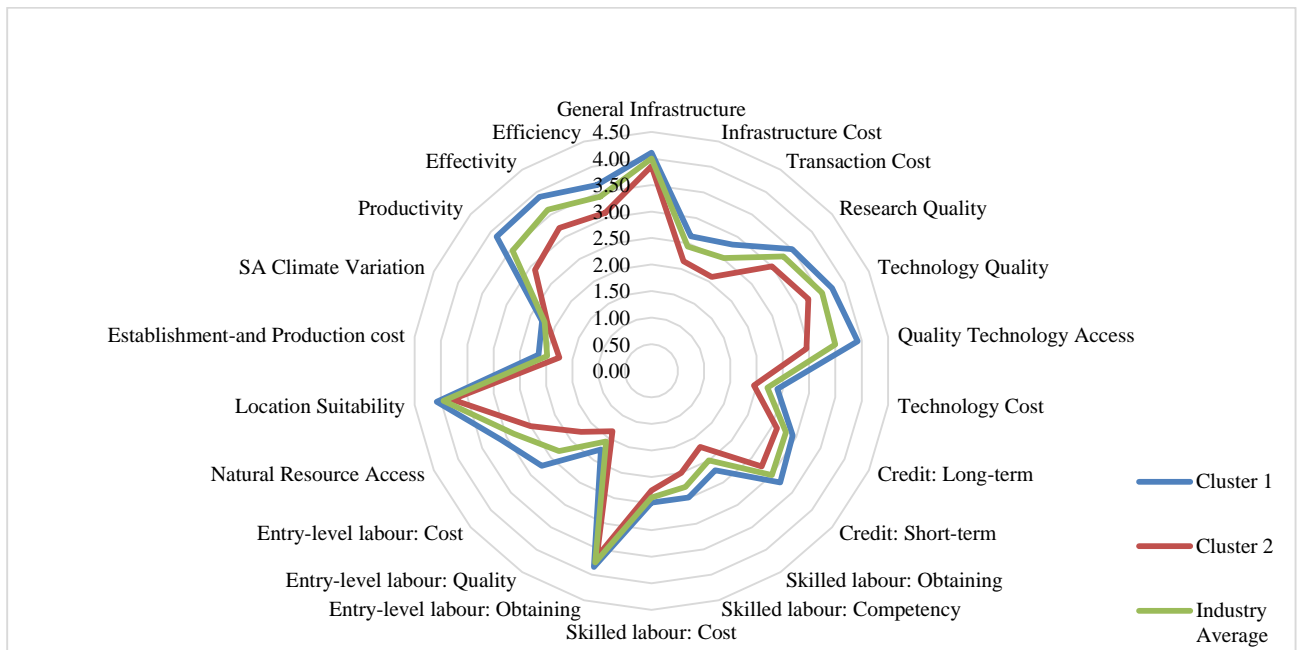
Figure 5.4.2 Ratings of factors in the production factor conditions determinant.

Source: SFES (2014) and SPSS calculations (2014)

Costs across the spectrum of factors, climate variation and the availability of skilled labour are issues giving rise to industry concerns. This implies that this industry will require increased investment in the training and education of the human capital (labour), along with improving cost-effective management throughout the value chain, without compromising quality, for the industry to increase its competitive performance. The degree to which the negative impact of climate variation can be managed is not only limited to the development of new and improved cultivars/varieties, but the role of improved productivity and effective/efficient orchard management practices at the forefront of technological innovation also will be vital to improve current performance levels.

Cluster 1 (agribusiness role players) generally scored more positive values than Cluster 2 (production level role players), indicating that firms operating in the agribusiness functions of the value chain are, to a lesser extent, exposed to the higher costs associated with the primary production level. Thus the effect of the price cost-squeeze is more apparent in Cluster 2 than in Cluster 1.

5.4.2.2. Demand conditions

The 10 factors falling within this determinant are shown in Figure 5.4.3. The highest factor scores – those enhancing competitive performance in both clusters, are relationships with overseas clients, size of the international market, and the seasonality and availability of produce marketed. The product characteristics and diversity of SA stone fruit are viewed as enhancing factors for competitive performance.

Figure 5.4.3 Demand/market factor conditions

Source: SFES (2014) and SPSS calculations (2014)

Local market growth and consumer education scored relatively low values, i.e. reflecting opinions that this factor constrains competitiveness performance. Cluster 1 (Agribusiness orientated) scored more positively across the board than Cluster 2 – as Cluster 1 is more engaged in and accustomed to the dynamics and nature of trade and marketing issues surrounding this determinant. From the PCA, two constraining factors on which there was a large degree of consensus between the respondents were the influence of adverse weather conditions on the buying patterns of international consumers and the seasonality and availability of stone fruit that are relatively limited.

Due to the limited shelf life of the products, stone fruit require adequate infrastructure and cooling and transport facilities to reach lucrative markets in Europe, USA, Africa, such as Nigeria, and the Indian Ocean rim islands, such as Indonesia, to mention a few. Foreign direct investment in these

potentially lucrative markets' infrastructure will stimulate stone fruit exports and lower the risk associated with trading perishable products with these markets (BLES, 2014; Joint Marketing Forum, 2014; PMA & FPEF, 2014; Rabe et al., 2014; SFES, 2014).

Detailed focus on and investment in the local market structures will also be required to stimulate demand for stone fruit domestically – an attribute that can be addressed by the concept of Kim and Mauborgne's (2005a) Blue Ocean Strategies (BOS), which will be presented in Chapter 6 – to propose the creation of uncontested marketspace in further research. Supplying an improved quality of a bigger quantity over a longer period of time in the market place at and increasing market value will holistically enhance competitive performance (Carew & Looney, 2007). The ability of stone fruit breeders and evaluators to select cultivars with these attributes and then communicate clear information to stakeholders through the supply and value chains of the South African stone fruit industry will be essential. The peril of competitiveness in agriculture can be ascribed to poor-quality cultivars, varieties, etc.

The need for directed attention to improve quality, form, consistency, utility, continuity and marketing period of fruit supplied to the international markets to have a longer shelf life, superior eating quality with increased yields is evident to all stakeholders involved with the activities of plant improvement and breeding, as stone fruit operations are labour and capital intensive. An extensive national cultivar breeding and evaluation programme, to which all industry players adhere, will be required to produce the tastes and preferences which are demanded in the market place.

Attention needs to be paid to several aspects relating to the local market to educate consumers by informing them sufficiently on quality, tastes, health benefits, etc. in order to stimulate local demand and expand growth in this market – as currently is being tapped by the Joint Marketing Forum (JMF) (2014).

5.4.2.3. Related and supporting industries

Industries, organisations and entities that form the support (input or supply) base and that are directly or indirectly related to the stone fruit industry are grouped within this determinant. The respondents generally viewed the 19 factors belonging within this determinant, of relevant and related industries, as enhancing regarding quality and availability of input suppliers and service providers, cold chain management and private research, but the high associated costs, electricity supply and the limited access to exclusive varieties and cultivars were viewed as less enhancing, as shown in Figure 5.4.4.
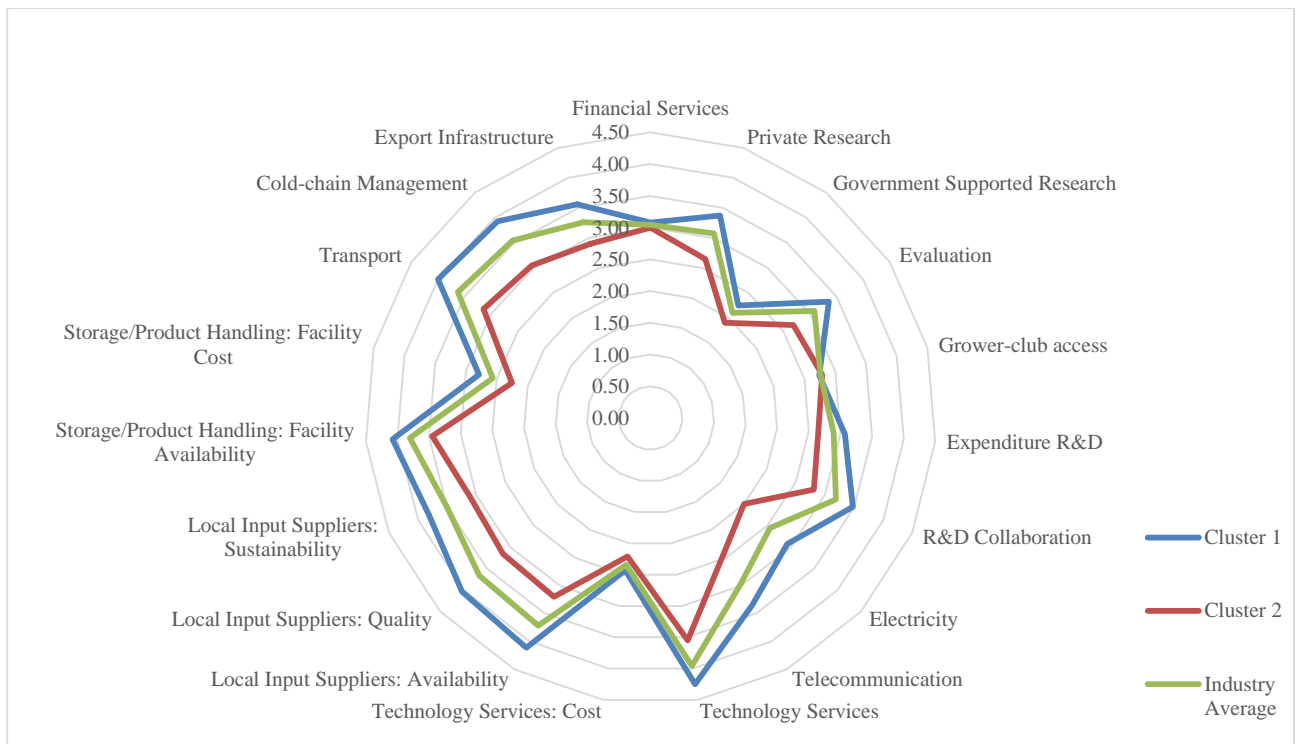
Figure 5.4.4 Relating and supporting industries

Source: SFES (2014) and SPSS calculations (2014)

Privately funded research and associated stone fruit services/products are viewed as more enhancing of competitive performance in the industry than the area where government is involved, which did not score high. This is cause for concern, as this was apparent throughout the assessment of the ability of government to contribute on this matter From the PCA there was a high degree of consensus between respondents on the following enhancing factors: availability of technology services, availability of product storage and handling facilities, export infrastructure, reliability of transport, and research and development collaboration. Constraining factors on which the respondents expressed a high a degree of consensus were electricity supply and the lack of expenditure on research on development. Cluster 1 (agribusiness orientated) generally expressed more optimistic/positive views on the relevant factors, possibly because they are more integrated into the value, input and supply chains.

Two constraining factors with a high degree of consensus, namely electricity supply and expenditure on research and development, 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. Other constraining factors, with varying levels of consensus that could be included in strategic approaches to enhance competitive performance include telecommunication, grower-club access, and storage/product handling: facility cost, technology services: cost, and government supported research (Agricultural Research Council).

5.4.2.4. Firm strategy, structure and rivalry

The 10 factors within this determinant generally scored high values. This determinant is most enhancing to the competitiveness of the industry analysed, and reflects a positive attitude in the industry related to the phase of competitiveness in which the industry now finds itself (see Section 5.2.2). International market competition scored a fairly high rating, as this relates to the mind-set of competitive behaviour expressed by the respondents. In general, all other statements on competitiveness in Figure 5.4.5 scored strong enhancing ratings in both clusters.
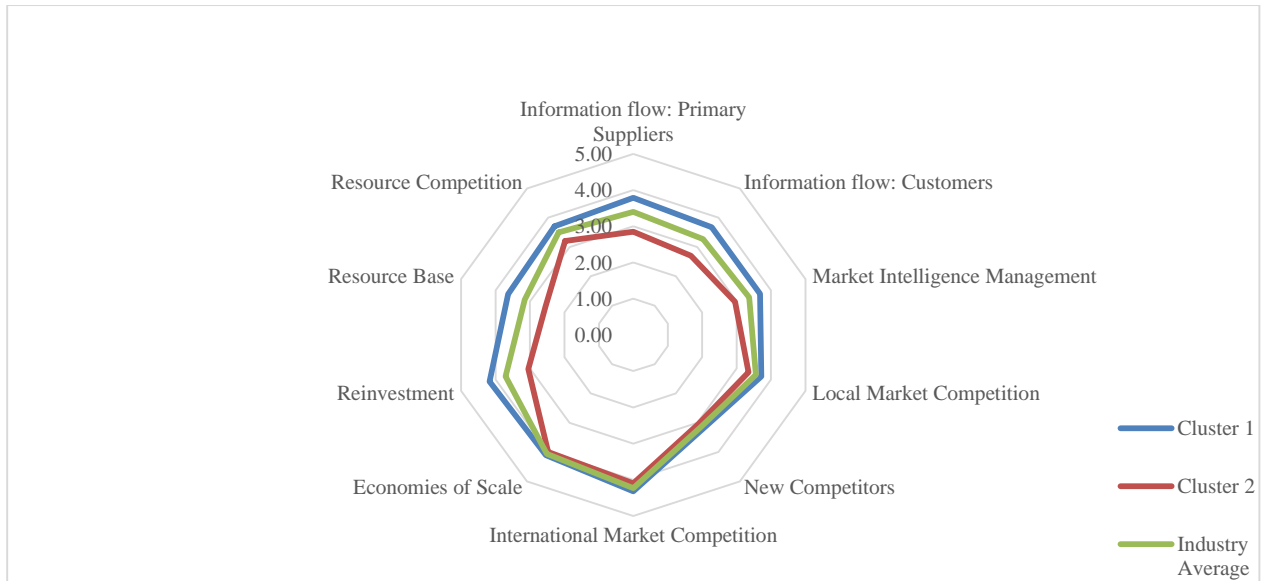
Figure 5.4.5 Firm strategy, structure and rivalry

Source: SFES (2014) and SPSS calculations (2014)

A high degree of consensus was found through PCA of the factor, resource base for projected stone fruit operations is sufficient, as expressed by the respondents, but Cluster 1 was keener to reinvest in stone fruit operations as their resource base was even more aligned to facilitate projected stone fruit operations. Additionally, Cluster 1 expressed more positive views on the factors and synergies regarding the flow of information and market intelligence, as Cluster 1 is more integrated into the value chain. The worldwide trend of increasing demand for agricultural drives up land prices and value, which has a positive effect on firms' balance sheets for investment purposes (Anseeuw *et al*., 2012; Deininger & Byerlee, 2012).

New competition is viewed as less enhancing to the competitive performance of the industry – in contrast to the view of Porter that the more competitors the better. This is understandable as 'own views', because firms, industries and nations are constantly competing for resources, on the perception that market share will decrease when new competitors enter the 'game'.

For this determinant to enhance the competitive performance of this industry, it is necessary that the flow of information and the management thereof are adequate and available in the desired format for all stakeholders, whilst not neglecting other enhancing factors. As the relative position and involvement in the value chain presents significant statistical differences, it is expected that conglomerations between smaller role players to integrate vertically into the value chain possibly would yield competitive performance enhancements. Consolidations, or perhaps improved value chain management functions, between industry role players and other stakeholder will be essential to improve not only the competitiveness of individual firms in this regard, but also of the industry as a whole.

The maintenance of financial management strategies to combat the cost/price squeeze at agribusiness and industry level, with a focus to the following cost points – transaction, infrastructure, labour, establishment, production, technology and storage/product-handling facility – is necessary without compromising the product quality and value (Crisosto, Mitchell & Johnson, 1995; Maree, 2006).

5.4.2.5. Government support and policies

Although some of the 14 factors within the determinant of government support and policies scored relatively low, indicating a disappointed performance by government agencies and policies, there were a few important factors that evidently contribute to the overall competitive performance of the industry. In Figure 5.4.6, both clusters stated that regulatory standards are cumbersome to execute because of red tape and slowness, but they nevertheless enhance competitive performance by ensuring adherence to internationally acclaimed production standards and related certification standards. Competition laws also scored relatively high.
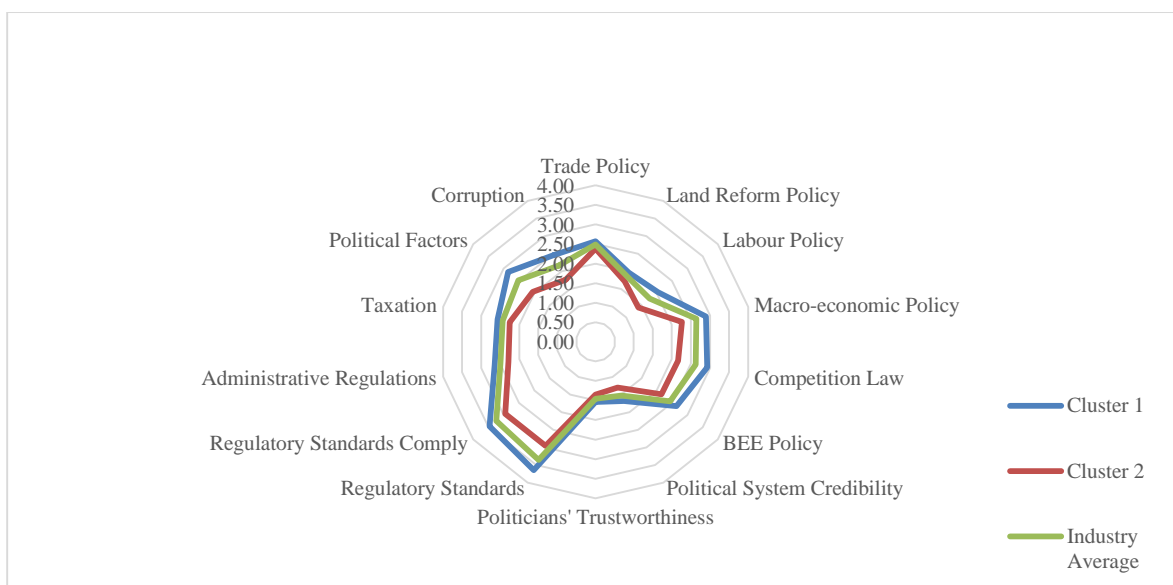
Figure 5.4.6 Government support and policies

Source: SFES (2014) and SPSS calculations (2014)

Through the PCA it was indicated that there was a large degree of consensus on one enhancing factor – to comply with regulatory standards does improve competitive performance, as international markets are opened up and maintained with a greater level of transparency throughout the industry. This aligns with the other enhancing factor, viz. regulatory standards are viewed as positive. Factors that constrain this industry's performance and on which a high degree of consensus was expressed by the respondents were corruption, trade policy and political factors in general.

Three constraining factors with a high degree of correlation were identified, viz. trade policy, political factors and corruption. Other constraining factors (with a low degree of consensus) were identified as macro-economic policy, competition law, administrative regulations, BEE policy, taxation, land reform policy, labour policy, political system credibility, and politicians' trustworthiness.

The power the government holds over trade and other relevant policies, and the assistance to improve and maintain infrastructure, is expected to nurture competitive performance enhancements. Negotiation at the industry level (lobby action) with government, based on high-quality industry intelligence, will be important to build the necessary trust between industry and government, which is crucial for enhancing competitive performance. Dedicated strategies and plans will have to formalised and prioritised to be successful in the future, and these account for the following incentives: dedicated policy development, international market development with regulation and export promotion, trade agreements, infrastructure expansion – in particular exportation facilities and transportation networks, research support, technological innovation and collaboration, economic empowerment and transformation support, combatting crime, and relaxation of labour regulations and reduction in bureaucratic red tape.

Comments and remarks by politicians are somewhat contradictory and conflicting, resulting in straining the mutual trust between industry and government – a matter that is viewed sympathetically, as the restructuring of South African agricultural capital has given rise to dramatic changes in the political and economic situation over the past two decades, with views sometimes being polarised between government objectives and primary agricultural investors/risk takers (Hall, 2012). Mutual understanding, a high level of positive/objective interactions and a gradual gain in the level of trust, along with a holistic approach by role players and government, will be required to strengthen partnerships and pave the way to expand the competitive performance of this industry in the future (BLES, 2014; Industry Workshop, 2014; Joint Marketing Forum, 2014; PMA & FPEF, 2014; Rabe et al., 2014).

5.4.2.6. Chance factors

Unpredictable factors, outside the control of industry and firm-level actions, sometimes even government level action, are included in this determinant – factors such as exchange rate fluctuations, global economic and related events, serious droughts, etc. The impact of nine identified factors as constraining competitiveness are presented in Figure 5.4.7, namely crime, RSA economic growth

development, social unrest, the political system and exchange rate fluctuations. For example, the social unrest in De Doorns in the Western Cape province of South Africa during November 2012 is reflected in opinions on this matter (Sims, 2013).
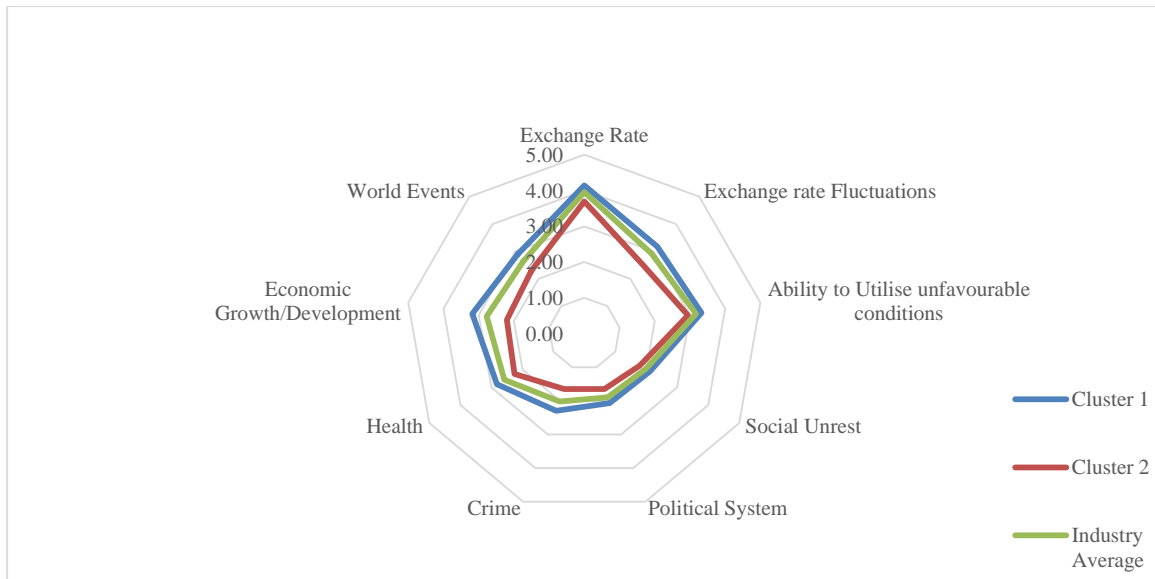
Figure 5.4.7 Chance of opportunity factors

Source: SFES (2014) and SPSS calculations (2014)

The exchange rate (low and decreasing value of the ZAR is viewed as a particularly enhancing factor, as the ZAR decreased gradually, from a rate of R6.94 to the Euro (€), R9.12 to the pound sterling (£) and R5.49 to the US dollar ($) in 1998, to a level in 2012 of R10.55 to the Euro (€), R13.01 to the pound sterling (£) and R8.23 to the US dollar ($), with no clear signs of any recovery (BFAP, 2014). Although a declining ZAR value does support export trade, it also increases certain capital and production costs – as discussed in Section 5.4.2.1. However, on balance, the industry viewed the declining ZAR as an important factor enhancing the competitive performance of the industry to date. To what extent this can be sustained will have to be seen.

The ability of the stone fruit industry to utilise unfavourable condition with which international competitors are faced, e.g. erratic weather conditions in Chile, is viewed as enhancing to the performance of this industry, as the supply in international trade from the affected countries is affected negatively.

Proactive planning and the flow of sufficient and timely, accurate information and the management thereof will be essential to 'gear' and prepare this industry role player for these factors over which agribusinesses, farms and the general industry have no control.

5.5. Porter diamond model validation – comparing outcomes with the IMD and the WEF.

The competitiveness of the SA stone fruit industry was assessed in terms of the Porter diamond model. In this section, this analysis is validated using two related frameworks, that of the IMD and the WEF, as referred to in Chapter 3.

Cronbach's alpha was firstly employed to test the consistency of responses regarding the SFES statements/factors that were restructured to fit the frameworks of the IMD (World Competitiveness Yearbook - WCY) and the WEF (Global Competitiveness Report - GCR). The results are presented in Table 5.5.1.

Table 5.5.1 Cronbach's alpha values for the three competitiveness methodologies

Competitiveness model	Determinant, pillar or grouping of factors	Cronbach's alpha value	Comment on level of internal consistency for question/factor groupings
Porter Diamond Model	Production Factor Conditions	0.811	Remarkably high level of internal consistency
	Demand Market Factors	0.771	Remarkably high level of internal consistency
	Related and Supporting Industries	0.765	Remarkably high level of internal consistency
	Firm, Strategy, Structure and Rivalry	0.751	Remarkably high level of internal consistency
	Government Support and Policies	0.810	Remarkably high level of internal consistency
	Chance of Opportunity Factors	0.644	High level of internal consistency
Institute for Management Development's World Competitiveness Yearbook	Economic Performance	0.623	High level of internal consistency
	Government Efficiency	0.767	Remarkably high level of internal consistency
	Business Efficiency	0.795	Remarkably high level of internal consistency
	Infrastructure	0.828	Remarkably high level of internal consistency
World Economic Forum's Global Competitiveness Reports	Institutions	0.814	Remarkably high level of internal consistency
	Infrastructure	0.551	Relatively high level of internal consistency
	Macroeconomic Environment	0.617	High level of internal consistency
	Goods and Market Efficiency	0.634	High level of internal consistency
	Labour Market Efficiency	0.718	High level of internal consistency
	Financial Market Development	0.838	Remarkably high level of internal consistency
	Technological Readiness	0.542	Relatively high level of internal consistency for aspect tested
	Market Size	0.696	High level of internal consistency for aspect tested
	Business Sophistication	0.869	Remarkably high level of internal consistency
	Innovation	0.286	Very low level of internal consistency for aspect tested

Source: IMD (2014); WEF (2014) and SPSS calculations (2014)

The grouping of the 84 factors from the SFES, belonging to the relevant determinants or pillars within the particular framework of the each of models, was calculated by Cronbach's alpha – where a score closest to 1 (one) represents a high level of consistency. The responses in their own right provide a high level of consistency – proving that the 84 questions in the SFES are validated as highly relevant and the application of the Porter diamond model is substantiated.

In Table 5.5.2., the general calculated scores[57] for each of the SFES factors are drawn into the IMD and WEF frameworks. Figure 5.5.1 graphically presents the relevant average scores of the IMD framework, while Figure 5.5.2 presents the graphic average scoring of the WEF framework.

Table 5.5.2 National competitiveness frameworks applied: Average factor/pillar score

WEF MODEL	Industry Average
Institutions	2.06
Infrastructure	3.26
Macroeconomic Environment	2.65
Goods And Market Efficiency	2.9
Labour Market Efficiency	2.42
Financial Market Development	2.97
Technological Readiness	3.32
Market Size	2.58
Business Sophistication	3.43
Innovation	2.89

PORTER DIAMOND MODEL	Industry Average
Business strategy, structure and rivalry	3.55
Relating and supporting industries	3.14
Production factor conditions	2.81
Demand market factors	2.76
Chance of opportunity factors	2.66
Government support and policy	2.35

IMD MODEL	Industry Average
Economic Performance	3.02
Government Efficiency	2.61
Business Efficiency	3
Infrastructure	2.99

Source: IMD (2014); WEF (2014) and SPSS calculations (2014)
Notes:
Scores/ratings: 0 = most constraining, 3 = neutral rating, and 5 = most enhancing

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[57] Average scores calculated for each of the factors/statements from the respondents grouped into the respective factor/pillar grouping. The term "pillars or factors" is equivalent to the term "determinants" used in the Porter diamond model. Only averages were calculated, and PCA, cluster analysis and analysis of variance were not applied.

For the IMD WCY in Figure 5.5.1, the factor referring to government attributes is viewed as less enhancing, whilst the factors of infrastructure and business efficiency are perceived as more enhancing. The factor economic performance is perceived as most enhancing to the competitive performance of the SA stone fruit industry.
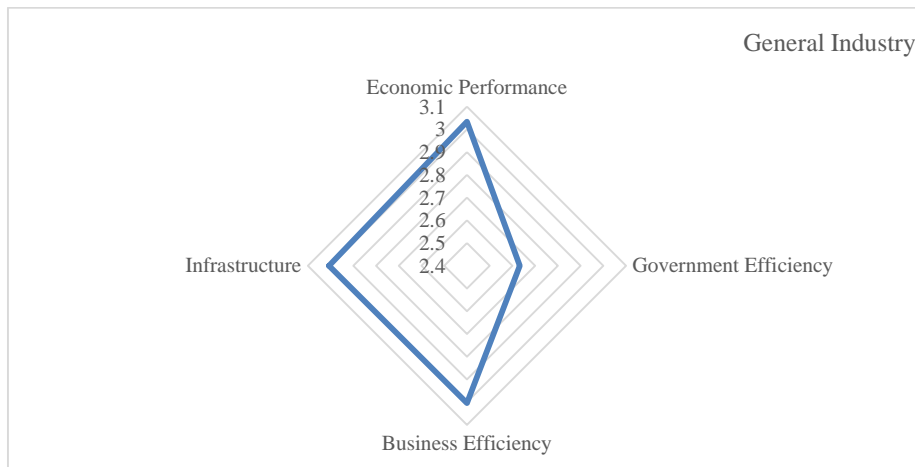
Figure 5.5.1 IMD World Competitiveness Centre: Four factor averages

Source: IMD (2014) and SPSS calculations (2014)

The WEF results are presented in Figure 5.5.2. The pillar, institutions, is viewed as most constraining, whilst labour efficiency, market size, macroeconomic environment, goods and market efficiency, innovation and financial market development are viewed as more enhancing pillars. Business sophistication, technological readiness and infrastructure are viewed as the most enhancing pillars within this framework for the competitive performance analysis of the South African stone fruit industry.
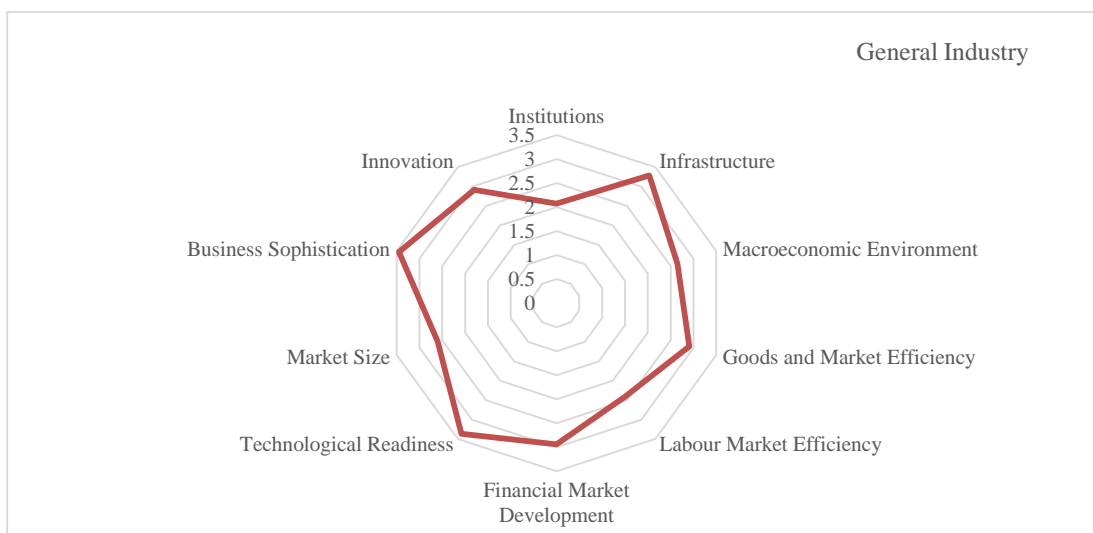
Figure 5.5.2 WEF Global Competitiveness Report: Pillar's averages

Source: WEF (2014) and SPSS calculations (2014)

From the above analysis, many similarities can be drawn with the Porter diamond findings. This therefore greatly validates the findings of the Porter diamond analysis. The Porter model was applied to the South African stone fruit industry. However, the frameworks of the IMD (World Competitiveness Yearbook - WCY) and WEF (Global Competitiveness Report - GCR) generally focus on the macro-economic situation, and it can thus also be confirmed that the stone fruit industry is integrated into and forms part of 'broader economic picture'.

Furthermore, if the SA stone fruit industry was analysed according to the WEF GCR in terms of what drives an economy,[58] it can be best described as "innovation driven", as it calculated a score of 3.32 within the respective model. A "factor-driven" economy yielded a lower score of 2.49, and an "efficiency-driven" economy a score of 2.84. This also correlates with the high-scoring determinants of the Porter diamond, viz. business strategy, structure and rivalry; relating and supporting industries; and production factor conditions.

5.6. Conclusions

South Africa is performing highly competitively in the international fruit arena, with increased performance from the mid-1990s, in the period post-deregulation. Apart from Chile in the Southern Hemisphere, the South African stone fruit industry is constantly the best performer in the next group of countries – Argentina, Australia, Peru, New Zealand and Brazil. In the South African context, plums (including prunes/sloes) are the top performer of the South African stone fruit types.

Through the Stone Fruit Executive Survey and a range of industry-based workshops, leading stakeholders within the SA stone fruit industry expressed a range of views and opinions on statements of competitive performance (BLES, 2014; Industry Workshop, 2014; Joint Marketing Forum, 2014; PMA & FPEF, 2014; Rabe et al., 2014).

There generally were no significant statistical differences between the relevant sizes, measured as hectares under production and volume of products marketed/exported, of stakeholders within the respective value chain positions, viz. the agribusiness-orientated cluster and the producer-orientated cluster. Generally, those in the producer-orientated cluster tended be less optimistic about the relevant statements, as this cluster rate constraining factors which impact on the competitive performance of the SA stone fruit industry higher.

These industry opinions on factors influencing competitive performance were then captured in the six determinants of the Porter diamond model and verified through the application of the IMD and WEF frameworks, which supported the Porter diamond findings. Various improvements related to constraining and enhancing conditions were identified, based on the Porter diamond analysis, and will

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[58] In the terms of this study, an industry instead of an "economy" – see Figure 2.2.3 on page 15.

be captured in Step 5 of the analytical framework, in which strategies to improve the competitive performance of the industry will be considered (see Chapter 6).

Chapter 6: Conclusions, strategic proposals and recommendations

"Strategy without tactics is the slowest route to victory. Tactics without strategy is the noise before defeat."

The Art of War, by Sun Tzu (544BC – 496BC) [59]

6.1. Introduction

In the previous chapter, the nature of the competitive performance of the South African stone fruit industry was measured and described. Trends in competitive performance, factors constraining and enhancing competitiveness (84 factors) and determinants influencing such performance were identified and analysed. In this chapter, these findings will be drawn together to propose strategic directives for enhanced competitiveness in the industry (Step 5 of the proposed analytical framework). Clear pronouncements on the research questions and the hypothesis will then be made, together with proposals for further research, to conclude the study.

6.2. Short summary of major findings

The South African stone fruit industry is increasingly confronted with forces of change impacting on its global competitive performance – which has to be considered as a highest priority for the participating firms and for the industry as a whole. Variable elements affecting this industry are nestled in the production environment, and others, external to the production environment, are equally important. Many of these factors are also not directly controlled by the industry or by farm-level producers. Therefore the challenge remains to develop strategies and interventions impacting on the total stone fruit business environment that would combat constraining factors and promote enhancing factors in the competitive performance of the South African stone fruit industry.

The theoretical and methodical frameworks to direct the enquiry into the competitive performance of the South African stone fruit industry were set out in Chapters 2 and 3. From this, a five-step analytical framework was applied to the research process.

Firstly, an appropriate definition of competitiveness within the context of the SA stone fruit industry was presented, namely; the sustained ability of the South African stone fruit industry to attract investment by competitively trading its produce within the global marketplace, whilst continuously striving to earn returns greater that the opportunity cost on scarce resources engaged.

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[59] As translated by Giles (1910)

Secondly, the competitive status and trends in the SA stone fruit industry were measured, using the well-known relative trade advantage (RTA) formula; although not the only measure for competitiveness assessment, it captures the holistic essence of measuring competitiveness in an environment where global trade directs the growth and even survival of an industry. An entity's ability to trade is thus directly linked to competitive performance trends over time, also providing a measure of sustainability.

Historical trends in the industry's competitive performance were identified from 1961 to 2012, using two databases: Food and Agricultural Organisation Statistics (FAOSTAT), to compare competitive performance in only the agricultural produce environment from 1961 to 2011; and International Trade Centre (ITC), to compare the competitive performance within a wider economic perspective from 2001 to 2012.

Using the FAOSTAT data set it was evident that the industry experienced certain fluctuating trends associated with both increasing and decreasing phases. From 1961 to 1982, an index rating was experienced of around 1, which increased to 2.19 at the end of this period. Thereafter an initial decline was evident from 1984 onwards, gradually stabilising to a level of 2.39 in 1991. The following period was associated with the abolishment of economic and political sanctions and deregulation, leading to drastic fluctuations, with a high point at 5.61 in 1999 as this industry geared itself up. From 1999 onwards, sharp decreases in competitive performance were experienced, to a point of 2.97 in 2007, from which momentum was gained to reach a level of 4.25 in 2011.

Using the ITC data set, the trends expressed similar movement, but with varying magnitude. A level of 3.79 was reached in 2001, with fluctuations in the trend to follow. A high point was achieved in 2004, at a level of 5.10, but this gradually decreased; however, momentum was gained afterwards to reach a level of 3.95 in 2012. This industry is viewed as more competitive within the wider economic perspective than within an agriculture-only perspective.

From an international point of view, the industry is viewed as the runner-up in the Southern Hemisphere, behind Chile, and when its performance was analysed in relation to Northern Hemisphere countries, it outranked France, and was on par with Italy.

When individual stone fruit types were analysed, plums were labelled as the *de facto* leader of the stone fruit industry and the deciduous fruit industry, in which it outperformed major fruit types, like apples, pears, table grapes and wine, from 2008, at a level of 12.64, to achieving a score of 18.01 in 2012.

As stone fruit forms an integral part of the deciduous fruit industry, the performance of this broader fruit grouping also was analysed. Its performance was found to outrank several Northern Hemisphere countries, such as Spain, Italy and the USA, but it achieved 'second place' behind Chile when compared with Southern Hemisphere producers.

In Step 3, views and opinions were collected directly from prominent industry stakeholders through the Stone Fruit Executive Survey (SFES) and complemented by industry workshops and interviews. From these, 84 factors enhancing or constraining the competitive performance of the industry were identified. Statistical analysis through cluster analysis and principle component analysis revealed that the respondents' views on factors impacting competiveness differed between the respective value chain positions, which were group together into relevant clusters – agribusiness-orientated and producer-orientated clusters – and the degree to which there was consensus among their ratings of factors affecting the competitive performance of the SA stone fruit industry, where the agribusiness cluster generally scored higher ratings for the respective factors.

The objective in Step 4 was to group the identified factors into major groupings – determinants of competitiveness in the Porter diamond model – namely production factor conditions; demand/market factors; related and supporting industries; business strategy structure and rivalry; government support and policies; and chance factors, and to further analyse the major enhancing and constraining factors as per each determinant. Among the major findings here were that the business strategy, structure and rivalry determinant was viewed as the most enhancing determinant, and the factor international market competition scored the highest rating of all 84 factors analysed. Within this determinant, economies of scale received a high rating, whilst factors referring to information flow where viewed as being less enhancing.

The determinant government support and policy was perceived to be most constraining; however, the factors relating to regulatory standards were viewed as enhancing competitiveness. The chance factor determinant did not score high ratings, but the exchange rate and not exchange rate fluctuations were found to enhance competitive performance. Production factor conditions, such as suitability of production location and infrastructure, were allocated a more enhancing status than the factors associated with costs. Related and supporting industries in this determinant were rated as highly capable and technologically innovative, but the associated costs and research and development require detailed attention to improve their competitive performance. The demand conditions determinant showed that the factors surrounding the local market were less enhancing than the factors directed at the internal market.

From this analysis, an interesting difference between different functional role players in the value chain was noted. Players who were integrated vertically further up the value chain, viz. agribusiness orientated, tended to be more buoyant, optimistic and positive towards factors of competitiveness in the South African stone fruit industry, vis-à-vis those associated more closely with the primary farm producer environment.

The findings of the Porter diamond model, as applied to the RSA stone fruit industry, was verified through two comparable methods of enquiry, viz. the Institute for Management Development's (IMD) World Competitiveness Centre (WCC) World Competitiveness Yearbook (WCY), and the World

Economic Forum's (WEF) Global Competitiveness Report (GCR). From this comparison it was concluded that all three models point in the same direction, i.e. a validation of the applied Porter diamond, and that the South African stone fruit industry could be viewed as a sustained, highly competitive industry, largely though 'innovation-driven' processes and strategies.

6.3. Reporting on the research questions and the stated hypothesis

From the findings reached, the stated research questions, "What is competitiveness performance in this global trade-orientated industry and how can it be defined?"; "How competitively did the South African stone fruit industry perform?"; "How can it be measured?"; "What factors drive competitiveness?" and "How can the South African stone fruit industry successfully compete on a sustainable basis within the global environment?" were dealt with in an acceptable manner. The stated hypothesis, "The competitive performance of the South African stone fruit industry is determined by a range of factors, i.e. not one factor alone dominates competitive performance in the South African stone fruit industry, but rather a range of factors that include productivity, market strategy, trade, exports and local sales, firm strategy, the strength of the institutional support system, government support policy and the international value of the South African Rand (ZAR)", clearly can be accepted as valid and applicable to the South African stone fruit industry.

This hypothesis, stated in Chapter 1.3. (page 4), has been proven sufficiently through the RTA measure and the analyses of enhancing and constraining factors; clearly not only one factor/parameter or even determinant impacts on competitiveness alone, but rather a whole range of issues and variables, as noted in the analyses of the SFES; and a clear improvement in the competitive performance of the SA stone fruit industry post-deregulation and the democratic elections was shown. The SA stone fruit industry, furthermore had to adapt - mentally, physically and strategically to this new frontier of intensifying global market space competition.

All of this laid the foundation for Step 5 of the analytical framework, in which strategies to enhance the sustained competitive performance of the industry will be considered.

6.4. Towards strategies to enhance the competitive performance of the South African stone fruit industry (Step 5)

As mentioned in Chapter 4.10., existing strategic industry statements contained in the Fruit Industry Plan (2006) and the Fruit Industry Social Compact (2013) are rather broad based and do not address or even measure competitive performance. Also it does not consider the performance of factors impacting on competitiveness in detail. This situation provides step 5 of this study with a platform for identifying possible strategic proposals for the SA stone fruit industry.

6.4.1. Setting a strategic planning framework for the South African stone fruit industry

In this section strategic proposals to improve the competitive performance of the industry will be formulated. A "strategic planning framework" will firstly be set, based on the status of identified Porter diamond determinants (and the sets of factors within each determinant). The strategic approached followed concentrates on strategic incentives where the constraining factors, with a high degree of consensus from the SFES (2014), will be primarily focussed on (view relevant factors in Table 6.4.1. below).

6.4.2. Industry level strategic proposals

Eleven proposals, derived from the strategic framework are shown in Table 6.4.1 below. These resulted from focus group discussions and personal interviews in which the findings of this study (Chapter 5) were considered (also refer to BLES, 2014; FRUDATA, 2014; Joint Marketing Forum, 2014; PMA & FPEF, 2014; Rabe *et al*., 2014; SFES, 2014).

It must however be noted that these proposals are not claimed to be derived from a comprehensive industry based strategy-planning exercise. These proposals should rather be viewed as resulting from a set of "first-round strategic sessions" only, which identified those constraining factors, with a strong degree of industry level consensus, to be attended to. For a "comprehensive new industry plan", a more detailed process would be required, inter alia using all the findings from Chapter 5, as part of the broader industry level strategic intelligence. Such a strategic planning process should aim for improved industry: government relationships (lobby inter-actions) to enhance competitive performance.

Table 6.4.1 Strategic industry level proposals to improve competitive performance.

Porter determinants	Relevant and constraining competitive factors	Strategic proposals
Production factors conditions	Technology cost	1. **Technological innovation through value chain collaboration:** Upgrade and expansion of stone fruit technological innovation platforms to focus attention on aspects impacting on competitiveness in global markets; to encourage a long term vision; to foster investments in technological innovations through public-private initiatives; to broaden the scope and extent of technology affordability; collaborative information management sharing

		between stakeholders and clients along the value chain network; focus on "smart fresh" (new cooling technology), climate and moisture management tools, fruit-handling systems, fruit thinning and harvesting platforms, chemicals/fertilisers application equipment, etc. 2. "**Anticipating climate change**": The tracking and projection of possible climate variation conditions and possible impacts, like; heat waves prior to harvesting of fruit, frost damage during the flowering period of fruit, projected chilling unit (Richardson units and ARC units) accumulation measurement, shifting periods of full-bloom to harvesting, role of insects (pests and bees/natural predators of pests), virus infections and diseases, etc.
Demand/ market factors	Inconsistent quality and availability of SA stone fruit varieties in markets	3. **Improved consistency in supply to exports markets:** Market access are constrained by the inconsistency of fruit/cultivar types/tastes availability. The grouping of varieties with similar attributes and qualities as "homogenous products" must be considered to maintain/ensure product continuity. Quality control will also minimise "product confusion". 4. **Extended supply in export markets:** Market access will also be improved by breeding and evaluation (on a continuous and sustainable basis) of cultivars/varieties for specific production regions to lengthen and "even out the spikes" of fruit supplied in the global market(refer to strategic proposal 1) 5. **Market intelligence to achieve preferred supplier status:** Create market intelligence by linking consumer profiling in international markets to innovations in storage and ripening of fruit and to national cultivar breeding and evaluation programmes; and as such to claim the status of preferred suppliers in international markets.

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	The influence of adverse weather conditions on buying patterns of consumers (export markets)	**6.** **Redirecting market supply:** Buying patterns are often negatively impacted on by adverse weather conditions, such as heavy snow falls negatively affecting infrastructure network and logistics in export markets. Therefore contingency plans to proactively anticipate such conditions through "early warning systems" together with collective action from producers, exporters, overseas clients related to alternative destinations and inventories.
Related and supporting industries	Electricity supply (including renewable energy and fossil fuels)	**7.** **Consistency of power supply:** As stone fruit are extremely susceptible to "break-ups/stoppages" in the cold-chain, inconsistent electricity supply in the will have to be addressed in a much improved manner through area/time targeting and "early warning systems" with government departments; (Energy; Trade and Industry; Science and Technology) and agencies such as ESCOM (Electricity Supply Commission of South Africa). Investment in the provision of additional/supplementary electricity supply initiatives, especially during periods of critical demand also need to be considered, inter alia through renewable and fossil fuels options.
	Industry's expenditure on Research &Development and innovation	**8.** **Institutional arrangements to create innovation through collaborative partnerships:** Well-structured public-private Research & Development partnerships (for example between ARC – Agricultural Research Council, CSIR – Council for Scientific and Industrial Research and selected industries) to collaborate on the development of innovation through: • Goal driven research objectives and outputs; impact and cost-benefit analyses; effective management of budgets and resource allocation to priority projects. • Industry levies refocussed to improve the systems impacting on competitive performance.

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Government support and policy	Trade policy	9. **Trade promotion support:** Trade promotion negotiations and industry lobbying with relevant government departments to achieve/gain market access and realise international trade agreements into potential lucrative markets such as China and India; and inclusion in trade missions and trade agreements.
	Dealing with the political economy	10. **A "Stone Fruit Industry Plan (SFIP) and compact:** The establishment of a compact between industry and government to restore mutual trust and to create a "Shared-mission, joint-vision and strategic plan" (a Stone Fruit Industry Plan) for the industry by all role players and affected stakeholders. The SFIP should aim to establish an agreed to and transparent framework of agreement and co-operation with checks and balances to create conjoint engagement and governance to align major stakeholders and combat negatives such as corruption, discrimination, favouritism, racism, etc. at all levels. Private:public partnership, referred to above, will be an important component of this SFIP, including such collaboration on transformation and land redistribution matters. 11. **Improved industry intelligence systems:** High quality and improved industry intelligence will enable improved co-operation, lobby and negotiation at all levels, dealing with matters related to: • Human capital factors (including labour) and societal issues. • Education, capacity and training programmes. • Investment environment that the industry faces – improving the "climate" for South African agriculture and more specifically stone fruit. • Articulate the role and impact of the stone fruit industry in the broader economy, relating to the stimulation of employment opportunities and income generation.

Source: Author's own research

6.5 Recommendations for further studies

From the enquiry process, application of the chosen methodology and the findings and conclusions reached in this study, a number of issues can be recommended for further research related to competitiveness in agriculture.

Application of the competitiveness enquiry framework: This study provides a comprehensive and extended analytical framework (from the conventional one), that can be expanded for a comprehensive enquiry into competitive performance of other agricultural commodities and products traded in the global market. The focus of this study was on an industry-wide application, but through the five-step analytical framework the enquiry can be extended to focus on particular products within an industry. In the case of the stone fruit industry, for example, studies can be done on plums, apricots, peaches and nectarines, and cherries. These would investigate particular environments and will allow an exploration of individual product performance in greater detail, adding value to general findings (as reached in this study), describing views and opinions of relevant role players in a more refined and representative way; thus expanding the intelligence data base   for strategic planning purposes

Focus on form, place and time utilities in different markets: Based on the broad findings of this study, further research need to be conducted on detailed levels of enquiry and analysis regarding, for example, form, place and time utilities of particular stone fruit, clarifying details of the quality, quantity and market destinations. This could be achieved by the addition of techniques such as the constructed "Decision Support Model" (Cuyvers & Viviers, 2012) and the compilation of a "Market Attractiveness Index" (BFAP, 2014) to identify and analyse new, more lucrative, markets for the industry.

Expanding current industry benchmarking-type analysis : An analysis of factors constraining the competitiveness of respective stone fruit types at particular levels/functions in the value chain, e.g. on farm level, will yield interesting results, in terms of local level comparisons and also at a global, "benchmarking-levels". The development of such a "double and triple" diamond type of analysis, focussing on farm level comparisons, will compliment current standardised/traditional methods, used to do industry level benchmarking, by adding qualitative data and explanations to quantitative data sets

Value chain competitiveness: Expanding competitive analysis into value chains will give effect to what was found in Chapter 5, namely, that different groups or clusters of respondents, representing different functions in the agri-value chain, expressed different views on and ratings of factors impacting on competitive performance. Such intra value chain investigation of the relevance and weighting of those factors impacting on competitiveness can broaden and deepen the direction in which strategic

interventions can be identified and proposed for an industry or a particular intra value chain business model.

As can be expected, value chains will increasingly compete against each other (Kothandaraman & Wilson, 2001; Lia, & Whalleyb, 2002).inter-value chain performances i.e. comparing the performances of competing value chains should also be explored in greater detail from a strategic choice perspective.

Research is furthermore also required to develop farm-level strategies on how to be incorporated and compete in successful value chains, and how to maintain this level of performance in the long term.

Future-based enquiry: This study focused mainly on the determination of historical trends and the analysis thereof; no futuristic analysis was conducted, although such comments and inputs from the leading role players in the industry were mobilised in the process, however, as noted by Buffet & Clark (2006:129) to quote Warren Buffet; "In the business world, the rear-view mirror is always clearer than the windshield". Analytical frameworks for such competitiveness directed futuristic enquiry will contribute to enhancing strategic intelligence at the policy, industry and firm levels, as presented in the 'sector models' formulated by the BFAP (2014) in the scenario development process. The development of for example a "Deciduous Fruit Business Confidence Index", based on the work of Esterhuizen (2006) and the AgBiz Business Confidence Index (Agbiz, 2014) to predict expected variations in future competitiveness should be explored and will yield relevant business intelligence throughout the industry. It will lead to more focused attention being paid to the prognostic side of projections than only to diagnostic evaluation.

Across agri-industry analysis: A competitiveness based analytical framework, focussing on "willing and losing" industries could be expanded to serve as an investment decision-making tool to direct and explain investment practices in the local and broader economy. A number of options applicable to the stone fruit industry and related to 'red ocean and blue ocean environments' (Ackoff, 2001; Kim & Mauborgne, 2005b) could also be considered within such an analytical framework. For example, a 'red ocean environment' refers to the existing, highly competitive markets for the South African stone fruit industry, and 'blue ocean strategies' refer to attempts to create new uncontested markets (Ackoff, 2001; Kim & Mauborgne, 2005b) to add more encapsulating competitiveness-enhancement strategies. Within this approach, the extensions in competitive research re markets mentioned above, can for example, be incorporated to identify and enquire about 'new' lucrative export destinations, which can be referred to as the so-called 'blue ocean environment' in which South African stone fruit produce is positioned as the product of choice.

6.6 Concluding remarks

South African stone fruit trades successfully in the highly traded global market, with a share of 2.23% of the world stone fruit volume and of 14.75% of Southern Hemisphere stone fruit value. In this study, competitive performance therefore was linked directly to the notion of trade performance. Hence, competitiveness can be viewed as the end result of economic activity. In essence, whether it is a firm, industry, sector or nation that is analysed, the fundamental idea resides in a particular entity's ability to trade the respective commodity or product, whilst being compensated for the resources employed.

This orientation and the derived definition of competitiveness followed in this study, highlighted important notions relevant to the analytical approach followed. The notions of 'sustained' and 'continuously' require the consideration of competitive performance over a time period, i.e. trends; the notion of 'opportunity costs' relates to alternatives across a wide spectrum of products, industries, sectors, countries, etc. – all activities that are competing for scarce resources, not only a comparison of stone fruit locally and in other parts of the international market; and the notion of comprehensiveness refer to the identification and inclusion of all factors impacting on competitiveness; not only farm level production costs benchmarking for example.

Competitiveness thus can be viewed as an all-encapsulating measure of economic activity, as it indirectly takes into account the relevant variables and aspects involved to prepare a commodity or product to be traded. Trade information can readily be sourced from reliable sources, such as the FAO and ITC, in terms of empirical time series data, both in volume and value. However, the value of relevant, first-hand industry knowledge, and not necessarily only empirical information, but also quantitative and value based information, proved vital when assessing the competitive performance of the South African stone fruit industry.

This study has expanded the scope of agricultural competitive analysis by focussing on such qualitative enquiry, accommodating the range of differences in opinion statements by the respondents. This was achieved   through the application of cluster analysis; as opposed to the 'only average outed' opinions investigated in previous studies of this nature. This led to a more 'weighted' opinion base to draw better and more representative conclusions and finally to pronounce with confidence on the stated hypothesis, viz. The competitive performance of the South African stone fruit industry is determined by a range of factors, i.e. not one factor alone dominates competitive performance in the South African stone fruit industry, but rather a range of factors that includes productivity, market strategy, trade, exports and local sales, firm strategy, the strength of the institutional support system, government support policy and the international value of the South African Rand (ZAR).

The major findings of this study established that the South African stone fruit industry clearly is highly competitive in the global trading arena and performed so on a sustainable basis, especially since the period of deregulation in the mid 1990's with Plums was the most competitive stone fruit type, followed by apricots, peaches and nectarines, and lastly cherries. It was also established that he competitive

performance of these individual stone fruit types increased significantly from the late 1990s onwards, showing with gradual decreases in the early 2000s, but the competitive state was recovered from 2007 onwards. From the analysis eleven industry-based strategic actions were also formulated for consideration in a comprehensive stone fruit industry strategy plan.

References

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

Acemoglu, D. & Robinson, J.A. 2013. *Why nations fail: The origins of power, Prosperity and poverty*. Profile Books LTD. London.

Ackoff, R.L. 2001. *A brief guide to interactive planning and idealised design*. University of Pennsylvania. Wharton School Publishing. New Jersey.

Agbiz (Agricultural Business Chamber) 2014. Agricultural Business Chamber - Agribusiness Confidence Index. Available: http://www.agbiz.co.za/economic-intelligence-1/agribusiness-confidence. [Accessed 2014, August 27].

Agricultural Sector Plan. 2001. *The Strategic Plan for South African Agriculture*. Department of Agriculture: Directorate Agricultural Information Services. Pretoria.

Aiger, D., Lovell, C. & Schmidt, P. 1977. Formulation and estimation of stochastic production function models. *Journal of Econometrics*, 6:21–37.

Ajami, R. 1992. Industrial competitiveness: Resurgence or decline? In Ali, A.J. (Ed.), *How to manage for international competitiveness*. International Business Press. 11–38. New York.

Ambastha, A. & Momaya, K. 2004. Competitiveness of firms: Review of theory, frameworks, and models. *Singapore Management Review*, 26(1):45–62.

Anseeuw, W., Wily, L.A., Cotula, L. & Taylor, M. 2012. *Land rights and the rush for land: Findings of the Global Commercial Pressures on Land Research Project*.: The International land Coalition. Rome.

Aucamp, J. 1986. Die geskiedenis van die Kaapse sagtevrugtebedryf 1896-1910. PhD Dissertation. University of Stellenbosch. Stellenbosch.

Balassa, B. 1965. Trade liberalisation and "revealed" comparative advantage. *The Manchester School*, 33(2):99–123.

Balassa, B. 1977. "Revealed" comparative advantage revisited: An analysis of relative export shares of the industrialised countries. *The Manchester School*, 45(4):327–344.

Balkyte, A. & Tvaronavičiene, M. 2010. Perception of competitiveness in the context of sustainable development: Facets of "sustainable competitiveness". *Journal of Business Economics and Management*, 11(2):341–365.

Ball, V.E., Butault, J.-P., San Juan, C. & Mora, R. 2010. Productivity and international competitiveness of agriculture in the European Union and the United States. *Agricultural Economics*, 41(6):611–627. doi:10.1111/j.1574-0862.2010.00476.x.

Banterle, A. 2005. *Competitiveness and agri-food trade: An empirical analysis in the European Union*. Paper delivered at the 11th Congress of EAAE, August 24-27, Copenhagen, Denmark.

Banterle, A. & Carraresi, L. 2007. Competitive performance analysis and European Union trade: The case of the prepared swine meat sector. *Acta Agriculturae Scandinavica, Section C – Food Economics*, 4(3):307–318.

Barge-Gil, A. & Modrego, A. 2011. The impact of research and technology organizations on firm competitiveness. Measurement and determinants. *The Journal of Technology Transfer*, 36(1):61–83. doi:10.1007/s10961-009-9132-4.

Barker, T. & Köhler, J. 1998. Environmental policy and competitiveness. *Environmental Policy Research Briefs*, 6:1–12.

Barret, E & Mingo, J. 2002. Not another apple for the teacher: Hundreds of fascinating facts from the world of teaching. Conari Press. York Beach.York USA.

Baumann, R. & Ng, F. 2012. Regional productive complementarity and competitiveness. *The International Trade Journal*, 26(4):326–359. doi:10.1080/08853908.2012.702548.

Bayley, B. 2000. *A revolution in the market: The deregulation of South African agriculture*. Oxford: Oxford Policy Management.

Belová, A., Smutka, L., Rosochatecká, E. & Bazina, A. 2012. Competitiveness of domestic production of poultry meat on the EU market and on the world market. *Agris on-line Papers in Economics and Informatics*, 4(4):11–25. Available: http://purl.umn.edu/146273.

Bestbier, N.A. 1987. The history of the controlled marketing of South African deciduous fruit 1951-1980. PhD Dissertation. University of Stellenbosch. Stellenbosch.

Beukes, S. 2009. The competitiveness of the South African apple industry in a global context. MBA Thesis. University of Stellenbosch. Stellenbosch.

BFAP (Bureau for Food and Agricultural Policy). 2012. *BFAP baseline: Agricultural Outlook 2012-2021*. BFAP. Pretoria & Stellenbosch.

BFAP (Bureau for Food and Agricultural Policy). 2014. *BFAP baseline: Agricultural Outlook 2014 - 2023*. BFAP. Pretoria & Stellenbosch.

Bielik, P. & Rajèániová, M. 2004. Competitiveness analysis of agricultural enterprises in Slovakia. *Agricultural Economics – Czech*, 50(12):556–560.

Black, M. 1937. Deciduous fruit in the winter rainfall Area. In D. Seymore (Ed.), *Handbook for farmers in South Africa*. 3rd ed. Department of Agriculture and Forestry. 809–834. Pretoria:

Black, M. 1952. The deciduous fruit industry in South Africa. *Farming in South Africa*, 27(312):117–122, 126.

BLES ((Boland Landbou Ekonomiese Skakelgroep). 2014. Personal communication: Focus Group Discussion (HORTGRO, Financial Institutions, Agri-Western Cape, and Industry Stakeholders - 27/06/2014). BLES. Paarl.

Blignaut, C.S. 1999. Analysing competitive advantage in the South African dairy industry: An integrated approach. *Agrekon*, 38(4):693–706. doi:10.1080/03031853.1999.9524881.

Boonzaaier, J.D., Van Rooyen, C. & Rabe, A. 2014. *An inquiry into the competitiveness of the South African stone fruit industry*. IFAMA (International Food and Agribusiness Management Association)

Conference 2014, 16-19 June. Cape Town. Available: http://www.ifama.org/i4a/pages/index.cfm?pageid=3524.

Brinkman, G. 1987. The competitive position of Canadian agriculture. *Canadian Journal of Agricultural Economics*, 35:263–288.

Brunke, H., Henry De Frahan, B., Surry, J. & Desbois, D. 2009. *A literature review on cost of production studies in agriculture*. : FACEPA (Farm Accountancy Cost Estimation and Policy Analysis of European Agriculture). Rome.

Buckley, P.J., Pass, C.L. & Prescott, K. 1988. Measures of international competitiveness: A critical survey. *Journal of Marketing Management*, 4(2): 175-200.

Buffet, M. & Clark, D (2006). The TOA of Warren Buffet: Warren Buffet's Words of Wisdom. Simon & Schuster. New York.

Cameron, W.B. (1963): Informal Sociology: A Casual Introduction to Sociological Thinking. Random House, New York.

Carew, R. & Looney, N.E. 2007. How the introduction of late season sweet cherry cultivars and changing demand conditions impacted industry competitiveness: Evidence from British Columbia. *Canadian Journal of Plant Science*, 87:105–113.

Caves, D., Christensen, L. & Diewert, E. 1982. The economic theory of index numbers and the measurement of input, output and productivity. *Econometrica*, 50(6):1393–1414.

Cesaro, L., Marongiu, S., Arfini, F., Donati, M. & Capelli, M. 2008. *Cost of production. Definition and concept*. FACEPA (Farm Accountancy Cost Estimation and Policy Analysis of European Agriculture). Rome.

Cetindamar, D. & Kilitcioglu, H. 2013. Measuring the competitiveness of a firm for an award system. *Competitiveness Review,* 23(1):7–22. doi:10.1108/10595421311296597.

Charnes, A., Cooper, W. & Rhodes, E. 1978. Measuring the efficiency of decision making units. *Eurpean Journal of Operational Research*, 2:429–444.

Cho, D. 1994. A dynamic approach to international competitiveness: The case of Korea. *Journal of Far Eastern Business*, 1(1):17–36.

Cho, D.S. & Moon, H.C. 2002. *From Adam Smith to Michael Porter. Evolution of competitiveness theory*. World Scientific. Singapore, New Jersey, London, Hong Kong.

CIA (Central Intelligence Agency). 2014. *South Africa*. Available: https://www.cia.gov. Accessed [2014, April 30].

Coelli, T., Rao, D.S.P., O'Donnell, C.J. & Battese, G.E. 2005. *An introduction to efficiency and productivity analysis*. 2nd ed. New York: Springer Science + Business Media Inc.

Conradie, S. 2008. Crafting a positioning strategy for the South African apple and pear industry to successfully compete against Chile in European supermarket business. MBA Thesis. University of Stellenbosch. Stellenbosch.

Crisosto, C.H., Mitchell, F.G. & Johnson, S. 1995. Factors in fresh market stone fruit quality. *Postharvest News and Information*. 6(2): 17-22.

Cronbach, L. 1951. Coefficient alpha and the internal structure of tests. *Psychometrica*, 16(3): 297-334.

Cuyvers, L. & Viviers, W. (Eds.). 2012. *Export promotion: A decision support model approach*. SUN Media. Stellenbosch.

D'Adabal, L.A. 2012. The physiocrates. In Backhaus, J. (Ed.). *Handbook of the history of economic thought*. Springer. 137–160. New York, Dordrecht, Heidelberg, London.

DAFF (Department of Agriculture Forestry and Fisheries). 2012a. *A profile of the South African plum market value chain 2012*. DAFF. Pretoria.

DAFF (Department of Agriculture Forestry and Fisheries). 2012b. *A profile of the South African apricot market value chain 2012*. DAFF. Pretoria.

DAFF. (Department of Agriculture Forestry and Fisheries) 2012c. *A profile of the South African peach market value chain 2012*. DAFF. Pretoria.

DAFF (Department of Agriculture Forestry and Fisheries). 2013. *Abstract of agricultural statistics*. DAFF. Pretoria.

Davis, R. 1928. *Fruit growing in South Africa*. Central News Agency. South Africa Johannesburg.

De Beer, G., Paterson, A. & Olivier, H. 2003. *160 years of export - The history of the Perishable Products Export Control Board*. Cape Town: Perishable Products Export Control Board (PPECB). Cape Town.

Deininger, K. & Byerlee, D. 2012. The rise of large farms in land abundant countries: Do they have a future? *World Development*, 40(4):701–714. doi:10.1016/j.worlddev.2011.04.030.

Dennis, H.J. 2011. An analysis of the competitiveness of the South African sunflower industry. MBA Thesis North-West University, Potchefstroom.

Devlin, M. 2002. An improved questionnaire for gathering student perceptions of teaching and higher learning. *Higher Education Research and Development*, 21(3):289–304.

Dosi, G., Grazzi, M. & Moschella, D. 2013. *The determinants of international competitiveness: A firm-level perspective*. LEM - Sant' Anna School of Advanced Studies. Pisa, Italy.

Du Toit, A. 1981. *The South African deciduous fruit industry - "Quo vadis?"* Fruit and Fruit Technology Research Institute. Stellenbosch.

Du Toit, C.V.D.M. 2000. Nasionale mededingende voordeel: Die Suid-Afrikaanse appelbedryf. M.Sc.Agric Thesis. University of Stellenbosch. Stellenbosch.

Esterhuizen, D. 2006. *An evaluation of the competitiveness of the South African agribusiness sector*. PhD Dissertation, University of Pretoria. Pretoria.

Esterhuizen, D. & Van Rooyen, C. 2006. An inquiry into factors impacting on the competitiveness of the South African wine industry. *Agrekon*, 45(4):467–485. doi:10.1080/03031853.2006.9523758.

Esterhuizen, D. & Van Rooyen, C.J. 1999. How competitive is agribusiness in the South African food commodity chain. *Agrekon*, 38(4):37–41.

Esterhuizen, D., Van Rooyen, C.J. & Doyer, O.T. 2002. Investment in the South African agro-food and fibre complex: Perceptions, evidence and analysis. *Agrekon*, 41(2):178–188. doi:10.1080/03031853.2002.9523592.

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.

Fagerberg, J., Srholec, M. & Knell, M. 2007. The competitiveness of nations: Why some countries prosper while others fall behind. *World Development*, 35(10):1595–1620. doi:10.1016/j.worlddev.2007.01.004.

Fan, Y., Ren, S., Cai, H. & Cui, X. 2014. The state's role and position in international trade: A complex network perspective. *Economic Modelling*, 39:71–81. doi:10.1016/j.econmod.2014.02.027

FAO (Food and Agricultural Organisation). 2014. *FAOSTAT*. (Food and Agricultural Organisation - Statistical Database) Available: http://www.faostat.fao.org/ [Accessed 2014, January 14].

Farole, T., Reis, J. & Wagle, S. 2010. *Analyzing trade competitiveness: A diagnostics approach*. World Bank Policy Research Working Paper No. 5239. Available: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1619171.

Farrel, M. 1957. The measurement of productive efficiency. *Journal of Royal Statistical Society Series A*, 120(3):153–281.

Fertő, I. & Hubbard, L.J. 2002. Revealed comparative advantage and competitiveness in Hungarian agri-food sectors. *The World Economy*, 26(2):247–259.

Feurer, R. & Chaharbaghi, K. 1994. Defining competitiveness: A holistic approach. *Management Decision*, 32(2):49–58.

Flanagan, R., Lu, W., Shen, L. & Jewell, C. 2007. Competitiveness in construction: A critical review of research. *Construction Management and Economics*, 25(9):989-1000. doi:10.1080/01446190701258039.

Fourie, J. 2012. An inquiry into the nature, causes and distribution of wealth in the Cape Colony, 1652-1795. PhD Dissertation Utrecht University. Utrecht.

FPEF (Fresh Producer's Exporters Forum). 2014. *Fresh Produce Exporters' Forum*. Available: http://www.fpef.co.za/[Accessed 2014, March 14].

Freebairn, J.W. 1987. Implications of wages and industrial policies on the competitiveness of agricultural export industries. *Review of Marketing and Agricultural Economics*, 55(1). 79-87.

Fricke, M. 2008. The knowledge pyramid: A critique of the DIKW hierarchy. *Journal of Information Science*, 35(2):131–142. doi:10.1177/0165551508094050.

Frohberg, K. & Hartmann, M. 1997. *Comparing measures of competitiveness*. Discussion paper, Institute of Agricultural Development in Central and Eastern Europe, No. 2. Available: http://nbn-resolving.de/urn:nbn:de:gbv:3:2-22616.

FRUDATA. 2014. Personal communication: Piet van der Merwe (30/09/2014). Paarl.

Fruit Industry Plan Project Team. 2006. The future strategy of the fruit industry of South Africa. Fruit South Africa. Pretoria.

FSA (Fruit South Africa). 2013. Fruit Industry Social Compact. South African Fruit Industry Organisation. Fruit South Africa. Pretoria.

FSA (Fruit South Africa). 2014. *South African Fruit Industry Organisation*. Available: http://www.fruitsa.co.za/[Accessed 2014, June 27].

Fulponi, L., Shearer, M. & Almeida, J. 2011. Regional trade agreements - treatment of agriculture. *OECD Food, Agriculture and Fisheries Papers*, No 44. OECD Publishing. doi:10.1787/5kgg53fmnjxv-en.

Furceri, D. & Karras, G. 2007. Country size and business cycle volatility: Scale really matters. *Journal of Japanese and International Economies*, 21(4): 424-434.

Garelli, S. 2003. Competitiveness of nations: The fundamentals. *IMD World Competitiveness Yearbook*. 702–713. Luasanne, Switzerland.

Giles, l. 1910. Sun Tzu on the Art of War. British Museum, London England.

Gittinger, J.P. 1982. *Economic analysis of agricultural projects*. 2nd ed.: The John Hopkins University Press. London & Baltimore.

Glew, R.H., Ayaz, F.A., Sanz, D.J., Van der Jagt, D.J., Huang, H.S., Chuaung, L.T. & Strnad, M. 2003. Effect of postharvest period on sugars, organic acids and fatty acids composition in commercially sold medlar (*Mespilus germanica* Dutch) fruit. *European Food Research and Technology*, 216:390–394. doi:10.1007/s00217-002-0654-3.

Gorton, M., Daniłowska, A., Jarka, S., Straszewski, S., Zawojska, A. & Majewski, E. 2001. The international competitiveness of Polish agriculture. *Post-Communist Economies*, 13(4):445–457. doi:10.1080/14631370120095657.

Hall, R. 2012. The next Great Trek? South African commercial farmers move north. *The Journal of Peasant Studies*, 39(3-4): 823–843. doi:10.1080/03066150.2012.677037.

Hallatt, J. 2005. Relative competitiveness of the South African oilseed industry. M.Sc. Agric. Thesis University of the Free State, Bloemfontein.

Heady, E.O., Johnson, G.L. & Hardin, L.S. 1956. *Resource productivity, returns to scale and farm size*. The Iowa State College Press. Ames, Iowa.

Heertje, A. 2012. Life and work of David Ricardo (1772-1823). In Backhaus, J. (Ed.). *Handbook of the history of economic thought*. Springer. 173–178. New York, Dordrecht, Heidelberg, London.

Hofstee, E. 2006. *Constructing a good dissertation: A practical guide to finishing a Master's, MBA or PhD on schedule*. EPE. Johannesburg.

Hopps, A. & Maher, J. 2007. Competitiveness of milk production in Ireland. In S. O'Reilly, M. Keane & P. Enright (Eds.), *Proceedings of the 16th International Farm Management Association Congress "A Vibrant rural Economy - The Challenge for Balance"*. Snap Printing. 93–104. Cork, Ireland

HORTGRO (South African Horticultural Growers' Association). 2014a. *HORTGRO*. Available: http://www.hortgro.co.za/

HORTGRO (South African Horticultural Growers' Association). 2014b. *Key deciduous fruit statistics 2013*. HORTGRO (South African Horticultural Growers' Association). Paarl.

HORTGRO (South African Horticultural Growers' Association). 2014c. *SA cherry industry overview*. HORTGRO. Paarl.

HORTGRO (South African Horticultural Growers' Association). 2014d. *HORTGRO members and affiliated members*. Available: http://www.hortgro.co.za/ [Accessed 2014, February 9].

HORTGRO (South African Horticultural Growers' Association). 2014e. *South African Stone Fruit Producers' Association*. Available: http://www.hortgro.co.za/ [Accessed 2014, February 9].

HORTGRO (South African Horticultural Growers' Association). 2014f. *Produksieriglyne vir steenvrugte*. Available: http://www.hortgro.co.za/ [Accessed 2014, February 9].

Hurwitz, N. & Williams, O. 1962. *The economic framework of South Africa*. Shuter and Shooter. Pietermaritzburg.

IMD (Institute for Management Development). 2014. *Global competitiveness rankings*. (IMD) Available: www.imd.org. [Accessed 2014, April 23].

Industry Workshop. 2014. Stone Fruit Industry Workshops (07/08/2014; 10/09/2014 and 23/10/2014) (producers, exporters, input suppliers and service providers and other stakeholders). Paarl, Stellenbosch, Tulbagh.

ISMEA (Institut de Sciences Mathématiques et Economiques Appliquées). 1999. *The European agro-food system and the challenge of global competition*. ISMEA. Rome.

ITC (International Trade Centre). 2014. *Trademap*. Available: http://www.trademap.org/ ITC [Accessed 2014, January 12].

Jackson, D.V. 2011. Perception is reality: Your strengths matter. *Journal of Leadership Education*, 10(1):115–122.

Jafta, A. 2014. Analysing the competitiveness performance of the South African apple industry. M.Sc.Agric.Thesis. University of Stellenbosch. Stellenbosch.

Joint Marketing Forum. 2014. Personal Communication: Joint Marketing Forum - HORTGRO (26/02/2014; 23/04/2015 and14/05/2014). Paarl & Stellenbosch.

Jooste, A. & Van Schalkwyk, H.D. 2001. Comparative advantage of the primary oilseeds industry in South Africa. *Agrekon*, 40(1):35–44. doi:10.1080/03031853.2001.9523692.

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*, 40(4):794–809.

Kandulu, J.M., Bryan, B.A., King, D. & Connor, J.D. 2012. Mitigating economic risk from climate variability in rain-fed agriculture through enterprise mix diversification. *Ecological Economics*, 79:105–112. doi:10.1016/j.ecolecon.2012.04.025.

Karaan, M. 2006. Re-imagining a future for South African agriculture. *Agrekon*, 45(3):245–260.

Kassier Committee of Inquiry into the Marketing Act. 1992. *Report of the Committee of Inquiry into the Marketing Act*. Nietvoorbij. Stellenbosch.

Kaufman, L. & Rousseeuw, P.J. 2005. *Finding groups in data: An introduction to cluster analysis*. John Wiley & Sons. Hoboken, New Jersey.

Keller, G. & Warrack, B. 2000. *Statistics for management and economics*. 5th ed. Duxbury, Pacific Grove USA: Brooks/Cole.

Ketels, C.H. 2006. Michael Porter's competitiveness framework: Recent learnings and new research priorities. *Journal of Industrial Trade and Competition*, 6:63–66.

Kim, W.C. & Mauborgne, R. 2005a. How to create uncontested market space and make the competition irrelevant. Harvard Business School Press. Boston.

Kim, W.C. & Mauborgne, R. 2005b. Blue ocean strategy: From theory to practice. *California Management Review*, 47(3):105–121.

Kirsten, J.F. 1999. The agricultural input industry and the competitiveness of South African agriculture. *Agrekon*, 38(4):487–515. doi:10.1080/03031853.1999.9524864.

Kirsten, J.F. 2000. Die neem van bemarkingsbesluite deur die individuele sagtevrugteprodusent in 'n gedereguleerde markomgewing. M.Agric.Admin Thesis. University of Stellenbosch. Stellenbosch.

Korom, E. & Sagi, J. 2005. Measures of competitiveness in agriculture. *Journal of Central European Agriculture*, 6(3):375–380.

Kothandaraman, P. & Wilson, D.T. 2001. The Future of Competition: Value-Creating Networks. *Industrial Marketing Management* 30, 379–389.

Kotzé, M. 2014. Personal communication (07/10/2014). HORTGRO, Paarl, Western Cape.

Kruger, K.L. 2000. The challenges of the fruit supply chain following the deregulation of the South African fruit industry in 1997. Masters of Philosophy in Maritime Studies. University of Stellenbosch. Stellenbosch.

Kumar, A. 2010. Exports of livestock products from India: Performance, competitiveness and determinants. *Agricultural Economics Research Review*, 23:57–67.

Lall, S. 2001. Competitiveness indices and developing countries: An economic evaluation of the Global Competitiveness Report. *World Development*, 29(9):1501–1525.

Leedy, P. & Ormrod, J. 2010. *Practical research: Planning and design*. 9th ed.: Pearson Education, Inc., publishing as Merrill. Upper Saddle River, New Jersey.

Lengyel, I. 2004. The pyramid model: Enhancing regional competitiveness in Hungary. *Acta Oeconomica*, 54(3):323–342.

Lia, F, & Whalleyb, J. 2002. Deconstruction of the telecommunications industry: from value chains to value networks. *Telecommunications Policy* 26 451–472.

Liapis, P. 2011. Changing patterns of trade in processed agricultural products. *OECD Food, Agriculture and Fisheries Papers*. (47) http://dx.doi.org/10.1787/5kgc3mq19s6d-en.

Liefert, W. 2002. Comparative (dis?) advantage of Russian agriculture. *American Journal of Agricultural Economics*, 84(3):762–767.

Likert, R. 1932. A technique for the measurement of attitudes. *Achives of Psychology*, 22(140):55.

Latruffe, L. 2010. Competitiveness, productivity and efficiency in the agricultural and agri-food sectors. *OECD Food, Agriculture and Fisheries Papers*. (30) http://dx.doi.org/10.1787/5km91nkdt6d6-en.

Madima, T. 2009. Competitiveness of the South African deciduous fruit canning industry. M. Inst. Agrar. Thesis. University of Pretoria. Pretoria.

Mahlanza, B., Mendes, E. & Vink, N. 2003. Comparative advantage of organic wheat production in the Western Cape. *Agrekon*, 42(2):144–162. doi:10.1080/03031853.2003.9523617.

Maree, W.J. 2006. Comparative economic efficiency of training systems and rootstocks for "Alpine" nectarines (*Prunus persica* var. *nectarine*). M.Sc.Agric Thesis. University of Stellenbosch. Stellenbosch.

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

Masters, W.A. 1995. *Guidelines on national comparative advantage and agricultural trade*. Agricultural Policy Analysis Project, Phase III. United States Agency for International Development. Bethesda. USA.

Masters, W.A. & Winter-Nelson, A. 1995. Measuring the comparative advantage of agricultural activities: Domestic resource cost and the social benefit ratio. *American Journal of Agricultural Economics*, 77(2):171–187.

Mather, C. & Greenberg, S. 2003. Market liberalisation in post-apartheid South Africa: The restructuring of citrus exports after "deregulation". *Journal of Southern African Studies*, 29(2):393–412. doi:10.1080/03057070306210.

McDonald, S. & Punt, C. 2001. *The Western Cape of South Africa: Export opportunities, productivity growth and agriculture*. Global Trade Analysis Project. Available: https://www.gtap.agecon.purdue.edu/resources/download/335.pdf.

Meintjies, F. 2009. New deciduous body for RSA industry. *Eurofruit*. (October).http://ftp.freshinfo.com/eurofruit/article/4524/new-deciduous-body-for-rsa-industry. [Accessed 2014, September 18]

Ministerial Committee to Review Agricultural Marketing. 2006. *Report of the Committee to Review the Agricultural Marketing Environment*. National Department of Agriculture. Pretoria.

Molteno, P.A. 1892.*Memorandum of the Cape Fruit Exports of 1892*.3&4 Fenchurch Street. London, E.C.

Momaya, K. 1998. Evaluating international competitiveness at the industry level. *Vikalpa*, 23(2):39–46.

Moon, H.C., Rugman, A.M. & Verbeke, A. 1998. A generalized double diamond approach to the global competitiveness of Korea and Singapore. *International Business Review*, 7:135–150.

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

Mouton, J. 2001. *How to succeed in your master's & doctoral studies*. Van Schaik Publishers. Pretoria.

NAMC (National Agricultural Marketing Council). 2010. *Status report on statutory measures: 2009 survey*. NAMC. Pretoria.

National Planning Commission. 2011. *Agricultural Sector Plan: National Development Plan 2030*. Department: The Presidency Pretoria.

Ndou, P. & Obi, A. 2011. *The business environment and international competitiveness of the South African Citrus Industry*. IFAMA 21st Annual World Symposium, 20-23 June. Frankfurt, Germany.

Neary, J.P. 2005. *Measuring competitiveness*. (05/21).University College Dublin and CEPR Dublin.

Neves, F.M., Trombin, G.V. & Kalaki, B.R. 2013. Competitiveness of the orange juice chain in Brazil. *International Food and Agribusiness Management Review*, 16(4):141–158.

Nicita, A. 2013. Exchange rates, international trade and trade policies. *International Economics*, 135-136:47–61. doi:10.1016/j.inteco.2013.10.003.

OECD (Organisation for Economic Co-operation and Development). 2001. Environmentally related taxes in OECD countries. Issues and strategies. *OECD Publishing*. 71–85. http://www.oecd.org/env/tools-evaluation/environmental-taxes.

Ohlin, B. 1933. Interregional and International Trade. Harvard University Press. Cambridge Massachusetts.

Omela, R. & Värnika, R. 2009. The competitiveness of Estonian milk production: An opportunity cost approach. *Acta Agriculturae Scandinavica Section C - Food Economics*, 6(3-4):197–203.

Önsel, Ş., Ülengin, F., Ulusoy, G., Aktaş, E., Kabak, Ö. & Topcu, Y.İ. 2008. A new perspective on the competitiveness of nations. *Socio-Economic Planning Sciences*, 42(4):221–246. doi:10.1016/j.seps.2007.11.001.

O'Rourke, D. 2008. *The world apple review 2008*. Belrose Inc. Pullman Washington.

O'Rourke, D. 2013. *The world apple review 2013*. Belrose Inc. Pullman Washington.

Ortmann, G.F. 2000. Promoting competitiveness in South African agriculture and agribusiness: The role of institutions. *Agrekon*, 39(4):367–399. doi:10.1080/03031853.2000.9523662.

Ortmann, G.F. 2001. Industrialisation of agriculture and the role of supply chains in promoting competitiveness. *Agrekon*, 40(4):459–489. doi:10.1080/03031853.2001.9524967.

Peleckis, K., Slavinskaitė, N., Limba, T. & Liučvaitienė, A. 2013. Theoretical models of business competitiveness: Formation and evaluation. *Strategic Management Quarterly*, 1(1):31-44.

Peukert, H. 2012. Mercantillism. In J.G. Backhaus, Ed. *Handbook of the history of economic thought*. New York, Dordrecht, Heidelberg, London: Springer New York. 93–122. DOI: 10.1007/978-1-4419-8336-7.

PMA & FPEF. 2014. Personal communication: Produce Marketing Association and Fresh Produce Exporters Forum (PMA & FPEF) (13/08/2015 and 27/08/2015). Somerset West and Pretoria.

Popescu, N.E. & Seban, A. 2014. Competitiveness for sustainable economies. *SEA - Practical Application of Science*, II (1):457-469.

Porter, M. 1985. *Competitive advantage - Creating and sustaining superior performance*. The Free Press. New York.

Porter, M. 1990. *The competitive advantage of nations*. MacMillan. London.

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

Porter, M. 2013. On Competition: Updated and expanded edition. Harvard Business School Publishing. Boston.

PPECB (Perishable Products Export Control Board). 2013. *Perishable Products Export Control Board: Export directory 2013*. 11th ed.: PPECB), in association with Malachite Media Services. Cape Town.

PPECB (Perishable Products Exports Control Board). 2014. Personal communication: Tewie Engelbrecht (16/07/2014). Cape Town.

President's Office. 1996. *Marketing of Agricultural Products Act, No. 47 of 1996*. Pretoria: Parliament of the Republic of South Africa.

Pugel, T. 2012. *International economics*. 14th ed.: McGraw-Hill/Irwin. New York, USA.

Putterill, V. 1937. The export of fruit in the Union. In D. Seymore (Ed.), *Handbook for farmers in South Africa*. 3rd ed. Pretoria: Department of Agriculture and Forestry. 948–950.

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.

Rabe, A., De Necker, P., Smit, J. & Du Preez, J. 2014. Personal communication: Focus Group Discussion (10/02/2014). Paarl.

Reiljan, J., Hinrikus, M. & Ivanov, A. 2000. *Key issues in defining and analysing the competitiveness of a country*. Tartu University Press. Tartu, Estonia.

Rencher, A. 2002. *Methods of multivariate analysis*. 2nd ed.: John Wiley & Sons. New York.

Roberts, J. 2001. *The origins of fruit and vegetables*. Universe Publishing. New York.

Rugman, A.M. & D'Cruz, J.R. 1993. The "double diamond" model of international competitiveness: The Canadian experience. *Management International Review*, 33:17–39.

SACGA (*South African Cherry Growers' Association)*. 2014. *South African Cherry Growers' Association*. Available: http://www.cherries.co.za/[Accessed 2014, February 24].

Sarker, R. & Ratnasena, S. 2014. Revealed comparative advantage and half-a-century competitiveness of Canadian agriculture: A case study of wheat, beef and pork sectors. *Canadian Journal of Agricultural Economics/Revue canadienne d'agroeconomie*, 62(4):519–544.

SATI (South African Table Grape Industry). 2014. *South African Table Grape Industry statistics booklet 2013/2014*.: SATI. Paarl.

Schirmer, S. 2001. *Market regulation and agricultural development*. Econometric Research Southern Africa. Witwatersrand.

SFES. 2014. *Stone Fruit Executive Survey (SFES)*. Paarl, Stellenbosch.

Silva, B., Andrade, P., Valentão, P., Ferreres, F., Seabra, R. & Ferreira, M. 2004. Quince (*Cydonia oblonga* Miller) fruit (pulp, peel, and seed) and jam: Antioxidant activity. *Journal of Agricultural and Food Chemistry*, 52:4705–4712.

Sims, B.M. 2013. *The farm strike paradox*. Africa Conflict Monthly Monitor. Consultancy Africa Intelligence (Pty) Ltd. Pretoria.

Siudek, T. & Zawojska, A. 2014. Competitiveness in the economic concepts, theories and empirical research. *Acta OeconomiaOeconomia*, 13(1):91–108.

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

Smit, D. 2014. Personal communication (25/03/2014). HORTGRO Paarl, Western Cape.

Spies, P. 1999. The impact of global trends on the competitiveness of South African agriculture. *Agrekon*, 38(4):37–41.

SPSS. 2014. *Statistical Calculations and Analyses*. IBM (International Business Machines) Statistical Package for Social Scientists.

SSA (Statistics South Africa). 2014. *Statistical release P0441*. SSA. Pretoria.

Stander, S. 1983. *Boom van die lewe: Die verhaal van Kaapse vrugte*. Saayman & Weber (Edms) Beperk. Cape Town.

Stolper, W.F. & Samuelson, P.A. 1941. Protection and real wages. *The Review of Economic Studies*, 9(1):58–73.

Strauss, P., Meyer, F. & Kirsten, J. 2010. Facilitating decision-making in agriculture by using a system of models. *Agrekon* 47(3):37–41.

Stroebel, L., Jooste, A., Van Zyl, P. & Swart, L. 2011. *Identification of the forces that determine competitiveness in the South African potato industry*. Paper presented at the International Food and Agribusiness Management Association (IFAMA) 21st World Forum and Symposium, June. Frankfurt, Germany.

Swinnen, J. 2014. *Global agricultural value chains, standards, and development*. RSCAS Research Paper No. 2014/30. RSCAS (Robert Schuman Centre for Advanced Studies). Badia, Fiesolana, Italy.

Thomas, B. 2007. The development of the horticultural industry in Namibia: An assessment of the determinants of the global market competitiveness of table grape production. M.Sc.Agric. Thesis University of Stellenbosch. Stellenbosch.

Thorne, F.S. 2004. *Measuring the competitiveness of Irish agriculture (1996-2000)*. Rural Economy Research Centre. Dublin.

Tregurtha, N. & Vink, N. 2002. *B2B E-commerce and the South African horticultural export industry: Current status and future directions*. Stellenbosch University: Department of Agricultural Economics, Stellenbosch.

Trienekens, J.H. 2011. Agricultural value chains in developing countries: A framework for analysis. *International Food and Agribusiness Managment Review*, 14(2):51–82.

Tuna, E., Georgiev, N. & Nacka, M. 2013. Competitiveness analysis of the tobacco sub-sector in the Republic of Macedonia. *Agroeconomia Croatia*, 11(1):53–60.

US Senate: Committee on Finance. 1985. *Review of findings of the President's Commission on Industrial Competitiveness.*. US Government Printing Office Washington, DC.

Valenciano, J.D.P., Giancinti, M.A. & Uribe, J. 2012. Revealed comparative advantage and competitiveness in pear. *International Journal on Food System Dynamics*, 3(1):1–10.

Van Deventer, A.C. 1969. *The marketing of controlled deciduous fruit in the Republic of South Africa*. MBA Thesis. University of Cape Town, Cape Town.

Van Rooyen, C.J. 2008. *The competitiveness of the South African agribusiness sector, 2008.* University of Pretoria. Pretoria

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

Van Rooyen, I., Kirsten, J. & Van Rooyen, C.J. 2001. *The competitiveness of the South African and Australian flower industries: An application of three methodologies*. . Paper presented at the 45th Annual Conference of the Australian Agricultural and Resource Economics Society, January 23-25. Australia. Adelaide.

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 Wyk, F. & Maspero, E. 2004. An analysis of the South African fruit logistics infrastructure. *Orion*, 20(1):55–72.

Venter, R.H. & Horsthemke, O. 1999. Analysis of the competitive nature of the Southern African sheep meat v chain. *Agrekon*, 38(4):716–725. doi:10.1080/03031853.1999.9524883.

Vermeulen, H. 2004. Genetically modified white maize in South Africa: Consumer perceptions and market segmentation. M.Sc. Agric. Thesis. University of Pretoria. Pretoria.

Viner, J. 1927. Adam Smith and Laissez Faire. *Journal of Political Economy*. 35(2):198-232.

Vink, N., Kleynhans, T.E. & Street, K. 1998. The competitiveness of Western Cape wheat production: An international comparison. *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.

Vukovic, D., Jovanovic, A. & Djukic, M. 2012. Defining competitiveness through the theories of new economic geography and regional economy. *Journal of the Geographical Institute Jovan Cvijic*, 62(3):49–64. doi:10.2298/IJGI1203049V.

Waheeduzzaman, A.N. & Ryans, J. 1996. Definition, perspectives and understanding of international competitiveness: A quest for a common ground. *Competitiveness Review: An International Business Journal*, 6(2):7–26.

Walters, S. & De Beer, B. 1999. *An indicator of South Africa's external competitiveness*. South African Reserve Bank. Pretoria.

WCC (World Competitiveness Centre). 2011. *World competitiveness yearbook 2011*, Institute for Management Development. Lausanne.

WCC World Competitiveness Centre). 2013. *World competitiveness yearbook 2013*. Institute for Management Development. Lausanne.

WEF (World Economic Forum). 2013. *The global competitiveness report 2012-2013*. WEF. Geneva

WEF (World Economic Forum). 2014. *Competitiveness rankings*. Available: www.weforum.org. [Accessed 2014, June 28].

Wold, S., Esbensen, K. & Geladi, P. 1987. Principal component analysis. *Chemometrics and Intelligent Laboratory Systems*, 2:37–52.

Zairi, M. 1994. Benchmarking: The best tool for measuring competitiveness. *Benchmarking for Quality Management & Technology*, 1(1):11–24.

Appendices

Appendix A

Four-factor breakdown of 331 criteria - IMD (WCC, 2013)

1. Economic performance

1.1. Domestic economy
   Size

   1.1.1. Gross domestic product (GDP)
   1.1.2. GDP (PPP)
   1.1.3. World GDP contribution (%)
   1.1.4. Household consumption expenditure ($ bn)
   1.1.5. Household consumption expenditure (%)
   1.1.6. Government consumption expenditure ($ bn)
   1.1.7. Government consumption expenditure (%)
   1.1.8. Gross fixed capital formation ($ bn)
   1.1.9. Gross fixed capital formation (%)
   1.1.10. Gross domestic savings ($ bn)
   1.1.11. Gross domestic savings (%)
   1.1.12. Economic sectors
   1.1.13. Diversification of the economy

   Growth

   1.1.14. Real GDP growth
   1.1.15. Real GDP growth per capita
   1.1.16. Household consumption expenditure – real growth
   1.1.17. Government consumption – real growth
   1.1.18. Gross fixed capital formation – real growth
   1.1.19. Resilience of the economy

   Wealth

   1.1.20. GDP per capita
   1.1.21. GDP (PPP) per capita

   Forecasts

   1.1.22. Forecast: Real GDP growth
   1.1.23. Forecast: Inflation
   1.1.24. Forecast: Unemployment
   1.1.25. Forecast: Current account balance

1.2. International trade

   1.2.1. Current account balance ($ bn)
   1.2.2. Current account balance (%)
   1.2.3. Balance of trade ($ bn)
   1.2.4. Balance of trade (%)

1.2.5. Balance of commercial services ($ bn)

1.2.6. Balance of commercial services (%)

1.2.7. World exports contribution (%)

1.2.8. Exports of goods ($ bn)

1.2.9. Exports of goods (%)

1.2.10. Exports of goods per capita

1.2.11. Exports of goods – growth

1.2.12. Exports of commercial services ($ bn)

1.2.13. Exports of commercial services (%)

1.2.14. Exports of commercial services – growth

1.2.15. Exports of goods and commercial services ($ bn)

1.2.16. Exports breakdown by economic sector

1.2.17. Exports concentration by partner

1.2.18. Imports of goods and commercial services ($ bn)

1.2.19. Imports of goods and commercial services (%)

1.2.20. Imports of goods and commercial services – growth

1.2.21. Imports breakdown by economic sector

1.2.22. Trade to GDP ratio

1.2.23. Terms of trade index

1.2.24. Tourism receipts (%)

1.2.25. Exchange rates

1.3. International investment

Investment

1.3.1. Direct investment flows abroad ($ bn)

1.3.2. Direct investment flows abroad (%)

1.3.3. Direct investment stocks abroad ($ bn)

1.3.4. Direct investment stocks abroad (%)

1.3.5. Direct investment inward ($ bn)

1.3.6. Direct investment inward (%)

1.3.7. Direct investment stock inward ($ bn)

1.3.8. Direct investment stock inward (%)

1.3.9. Balance of direct investment flows ($ bn)

1.3.10. Balance of direct investment flows (%)

1.3.11. Net position in direct investment stocks ($ bn)

1.3.12. Net position in direct investment stocks (%)

1.3.13. Relocation threads of production

1.3.14. Relocation threads of R & D facilities

1.3.15. Relocation threads of services

Finance

1.3.16. Portfolio investment assets ($ bn)

1.3.17. Portfolio investment liabilities ($ bn)

1.4. Employment

1.4.1. Employment

1.4.2. Employment (%)

1.4.3. Employment – growth

1.4.4. Employment by sector

1.4.5. Employment by public sector (%)

1.4.6. Unemployment rate

1.4.7. Long-term unemployment

1.4.8. Youth unemployment

1.5. Prices

1.5.1. Consumer price inflation

1.5.2. Cost-of-living index

1.5.3. Apartment rent

1.5.4. Office rent

2. Government efficiency

2.1. Public finance

2.1.1. Government budget surplus/deficit ($ bn)

2.1.2. Government budget surplus/deficit (%)

2.1.3. Total general government debt ($ bn)

2.1.4. Total general government debt (%)

2.1.5. Total general government debt – real growth

2.1.6. Central government domestic debt (%)

2.1.7. Central government foreign debt (%)

2.1.8. Interest payment (%)

2.1.9. Public finances

2.1.10. Tax evasion

2.1.11. Pension funding

2.1.12. General government expenditure ((%)

2.2. Fiscal policy

2.2.1. Collected tax revenues (%)

2.2.2. Collected personal income tax (%)

2.2.3. Collected corporate taxes (%)

2.2.4. Collected indirect tax revenues (%)

2.2.5. Collected capital and property taxes (%)

2.2.6. Collected social security contribution (%)

2.2.7. Effective personal income tax rate

2.2.8. Corporate tax rate on profit

2.2.9. Consumption tax rate

2.2.10. Employee's social security contribution rate

2.2.11. Employer's social security contribution rate

2.2.12. Real personal taxes

2.2.13. Real corporate taxes

2.3. Institutional framework

Central Bank

2.3.1. Real short-term interest rate

2.3.2. Cost of capital

2.3.3. Interest rate spread

2.3.4. Country credit rating

2.3.5. Central bank policy

2.3.6. Foreign currency reserves ($ bn)

2.3.7. Exchange rate stability

State efficiency

2.3.8. Legal and regulatory framework
2.3.9. Adaptability of government policy
2.3.10.   Government decisions
2.3.11.   Transparency
2.3.12.   Bureaucracy
2.3.13.   Bribing and corruption

2.4. Business legislation

Openness

2.4.1. Tariff barriers
2.4.2. Customs authorities
2.4.3. Protectionism
2.4.4. Public sector contracts
2.4.5. Foreign investors
2.4.6. Capital markets
2.4.7. Investment incentives

Competition and regulation

2.4.8. Government subsidies (%)
2.4.9. Subsidies
2.4.10.   State ownership of enterprises
2.4.11.   Competition legislation
2.4.12.   Parallel economy
2.4.13.   Ease of doing business
2.4.14.   Creation of firms
2.4.15.   Start-up days
2.4.16.   Start-up procedures

Labour regulation

2.4.17.   Labour regulations
2.4.18.   Unemployment legislation
2.4.19.   Immigration laws
2.4.20.   Redundancy costs

2.5. Social framework

2.5.1. Justice
2.5.2. Personal security and private property rights
2.5.3. Ageing society
2.5.4. Risk of political instability
2.5.5. Social cohesion
2.5.6. Gini index
2.5.7. Income distribution – lowest 10%
2.5.8. Income distribution – highest 10%
2.5.9. Equal opportunity
2.5.10.   Women in parliament (%)

2.5.11.   Women on boards (%)
2.5.12.   Gender inequality

3. Business efficiency

3.1. Productivity and efficiency

3.1.1. Overall productivity (PPP)
3.1.2. Overall productivity
3.1.3. Overall productivity – real growth
3.1.4. Labour productivity (PPP)
3.1.5. Labour productivity (PPP) growth
3.1.6. Agricultural productivity (PPP)
3.1.7. Productivity in industry (PPP)
3.1.8. Productivity in services (PPP)
3.1.9. Workforce productivity
3.1.10.   Large corporation
3.1.11.   Small and medium-size enterprises
3.1.12.   Productivity of companies

3.2. Labour market
Costs

3.2.1. Compensation levels ($)
3.2.2. Unit labour costs in manufacturing sector (%)
3.2.3. Remuneration in services professions ($)
3.2.4. Remuneration of management ($)
3.2.5. Remuneration spread

Relations

3.2.6. Working hours
3.2.7. Labour relations
3.2.8. Worker motivation
3.2.9. Industrial disputes
3.2.10.   Apprenticeship
3.2.11.   Employee training

Availability of skills

3.2.12.   Labour force
3.2.13.   Labour force (%)
3.2.14.   Labour force growth
3.2.15.   Part-time employment (%)
3.2.16.   Female labour force (%)
3.2.17.   Foreign labour force (%)
3.2.18.   Skilled labour
3.2.19.   Finance skills
3.2.20.   Attracting and retaining talents
3.2.21.   Brain drain
3.2.22.   Foreign high-skilled people
3.2.23.   International experience
3.2.24.   Competent senior managers

3.3. Finance

Bank efficiency

3.3.1. Banking sector assets (%)
3.3.2. Financial cards in circulation
3.3.3. Financial card transactions
3.3.4. Investment risk
3.3.5. Banking and financial services
3.3.6. Finance and banking regulations
3.3.7. Financial risk factor

Stock market efficiency

3.3.8. Stock markets
3.3.9. Stock market capitalisation ($ bn)
3.3.10. Stock market capitalisation (%)
3.3.11. Value traded on stock markets
3.3.12. Listed domestic companies
3.3.13. Stock market index (%)
3.3.14. Shareholders' rights
3.3.15. Initial public offerings

Finance management

3.3.16. Credit
3.3.17. Venture capital
3.3.18. M & A activity
3.3.19. Corporate debt

3.4. Management practices

3.4.1. Adaptability of companies
3.4.2. Ethical practices
3.4.3. Credibility of managers
3.4.4. Corporate boards
3.4.5. Auditing and accounting practices
3.4.6. Customer satisfaction
3.4.7. Entrepreneurship
3.4.8. Social responsibility
3.4.9. Health, safety and environmental concerns

3.5. Attitudes and values

3.5.1. Attitude towards globalisation
3.5.2. Image abroad or branding
3.5.3. National culture
3.5.4. Flexibility and adaptability
3.5.5. Need for economic and social reforms
3.5.6. Value systems

4. **Infrastructure**

4.1. Basic infrastructure

4.1.1. Land area
4.1.2. Arable area
4.1.3. Water resources
4.1.4. Access to water
4.1.5. Access to commodities
4.1.6. Management of cities
4.1.7. Population-market size
4.1.8. Population under 15 years (%)
4.1.9. Population over 65 years (%)
4.1.10. Dependency ratio
4.1.11. Roads
4.1.12. Railroads
4.1.13. Air transportation
4.1.14. Quality of air transportation
4.1.15. Distribution infrastructure
4.1.16. Water transportation
4.1.17. Maintenance and development
4.1.18. Energy infrastructure
4.1.19. Future energy supply
4.1.20. Total indigenous energy production
4.1.21. Total indigenous energy production (%)
4.1.22. Total final energy consumption
4.1.23. Total final energy consumption per capita
4.1.24. Electricity costs for industrial clients
4.1.25. Gasoline prices

4.2. Technological infrastructure

4.2.1. Investment in telecommunications (%)
4.2.2. Fixed telephone lines
4.2.3. Fixed telephone tariffs
4.2.4. Mobile telephone subscribers
4.2.5. Mobile telephone costs
4.2.6. Communications technology
4.2.7. Connectivity
4.2.8. Computers in use
4.2.9. Computers per capita
4.2.10. Internet users
4.2.11. Fixed broadband tariffs
4.2.12. Broadband subscribers
4.2.13. Internet bandwidth speed
4.2.14. Information technology skills
4.2.15. Qualified engineers
4.2.16. Technological cooperation
4.2.17. Public and private sector ventures
4.2.18. Development and application of technology
4.2.19. Funding for technological development
4.2.20. Technological regulations
4.2.21. High-tech exports ($)
4.2.22. High-tech exports (%)
4.2.23. Cyber security

4.3. Scientific infrastructure

4.3.1. Total expenditure on R&D ($)
4.3.2. Total expenditure on R&D (%)
4.3.3. Total expenditure on R&D per capita ($)
4.3.4. Business expenditure on R&D ($)
4.3.5. Business expenditure on R&D (%)
4.3.6. Total R&D personnel nationwide
4.3.7. Total R&D personnel nationwide per capita
4.3.8. Total R&D personnel in business enterprise
4.3.9. Total R&D personnel in business enterprise per capita
4.3.10. Science degrees
4.3.11. Scientific articles
4.3.12. Nobel prizes
4.3.13. Nobel prizes per capita
4.3.14. Patent application
4.3.15. Patent application per capita
4.3.16. Patents grants
4.3.17. Number of patents in force
4.3.18. Scientific research
4.3.19. Researchers and scientists
4.3.20. Scientific research legislation
4.3.21. Intellectual property rights
4.3.22. Knowledge transfer
4.3.23. Innovative capacity

4.4. Health and environment

4.4.1. Total health expenditure (%)
4.4.2. Total health expenditure per capita
4.4.3. Public expenditure on health
4.4.4. Health infrastructure
4.4.5. Life expectancy at birth
4.4.6. Healthy life expectancy
4.4.7. Infant mortality
4.4.8. Medical assistance
4.4.9. Urban population (%)
4.4.10. Human development index
4.4.11. Health problems
4.4.12. Energy intensity
4.4.13. Paper and cardboard recycling rate
4.4.14. Waste water treatment plants
4.4.15. Water consumption intensity
4.4.16. CO_2 emissions
4.4.17. CO_2 emissions intensity
4.4.18. Renewable energies (%)
4.4.19. Green technology solutions
4.4.20. Total bio-capacity
4.4.21. Ecological footprint
4.4.22. Ecological balance (reserve/deficit)
4.4.23. Sustainable development
4.4.24. Pollution problems
4.4.25. Environmental laws
4.4.26. Quality of life

4.5. Education

4.5.1. Total public expenditure on education (%)
4.5.2. Total public expenditure on education per capita
4.5.3. Pupil-teacher ratio (primary education)
4.5.4. Pupil-teacher ratio (secondary education)
4.5.5. Secondary school enrolment (%)
4.5.6. Higher education achievement (%)
4.5.7. Student mobility inbound
4.5.8. Student mobility outbound
4.5.9. Educational assessment – PISA
4.5.10. English proficiency – TOEFL
4.5.11. Educational system
4.5.12. Science in schools
4.5.13. University education
4.5.14. Management education
4.5.15. Illiteracy (%)
4.5.16. Language skills

Appendix B

The 12 pillars of competitiveness – GCR (WEF, 2013)

1. **Institutions**
    1.1.   Property rights
    1.2.   Intellectual property protection
    1.3.   Division of public funds
    1.4.   Public trust in politicians
    1.5.   Irregular payments
    1.6.   Judicial independence
    1.7.   Favouritism in decisions of government officials
    1.8.   Wastefulness of government spending
    1.9.   Burden of government regulation
    1.10.   Efficiency of legal framework in settling disputes
    1.11.   Efficiency of legal framework in challenging regulation
    1.12.   Transparency of government policymaking
    1.13.   Business costs of terrorism
    1.14.   Business costs of crime and violence
    1.15.   Organised crime
    1.16.   Reliability of police services
    1.17.   Ethical behaviour of firms
    1.18.   Strength of auditing and reporting standards
    1.19.   Efficacy of corporate boards
    1.20.   Protection of minority shareholders' interests
    1.21.   Strength of investor protection

2. **Infrastructure**
    2.1.   Quality of overall infrastructure
    2.2.   Quality of roads
    2.3.   Quality of railroad infrastructure
    2.4.   Quality of port infrastructure
    2.5.   Quality of transport infrastructure
    2.6.   Available airline seat km/week
    2.7.   Quality of electricity supply
    2.8.   Mobile telephone subscriptions
    2.9.   Fixed telephone lines

3. **Macroeconomic environment**
    3.1.   Government budget balance, % GDP
    3.2.   Gross national savings, % GDP
    3.3.   Inflation, annual % change
    3.4.   General government debt, % GDP
    3.5.   Country credit rating

4. **Health and primary education**
    4.1.   Business impact of malaria
    4.2.   Malaria cases
    4.3.   Business impact of tuberculosis
    4.4.   Tuberculosis cases
    4.5.   Business impact of HIV/AIDS
    4.6.   HIV prevalence, % adult population
    4.7.   Infant mortality, deaths/1 000 live births

4.8.	Life expectancy
4.9.	Quality of primary education
4.10.	Primary education enrolment, net %

5. Higher education and training

5.1.	Secondary education enrolment, gross %
5.2.	Tertiary education enrolment, gross %
5.3.	Quality of educational system
5.4.	Quality of math and science education
5.5.	Quality of management schools
5.6.	Internet access in schools
5.7.	Availability of research and training services
5.8.	Extent of staff training

6. Goods market efficiency

6.1.	Intensity of local competition
6.2.	Extent of market dominance
6.3.	Effectiveness of anti-monopoly policy
6.4.	Effect of taxation on incentives to invest
6.5.	Total tax rate, % profits
6.6.	Number of procedures to start a business
6.7.	Number of days to start a business
6.8.	Agricultural policy costs
6.9.	Prevalence of trade barriers
6.10.	Trade tariffs, % duty
6.11.	Prevalence of foreign ownership
6.12.	Business impact of rules on FDI
6.13.	Burden of customs procedures
6.14.	Imports as percentage of GDP
6.15.	Degree of customer orientation
6.16.	Buyer sophistication

7. Labour market efficiency

7.1.	Cooperation in labour-employer relations
7.2.	Flexibility of wage determination
7.3.	Hiring and firing practices
7.4.	Redundancy costs, weeks of salary
7.5.	Effect of taxation on incentives to work
7.6.	Pay and productivity
7.7.	Reliance on professional management
7.8.	Country capacity to retain talent
7.9.	Country capacity to attract talent
7.10.	Women in labour force, ratio to men

8. Financial market development

8.1.	Availability of financial services
8.2.	Affordability of financial services
8.3.	Financing through local equity market
8.4.	Ease of access to loans
8.5.	Venture capital availability
8.6.	Soundness of banks
8.7.	Regulation of securities exchange
8.8.	Legal rights index

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9. Technological readiness
  9.1.   Availability of latest technologies
  9.2.   Firm-level technology absorption
  9.3.   FDI and technology transfer
  9.4.   Individuals using the internet
  9.5.   Fixed broadband internet subscriptions
  9.6.   Internet bandwidth
  9.7.   Mobile broadband subscriptions

10. Market size
  10.1.   Domestic market size index
  10.2.   Foreign market size index
  10.3.   GDP (PPP)
  10.4.   Exports as percentage of GDP

11. Business sophistication
  11.1. Local supplier quantity
  11.2. Local supplier quality
  11.3. State of cluster development
  11.4. Nature of competitive advantage
  11.5. Value chain breadth
  11.6. Control of international distribution
  11.7. Production process sophistication
  11.8. Extent of marketing
  11.9. Willingness to delegate authority

12. Innovation
  12.1. Capacity for innovation
  12.2. Quality of scientific research institutions
  12.3. Company spending on R&D
  12.4. University-industry collaboration in R&D
  12.5. Government procurement of advanced technological products
  12.6. Availability of scientists and engineers
  12.7. PCT patent application

Appendix C

Stone Fruit Executive Survey: Questionnaire

RESPONDENT INFORMATION

Name of Respondent:	

Contact number:	

E-mail address:	

Geographical Area: (District/Municipality)	

Stone Fruit Types addressed (Mark with "x" where applicable)	Peaches	Plums	Prunes	Nectarines	Apricots	Cherries

Fruit Type: Crop Distribution (Mark with "x" where applicable)	Fresh	Dried	Processed

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

If an Input or Service Provider, indicate with an "x" applicable % of resources (land, human, capital) spent on Stone Fruit operations	< 10%	11%–25%	26%–50%	51%–75%	> 75%

If a Producer, indicate with an "x" the applicable area (ha) under Stone Fruit Production	< 5 ha	6 ha – 15 ha	15 ha – 25 ha	25 ha – 50 ha	> 50 ha

If a Pack house or Processor, indicate with an "x" the applicable volume of Stone Fruit (ton) handled by your business	< 100 t	100 t – 1 000 t	1 000 t – 10 000 t	> 10 000 t

If an Exporter or Marketer, indicate with an "x" the applicable volume (equivalent cartons) of all Stone Fruit Exported	< 100 000	100 000–500 000	500 000–1000 000	> 1000 000

Please mark only one block: 1 = negative; 3 = neutral; 5 = positive
Any additional comments would be welcomed in the space provided

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PRODUCTION FACTOR CONDITIONS

1) The general infrastructure used by your company is:

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

Comment:

2) The cost of infrastructure is:

	1	2	3	4	5	
Extremely high						Very affordable

Comment:

3) The transaction cost in your business is: (E.g. cost of doing business, finding markets, bureaucratic red tape, etc.)

	1	2	3	4	5	
Extremely high						Very affordable

Comment:

4) The quality of research available to your industry:

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

Comment:

5) The quality of technology available to your industry:

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

Comment:

6) Access to quality technology for your industry is:

	1	2	3	4	5	
Difficult to obtain						Easy to obtain

Comment:

7) The cost of technology is:

	1	2	3	4	5	
Extremely high						Very affordable

Comment:

8) Obtaining long-term credit for your business is:

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

Comment:

9) Obtaining short-term credit for your business is:

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

Comment:

10) Skilled labour is:

	1	2	3	4	5	
Difficult to obtain						Easy to obtain

Comment:

11) Competency level amongst skilled labour is:

	1	2	3	4	5	
Not of a very high quality						Outstanding

Comment:

12) Skilled labour is:

	1	2	3	4	5	
Too costly						Very affordable

Comment:

13) Unskilled/Entry-level labour is:

	1	2	3	4	5	
Difficult to obtain						Easy to obtain

Comment:

14) Unskilled/Entry-level labour is:

	1	2	3	4	5	
Not of a very high quality						Of outstanding quality

Comment:

15) Unskilled/Entry-level labour is:

	1	2	3	4	5	
Too costly						Very affordable

Comment:

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

	1	2	3	4	5	
Limited						Readily available

Comment:

17) Your location's suitability for Stone Fruit production is:

	1	2	3	4	5	
Not suitable						Appropriate

Comment:

18) Establishment and production costs are:

	1	2	3	4	5	
Too costly						Very affordable

Comment:

19) The impact of SA climate/weather variation (unpredicted conditions) affects your business:

	1	2	3	4	5	
Negatively						Positively

Comment:

20) The productivity level of your business is:

	1	2	3	4	5	
Very low						Very high

Comment:

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

	1	2	3	4	5	
Very low						Very high

Comment:

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

	1	2	3	4	5	
Very low						Very high

Comment:

DEMAND/MARKET FACTORS

1) Local market size is:

	1	2	3	4	5	
Unable to handle large volumes						Large enough and growing in demand

Comment:

2) Local consumers of Stone Fruit are:

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

Comment:

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

	1	2	3	4	5	
Too slow						Large enough and fast enough

Comment:

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

	1	2	3	4	5	
Insufficient						Adequate

Comment:

5) The international Stone Fruit export market is:

	1	2	3	4	5	
Too small						Large enough

Comment:

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

	1	2	3	4	5	
Similar						Varied

Comment:

7) The influence of adverse weather conditions on buying patterns of consumers (export markets)

	1	2	3	4	5	
Dependent						Sovereign/Independent

Comment:

8) The seasonality and availability of SA stone fruit varieties does impact the industry's competitiveness:

	1	2	3	4	5	
Negatively						Positively

Comment:

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

	1	2	3	4	5	
Insufficient						Sufficient

Comment:

10) The South African Stone Fruit Industry's relationship with multinational retailers (M&S, Tesco etc.)

	1	2	3	4	5	
Very poor						Very good

Comment:

RELATED AND SUPPORTING INDUSTRIES

1) Financial service providers generally:

	1	2	3	4	5	
Constrain your business' competitiveness						Enhance your business' competitiveness

Comment:

2) Privately funded scientific research institutions are:

	1	2	3	4	5	
Non-existent						The best in their fields

Comment:

3) Government-funded scientific research institutions are:

	1	2	3	4	5	
Non-existent						The best in their fields

Comment:

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

	1	2	3	4	5	
Improper						Properly evaluated and tested

Comment:

5) Access to grower-club varieties:

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

Comment:

6) Industry`s expenditure on Research & Development

	1	2	3	4	5	
Insufficient						Sufficient

Comment:

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

	1	2	3	4	5	
Non-existent						Intensive and continuing

Comment:

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

	1	2	3	4	5	
Constrains competitiveness						Enhances competitiveness

Comment:

9) Telecommunication services:

	1	2	3	4	5	
Constrain competitiveness						Enhance competitiveness

Comment:

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

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

Comment:

11) The cost of specialised technology services is:

	1	2	3	4	5	
Too expensive						Very affordable

Comment:

12) Availability of local suppliers of primary inputs:

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

Comment:

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

Inefficient and with 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:

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 through the value chain:

Ineffective and inefficient	1	2	3	4	5	Effective and efficient

Comment:

19) Necessary infrastructure requirements for export purposes: (E.g. facilities at Cape Town harbour)

Insufficient and hinder competitiveness	1	2	3	4	5	Sufficient and improve 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 are:

Inadequate	1	2	3	4	5	Excellent

Comment:

3) The management of market intelligence for the Stone Fruit industry is: (Compared to other fruit industries)

	1	2	3	4	5	
Inadequate						Excellent

Comment:

4) Competition in the local market is:

	1	2	3	4	5	
Very limited						Very intense

Comment:

5) Entry of new competitors:

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

Comment:

6) Competition in international market is:

	1	2	3	4	5	
Very limited						Very intense

Comment:

7) To what extent do economies of scale influence your competitiveness? Regarding integration into the value chain:

	1	2	3	4	5	
Minor influence						Major influence

Comment:

8) Your willingness to reinvest in Stone Fruit operations:

	1	2	3	4	5	
Reluctant						Keen

Comment:

9) Your current resource (land, human and capital) base to support projected Stone Fruit operations:

	1	2	3	4	5	
Insufficient						Sufficient

Comment:

10) Stone Fruit's competition for resources (land, human and capital) from other agricultural activities:

	1	2	3	4	5	
Not competitive at all						Very competitive

Comment:

GOVERNMENT SUPPORT AND POLICIES

1) South Africa's trade policy:

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

Comment:

2) South Africa's land reform policy:

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

Comment:

3) South Africa's labour policy:

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

Comment:

4) South Africa's macro-economic policy:

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

Comment:

5) South Africa's competition law:

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

Comment:

6) South Africa's BEE policy:

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

Comment:

7) The credibility of the political system is:

	1	2	3	4	5	
Very low						Very high

Comment:

8) The trustworthiness of the politicians is:

	1	2	3	4	5	
Very low						Very high

Comment:

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

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

Comment:

10) Complying with regulatory standards:

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

Comment:

11) Administrative regulations are:

	1	2	3	4	5	
Burdensome						Routine with minor effort

Comment:

12) The taxation system:

	1	2	3	4	5	
Impedes business investment						Promotes business investment

Comment:

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

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

Comment:

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

	1	2	3	4	5	
Impedes business investment						Promotes business investment

Comment:

CHANCE OF OPPORTUNITY FACTORS	(factors over which your firm has no control and that are of an external nature to the firm, industry and country)

1) The current exchange rate:

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

Comment:

2) WHY??

3) The exchange rate fluctuations:

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

Comment:

4) The ability of the Stone Fruit industry to fully utilise the effect of unfavourable weather conditions on competitors:

	1	2	3	4	5	
Incapable						Capable

Comment:

5) Social unrest

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

Comment:

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6) The South African political system in general:

	1	2	3	4	5	
Hinders competitiveness						Promotes competitiveness

Comment: _____

7) Crime

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

Comment: _____

8) Health – HIV/AIDS, TB, etc.:

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

Comment: _____

9) Economic development and growth in South Africa:

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

Comment: _____

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

	1	2	3	4	5	
Big impact						No impact

Comment: _____

GENERAL QUESTIONS - In your opinion:

1. What are the **5** main factors that enhance the competitive performance of your industry?

_____

2. What are the **5** main factors that constrain the competitive performance of your industry?

_____

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

International _____

Local _____

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

_____

THANK YOU FOR TAKING THE TIME TO COMPLETE THIS QUESTIONNAIRE
YOUR RESPONSE IS HIGHLY APPRECIATED

SFES: Coding of questions and abbreviations

		Section B: Production Factor Conditions
B1	General infrastructure	1) The general infrastructure used by your company is:
B2	Infrastructure cost	2) The cost of infrastructure is:
B3	Transaction cost	3) The transaction cost in your business is: (E.g. cost of doing business, finding markets, bureaucratic red tape etc.)
B4	Research quality	4) The quality of research available to your industry:
B5	Technology quality	5) The quality of technology available to your industry:
B6	Quality technology access	6) Access to quality technology for you industry is:
B7	Technology cost	7) The cost of technology is:
B8	Credit: Long-term	8) Obtaining long-term credit for your business is:
B9	Credit: Short-term	9) Obtaining short-term credit for your business is:
B10	Skilled labour: Obtaining	10) Skilled labour is:
B11	Skilled labour: Competency	11) Competency level amongst skilled labour is:
B12	Skilled labour: Cost	12) Skilled labour is:
B13	Entry-level labour: Obtaining	13) Unskilled/Entry-level labour is:
B14	Entry-level labour: Quality	14) Unskilled/Entry-level labour is:
B15	Entry-level labour: Cost	15) Unskilled/Entry-level labour is:
B16	Natural resource access	16) Access to natural resources (land and water) is:
B17	Location suitability	17) Your location's suitability for Stone Fruit production is:
B18	Establishment and production cost	18) Establishment and production costs are:
B19	SA climate variation	19) The impact of SA climate/weather variation (unpredicted conditions) affects your business:
B20	Productivity	20) The productivity level of your business is:
B21	Effectivity	21) The effectivity (successful in achieving a desired result) level of your business is:
B22	Efficiency	22) The efficiency (input : output relation) level of your business:
		Section C: Demand Market Factors
C1	Local market	1) Local market size is:
C2	Local consumers	2) Local consumers of Stone Fruit are:
C3	Growth	3) The growth in volume of the local market is: (Capacity to handle increasing volumes)
C4	Consumer education	4) Consumer education and availability of information, to base marketing decisions on, is:
C5	International market	5) The international Stone Fruit export market is:
C6	Diversity	6) The diversity (based on volume and variety) of new (more lucrative) international markets is:
C7	Buying patterns	7) The influence of adverse weather conditions on buying patterns of consumers (export markets)
C8	Seasonality and availability	8) The impact of seasonality and availability of the SA Stone Fruit Industry's competitiveness:
C9	Characteristics	9) The availability and characteristics (profile and product) of the SA Stone Fruit on offer, in line with market demand:
C10	Relation	10) The South African Stone Fruit Industry's relationship with multinational retailers (M&S, Tesco etc.)
		Section D: Relating and Supporting Industries
D1	Financial services	1) Financial service providers generally:
D2	Private research	2) Privately funded scientific research institutions are:
D3	Government research	3) Government-funded scientific research institutions are:
D4	Evaluation	4) Evaluation and testing of new varieties according to industry's best practices:
D5	Grower-club access	5) Access to grower-club varieties:
D6	Expenditure R&D	6) Industry`s expenditure on Research & Development
D7	R&D collaboration	7) Your company's collaboration with scientific research institutions in their R&D activity is:
D8	Electricity	8) Electricity supply (including renewable energy and fossil fuels):
D9	Telecommunication	9) Telecommunication services:
D10	Technology services: Availability	10) Specialised technology services are: (E.g. computerised irrigation systems/services, smart fresh, consultants etc.)
D11	Technology services: Cost	11) The cost of specialised technology services are:

D12	Local input suppliers: Availability	12) Availability of local suppliers of primary inputs:
D13	Local input suppliers: Quality	13) The quality of local suppliers for your industry's primary inputs is:
D14	Local input suppliers: Sustainability	14) The sustainability of local suppliers of your industry's primary inputs:
D15	Storage/Product handling: Facility availability	15) Availability of storage and packing/product-handling facilities:
D16	Storage/Product handling: Facility cost	16) The cost of storage and packing/product-handling facilities:
D17	Transport: Reliability	17) Availability and reliability of transport:
D18	Cold-chain management	18) Effective management of cold-chain through the value chain:
D19	Export infrastructure	19) Necessary infrastructure requirements for export purposes: (E.g. facilities at Cape Town harbour)

Section E: Business Strategy, Structure and Rivalry

E1	Information flow: Primary suppliers	1) The management of information flow from primary suppliers to your company is:
E2	Information flow: Customers	2) The flow and use of information from customers to your company to inform strategy is:
E3	Market intelligence management	3) The management of market intelligence for the Stone Fruit industry is: (Compared to other fruit industries)
E4	Local market competition	4) Competition in the local market is:
E5	New competitors	5) Entry of new competitors:
E6	International market competition	6) Competition in international market is:
E7	Economies of scale	7) To what extent do economies of scale influence your competitiveness? Regarding integration into the value chain:
E8	Reinvestment	8) Your willingness to reinvest in Stone Fruit operations:
E9	Resource base	9) Your current resource (land, human and capital) base to support projected Stone Fruit operations:
E10	Resource competition	10) Stone Fruit's competition for resources (land, human and capital) from other agricultural activities:

Section F: Government Support and Policy

F1	Trade policy	1) South Africa's trade policy:
F2	Land reform policy	2) South Africa's land reform policy:
F3	Labour policy	3) South Africa's labour policy:
F4	Macro-economic policy	4) South Africa's macro-economic policy:
F5	Competition law	5) South Africa's competition law:
F6	BEE policy	6) South Africa's BEE policy:
F7	Political system credibility	7) The credibility of the political system is:
F8	Politicians' trustworthiness	8) The trustworthiness of the politicians is:
F9	Regulatory standards	9) Regulatory standards (e.g. Products standards, energy, safety, and environment) in your opinion are:
F10	Regulatory standards comply	10) Complying with regulatory standards:
F11	Administrative regulations	11) Administrative regulations are:
F12	Taxation	12) The taxation system:
F13	Political factors	13) Have legal or political factors over the past five years undermined your company's strategic positioning?
F14	Corruption	14) The effect of corruption and opportunism on business' competitiveness:

Section G: Chance of Opportunity Factors

G1	Exchange rate	1) The current exchange rate:
G2	Exchange rate fluctuations	3) The exchange rate fluctuations:
G3	Ability to utilise unfavourable conditions	4) The ability of the Stone Fruit industry to fully utilise the effect of unfavourable weather conditions on competitors:
G4	Social unrest	5) Social unrest
G5	Political system	6) The South African political system in general:
G6	Crime	7) Crime
G7	Health	8) Health -HIV/AIDS, TB, etc.:
G8	Economic growth/development	9) Economic development and growth in South Africa:
G9	World events	10) To what extent do international/world events impact on your competitiveness? (E.g. warfare/conflicts, international strikes etc.)

Appendix D

Additional RTA calculations and graphs

Table D.1 Stone fruit FAO RTA calculations: SA compared globally (1961–2011)

Country	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977
SA	0.57	0.41	0.70	0.72	0.86	1.39	1.22	1.06	1.17	0.84	1.04	0.99	0.63	0.78	0.50	1.32	0.64
CHILE	12.52	11.99	8.07	8.40	7.29	7.48	7.68	16.78	15.75	13.37	8.06	5.78	10.21	10.76	5.67	17.84	8.64
ARG	0.19	0.24	0.17	0.22	0.10	0.13	0.18	0.23	0.21	0.22	0.23	0.17	0.19	0.22	0.13	0.19	0.20
AUS	0.04	0.03	0.04	0.04	0.03	0.03	0.04	0.06	0.03	0.05	0.04	0.04	0.05	0.04	0.04	0.05	0.03
BRZ	-0.47	-0.68	-0.40	-0.55	-0.39	-0.50	-0.82	-1.10	-1.57	-1.73	-2.37	-1.57	-1.33	-1.18	-0.78	-1.70	-2.46
NZ	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.03	0.02	0.02	0.02	0.03	-0.07	-0.10	-0.02	-0.07
USA	0.24	0.25	0.20	0.11	0.31	0.25	0.28	0.33	0.42	0.33	0.33	0.42	0.31	0.35	0.21	0.29	0.28
CHN	0.17	0.15	0.10	0.09	0.09	0.08	0.10	0.16	0.16	0.24	0.21	0.15	0.13	0.24	0.10	0.14	0.19
ESP	2.55	2.54	3.10	2.24	1.85	1.99	1.65	1.81	1.63	1.58	1.52	1.82	1.27	1.81	2.05	2.74	1.12
FRC	0.95	0.12	2.33	0.02	3.35	-0.37	2.15	1.97	2.48	1.14	1.98	1.05	2.04	0.87	-7.44	0.64	-2.12
ITA	57.10	56.63	50.97	58.68	39.28	65.34	35.23	37.61	23.60	36.81	33.84	29.35	35.27	29.79	52.44	38.40	49.15

Country	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
SA	0.76	1.07	1.46	1.24	2.19	2.50	1.72	1.25	1.14	1.50	1.52	1.59	2.19	2.39	4.78	4.78	3.05
CHILE	9.87	7.90	11.53	13.90	14.24	18.88	32.15	27.74	26.17	22.69	22.59	22.86	18.44	16.05	18.44	16.33	15.65
ARG	0.37	0.13	0.12	0.07	0.19	0.10	0.13	0.06	0.15	0.18	0.21	0.15	0.13	0.12	-0.70	-2.17	-1.08
AUS	0.05	0.09	0.13	0.08	0.09	0.10	0.13	0.12	0.11	0.13	-0.39	-0.54	-0.55	-0.58	-0.52	-0.26	-0.17
BRZ	-1.91	-0.61	-0.34	-0.47	-0.54	-0.45	-0.59	-0.47	-0.42	-0.82	-1.54	-1.56	-1.32	-1.06	-0.98	-0.86	-1.22
NZ	0.01	-0.07	-0.08	-0.06	0.07	0.04	0.38	0.33	0.24	0.30	0.16	0.00	0.15	0.20	0.39	0.24	0.17
USA	0.29	0.24	0.28	0.37	0.26	-0.01	0.01	-0.30	0.02	0.22	0.19	0.09	0.45	0.34	0.54	0.60	0.76
CHN	0.09	0.07	0.00	0.00	-0.01	0.00	-0.27	-0.42	-0.37	-0.47	-0.67	-0.76	-0.92	-0.69	-0.80	-0.87	-0.84
ESP	3.79	3.40	4.48	4.63	3.29	4.68	3.77	5.52	3.08	3.82	4.40	5.41	2.21	5.18	6.16	6.99	6.53
FRC	-0.65	-0.54	0.21	-0.31	-1.10	-0.94	-0.15	-0.14	-0.53	-0.14	-0.47	0.07	0.02	-0.23	-0.32	-0.20	0.12
ITA	35.84	38.58	34.73	30.41	32.62	44.05	36.60	27.10	26.14	24.16	20.24	16.35	19.20	14.60	13.19	11.43	11.90

Country	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
SA	2.08	2.31	3.82	3.30	5.61	3.20	3.07	2.92	3.11	3.85	2.96	2.08	2.97	2.66	3.38	3.27	4.25
CHILE	15.52	17.17	13.13	10.74	15.10	12.65	12.95	15.45	13.49	12.94	12.00	10.76	13.86	12.36	12.99	17.32	20.15
ARG	-0.84	-0.76	-0.22	-0.03	-0.74	-0.70	-0.14	0.38	0.19	0.22	0.24	0.31	0.22	0.14	0.10	0.15	0.19
AUS	-0.13	-0.21	-0.16	0.09	-0.02	-0.07	-0.05	-0.08	0.02	-0.24	-0.10	0.03	-0.19	0.01	-0.02	-0.25	-0.48
BRZ	-2.21	-2.32	-1.85	-1.96	-1.24	-1.44	-1.38	-1.25	-0.78	-1.14	-1.78	-2.01	-1.82	-1.41	-2.35	-2.19	-2.41
NZ	0.26	-0.03	-0.15	-0.07	-0.27	-0.14	-0.08	-0.15	-0.41	-0.18	-0.10	-0.26	-0.26	-0.27	-0.13	-0.07	-0.05
USA	0.51	0.51	0.79	0.65	0.98	1.04	0.80	0.89	0.78	0.78	1.01	0.64	0.69	0.45	0.74	0.62	0.87
CHN	-0.65	-0.90	-1.16	-1.28	-1.54	-1.40	-1.39	-1.39	-1.13	-0.81	-0.87	-0.83	-0.69	-0.53	-0.70	-0.68	-0.60
ESP	6.26	6.32	6.95	8.04	6.34	6.66	6.51	6.17	7.95	5.66	6.95	8.99	7.35	8.92	8.86	8.85	8.38
FRC	0.41	0.14	0.85	-0.26	0.04	0.08	-0.12	0.31	-0.15	-0.12	-0.08	0.05	0.04	-0.51	-0.13	-0.29	-0.18
ITA	10.19	8.86	6.41	7.23	5.18	4.53	4.36	3.37	2.93	2.79	3.15	3.07	3.85	3.85	1.76	2.67	2.05

Source: Author's own calculations from data provided by FAO (2014)
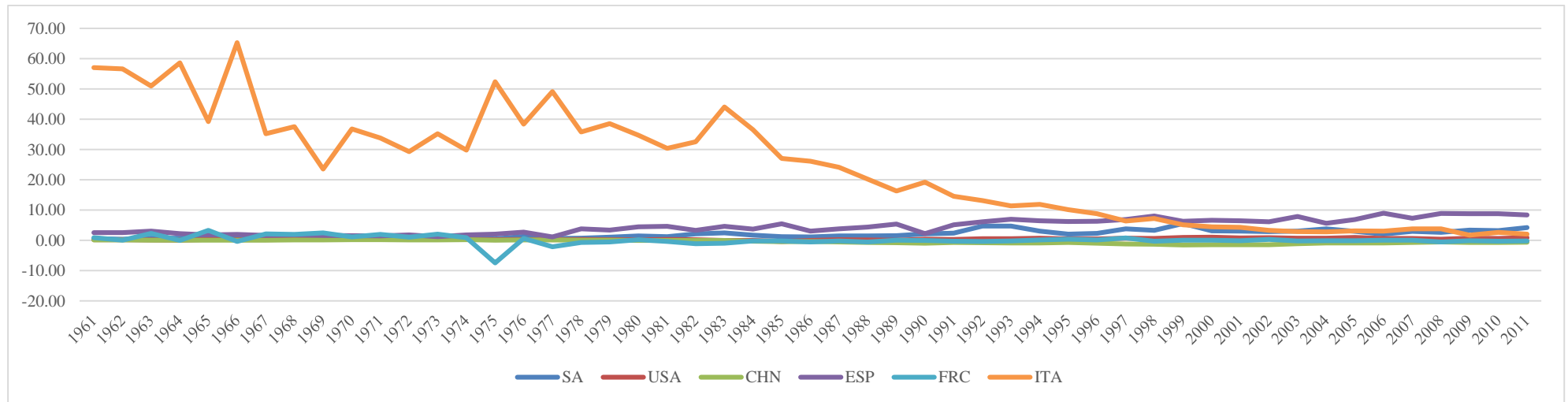
Figure D.3 Stone fruit FAO RTA trends: SA compared with NH countries (1961–2011)

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Source: Author's own calculations from data provided by FAO (2014)
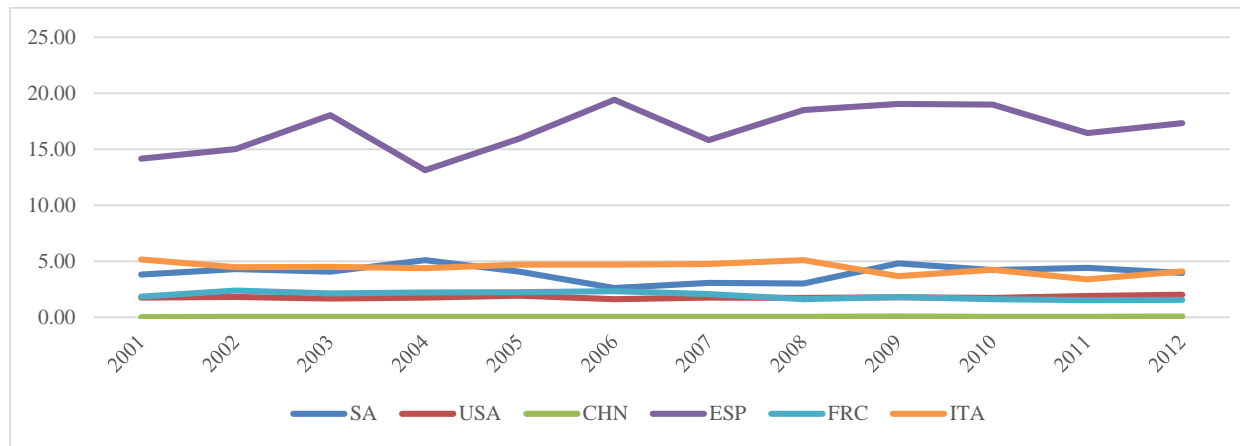
Figure D.4 Stone fruit ITC RTA trends: SA compared with NH countries (2001–2012)

Source: Author's own calculations from data provided by ITC (2014)

Table D.2 Stone fruit ITC RTA calculations: SA compared globally (2001–2012)

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
SA	3.79	4.29	4.06	5.10	4.06	2.60	3.05	2.99	4.80	4.21	4.40	3.95
CHILE	31.12	34.96	33.49	29.06	26.84	21.09	21.68	30.66	22.41	27.90	34.19	36.02
ARG	2.34	2.57	1.83	2.09	2.30	2.69	2.38	1.77	1.65	1.55	1.53	1.11
AUS	1.39	1.90	1.61	1.34	1.38	0.97	0.87	0.73	0.81	0.64	0.60	0.61
BRZ	-0.08	-0.08	-0.06	-0.05	-0.08	-0.10	-0.09	-0.06	-0.09	-0.08	-0.09	-0.09
NZ	1.52	1.86	1.43	2.41	2.29	1.33	1.83	1.85	2.60	2.60	2.11	2.45
USA	1.75	1.79	1.66	1.74	1.93	1.60	1.74	1.73	1.79	1.72	1.89	2.00
CHN	0.01	0.03	0.03	0.04	0.03	0.03	0.03	0.03	0.05	0.02	0.04	0.05
ESP	14.15	15.01	18.02	13.12	15.96	19.40	15.80	18.48	19.04	18.98	16.43	17.31
FRC	1.83	2.38	2.11	2.21	2.24	2.32	2.06	1.61	1.80	1.61	1.52	1.56
ITA	5.14	4.46	4.49	4.38	4.70	4.69	4.74	5.08	3.66	4.23	3.37	4.10

Source: Author's own calculations from data provided by ITC (2014)

Table D.3 Individual stone fruit type ITC RTA calculations compared within the SA deciduous fruit grouping

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Apricots	5.14	5.24	5.08	4.01	5.08	2.77	2.52	4.09	6.29	4.60	5.16	4.06
Cherries	0.03	0.12	0.06	0.08	-0.02	-0.05	-0.03	0.00	0.02	0.00	0.01	0.01
Peaches & nectarines	1.47	1.83	1.43	1.73	1.27	1.00	1.18	1.15	1.97	2.02	2.30	2.06
Plums & sloes	14.13	16.15	17.22	23.63	17.33	10.73	13.69	12.64	20.36	18.70	19.33	18.01
Stone fruit	3.79	4.29	4.06	5.10	4.06	2.60	3.05	2.99	4.80	4.21	4.40	3.95
Deciduous fruit	17.30	21.08	22.21	26.37	24.13	20.52	21.41	19.29	23.96	25.70	22.09	24.27
Pome fruit	6.97	8.83	10.09	11.73	10.20	8.67	9.89	9.04	11.60	10.36	9.56	10.81
Apples	7.06	8.40	10.12	11.00	9.04	8.30	8.49	8.48	10.06	8.47	8.13	9.70
Pears & quinces	6.70	9.95	9.93	13.68	13.00	9.64	13.93	10.47	15.44	15.71	13.64	13.86
Grapes	13.01	14.54	14.42	19.48	16.21	13.90	14.24	11.92	15.52	15.14	12.61	13.40
Wine	4.23	5.60	5.72	6.24	6.52	5.32	5.34	5.53	6.48	6.02	4.46	4.61

Source: Author's own calculations from data provided by ITC (2014)

Table D.4 Individual stone fruit type ITC RTA calculations compared within the SA deciduous fruit grouping

Fruit type	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977
Plums & sloes	3.40	2.40	4.50	4.69	4.59	6.60	4.60	4.81	3.88	4.02	4.74	4.59	4.21	4.32	3.18	8.77	3.79
Pears & quinces	7.83	6.96	6.93	5.71	6.22	10.19	4.24	6.55	6.45	6.87	6.39	4.68	5.14	3.90	4.01	9.61	5.61
Grapes	6.19	7.41	5.27	7.35	7.13	8.46	7.43	6.35	6.92	7.62	8.25	5.82	4.80	5.45	4.28	5.64	4.56
Apples	3.85	3.76	4.31	5.78	5.55	8.48	6.38	8.10	6.97	8.77	7.87	6.18	5.63	5.79	4.64	7.61	3.52
Apricots	0.00	0.00	0.00	0.00	0.00	1.20	0.70	0.92	1.06	0.63	0.72	0.68	0.54	0.43	0.13	0.31	0.32
Peaches & nectarines	0.00	0.00	0.00	0.00	0.00	0.78	0.62	0.51	0.72	0.45	0.57	0.37	0.27	0.28	0.18	0.37	0.19
Cherries	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Deciduous fruit	4.41	4.65	4.29	5.26	5.31	7.72	5.51	6.46	6.09	6.88	6.73	4.98	4.49	4.58	3.57	6.30	3.43
Pome fruit	4.74	4.43	4.91	5.85	5.78	9.13	5.98	7.94	7.01	8.55	7.72	5.96	5.61	5.46	4.58	8.13	3.97
Wine	0.51	0.35	0.39	0.00	0.04	0.57	0.35	0.24	0.24	0.16	0.18	0.03	0.09	-0.43	-0.92	0.07	0.00

Fruit type	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Plums & sloes	4.35	6.00	8.02	7.17	14.99	16.47	10.10	6.60	5.42	8.85	7.19	8.26	9.27	10.62	12.55	17.67	13.11
Pears & quinces	6.75	8.26	6.94	8.73	8.53	16.64	14.50	7.61	6.37	13.93	8.93	6.61	15.68	16.16	16.32	25.79	10.62
Grapes	4.70	9.64	7.76	7.01	8.85	12.52	10.10	6.48	3.79	6.10	4.08	6.98	7.25	8.17	9.59	14.23	13.94
Apples	7.14	6.88	6.15	6.22	9.25	8.82	17.19	9.71	7.26	8.85	5.19	6.92	7.80	11.25	15.38	15.59	6.05
Apricots	0.26	0.23	0.82	0.41	0.78	0.56	0.08	0.51	1.11	1.22	1.05	0.93	3.43	2.86	4.65	5.03	1.65
Peaches & nectarines	0.20	0.36	0.41	0.18	0.27	0.11	0.18	0.24	0.25	0.25	0.45	0.36	0.65	0.63	4.12	2.21	1.24
Cherries	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.17	0.12	0.16	0.16	0.01	0.12	0.61	0.04	0.92	0.04
Deciduous fruit	5.52	6.79	5.86	6.00	8.18	9.97	12.83	7.14	5.09	7.45	4.68	5.87	7.88	9.93	13.30	16.54	8.87
Pome fruit	7.19	7.29	6.41	6.83	9.33	10.68	17.19	9.43	7.19	10.34	6.20	6.96	10.11	13.02	16.47	19.45	7.41
Wine	-0.09	-0.03	0.03	-0.09	-0.07	0.17	0.13	0.07	0.12	0.13	0.21	0.15	0.33	0.56	0.96	1.23	1.41

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Fruit type	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Plums & sloes	10.94	10.10	14.10	12.97	22.50	13.16	11.54	10.95	13.23	18.46	13.27	9.81	13.32	11.97	14.94	15.14	18.99
Pears & quinces	8.29	6.51	10.44	8.45	10.15	7.74	5.50	6.93	7.63	11.23	10.00	8.47	13.89	9.58	11.74	13.04	13.66
Grapes	13.45	9.17	11.00	13.55	17.93	14.20	11.24	9.75	11.58	17.79	14.17	13.86	15.20	12.00	12.34	13.27	12.77
Apples	8.50	5.84	7.29	9.57	8.13	5.98	5.81	5.79	8.03	9.15	7.00	7.49	8.69	7.93	7.77	7.18	8.26
Apricots	1.78	0.73	5.05	3.74	5.87	2.17	4.12	3.48	3.87	3.07	3.75	2.36	2.49	3.46	4.34	3.72	4.98
Peaches & nectarines	0.31	0.89	1.50	1.31	1.87	1.53	1.19	1.26	1.11	1.35	0.91	0.77	1.15	1.02	1.45	1.61	2.25
Cherries	-0.04	0.02	0.17	0.00	0.08	0.04	0.02	0.08	0.04	0.05	-0.04	-0.07	-0.04	0.00	-0.01	-0.01	0.01
Deciduous fruit	9.11	6.46	8.81	10.12	12.29	9.12	7.44	7.11	8.73	12.23	9.76	9.06	11.41	9.00	9.78	9.90	10.52
Pome fruit	8.69	6.14	8.42	9.54	8.98	6.62	5.83	6.22	8.14	10.03	8.09	7.97	10.42	8.63	9.19	8.99	9.97
Wine	4.00	3.13	2.82	2.18	1.50	4.06	3.70	4.21	4.88	5.63	5.57	5.13	6.15	5.71	5.62	5.59	4.92

Source: Author's own calculations from data provided by FAO (2014)

Appendix E

Statistical results

Table E 1. Overall sample: All statements sorted from largest to smallest average scores

Specific question:	Number of observations:	Average rating score by entire sample:
E6) Competition in international market is:	48	4.23
E7) To what extent does economies of scale influence your competitiveness? Regarding integration into the value chain:	48	4.06
B1) The general infrastructure used by your company is:	48	4.00
D10) Specialised technology services are: (E.g. computerised irrigation systems/services, smart fresh, consultants etc.)	48	3.96
G1) The current exchange rate:	49	3.96
B17) Your location's suitability for Stone Fruit production is:	43	3.95
D15) Availability of storage and packing/product handling facilities:	46	3.80
B13) Unskilled/Entry-level labour is: (Availability)	46	3.76
D12) Availability of local suppliers of primary inputs:	46	3.72
E8) Your willingness to reinvest in Stone Fruit operations:	48	3.71
C10) The South African Stone Fruit Industry's relationship with multinational retailers (M&S, Tesco etc.)	49	3.67
D13) The quality of local suppliers for your industry's primary inputs is:	45	3.67
D17) Availability and reliability of transport:	48	3.63
B21) The effectivity (successful in achieving a desired result) level of your business is:	48	3.60
E4) Competition in the local market is:	45	3.56
D18) Effective management of cold-chain through the value chain:	48	3.54
B5) The quality of technology available to your industry:	47	3.53
B6) Access to quality technology for you industry is:	46	3.50
D14) The sustainability of local suppliers of your industry's primary inputs:	46	3.50
E10) Stone Fruit's competition for resources (land, human and capital) from other agricultural activities:	46	3.50
B20) The productivity level of your business is:	48	3.46
B22) The efficiency (input : output relation) level of your business:	48	3.42
E1) The management of information flow from primary suppliers to your company is:	48	3.40
E3) The management of market intelligence for the Stone Fruit industry is: (Compared to other fruit industries)	49	3.37
F9) Regulatory standards (e.g. Products standards, energy, safety, and environment) in your opinion are:	48	3.35
B4) The quality of research available to your industry:	48	3.29
C5) The international Stone Fruit export market is:	47	3.28
E2) The flow and use of information from customers to your company to inform strategy is:	48	3.27
D19) Necessary infrastructure requirements for export purposes: (E.g. facilities at Cape Town harbour)	46	3.26
F10) Complying with regulatory standards:	49	3.24
C9) The availability and characteristics (profile and product) of the SA Stone Fruit on offer, in line with market demand:	48	3.21
D7) Your company's collaboration with scientific research institutions in their R&D activity is:	48	3.19
G3) The ability of the Stone Fruit industry to fully utilise the effect of unfavourable weather conditions on competitors:	48	3.17
E9) Your current resource (land, human and capital) base to support projected Stone Fruit operations:	45	3.16
E5) Entry of new competitors:	46	3.15
C6) The diversity (based on volume and variety) of new (more lucrative) international markets is:	48	3.13
D4) Evaluation and testing of new varieties according to industry's best practices:	47	3.09
D2) Private-funded scientific research institutions are:	41	3.07
D1) Financial service providers generally:	46	3.04
B9) Obtaining short-term credit for your business is:	44	3.00
D9) Telecommunication services:	47	2.98
C8) The impact of seasonality and availability of the SA Stone Fruit Industry's competitiveness:	48	2.94
G2) The exchange rate fluctuations:	48	2.94
D6) Industry`s expenditure on Research & Development	48	2.90
B16) Access to natural resources (land and water) is:	46	2.85
B8) Obtaining long-term credit for your business is:	46	2.78

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G8) Economic development and growth in South Africa:	49	2.78
D5) Access to grower-club varieties:	46	2.76
G9) To what extent do international/world events impact on your competitiveness? (E.g. warfare/conflicts, international strikes etc.)	49	2.65
F4) South Africa's macro-economic policy:	47	2.64
F5) South Africa's competition law:	45	2.62
G7) Health -HIV/AIDS, TB, etc.:	49	2.59
D16) The cost of storage and packing/product handling facilities:	48	2.56
D8) Electricity supply (including renewable energy and fossil fuels):	47	2.55
B3) The transaction cost in your business is: (E.g. cost of doing business, finding markets, bureaucratic red-tape etc.)	48	2.52
F13) Have legal or political factors over the past five years undermined your company's strategic positioning?	48	2.52
F1) South Africa's trade policy:	49	2.49
F11) Administrative regulations are:	49	2.49
B2) The cost of infrastructure is:	48	2.44
F6) South Africa's BEE policy:	48	2.44
F12) The taxation system:	48	2.44
C2) Local consumers of Stone Fruit are:	47	2.4
B12) Skilled labour is:	47	2.38
D11) The cost of specialised technology services are:	47	2.34
C1) Local market size is:	46	2.33
C4) Consumer education and availability of information, to base marketing decisions on, is:	46	2.33
B15) Unskilled/Entry-level labour is: (Affordability)	46	2.30
B11) Competency level amongst skilled labour is:	47	2.28
B7) The cost of technology is:	48	2.21
B19) The impact of SA climate/weather variation (unpredicted conditions) affects your business:	47	2.21
C3) The growth in volume of the local market is: (Capacity to handle increasing volumes)	47	2.19
F14) The effect of corruption and opportunism on business' competitiveness:	49	2.16
D3) Government-funded scientific research institutions are:	49	2.10
C7) The influence of adverse weather conditions on buying patterns of consumers (export markets)	48	2.06
G6) Crime	48	2.04
G4) Social unrest	46	2.02
B10) Skilled labour is:	47	2.00
B18) Establishment-and production costs are:	47	1.98
G5) The South African political system in general:	49	1.92
F2) South Africa's land reform policy:	49	1.86
F3) South Africa's labour policy:	48	1.77
B14) Unskilled/Entry-level labour is: (Quality)	45	1.58
F7) The credibility of the political system is:	48	1.52
F8) The trustworthiness of the politicians is:	48	1.46

Source: Calculations with SPSS (2014)

Appendix E.1 Porter section B: PCA results (Detailed statistical output and comments)

Communalities	Initial	Extraction
B1	1.000	.688
B2	1.000	.839
B3	1.000	.824
B4	1.000	.803
B5	1.000	.820
B6	1.000	.752
B7	1.000	.698
B8	1.000	.797
B9	1.000	.783
B10	1.000	.778
B11	1.000	.771
B12	1.000	.539
B13	1.000	.869
B14	1.000	.662
B15	1.000	.751
B16	1.000	.772
B17	1.000	.627
B18	1.000	.736
B19	1.000	.493
B20	1.000	.791
B21	1.000	.815
B22	1.000	.815

Extraction Method: Principal Component Analysis.

Most of the extraction values are high, thus indicating the variance in each variable accounted for by the components. The extracted components represent the variables well.

Total Variance Explained

Component	Initial Eigen Values			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	5.345	24.297	24.297	5.345	24.297	24.297	3.026	13.755	13.755
2	3.288	14.945	39.243	3.288	14.945	39.243	3.019	13.724	27.479
3	2.100	9.544	48.787	2.100	9.544	48.787	2.817	12.803	40.282
4	2.035	9.249	58.036	2.035	9.249	58.036	2.552	11.600	51.882
5	1.395	6.342	64.378	1.395	6.342	64.378	1.862	8.466	60.348
6	1.180	5.365	69.743	1.180	5.365	69.743	1.585	7.204	67.552
7	1.081	4.913	74.656	1.081	4.913	74.656	1.563	7.104	74.656
8	.953	4.330	78.986						
9	.828	3.766	82.752						
10	.588	2.672	85.424						
11	.563	2.561	87.985						
12	.512	2.327	90.312						
13	.499	2.267	92.579						
14	.409	1.860	94.439						
15	.265	1.204	95.643						
16	.239	1.085	96.728						
17	.189	.858	97.587						
18	.162	.737	98.323						
19	.127	.575	98.898						
20	.100	.455	99.354						
21	.075	.339	99.693						
22	.068	.307	100.000						

The first seven components had Eigen values larger than 1 and was included in the analysis.

Extraction Method: Principal Component Analysis.

		Rotated Component Matrix[a]						
		Component						
		1	2	3	4	5	6	7
1	B1	.048	.751	.184	-.078	-.033	-.272	.085
2	B2	.258	.096	.820	.241	-.159	-.037	-.075
3	B3	.296	.106	.835	.142	.075	-.045	.015
4	B4	.027	.029	.017	.886	-.069	.068	-.076
5	B5	-.166	.058	.142	.868	.040	-.099	.055
6	B6	-.018	.335	.374	.683	.034	-.115	.137
7	B7	.389	.064	.446	.048	.238	.082	-.528
8	B8	-.014	.820	.104	.130	.087	.197	-.224
9	B9	.034	.843	-.084	.141	.108	.131	-.124
10	B10	.824	-.084	.241	-.094	-.126	.091	.040
11	B11	.752	.085	-.072	.049	.357	-.225	.110
12	B12	.659	.062	.137	-.128	-.204	-.028	-.153
13	B13	.221	-.101	-.125	.182	-.825	.158	.237
14	B14	.593	-.115	.057	.110	.138	.383	-.341
15	B15	.731	.186	.166	-.008	-.199	.314	.128
16	B16	.108	.120	.139	-.136	-.124	.829	.076
17	B17	.004	-.112	-.085	.044	-.053	.058	.774
18	B18	-.124	.027	.725	-.089	.294	.238	-.211
19	B19	.085	.069	.538	.209	.110	.368	.003
20	B20	.146	.435	.153	.428	.415	.290	.343
21	B21	.135	.574	.104	.154	.364	.345	.426
22	B22	.000	.551	.177	.267	.634	.038	.067

An item was interpreted 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 yellow cells in table to the left.

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 14 iterations.

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Appendix E.2 Porter section C: PCA results (Detailed statistical output and comments)

Communalities		
	Initial	Extraction
C1	1.000	.733
C2	1.000	.738
C3	1.000	.842
C4	1.000	.541
C5	1.000	.591
C6	1.000	.637
C7	1.000	.411
C8	1.000	.613
C9	1.000	.733
C10	1.000	.778

Most of the extraction values are high, thus indicating the variance in each variable accounted for by the components. The extracted components represent the variables well.

Total Variance Explained									
	Initial Eigen Values			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.344	33.443	33.443	3.344	33.443	33.443	2.453	24.526	24.526
2	2.012	20.117	53.560	2.012	20.117	53.560	2.131	21.306	45.832
3	1.260	12.603	66.164	1.260	12.603	66.164	2.033	20.332	66.164
4	.861	8.608	74.772						
5	.737	7.370	82.143						
6	.520	5.198	87.341						
7	.500	5.004	92.345						
8	.318	3.184	95.529						
9	.259	2.587	98.116						
10	.188	1.884	100.000						

The first three components had Eigen values larger than 1 and were included in the analysis.

Extraction Method: Principal Component Analysis

Rotated Component Matrix			
	Component		
		1	2	3
1	C1	.853	.065	-.006
2	C2	.831	.193	.105
3	C3	.898	.184	-.045
4	C4	.115	.675	.270
5	C5	.237	.687	-.250
6	C6	.118	.788	.047
7	C7	.369	.453	.264
8	C8	-.057	.543	.561
9	C9	.072	.084	.849
10	C10	.018	.001	.882

An item was interpreted 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 yellow cells in table to the left.

Appendix E. 3 Porter section D: PCA results (Detailed statistical output and comments)

Communalities		
	Initial	Extraction
D1	1.000	.790
D2	1.000	.628
D3	1.000	.731
D4	1.000	.836
D5	1.000	.768
D6	1.000	.738
D7	1.000	.681
D8	1.000	.772
D9	1.000	.874
D10	1.000	.816
D11	1.000	.798
D12	1.000	.712
D13	1.000	.800
D14	1.000	.789
D15	1.000	.761
D16	1.000	.703
D17	1.000	.840
D18	1.000	.835
D19	1.000	.811

Extraction Method: Principal Component Analysis

Most of the extraction values are high, thus indicating the variance in each variable accounted for by the components. The extracted components represent the variables well.

Total Variance Explained									
	Initial Eigen Values			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4.833	25.436	25.436	4.833	25.436	25.436	3.438	18.095	18.095
2	2.144	11.285	36.721	2.144	11.285	36.721	2.380	12.524	30.619
3	1.861	9.797	46.518	1.861	9.797	46.518	2.213	11.647	42.267
4	1.671	8.797	55.315	1.671	8.797	55.315	1.963	10.329	52.596
5	1.554	8.178	63.493	1.554	8.178	63.493	1.653	8.701	61.297
6	1.448	7.620	71.113	1.448	7.620	71.113	1.630	8.580	69.878
7	1.171	6.163	77.276	1.171	6.163	77.276	1.406	7.399	77.276
8	.901	4.743	82.020						
9	.730	3.841	85.861						
10	.584	3.073	88.934						
11	.536	2.819	91.752						
12	.396	2.083	93.835						
13	.346	1.821	95.656						
14	.252	1.329	96.985						
15	.223	1.171	98.156						
16	.149	.783	98.940						
17	.100	.529	99.468						
18	.072	.377	99.845						
19	.029	.155	100.000						

Extraction Method: Principal Component Analysis

The first seven components had Eigen values larger than 1 and were included in the analysis.

Rotated Component Matrix[a]							
	Component						
	1	2	3	4	5	6	7
D1	.076	.027	.228	.789	-.277	-.144	-.109
D2	.651	.078	-.045	-.202	-.207	.015	-.335
D3	.044	.673	.039	-.292	.400	-.026	-.170
D4	.127	-.014	.093	-.024	-.148	-.017	.888
D5	-.067	.054	-.031	-.105	.168	-.847	.052
D6	.153	-.535	.207	-.040	.439	.398	-.181
D7	.483	.090	.606	-.022	.119	-.233	.056
D8	-.054	.149	.627	.183	.003	.414	.385
D9	.021	-.014	.925	.079	.031	.095	.033
D10	.190	.581	.243	.543	.121	.151	-.223
D11	.120	-.116	-.091	.817	.192	.177	.160
D12	.750	.110	-.021	.140	.245	.105	.215
D13	.793	.072	.123	.278	.255	.075	.055
D14	.834	.198	.109	.165	.004	.050	.114
D15	.279	.503	.540	.036	.084	-.269	-.242
D16	.104	.078	.109	-.010	.801	-.138	-.116
D17	.685	.113	.272	-.138	-.501	.086	-.072
D18	.341	.808	.122	.081	-.156	.063	.127
D19	.338	.517	-.027	-.214	.121	.567	.216

Extraction Method: Principal Component Analysis
Rotation Method: Varimax with Kaiser Normalisation

a. Rotation converged in eight iterations

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Appendix E. 4 Porter section E: PCA results (Detailed statistical output and comments)

Communalities		
	Initial	Extraction
E1	1.000	.569
E2	1.000	.656
E3	1.000	.683
E4	1.000	.760
E5	1.000	.709
E6	1.000	.495
E7	1.000	.648
E8	1.000	.563
E9	1.000	.654
E10	1.000	.756

Extraction Method: Principal Component
Analysis

Most of the extraction values are high, thus indicating the variance in each variable accounted for by the components. The extracted components represent the variables well.

Total Variance Explained									
	Initial Eigen Values			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative e %	Total	% of Variance	Cumulative e %
1	3.512	35.124	35.124	3.512	35.124	35.124	3.178	31.779	31.779
2	1.631	16.309	51.433	1.631	16.309	51.433	1.863	18.629	50.409
3	1.349	13.494	64.926	1.349	13.494	64.926	1.452	14.518	64.926
4	.940	9.405	74.331						
5	.643	6.430	80.761						
6	.562	5.624	86.385						
7	.459	4.593	90.979						
8	.390	3.899	94.878						
9	.320	3.201	98.079						
10	.192	1.921	100.000						

Extraction Method: Principal Component Analysis

The first three components had Eigen values larger than 1 and were included in the analysis.

Rotated Component Matrix[a]			
	Component		
	1	2	3
E1	.734	.137	.108
E2	.749	.147	-.271
E3	.820	.000	-.102
E4	.150	.856	.075
E5	.045	.838	.064
E6	.636	.175	.245
E7	-.176	-.056	.783
E8	.629	-.264	.312
E9	.681	.415	-.135
E10	.294	.335	.747

Extraction Method: Principal Component Analysis
Rotation Method: Varimax with Kaiser Normalisation

a. Rotation converged in five iterations

An item was interpreted 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 yellow cells in table to the left.

Appendix E.5 Porter section F: PCA results (Detailed statistical output and comments)

Communalities

	Initial	Extraction
F1	1.000	.560
F2	1.000	.702
F3	1.000	.615
F4	1.000	.812
F5	1.000	.827
F6	1.000	.654
F7	1.000	.859
F8	1.000	.793
F9	1.000	.809
F10	1.000	.655
F11	1.000	.760
F12	1.000	.777
F13	1.000	.648
F14	1.000	.709

Extraction Method: Principal Component Analysis

Most of the extraction values are high, thus indicating the variance in each variable accounted for by the components. The extracted components represent the variables well.

Total Variance Explained

Component	Initial Eigen Values			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4.634	33.100	33.100	4.634	33.100	33.100	2.371	16.933	16.933
2	1.820	12.998	46.098	1.820	12.998	46.098	2.275	16.248	33.181
3	1.312	9.371	55.469	1.312	9.371	55.469	2.105	15.035	48.217
4	1.271	9.082	64.550	1.271	9.082	64.550	2.034	14.532	62.748
5	1.143	8.165	72.716	1.143	8.165	72.716	1.395	9.967	72.716
6	.849	6.065	78.780						
7	.688	4.917	83.698						
8	.626	4.472	88.169						
9	.525	3.748	91.918						
10	.372	2.657	94.575						
11	.268	1.917	96.491						
12	.217	1.553	98.045						
13	.154	1.101	99.146						
14	.120	.854	100.000						

Extraction Method: Principal Component Analysis

The first five components had Eigen values larger than 1 and were included in the analysis.

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Rotated Component Matrix[a]					
	Component				
	1	2	3	4	5
F1	.448	.108	.325	.483	-.096
F2	.802	.155	-.028	.069	-.171
F3	.651	.094	.333	.137	.229
F4	.321	.225	.810	.052	.004
F5	.051	.103	.863	.212	-.156
F6	.567	.312	.186	.264	-.361
F7	.196	.864	.216	.107	.121
F8	.098	.841	.249	.080	-.092
F9	-.076	.000	-.067	-.050	.893
F10	.572	-.493	.278	.023	.078
F11	.305	-.078	-.015	.800	-.145
F12	-.014	.200	.199	.831	.082
F13	.447	.459	-.090	.233	.418
F14	-.041	.343	.462	.504	.348

Extraction Method: Principal Component Analysis
Rotation Method: Varimax with Kaiser Normalisation

a. Rotation converged in seven iterations

An item was interpreted 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 yellow cells in table to the left.

Appendix E.6 Porter section G: PCA results (Detailed statistical output and comments)

Communalities	Initial	Extraction
G1	1.000	.689
G2	1.000	.681
G3	1.000	.711
G4	1.000	.739
G5	1.000	.799
G6	1.000	.603
G7	1.000	.713
G8	1.000	.580
G9	1.000	.768

Extraction Method: Principal Component Analysis

Total Variance Explained

Component	Initial Eigen Values			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.441	27.126	27.126	2.441	27.126	27.126	1.859	20.656	20.656
2	1.362	15.128	42.254	1.362	15.128	42.254	1.537	17.082	37.738
3	1.297	14.406	56.660	1.297	14.406	56.660	1.476	16.395	54.133
4	1.184	13.159	69.818	1.184	13.159	69.818	1.412	15.685	69.818
5	.807	8.972	78.790						
6	.622	6.907	85.698						
7	.540	6.001	91.699						
8	.440	4.890	96.588						
9	.307	3.412	100.000						

Extraction Method: Principal Component Analysis

Rotated Component Matrix[a]

	1	2	3	4
G1	.193	-.133	.791	.090
G2	-.004	.176	.806	-.020
G3	-.126	.193	.334	.739
G4	.808	-.026	.146	-.252
G5	.043	.887	-.081	-.058
G6	.651	.355	.060	.222
G7	.769	.117	.025	.327
G8	.178	.717	.141	.123
G9	.322	-.099	-.192	.786

Extraction Method: Principal Component Analysis
Rotation Method: Varimax with Kaiser Normalisation

a. Rotation converged in five iterations

Table E.2 Producers' perception scores

PRODUCERS: ANOVA BASED ON SIZE		Average rating score	Average rating score	Average rating score	F	df	Sig.	Comments
Question	Coding	Producer: < 26 ha	Producer: 26 ha and more	Total sample				
General infrastructure	B1	3.80	4.11	3.97	1.126	1	0.296	NSSD
Infrastructure cost	B2	2.80	2.00	2.35	4.249	1	0.047	SSD at p < 0.05: smaller producers larger score
Transaction cost	B3	2.73	2.05	2.35	3.899	1	0.057	SSD at p < 0.1: smaller producers larger score
Research quality	B4	3.40	3.26	3.32	0.122	1	0.730	NSSD
Technology quality	B5	3.67	3.58	3.62	0.074	1	0.788	NSSD
Quality technology access	B6	3.47	3.44	3.45	0.003	1	0.957	NSSD
Technology cost	B7	2.67	1.79	2.18	6.769	1	0.014	SSD at p < 0.05: smaller producers larger score
Credit: Long-term	B8	2.64	2.84	2.76	0.418	1	0.523	NSSD
Credit: Short-term	B9	2.93	3.11	3.03	0.274	1	0.604	NSSD
Skilled labour: Obtaining	B10	2.00	1.63	1.79	1.281	1	0.266	NSSD
Skilled labour: Competency	B11	2.07	2.16	2.12	0.088	1	0.769	NSSD
Skilled labour: Cost	B12	2.40	2.16	2.26	0.652	1	0.425	NSSD
Entry-level labour: Obtaining	B13	3.67	3.74	3.71	0.022	1	0.884	NSSD
Entry-level labour: Quality	B14	1.27	1.50	1.39	0.792	1	0.380	NSSD
Entry-level labour: Cost	B15	1.87	2.05	1.97	0.284	1	0.598	NSSD
Natural resource access	B16	2.60	2.58	2.59	0.002	1	0.962	NSSD
Location suitability	B17	3.86	4.05	3.97	0.387	1	0.538	NSSD
Establishment and production cost	B18	2.00	1.68	1.82	1.210	1	0.280	NSSD
SA climate variation	B19	2.53	2.17	2.33	1.534	1	0.225	NSSD
Productivity	B20	3.07	3.58	3.35	2.381	1	0.133	NSSD
Effectivity	B21	3.27	3.68	3.50	2.456	1	0.127	NSSD
Efficiency	B22	3.13	3.53	3.35	2.024	1	0.165	NSSD
Production Factor Conditions Averages		2.81	2.76	2.78	0.101	1	0.753	NSSD
Local market	C1	2.57	2.00	2.24	2.773	1	0.106	NSSD
Local consumers	C2	2.33	2.42	2.38	0.074	1	0.788	NSSD
Growth	C3	2.40	1.95	2.15	1.234	1	0.275	NSSD
Consumer education	C4	2.40	2.33	2.36	0.038	1	0.847	NSSD
International market	C5	3.40	3.22	3.30	0.261	1	0.613	NSSD
Diversity	C6	3.07	2.89	2.97	0.423	1	0.520	NSSD
Buying patterns	C7	2.27	1.95	2.09	0.915	1	0.346	NSSD
Seasonality and availability	C8	2.87	2.63	2.74	0.434	1	0.515	NSSD
Characteristics	C9	3.07	3.26	3.18	0.373	1	0.546	NSSD
Relation	C10	3.40	3.63	3.53	0.553	1	0.463	NSSD
Demand Market Factors Averages		2.78	2.63	2.69	0.582	1	0.451	NSSD
Financial services	D1	3.07	3.21	3.15	0.213	1	0.648	NSSD
Private research	D2	2.85	3.20	3.04	1.026	1	0.320	NSSD
Government research	D3	2.00	1.89	1.94	0.125	1	0.726	NSSD
Evaluation	D4	2.93	3.00	2.97	0.026	1	0.872	NSSD
Grower-club access	D5	2.43	2.95	2.73	2.214	1	0.147	NSSD
Expenditure R&D	D6	3.00	3.05	3.03	0.020	1	0.888	NSSD
R&D collaboration	D7	2.40	3.74	3.15	11.075	1	0.002	SSD at p < 0.01: larger producers larger score
Electricity	D8	2.27	2.22	2.24	0.013	1	0.909	NSSD
Telecommunication	D9	2.36	2.89	2.67	1.146	1	0.293	NSSD
Technology services	D10	3.87	4.00	3.94	0.150	1	0.701	NSSD
Technology services: Cost	D11	2.33	2.44	2.39	0.132	1	0.719	NSSD
Local input suppliers: Availability	D12	3.53	3.67	3.61	0.142	1	0.709	NSSD
Local input suppliers: Quality	D13	3.40	3.82	3.63	1.645	1	0.209	NSSD
Local input suppliers: Sustainability	D14	3.33	3.68	3.53	1.298	1	0.263	NSSD

Storage/product handling: Facility availability	D15	3.60	3.89	3.76	0.990	1	0.327	NSSD
Storage/product handling: Facility cost	D16	2.67	2.47	2.56	0.311	1	0.581	NSSD
Transport	D17	3.33	3.89	3.64	2.364	1	0.134	NSSD
Cold-chain management	D18	3.33	3.56	3.45	0.394	1	0.535	NSSD
Export infrastructure	D19	3.21	3.44	3.34	0.666	1	0.421	NSSD
Relating and Supporting Industries Averages		2.95	3.21	3.10	2.337	1	0.136	NSSD
Information flow: Primary suppliers	E1	3.33	3.42	3.38	0.094	1	0.761	NSSD
Information flow: Customers	E2	2.80	3.32	3.09	2.503	1	0.123	NSSD
Market intelligence management	E3	3.13	3.32	3.24	0.299	1	0.588	NSSD
Local market competition	E4	3.73	3.63	3.68	0.095	1	0.760	NSSD
New competitors	E5	3.20	3.42	3.32	0.524	1	0.475	NSSD
International market competition	E6	4.20	4.21	4.21	0.002	1	0.965	NSSD
Economies of scale	E7	4.20	3.89	4.03	1.374	1	0.250	NSSD
Reinvestment	E8	3.13	3.84	3.53	3.347	1	0.077	SSD at p < 0.1: larger producers larger score
Resource base	E9	2.73	3.24	3.00	1.434	1	0.240	NSSD
Resource competition	E10	3.53	3.53	3.53	0.000	1	0.991	NSSD
Business Strategy, Structure and Rivalry Averages		3.40	3.59	3.50	1.034	1	0.317	NSSD
Trade policy	F1	2.13	2.42	2.29	0.686	1	0.414	NSSD
Land reform policy	F2	1.53	2.05	1.82	2.711	1	0.109	NSSD
Labour policy	F3	1.60	1.63	1.62	0.011	1	0.917	NSSD
Macro-economic policy	F4	2.07	2.56	2.34	2.023	1	0.165	NSSD
Competition law	F5	1.92	2.78	2.43	7.464	1	0.011	SSD at p < 0.05: larger producers larger score
BEE policy	F6	1.80	2.56	2.21	3.930	1	0.056	SSD at p < 0.1: larger producers larger score
Political system credibility	F7	1.27	1.33	1.30	0.103	1	0.750	NSSD
Politicians' trustworthiness	F8	1.20	1.28	1.24	0.192	1	0.665	NSSD
Regulatory standards	F9	3.13	3.37	3.26	0.410	1	0.527	NSSD
Regulatory standards comply	F10	2.80	3.63	3.26	6.018	1	0.020	SSD at p < 0.05: larger producers larger score
Administrative regulations	F11	2.27	2.63	2.47	1.139	1	0.294	NSSD
Taxation	F12	2.20	2.47	2.35	1.050	1	0.313	NSSD
Political factors	F13	2.40	2.11	2.24	0.592	1	0.447	NSSD
Corruption	F14	1.87	2.11	2.00	0.709	1	0.406	NSSD
Government Support and Policy Averages		2.02	2.35	2.20	4.969	1	0.033	SSD at p < 0.05: larger producers larger score
Exchange rate	G1	3.73	4.28	4.03	2.832	1	0.102	NSSD
Exchange rate fluctuations	G2	2.80	3.06	2.94	0.856	1	0.362	NSSD
Ability to utilise unfavourable conditions	G3	3.13	3.17	3.15	0.013	1	0.911	NSSD
Social unrest	G4	2.07	1.83	1.94	0.469	1	0.498	NSSD
Political system	G5	1.40	1.74	1.59	2.697	1	0.110	NSSD
Crime	G6	1.93	1.84	1.88	0.081	1	0.777	NSSD
Health	G7	2.53	2.58	2.56	0.013	1	0.911	NSSD
Economic growth/development	G8	2.13	2.89	2.56	5.650	1	0.024	SSD at p < 0.05: larger producers larger score
World events	G9	2.87	2.67	2.76	0.213	1	0.648	NSSD
Chance of Opportunity Factors Averages		2.51	2.65	2.59	0.616	1	0.438	NSSD

Source: Calculations with SPSS (2014)

Table E.3 Pack houses' and processors' perception scores

PACK HOUSE / PROCESSORS: ANOVA BASED ON SIZE		Average rating score	Average rating score	Average rating score	F	df	Sig.	Comments
Question	Coding	Pack house Processor: Up to 1 000 t	Pack house Processor: more than 1 000 t	Total sample				
General infrastructure	B1	3.58	4.00	3.75	1.006	1	0.329	NSSD
Infrastructure cost	B2	2.50	2.13	2.35	0.359	1	0.557	NSSD
Transaction cost	B3	2.33	2.25	2.30	0.030	1	0.865	NSSD
Research quality	B4	3.25	3.25	3.25	0.000	1	1.000	NSSD
Technology quality	B5	3.33	3.88	3.55	1.872	1	0.188	NSSD
Quality technology access	B6	3.17	4.29	3.58	4.462	1	0.050	SSD at p < 0.01: larger role-players larger score
Technology cost	B7	1.92	1.88	1.90	0.008	1	0.932	NSSD
Credit: Long-term	B8	2.42	3.00	2.65	1.971	1	0.177	NSSD
Credit: Short-term	B9	2.91	3.38	3.11	1.156	1	0.297	NSSD
Skilled labour: Obtaining	B10	1.58	1.88	1.70	0.465	1	0.504	NSSD
Skilled labour: Competency	B11	1.75	2.38	2.00	2.784	1	0.113	NSSD
Skilled labour: Cost	B12	2.00	2.25	2.10	0.348	1	0.562	NSSD
Entry-level labour: Obtaining	B13	3.83	3.63	3.75	0.100	1	0.756	NSSD
Entry-level labour: Quality	B14	1.42	1.71	1.53	0.539	1	0.473	NSSD
Entry-level labour: Cost	B15	1.58	2.50	1.95	3.471	1	0.079	SSD at p < 0.01: larger role-players larger score
Natural resource access	B16	2.50	2.50	2.50	0.000	1	1.000	NSSD
Location suitability	B17	4.00	3.88	3.95	0.083	1	0.777	NSSD
Establishment and production cost	B18	2.08	1.63	1.90	1.081	1	0.312	NSSD
SA climate variation	B19	2.27	2.25	2.26	0.002	1	0.962	NSSD
Productivity	B20	3.17	3.75	3.40	1.713	1	0.207	NSSD
Effectivity	B21	3.33	3.75	3.50	1.233	1	0.281	NSSD
Efficiency	B22	3.08	3.75	3.35	3.093	1	0.096	SSD at p < 0.01: larger role-players larger score
Production Factor Conditions Averages		2.63	2.90	2.74	1.552	1	0.229	NSSD
Local market	C1	2.55	2.38	2.47	0.123	1	0.730	NSSD
Local consumers	C2	2.33	2.63	2.45	0.444	1	0.513	NSSD
Growth	C3	2.25	2.38	2.30	0.056	1	0.816	NSSD
Consumer education	C4	2.42	2.00	2.26	1.010	1	0.329	NSSD
International market	C5	3.75	3.57	3.68	0.200	1	0.660	NSSD
Diversity	C6	3.08	3.00	3.05	0.055	1	0.817	NSSD
Buying patterns	C7	2.25	1.75	2.05	0.909	1	0.353	NSSD
Seasonality and availability	C8	2.83	2.38	2.65	0.843	1	0.371	NSSD
Characteristics	C9	3.27	3.38	3.32	0.082	1	0.778	NSSD
Relation	C10	3.50	3.75	3.60	0.327	1	0.574	NSSD
Demand Market Factors Averages		2.82	2.72	2.78	0.140	1	0.713	NSSD
Financial services	D1	2.75	3.38	3.00	3.333	1	0.085	SSD at p < 0.01: larger role-players larger score
Private research	D2	2.89	3.43	3.13	1.514	1	0.239	NSSD
Government research	D3	1.92	2.13	2.00	0.211	1	0.652	NSSD
Evaluation	D4	2.82	3.00	2.89	0.133	1	0.720	NSSD
Grower-club access	D5	2.73	3.13	2.89	0.827	1	0.376	NSSD
Expenditure R&D	D6	2.75	3.00	2.85	0.206	1	0.656	NSSD
R&D collaboration	D7	2.75	3.88	3.20	4.352	1	0.051	SSD at p < 0.01: larger role-players larger score
Electricity	D8	1.92	2.38	2.10	0.966	1	0.339	NSSD
Telecommunication	D9	2.09	2.63	2.32	0.839	1	0.373	NSSD
Technology services	D10	3.50	4.25	3.80	2.627	1	0.122	NSSD
Technology services: Cost	D11	2.00	2.50	2.21	1.640	1	0.217	NSSD
Local input suppliers: Availability	D12	3.42	4.14	3.68	2.230	1	0.154	NSSD
Local input suppliers: Quality	D13	3.42	4.00	3.63	1.714	1	0.208	NSSD
Local input suppliers: Sustainability	D14	3.25	4.00	3.55	2.991	1	0.101	NSSD

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Storage/product handling: Facility availability	D15	3.67	4.00	3.80	0.758	1	0.395	NSSD
Storage/product handling: Facility cost	D16	2.50	2.63	2.55	0.054	1	0.818	NSSD
Transport	D17	3.58	4.13	3.80	1.281	1	0.273	NSSD
Cold-chain management	D18	3.17	4.13	3.55	5.457	1	0.031	SSD at p < 0.05: larger role-players larger score
Export infrastructure	D19	3.33	3.75	3.50	1.837	1	0.192	NSSD
Relating and Supporting Industries Averages		2.88	3.39	3.08	5.423	1	0.032	SSD at p < 0.05: larger role-players larger score
Information flow: Primary suppliers	E1	3.33	3.50	3.40	0.225	1	0.641	NSSD
Information flow: Customers	E2	2.92	3.38	3.10	1.419	1	0.249	NSSD
Market intelligence management	E3	3.17	3.63	3.35	1.902	1	0.185	NSSD
Local market competition	E4	3.67	3.75	3.70	0.027	1	0.871	NSSD
New competitors	E5	3.33	3.63	3.45	0.444	1	0.513	NSSD
International market competition	E6	4.00	4.38	4.15	1.543	1	0.230	NSSD
Economies of scale	E7	4.17	4.00	4.10	0.248	1	0.624	NSSD
Reinvestment	E8	3.08	4.13	3.50	4.302	1	0.053	SSD at p < 0.01: larger role-players larger score
Resource base	E9	2.67	3.25	2.90	1.044	1	0.320	NSSD
Resource competition	E10	3.58	3.63	3.60	0.008	1	0.930	NSSD
Business Strategy, Structure and Rivalry Averages		3.39	3.73	3.53	1.719	1	0.206	NSSD
Trade policy	F1	2.33	2.25	2.30	0.030	1	0.865	NSSD
Land reform policy	F2	2.25	1.50	1.95	2.991	1	0.101	NSSD
Labour policy	F3	1.67	1.63	1.65	0.010	1	0.920	NSSD
Macro-economic policy	F4	2.33	2.50	2.40	0.225	1	0.641	NSSD
Competition law	F5	2.22	3.13	2.65	8.052	1	0.012	SSD at p < 0.05: larger role-players larger score
BEE policy	F6	2.42	2.13	2.30	0.285	1	0.600	NSSD
Political system credibility	F7	1.25	1.25	1.25	0.000	1	1.000	NSSD
Politicians' trustworthiness	F8	1.33	1.25	1.30	0.097	1	0.759	NSSD
Regulatory standards	F9	2.83	3.50	3.10	1.623	1	0.219	NSSD
Regulatory standards comply	F10	3.00	3.88	3.35	3.169	1	0.092	SSD at p < 0.01: larger role-players larger score
Administrative regulations	F11	2.50	3.00	2.70	1.271	1	0.274	NSSD
Taxation	F12	2.33	2.50	2.40	0.360	1	0.556	NSSD
Political factors	F13	2.33	2.13	2.25	0.192	1	0.667	NSSD
Corruption	F14	1.83	2.38	2.05	2.196	1	0.156	NSSD
Government Support and Policy Averages		2.19	2.36	2.26	0.781	1	0.389	NSSD
Exchange rate	G1	3.50	4.50	3.90	4.547	1	0.047	SSD at p < 0.05: larger role-players larger score
Exchange rate fluctuations	G2	2.58	3.00	2.75	1.374	1	0.256	NSSD
Ability to utilise unfavourable conditions	G3	2.92	3.38	3.10	1.682	1	0.211	NSSD
Social unrest	G4	1.75	1.38	1.60	1.002	1	0.330	NSSD
Political system	G5	1.67	1.50	1.60	0.277	1	0.605	NSSD
Crime	G6	1.83	1.63	1.75	0.325	1	0.576	NSSD
Health	G7	2.25	2.63	2.40	0.549	1	0.468	NSSD
Economic growth/development	G8	2.33	3.00	2.60	2.304	1	0.146	NSSD
World events	G9	2.92	3.00	2.95	0.019	1	0.891	NSSD
Chance of Opportunity Factors Averages		2.42	2.67	2.52	1.383	1	0.255	NSSD

Source: Calculations with SPSS (2014)

Table E.4 Exporters' and marketers' perception scores

EXPORTERS / MARKETERS: ANOVA BASED ON SIZE		Average rating score	Average rating score	Average rating score	F	d f	Sig.	Comments
Question	Coding	Exporter/ Marketer : Up to 500 000 cartons	Exporter/ Marketer: More than 500 000 cartons	Total sample				
General infrastructure	B1	4.67	4.14	4.38	2.327	1	0.155	NSSD
Infrastructure cost	B2	2.83	3.00	2.92	0.077	1	0.787	NSSD
Transaction cost	B3	3.00	3.00	3.00	0.000	1	1.000	NSSD
Research quality	B4	3.33	2.57	2.92	2.927	1	0.115	NSSD
Technology quality	B5	4.00	2.71	3.25	5.114	1	0.047	SSD at p < 0.05: smaller role-players larger score
Quality technology access	B6	4.00	3.33	3.64	1.488	1	0.254	NSSD
Technology cost	B7	2.00	2.00	2.00	0.000	1	1.000	NSSD
Credit: Long-term	B8	2.83	3.00	2.92	0.077	1	0.787	NSSD
Credit: Short-term	B9	3.40	3.17	3.27	0.111	1	0.747	NSSD
Skilled labour: Obtaining	B10	1.50	2.67	2.08	3.182	1	0.105	NSSD
Skilled labour: Competency	B11	1.83	2.67	2.25	2.551	1	0.141	NSSD
Skilled labour: Cost	B12	1.83	2.67	2.25	3.378	1	0.096	SSD at p < 0.1: larger role-players larger score
Entry-level labour: Obtaining	B13	3.17	3.80	3.45	0.501	1	0.497	NSSD
Entry-level labour: Quality	B14	1.67	1.80	1.73	0.054	1	0.822	NSSD
Entry-level labour: Cost	B15	2.50	3.60	3.00	1.588	1	0.239	NSSD
Natural resource access	B16	2.83	3.00	2.91	0.027	1	0.872	NSSD
Location suitability	B17	4.00	3.80	3.89	0.130	1	0.729	NSSD
Establishment and production cost	B18	2.60	2.29	2.42	0.228	1	0.643	NSSD
SA climate variation	B19	2.20	1.71	1.92	0.484	1	0.503	NSSD
Productivity	B20	3.83	3.71	3.77	0.049	1	0.829	NSSD
Effectivity	B21	3.50	3.71	3.62	0.236	1	0.637	NSSD
Efficiency	B22	3.83	3.57	3.69	0.372	1	0.554	NSSD
Production Factor Conditions Averages		2.52	2.98	2.75	1.028	1	0.331	NSSD
Local market	C1	3.50	2.00	2.75	12.273	1	0.006	SSD at p < 0.01: smaller role-players larger score
Local consumers	C2	3.17	2.00	2.58	4.623	1	0.057	SSD at p < 0.1: smaller role-players larger score
Growth	C3	3.50	1.67	2.58	11.415	1	0.007	SSD at p < 0.01: smaller role-players larger score
Consumer education	C4	2.50	2.00	2.25	0.484	1	0.503	NSSD
International market	C5	4.17	3.14	3.62	3.186	1	0.102	NSSD
Diversity	C6	3.67	3.00	3.31	1.030	1	0.332	NSSD
Buying patterns	C7	2.50	1.57	2.00	2.014	1	0.184	NSSD
Seasonality and availability	C8	2.83	3.14	3.00	0.249	1	0.628	NSSD
Characteristics	C9	2.71	3.29	3.00	1.263	1	0.283	NSSD
Relation	C10	3.57	4.29	3.93	4.167	1	0.064	SSD at p < 0.1: larger role-players larger score
Demand Market Factors Averages		3.13	2.67	2.90	2.291	1	0.156	NSSD
Financial services	D1	3.00	3.17	3.08	0.094	1	0.765	NSSD
Private research	D2	3.33	3.17	3.22	0.029	1	0.870	NSSD
Government research	D3	2.14	2.29	2.21	0.083	1	0.778	NSSD
Evaluation	D4	2.83	3.29	3.08	0.510	1	0.490	NSSD
Grower-club access	D5	2.80	3.14	3.00	0.355	1	0.565	NSSD
Expenditure R&D	D6	3.17	2.29	2.69	1.934	1	0.192	NSSD
R&D collaboration	D7	3.57	3.14	3.36	0.375	1	0.552	NSSD
Electricity	D8	2.67	3.14	2.92	0.568	1	0.467	NSSD
Telecommunication	D9	2.33	3.86	3.15	5.097	1	0.045	SSD at p < 0.05: larger role-players larger score
Technology services	D10	3.83	4.14	4.00	0.443	1	0.520	NSSD
Technology services: Cost	D11	2.50	2.29	2.38	0.331	1	0.577	NSSD
Local input suppliers: Availability	D12	3.83	3.83	3.83	0.000	1	1.000	NSSD

Local input suppliers: Quality	D13	4.00	3.50	3.75	1.364	1	0.270	NSSD
Local input suppliers: Sustainability	D14	4.00	3.20	3.64	3.273	1	0.104	NSSD
Storage/product handling: Facility availability	D15	4.17	3.83	4.00	0.588	1	0.461	NSSD
Storage/product handling: Facility cost	D16	3.17	2.57	2.85	1.194	1	0.298	NSSD
Transport	D17	3.71	3.71	3.71	0.000	1	1.000	NSSD
Cold-chain management	D18	3.29	3.71	3.50	0.711	1	0.416	NSSD
Export infrastructure	D19	3.17	2.86	3.00	0.291	1	0.600	NSSD
Relating and Supporting Industries Averages		3.21	3.20	3.21	0.005	1	0.947	NSSD
Information flow: Primary suppliers	E1	3.67	3.43	3.54	0.223	1	0.646	NSSD
Information flow: Customers	E2	3.67	3.86	3.77	0.157	1	0.699	NSSD
Market intelligence management	E3	3.57	3.71	3.64	0.077	1	0.786	NSSD
Local market competition	E4	4.00	2.80	3.40	2.667	1	0.141	NSSD
New competitors	E5	3.33	3.00	3.18	0.241	1	0.635	NSSD
International market competition	E6	4.17	4.29	4.23	0.080	1	0.782	NSSD
Economies of scale	E7	3.83	4.00	3.92	0.144	1	0.711	NSSD
Reinvestment	E8	3.83	4.14	4.00	0.443	1	0.520	NSSD
Resource base	E9	3.83	3.50	3.67	0.400	1	0.541	NSSD
Resource competition	E10	3.50	3.43	3.46	0.035	1	0.855	NSSD
Business Strategy, Structure and Rivalry Averages		3.76	3.68	3.72	0.051	1	0.826	NSSD
Trade policy	F1	3.00	2.57	2.79	0.794	1	0.390	NSSD
Land reform policy	F2	2.29	1.57	1.93	3.000	1	0.109	NSSD
Labour policy	F3	2.50	2.00	2.23	0.658	1	0.434	NSSD
Macro-economic policy	F4	2.86	3.14	3.00	0.923	1	0.356	NSSD
Competition law	F5	3.00	3.00	3.00	0.000	1	1.000	NSSD
BEE policy	F6	2.43	3.14	2.79	2.027	1	0.180	NSSD
Political system credibility	F7	1.57	2.00	1.79	1.350	1	0.268	NSSD
Politicians' trustworthiness	F8	1.57	1.86	1.71	0.522	1	0.484	NSSD
Regulatory standards	F9	2.83	3.43	3.15	1.194	1	0.298	NSSD
Regulatory standards comply	F10	3.14	3.29	3.21	0.042	1	0.841	NSSD
Administrative regulations	F11	2.43	2.86	2.64	0.730	1	0.410	NSSD
Taxation	F12	2.43	2.50	2.46	0.035	1	0.855	NSSD
Political factors	F13	2.83	3.00	2.92	0.077	1	0.787	NSSD
Corruption	F14	1.86	2.57	2.21	2.500	1	0.140	NSSD
Government Support and Policy Averages		2.45	2.64	2.55	0.837	1	0.378	NSSD
Exchange rate	G1	3.71	4.00	3.86	0.222	1	0.646	NSSD
Exchange rate fluctuations	G2	3.33	3.00	3.15	0.538	1	0.478	NSSD
Ability to utilise unfavourable conditions	G3	2.67	3.71	3.23	5.768	1	0.035	SSD at p < 0.05: larger role-players larger score
Social unrest	G4	2.17	1.20	1.73	2.381	1	0.157	NSSD
Political system	G5	2.17	2.71	2.46	2.501	1	0.142	NSSD
Crime	G6	2.33	2.00	2.17	0.625	1	0.448	NSSD
Health	G7	2.50	2.57	2.54	0.025	1	0.877	NSSD
Economic growth/development	G8	3.50	3.14	3.31	0.542	1	0.477	NSSD
World events	G9	2.57	2.57	2.57	0.000	1	1.000	NSSD
Chance of Opportunity Factors Averages		2.75	2.84	2.80	0.226	1	0.643	NSSD

Source: Calculations with SPSS (2014)

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Table E. 5 Combined supply chain roles - comparing perception scores

(Indicates lowest average score for particular question)										
(Indicates highest average score for particular question)										
Question	SFES coding	Producer only	Producer & pack house/ processor	Producer & pack house/ processor & exporter/ marketer	Input only	Exporter/ marketer only	Total	F	df	p	Comments
General infrastructure	B1	4.31	3.50	4.60	4.00	4.17	4.02	3.370	4	0.018	SSD p < 0.05
Infrastructure cost	B2	2.38	2.14	3.00	2.50	2.83	2.46	0.815	4	0.523	NSSD
Transaction cost	B3	2.46	2.14	2.80	2.75	3.17	2.54	1.364	4	0.263	NSSD
Research quality	B4	3.54	3.43	3.00	3.50	2.83	3.35	0.764	4	0.555	NSSD
Technology quality	B5	3.77	3.43	3.80	3.50	3.00	3.53	0.771	4	0.550	NSSD
Quality technology access	B6	3.38	3.50	4.00	3.75	3.40	3.55	0.368	4	0.830	NSSD
Technology cost	B7	2.62	1.93	1.80	2.50	2.00	2.22	1.261	4	0.301	NSSD
Credit: Long-term	B8	2.92	2.64	2.80	2.88	2.80	2.80	0.176	4	0.949	NSSD
Credit: Short-term	B9	2.92	3.00	3.50	2.71	3.20	3.00	0.502	4	0.734	NSSD
Skilled labour: Obtaining	B10	2.00	1.86	1.20	2.25	3.00	2.02	2.240	4	0.082	SSD p < 0.1
Skilled labour: Competency	B11	2.38	2.07	1.80	2.63	2.80	2.31	1.323	4	0.278	NSSD
Skilled labour: Cost	B12	2.54	2.14	1.60	2.75	2.60	2.36	2.393	4	0.067	SSD p < 0.1
Entry-level labour: Obtaining	B13	3.54	4.00	2.80	3.88	4.00	3.70	0.969	4	0.435	NSSD
Entry-level labour: Quality	B14	1.23	1.62	1.40	2.13	2.00	1.60	2.134	4	0.095	SSD p < 0.1
Entry-level labour: Cost	B15	2.00	1.93	2.20	2.88	4.00	2.34	4.365	4	0.005	SSD p < 0.01
Natural resource access	B16	2.62	2.64	2.00	3.38	4.00	2.82	2.149	4	0.093	SSD p < 0.1
Location suitability	B17	3.92	4.00	4.00	4.00	3.50	3.95	0.170	4	0.952	NSSD
Establishment and production cost	B18	1.69	1.64	2.60	2.63	2.00	1.98	3.160	4	0.024	SSD p < 0.05
SA climate variation	B19	2.38	2.07	2.75	2.25	1.50	2.18	1.621	4	0.188	NSSD
Productivity	B20	3.31	3.14	4.20	3.75	3.67	3.48	1.305	4	0.284	NSSD
Effectivity	B21	3.46	3.43	3.80	4.13	3.50	3.61	1.239	4	0.310	NSSD
Efficiency	B22	3.38	3.07	4.20	3.88	3.17	3.43	3.092	4	0.026	SSD p < 0.05
Production Factor Conditions Averages		**2.86**	**2.70**	**2.89**	**2.77**	**2.58**	**2.76**	**0.220**	**4**	**0.926**	**NSSD**
Local market	C1	1.92	2.21	3.20	2.38	2.80	2.33	1.869	4	0.135	NSSD
Local consumers	C2	2.31	2.29	3.00	2.50	2.40	2.42	0.618	4	0.652	NSSD
Growth	C3	2.00	1.93	3.40	2.38	2.20	2.22	1.839	4	0.140	NSSD
Consumer education	C4	2.54	2.15	2.60	2.38	2.00	2.34	0.460	4	0.764	NSSD
International market	C5	2.77	3.46	4.20	3.38	3.00	3.27	2.247	4	0.081	SSD p < 0.1
Diversity	C6	2.92	3.00	3.20	3.88	3.00	3.15	1.788	4	0.150	NSSD
Buying patterns	C7	2.08	1.93	2.40	2.38	1.50	2.04	0.981	4	0.428	NSSD
Seasonality and availability	C8	2.92	2.64	2.60	3.63	3.17	2.96	1.430	4	0.241	NSSD
Characteristics	C9	2.85	3.31	3.40	3.75	2.71	3.17	1.893	4	0.130	NSSD
Relation	C10	3.31	3.64	3.80	4.00	4.00	3.68	1.344	4	0.270	NSSD
Demand Market Factors Averages		**2.56**	**2.65**	**3.18**	**2.72**	**2.72**	**2.71**	**0.791**	**4**	**0.537**	**NSSD**
Financial services	D1	3.38	3.00	3.00	2.57	3.00	3.05	0.874	4	0.488	NSSD
Private research	D2	2.91	3.08	3.50	2.88	3.60	3.08	0.523	4	0.720	NSSD
Government research	D3	1.85	2.07	1.80	2.50	2.43	2.11	0.894	4	0.476	NSSD
Evaluation	D4	2.92	2.85	2.80	3.38	3.33	3.02	0.552	4	0.698	NSSD
Grower-club access	D5	2.54	2.85	3.00	2.75	3.00	2.77	0.315	4	0.866	NSSD
Expenditure R&D	D6	3.23	3.07	2.60	2.13	3.17	2.91	1.917	4	0.126	NSSD
R&D collaboration	D7	3.15	3.00	4.00	3.86	2.71	3.24	1.388	4	0.255	NSSD
Electricity	D8	2.42	2.07	2.20	3.25	3.33	2.56	2.351	4	0.070	SSD p < 0.1
Telecommunication	D9	3.00	2.46	2.00	3.75	3.67	2.96	2.199	4	0.086	SSD p < 0.1
Technology services	D10	4.08	3.71	4.00	4.00	4.00	3.93	0.330	4	0.856	NSSD

Technology services: Cost	D11	2.54	2.08	2.60	2.25	2.17	2.31	0.826	4	0.516	NSSD
Local input suppliers: Availability	D12	3.46	3.62	4.00	4.25	3.60	3.73	1.099	4	0.371	NSSD
Local input suppliers: Quality	D13	3.58	3.46	4.20	3.88	3.60	3.67	0.792	4	0.538	NSSD
Local input suppliers: Sustainability	D14	3.54	3.43	4.20	3.50	3.25	3.55	1.004	4	0.417	NSSD
Storage/product handling: Facility availability	D15	3.58	3.57	4.40	4.13	3.60	3.77	2.041	4	0.108	NSSD
Storage/product handling: Facility cost	D16	2.54	2.14	3.60	2.75	2.33	2.54	2.983	4	0.030	SSD p < 0.05
Transport	D17	3.38	3.86	4.00	3.75	3.43	3.66	0.704	4	0.594	NSSD
Cold-chain management	D18	3.31	3.57	3.40	4.00	3.43	3.53	0.733	4	0.575	NSSD
Export infrastructure	D19	3.08	3.57	3.60	3.38	2.67	3.29	1.679	4	0.174	NSSD
Relating and Supporting Industries Averages		**3.08**	**3.03**	**3.30**	**2.95**	**3.14**	**3.07**	**0.281**	**4**	**0.889**	**NSSD**
Information flow: Primary suppliers	E1	3.38	3.21	4.00	3.50	3.33	3.41	0.850	4	0.502	NSSD
Information flow: Customers	E2	3.15	2.86	4.00	3.75	3.67	3.33	2.502	4	0.057	SSD p < 0.1
Market intelligence management	E3	3.15	3.14	4.00	3.88	3.43	3.40	1.553	4	0.205	NSSD
Local market competition	E4	3.62	3.64	4.00	3.00	3.67	3.56	0.937	4	0.453	NSSD
New competitors	E5	3.15	3.43	3.80	2.50	3.00	3.18	1.904	4	0.129	NSSD
International market competition	E6	4.31	4.14	4.20	4.25	4.33	4.24	0.143	4	0.965	NSSD
Economies of scale	E7	3.92	4.21	3.80	4.00	4.33	4.07	0.609	4	0.659	NSSD
Reinvestment	E8	3.54	3.43	3.80	4.00	4.33	3.72	0.915	4	0.464	NSSD
Resource base	E9	3.17	2.50	4.00	3.38	3.80	3.16	2.948	4	0.032	SSD p < 0.05
Resource competition	E10	3.42	3.71	3.60	3.25	3.67	3.53	0.501	4	0.735	NSSD
Business Strategy, Structure and Rivalry Averages		**3.49**	**3.43**	**3.92**	**3.16**	**3.81**	**3.50**	**1.337**	**4**	**0.272**	**NSSD**
Trade policy	F1	2.31	2.21	2.60	2.75	3.14	2.51	1.306	4	0.283	NSSD
Land reform policy	F2	1.54	1.86	2.20	2.13	1.71	1.83	0.799	4	0.533	NSSD
Labour policy	F3	1.62	1.36	2.40	2.25	2.00	1.78	2.596	4	0.050	SSD p < 0.1
Macro-economic policy	F4	2.27	2.36	2.60	3.25	3.29	2.67	2.688	4	0.045	SSD p < 0.05
Competition law	F5	2.17	2.50	3.25	3.00	3.00	2.65	2.051	4	0.107	NSSD
BEE policy	F6	1.92	2.21	2.40	3.00	2.86	2.39	1.804	4	0.147	NSSD
Political system credibility	F7	1.33	1.29	1.20	1.75	2.29	1.52	4.184	4	0.006	SSD p < 0.01
Politicians' trustworthiness	F8	1.17	1.29	1.20	1.75	2.14	1.46	4.295	4	0.005	SSD p < 0.01
Regulatory standards	F9	3.46	3.21	3.00	3.88	3.17	3.37	0.940	4	0.450	NSSD
Regulatory standards comply	F10	3.15	3.14	3.80	3.63	2.71	3.23	1.086	4	0.376	NSSD
Administrative regulations	F11	2.15	2.71	2.60	2.50	2.57	2.49	0.578	4	0.680	NSSD
Taxation	F12	2.31	2.43	2.40	2.71	2.57	2.46	0.397	4	0.810	NSSD
Political factors	F13	2.00	2.14	2.60	3.25	3.17	2.48	3.366	4	0.018	SSD p < 0.05
Corruption	F14	2.00	2.14	2.00	2.63	2.43	2.21	0.988	4	0.425	NSSD
Government Support and Policy Averages		**2.10**	**2.20**	**2.43**	**2.44**	**2.63**	**2.31**	**1.212**	**4**	**0.320**	**NSSD**
Exchange rate	G1	4.17	3.93	4.00	3.67	4.00	3.96	0.325	4	0.859	NSSD
Exchange rate fluctuations	G2	3.25	2.50	3.40	2.78	3.17	2.93	2.049	4	0.105	NSSD
Ability to utilise unfavourable conditions	G3	3.17	3.07	3.20	3.33	3.00	3.15	0.176	4	0.949	NSSD
Social unrest	G4	2.33	1.43	2.00	2.63	1.60	1.98	3.068	4	0.027	SSD p < 0.05
Political system	G5	1.54	1.43	2.00	2.56	2.83	1.91	10.676	4	0.000	SSD p < 0.01
Crime	G6	2.08	1.57	2.20	2.44	2.40	2.04	1.583	4	0.197	NSSD
Health	G7	2.62	2.29	2.60	2.78	2.50	2.53	0.344	4	0.847	NSSD
Economic growth/development	G8	2.38	2.36	3.40	3.00	3.67	2.77	3.498	4	0.015	SSD p < 0.05
World events	G9	2.25	2.86	3.40	2.89	1.86	2.62	2.282	4	0.076	SSD p < 0.1
Chance of Opportunity Factors Averages		2.60	2.38	2.91	2.90	2.79	2.65	2.739	4	0.041	SSD p < 0.05

NSSD: No statistically significant differences

SSD: Statistically significant differences

Source: Calculations with SPSS (2014)

Appendix E.7 Cluster analyses

QUICK CLUSTER B_average C_average D_average E_average F_average G_average

/MISSING=LISTWISE

/CRITERIA=CLUSTER(3) MXITER(100) CONVERGE(0)

/METHOD=KMEANS(NOUPDATE)

/SAVE CLUSTER DISTANCE

/PRINT INITIAL ANOVA CLUSTER DISTAN.

Quick Cluster

Notes		
Output Created		28-NOV-2014 10:23:04
Comments		
Input	Data	C:\Users\User\Documents\00 Werk\2011 to 2014\Steenvrugte studie\Steenvrugte datastel in SPSS.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	50
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any clustering variable used.
Syntax		QUICK CLUSTER B_average C_average D_average E_average F_average G_average /MISSING=LISTWISE /CRITERIA=CLUSTER(3) MXITER(100) CONVERGE(0) /METHOD=KMEANS(NOUPDATE) /SAVE CLUSTER DISTANCE /PRINT INITIAL ANOVA CLUSTER DISTAN.
Resources	Processor Time	00:00:00.03
	Elapsed Time	00:00:00.02
	Workspace Required	1344 bytes
Variables Created or Modified	QCL_1	Cluster Number of Case
	QCL_2	Distance of Case from its Classification Cluster Centre

200

Initial Cluster Centres

	Cluster		
	1	2	3
B_average	3.68	0.00	0.00
C_average	4.50	2.50	0.00
D_average	4.17	3.00	0.00
E_average	4.60	4.00	0.00
F_average	2.31	2.09	0.00
G_average	2.78	2.50	3.33

Iteration History[a]

	Change in Cluster Centres		
Iteration	1	2	3
1	2.084	2.482	0.000
2	.133	.146	0.000
3	.038	.049	0.000
4	0.000	0.000	0.000

a. Convergence achieved due to no or small change in cluster centres. The maximum absolute coordinate change for any centre is .000.
The current iteration is 4. The minimum distance between initial centres is 4.405.

Cluster Membership

Case Number	Cluster	Distance
1	1	.557
2	2	.796
3	2	1.067
4	2	1.219
5	2	.813
6	1	.798
7	2	.308
8	2	.896
9	2	1.001
10	2	.428
11	3	0.000
12	1	.864
13	1	1.475
14	1	1.176
15	1	.857
16	1	1.107
17	1	1.472
18	2	.703
19	1	1.073
20	2	.642

21	1	.968
22	2	.561
23	2	.632
24	1	.752
25	2	.898
26	1	.493
27	2	.778
28	2	.845
29	2	.640
30	1	.766
31	1	.881
32	2	.977
33	1	.639
34	1	.580
35	2	.782
36	1	1.162
37	2	.974
38	1	1.124
39	2	2.588
40	1	.874
41	1	.904
42	2	.760
43	1	1.973
44	1	.607
45	1	1.414
46	1	1.121
47	1	.978
48	1	.609
49	1	1.148
50	1	.847

Final Cluster Centres

	Cluster		
	1	2	3
B_average	3.08	2.45	0.00
C_average	3.01	2.42	0.00
D_average	3.39	2.80	0.00
E_average	3.81	3.22	0.00
F_average	2.56	2.07	0.00
G_average	2.90	2.33	3.33

Distances between Final Cluster Centres

Cluster	1	2	3
1		1.416	7.162
2	1.416		5.945
3	7.162	5.945	

ANOVA

	Cluster		Error			
	Mean Square	df	Mean Square	df	F	Sig.
B_average	6.237	2	.254	47	24.506	.000
C_average	5.807	2	.200	47	29.042	.000
D_average	6.929	2	.100	47	69.193	.000
E_average	8.298	2	.175	47	47.533	.000
F_average	4.149	2	.168	47	24.642	.000
G_average	2.161	2	.154	47	14.058	.000

The F tests should be used only for descriptive purposes because the clusters have been chosen to maximise the differences among cases in different clusters. The observed significance levels are not corrected for this and thus cannot be interpreted as tests of the hypothesis that the cluster means are equal.

Number of cases in each cluster

Cluster	1	28.000
	2	21.000
	3	1.000
Valid		50.000
Missing		0.000

DATASET ACTIVATE DataSet1.

SAVE OUTFILE='C:\Users\User\Documents\00 Werk\2011 to 2014\Steenvrugte studie\Steenvrugte '+

  'datastel in SPSS.sav'

 /COMPRESSED.

{ONEWAY B1 B2 B3 B4 B5 B6 B7 B8 B9 B10 B11 B12 B13 B14 B15 B16 B17 B18 B19 B20 B21 B22 B_average

 C1 C2 C3 C4 C5 C6 C7 C8 C9 C10 C_average D1 D2 D3 D4 D5 D6 D7 D8 D9 D10 D11 D12 D13 D14 D15 D16 D17 D18 D19 D_average

E1 E2 E3 E4 E5 E6 E7 E8 E9 E10 E_average F1 F2 F3 F4 F5 F6 F7 F8 F9 F10 F11 F12 F13 F14 F_average

G1 G2 G3 G4 G5 G6 G7 G8 G9 G_average BY Avg_cluster_no}

 /STATISTICS DESCRIPTIVES

 /MISSING ANALYSIS.

Source: Calculations with SPSS (2014)

Table E.6 Comparing the two clusters - average rating scores of Porter statements:

Question	Coding	Cluster 1	Cluster 2	Total	F	df	p	Comments:	
General infrastructure	B1	4.11	3.85	4.00	1.303	1	.260	NSSD	
Infrastructure cost	B2	2.64	2.15	2.44	2.662	1	.110	NSSD	
Transaction cost	B3	2.82	2.10	2.52	6.999	1	.011	SSD (p < 0.05)	SHV C1
Research quality	B4	3.50	3.00	3.29	3.120	1	.084	SSD (p < 0.1)	SHV C1
Technology quality	B5	3.74	3.25	3.53	3.564	1	.066	SSD (p < 0.1)	SHV C1
Quality technology access	B6	3.92	2.95	3.50	12.799	1	.001	SSD (p < 0.01)	SHV C1
Technology cost	B7	2.39	1.95	2.21	2.412	1	.127	NSSD	
Credit: Long-term	B8	2.92	2.60	2.78	1.694	1	.200	NSSD	
Credit: Short-term	B9	3.21	2.75	3.00	2.855	1	.098	SSD (p < 0.1)	SHV C1
Skilled labour: Obtaining	B10	2.22	1.70	2.00	3.009	1	.090	SSD (p < 0.1)	SHV C1
Skilled labour: Competency	B11	2.48	2.00	2.28	3.450	1	.070	SSD (p < 0.1)	SHV C1
Skilled labour: Cost	B12	2.48	2.25	2.38	0.909	1	.346	NSSD	
Entry-level labour: Obtaining	B13	3.85	3.65	3.76	0.266	1	.609	NSSD	
Entry-level labour: Quality	B14	1.76	1.35	1.58	3.199	1	.081	SSD (p < 0.1)	SHV C1
Entry-level labour: Cost	B15	2.73	1.75	2.30	10.209	1	.003	SSD (p < 0.01)	SHV C1
Natural resource access	B16	3.12	2.50	2.85	2.869	1	.097	SSD (p < 0.1)	SHV C1
Location suitability	B17	4.08	3.79	3.95	1.391	1	.245	NSSD	
Establishment and production cost	B18	2.15	1.75	1.98	2.630	1	.112	NSSD	
SA climate variation	B19	2.26	2.15	2.21	0.173	1	.680	NSSD	
Productivity	B20	3.86	2.90	3.46	13.206	1	.001	SSD (p < 0.01)	SHV C1
Effectivity	B21	3.89	3.20	3.60	10.789	1	.002	SSD (p < 0.01)	SHV C1
Efficiency	B22	3.64	3.10	3.42	6.030	1	.018	SSD (p < 0.05)	SHV C1
Production Factor Conditions Averages		3.08	2.45	2.81	18.601	1	.000	SSD (p < 0.01)	SHV C1
Local market	C1	2.56	2.00	2.33	3.550	1	.066	SSD (p < 0.1)	SHV C1
Local consumers	C2	2.63	2.10	2.40	4.253	1	.045	SSD (p < 0.05)	SHV C1
Growth	C3	2.48	1.80	2.19	4.451	1	.040	SSD (p < 0.05)	SHV C1
Consumer education	C4	2.46	2.15	2.33	1.177	1	.284	NSSD	
International market	C5	3.37	3.15	3.28	0.536	1	.468	NSSD	
Diversity	C6	3.36	2.80	3.13	4.954	1	.031	SSD (p < 0.05)	SHV C1
Buying patterns	C7	2.29	1.75	2.06	4.111	1	.048	SSD (p < 0.05)	SHV C1
Seasonality and availability	C8	3.21	2.55	2.94	5.424	1	.024	SSD (p < 0.05)	SHV C1
Characteristics	C9	3.61	2.65	3.21	15.744	1	.000	SSD (p < 0.01)	SHV C1
Relation	C10	4.07	3.14	3.67	19.907	1	.000	SSD (p < 0.01)	SHV C1
Demand Market Factors Averages		3.01	2.42	2.76	20.823	1	.000	SSD (p < 0.01)	SHV C1
Financial services	D1	3.08	3.00	3.04	0.078	1	.782	NSSD	
Private research	D2	3.38	2.65	3.07	5.792	1	.021	SSD (p < 0.05)	SHV C1
Government research	D3	2.25	1.90	2.10	1.637	1	.207	NSSD	
Evaluation	D4	3.36	2.68	3.09	5.179	1	.028	SSD (p < 0.05)	SHV C1
Grower-club access	D5	2.74	2.79	2.76	0.028	1	.869	NSSD	
Expenditure R&D	D6	3.07	2.65	2.90	1.891	1	.176	NSSD	
R&D collaboration	D7	3.48	2.81	3.19	3.609	1	.064	SSD (p < 0.1)	SHV C1
Electricity	D8	2.93	2.00	2.55	8.469	1	.006	SSD (p < 0.01)	SHV C1
Telecommunication	D9	3.36	2.42	2.98	5.374	1	.025	SSD (p < 0.05)	SHV C1
Technology services	D10	4.25	3.55	3.96	9.325	1	.004	SSD (p < 0.01)	SHV C1
Technology services: Cost	D11	2.43	2.21	2.34	0.864	1	.357	NSSD	
Local input suppliers: Availability	D12	4.12	3.20	3.72	14.963	1	.000	SSD (p < 0.01)	SHV C1
Local input suppliers: Quality	D13	4.04	3.16	3.67	15.583	1	.000	SSD (p < 0.01)	SHV C1
Local input suppliers: Sustainability	D14	3.81	3.10	3.50	9.641	1	.003	SSD (p < 0.01)	SHV C1
Storage/product handling: Facility availability	D15	4.08	3.45	3.80	9.400	1	.004	SSD (p < 0.01)	SHV C1

Storage/product handling: Facility cost	D16	2.79	2.25	2.56	4.469	1	.040	SSD (p < 0.05)	SHV C1
Transport	D17	4.00	3.14	3.63	11.548	1	.001	SSD (p < 0.01)	SHV C1
Cold-chain management	D18	3.93	3.05	3.54	13.608	1	.001	SSD (p < 0.01)	SHV C1
Export infrastructure	D19	3.56	2.90	3.26	7.708	1	.008	SSD (p < 0.01)	SHV C1
Relating and Supporting Industries Averages		3.39	2.80	3.14	42.082	1	.000	SSD (p < 0.01)	SHV C1
Information flow: Primary suppliers	E1	3.79	2.85	3.40	22.097	1	.000	SSD (p < 0.01)	SHV C1
Information flow: Customers	E2	3.68	2.70	3.27	15.907	1	.000	SSD (p < 0.01)	SHV C1
Market intelligence management	E3	3.68	2.95	3.37	8.026	1	.007	SSD (p < 0.01)	SHV C1
Local market competition	E4	3.72	3.35	3.56	1.652	1	.206	NSSD	
New competitors	E5	3.23	3.05	3.15	0.391	1	.535	NSSD	
International market competition	E6	4.32	4.10	4.23	1.469	1	.232	NSSD	
Economies of scale	E7	4.11	4.00	4.06	0.250	1	.620	NSSD	
Reinvestment	E8	4.18	3.05	3.71	16.648	1	.000	SSD (p < 0.01)	SHV C1
Resource base	E9	3.64	2.55	3.16	14.664	1	.000	SSD (p < 0.01)	SHV C1
Resource competition	E10	3.70	3.21	3.50	4.146	1	.048	SSD (p < 0.05)	SHV C1
Business Strategy, Structure and Rivalry Averages		3.81	3.22	3.55	24.125	1	.000	SSD (p < 0.01)	SHV C1
Trade policy	F1	2.57	2.38	2.49	0.447	1	.507	NSSD	
Land reform policy	F2	1.96	1.71	1.86	0.946	1	.336	NSSD	
Labour policy	F3	2.04	1.40	1.77	7.287	1	.010	SSD (p < 0.05)	SHV C1
Macro-economic policy	F4	2.89	2.26	2.64	5.554	1	.023	SSD (p < 0.05)	SHV C1
Competition law	F5	2.93	2.17	2.62	8.820	1	.005	SSD (p < 0.01)	SHV C1
BEE policy	F6	2.64	2.15	2.44	2.557	1	.117	NSSD	
Political system credibility	F7	1.68	1.30	1.52	3.787	1	.058	SSD (p < 0.1)	SHV C1
Politicians' trustworthiness	F8	1.54	1.35	1.46	0.949	1	.335	NSSD	
Regulatory standards	F9	3.64	2.95	3.35	6.892	1	.012	SSD (p < 0.05)	SHV C1
Regulatory standards comply	F10	3.46	2.95	3.24	2.961	1	.092	SSD (p < 0.1)	SHV C1
Administrative regulations	F11	2.64	2.29	2.49	1.684	1	.201	NSSD	
Taxation	F12	2.57	2.25	2.44	2.453	1	.124	NSSD	
Political factors	F13	2.86	2.05	2.52	7.227	1	.010	SSD (p < 0.05)	SHV C1
Corruption	F14	2.46	1.76	2.16	10.392	1	.002	SSD (p < 0.01)	SHV C1
Government Support and Policy Averages		2.56	2.07	2.35	17.084	1	.000	SSD (p < 0.01)	SHV C1
Exchange rate	G1	4.14	3.70	3.96	2.412	1	.127	NSSD	
Exchange rate fluctuations	G2	3.18	2.53	2.91	8.073	1	.007	SSD (p < 0.01)	SHV C1
Ability to utilise unfavourable conditions	G3	3.32	2.95	3.17	2.295	1	.137	NSSD	
Social unrest	G4	2.12	1.79	1.98	1.259	1	.268	NSSD	
Political system	G5	2.07	1.65	1.90	3.905	1	.054	SSD (p < 0.1)	SHV C1
Crime	G6	2.30	1.65	2.02	6.318	1	.016	SSD (p < 0.05)	SHV C1
Health	G7	2.82	2.25	2.58	3.515	1	.067	SSD (p < 0.1)	SHV C1
Economic growth/development	G8	3.18	2.20	2.77	13.775	1	.001	SSD (p < 0.01)	SHV C1
World events	G9	2.89	2.30	2.65	3.204	1	.080	SSD (p < 0.1)	SHV C1
Chance of Opportunity Factors Averages		2.90	2.33	2.66	25.202	1	.000	SSD (p < 0.01)	SHV C1

NSSD: No statistically significant differences
SSD: Statistically significant differences
SHV C1: Significant higher value for Cluster 1

Source: Calculations with SPSS (2014)

Appendix E.8

SCrole_comb * Avg_cluster_no Crosstabulation			Avg_cluster_no		Total
			1	2	
SCrole_comb	Producer only	Count	4	9	13
		% within SCrole_comb	30.8%	69.2%	100.0%
		% within Avg_cluster_no	14.8%	45.0%	27.7%
		% of Total	8.5%	19.1%	27.7%
	Producer & pack house/processor	Count	6	8	14
		% within SCrole_comb	42.9%	57.1%	100.0%
		% within Avg_cluster_no	22.2%	40.0%	29.8%
		% of Total	12.8%	17.0%	29.8%
	All three	Count	4	1	5
		% within SCrole_comb	80.0%	20.0%	100.0%
		% within Avg_cluster_no	14.8%	5.0%	10.6%
		% of Total	8.5%	2.1%	10.6%
	Input only	Count	7	1	8
		% within SCrole_comb	87.5%	12.5%	100.0%
		% within Avg_cluster_no	25.9%	5.0%	17.0%
		% of Total	14.9%	2.1%	17.0%
	Exp/mkt only	Count	6	1	7
		% within SCrole_comb	85.7%	14.3%	100.0%
		% within Avg_cluster_no	22.2%	5.0%	14.9%
		% of Total	12.8%	2.1%	14.9%
Total		Count	27	20	47
		% within SCrole_comb	57.4%	42.6%	100.0%
		% within Avg_cluster_no	100.0%	100.0%	100.0%
		% of Total	57.4%	42.6%	100.0%

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	11.288[a]	4	.024
Likelihood Ratio	12.166	4	.016
Linear-by-Linear Association	9.907	1	.002
N of Valid Cases	47		
a. 6 cells (60.0%) have expected count less than 5. The minimum expected count is 2.13.			