DETERMINANTS OF COMPETITIVENESS AMONG SMALLHOLDER AVOCADO FARMERS IN VHEMBE DISTRICT OF LIMPOPO PROVINCE, SOUTH AFRICA

MASIKHWA HUMBULANI

A MINI-DISSERTATION SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF SCIENCE IN AGRICULTURE (AGRICULTURAL ECONOMICS) IN THE DEPARTMENT OF AGRICULTURAL ECONOMICS AND ANIMAL PRODUCTION, SCHOOL OF AGRICULTURAL AND ENVIRONMENTAL SCIENCES, FACULTY OF SCIENCE AND AGRICULTURE, UNIVERSITY OF LIMPOPO, SOUTH AFRICA

SUPERVISOR: DR P CHAMINUKA

CO-SUPERVISOR: PROF I.B. OLUWATAYO

JULY 2018

DETERMINANTS OF COMPETITIVENESS AMONG SMALLHOLDER AVOCADO FARMERS IN VHEMBE DISTRICT OF LIMPOPO PROVINCE, SOUTH AFRICA

by

HUMBULANI MASIKHWA

A MINI-DISSERTATION

Submitted in partial fulfilment of the requirements for the degree

Master of Science

In Agriculture (Agricultural Economics)

In the

FACULTY OF SCIENCE AND AGRICULTURE

DEPARTMENT OF AGRICULTURAL ECONOMICS AND ANIMAL PRODUCTION, (School of Agricultural and Environmental Sciences)

At the

UNIVERSITY OF LIMPOPO

Supervisor: Dr P Chaminuka (Agricultural Research Council)

Co-Supervisor: Prof I.B. Oluwatayo (University of Limpopo)

2018

DECLARATION

I declare that the mini-dissertation hereby submitted to the University of Limpopo for the degree of Master of Science in Agricultural Economics has not previously been submitted by me for a degree at this or any other university; that it is my own work in design and execution, and that all materials contained herein have been duly acknowledged.

....

Initials and Surname (title) Date

DEDICATION

I dedicate this work to:

My mother Maumela Suzan Masikhwa, it was through your prayers, support and encouragement that I made it this far. Thank you for being my pillar of strength.

My daughter Anzatshilidzitshau and her unborn siblings, this is a benchmark, and you need to go above and beyond.

My late father Azwidihwi Hendrick Masikhwa and my late brothers Maanda Makwarela Masikhwa and Livhuwani Masikhwa, I really wish you were still here to see all my achievements, I know you would have been so proud of me, this one is for you.

ACKNOWLEDGEMENTS

Firstly, I would like to thank the Almighty God our heavenly father for giving me the strength, wisdom and courage to embark on and to complete this study.

My supervisor Dr Chaminuka, thank you for never giving up on me, this road was not easy but you never dropped me along the way and for that I am eternally grateful. May the good Lord bless you and grant you all the desires of your heart.

My co-supervisor Prof Oluwatayo, thank you for your commitment to the advancement of your students. You were always available to assist in any way possible to ensure that there is progress; I would not have seen the finalization of this study if it was not for you. For this I am forever grateful, May the good Lord bless you and grant you all the desires of your heart.

I am thankful for the support of my mother (Suzan), my siblings (Alu and Maru), my partner (Mahwasane) and the Khorommbi family, I would not have done this without you, and for that I say thank you.

My daughter Anzatshilidzitshau: throughout this journey you were my motivation, I had to fight till the end so that you can have a good example of the importance of education. The bar has been set; you need to emulate this or go further than this.

My friends Tshilidzi and Hangwelani; we started this journey together but you conquered before I did. Yet you did not leave me behind to fight alone, you were always there for me, encouraging me and pushing me to the finish line, and for that I thank you. My friend Rangarirai, you deserve a special thanks because you literally pushed me, you made me believe I could when I had concluded I could not, you allowed me to harass you whenever I was “stuck” and assisted me in any way you could, thank you so much, may the good Lord grant you all the desires of your heart.

Lastly, my deepest gratitude goes to the avocado farmers that participated in this study as well as all other individuals, who have contributed to this work directly and indirectly, thank you and may the good Lord bless you abundantly.

ABSTRACT

The avocado industry is a major industry in South Africa and this can be seen by its economic contribution. Limpopo Province is one of the major avocado producing areas in South Africa, and avocado production within the province ranges from smallholder to commercial production. Smallholder avocado producers within the province have a significant role to play, especially if their full potential is unleashed. For smallholder farmers to play such a role they need to be competitive.

The concept of competitiveness can be defined as the ability of an industry or firm to compete successfully in order to achieve sustainable growth while earning at least the opportunity cost on resources employed. The main aim of this study was to analyse the determinants of competitiveness of smallholder avocado farmers in the Vhembe District of the Limpopo Province based on the Porter's Diamond model framework in order to assess the level of competitiveness of farmers and to establish how the farmers can be assisted to reach their full potential.

The study was conducted in the Vhembe District Municipality and a sample of 60 farmers was interviewed. SPSS (SPSS 26.0) was used to analyse the data. Three analytical techniques were used in the analysis for this study. Firstly, factor analysis was used to reduce and group the number of variables associated with competitiveness of the farmers. Secondly, profitability analysis through enterprise budgeting was used to categorise the farmers into two groups; competitive and non-competitive. Thirdly, Logistic regression was used to establish the socio-economic and Porter's Diamond model determinants that could be linked to the competitiveness of the farmers.

From the factor analysis, 5 factors were extracted, namely; "chance", "government, related and supporting industries", "factor conditions", "firm strategy structure and rivalry" and "demand conditions". From the profitability analysis the farmers were grouped into competitive and non-competitive categories with 22 farmers classified as being competitive and 38 farmers as being non-competitive. From the results of logistic regression, 7 out of 12 hypothesised variables were found to be statistically significant, these were; age of farmer, number of trees planted, related and supporting industries, firm strategy structure and rivalry, chance, demand conditions and factor conditions. Chance was the only variable with a statistically significant

negative influence on the competitiveness of the farmers, this was because factors that were tested for their influence on the competitiveness of the farmers are among others: Crime, HIV/AIDS, fires, frost and floods.

Based on the research findings, several policy suggestions were made, these include; mentorship and encouragement of youth participation in farming, provision of agricultural land, capacity building for farmers, government support and stakeholder mobilization, specialized extension service and formation of co-operatives as well as encouraging commercialization.

TABLE OF CONTENTS

Contents

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

ABC	Activity Based Cost accounting
AIDS	Acquired Immune Deficiency Syndrome
APAP	Agricultural Policy Action Plan
ATC	Average Total Costs
AVC	Average Variable Costs
DAFF	Department of Agriculture, Forestry and Fisheries
DOA	Department of Agriculture
FAO	Food and Agriculture Organization
GAP	Good Agricultural practices
GM	Gross Margin
GVP	Gross Value of Production
HIV	Human Immunodeficiency Virus
KMO	Kaiser-Meger-Olkin
LDARD	Limpopo Department of Agriculture and Rural Development
LR	Likelihood Ratio
NAMC	National Agricultural Marketing Council
NFI	Net Farm Income
NFPM	National Fresh Produce Markets
OECD	Organisation for Economic Co-operation and Development
RCA	Revealed Comparative Advantage
RTA	Relative Trade Advantage
SA	South Africa
SAAGA	South African Avocado Growers Association
SPSS	Statistical Package for Social Science
TFC	Total Fixed Costs
TVC	Total Variable Costs
UK	United Kingdom

CHAPTER 1: INTRODUCTION

1.1 Background

The South African avocado industry is mainly aimed at the export market with the European Union being its main destination. Avocado is produced mainly in the Limpopo and Mpumalanga provinces and lesser in the Kwazulu Natal province (DAFF 2016). The variation in the growing regions of this commodity makes the avocados available over an extended period (DAFF 2016). Avocado is available in the market from end of February to the beginning of November.

During the 2014 crop season, about 51% of the total avocados produced in South Africa were exported, 21% of the produce was traded through the National Fresh Produce Markets (NFPMs), 15% was sold to informal markets (vendors and hawkers), 4% was sent for processing, and the remaining 8% was distributed directly to retailers (DAFF 2016).

In 2015/2016 the gross value of production (GVP) for the avocado sector was approximately R1.1 Billion (DAFF 2017). The GVP fluctuates for every season, and reasons for the fluctuations are among others, fluctuations of volumes produced and volumes sold internationally and locally. Up to 61% of South Africa's avocados are produced in the Limpopo Province, 12% out of the 61% is produced by emerging farmers. About 9 401 hectares are under avocado cultivation in the Limpopo Province (DAFF 2016).

Avocado trade functions in a deregulated setting, where the prices are controlled by market forces of supply and demand. Avocado growers in South Africa formed an organization in the 1960s. The main aim of the organization was to enhance the conditions for avocado producers. The South African Avocado Growers Association (SAAGA) encourages coordinated fruit exports, funds limited field and post-harvest research, and organizes grower meetings (Vorster 2001).

The avocado industry in South Africa is a major employer, especially for people residing in rural areas. Approximately 6 000 permanent workers and 2 000 temporary workers are employed by the avocado industry (DAFF 2016). Further

impact is seen through the dependence of individual members of the households estimated at 36 000 per annum (DAFF 2016).

The South African agricultural industry is dualistic in nature, comprising of a well-established commercial farming sector that hosts major market players, as well as an emerging smallholder farming sector that consists of farmers that are struggling to penetrate the market and to produce products that are of a standard that is acceptable in the international markets (May and Carter 2009).

Smallholder avocado farmers are faced with a challenge of limited resources; this often affects the quality of avocados they produce. The avocados may be soft or blemished which limits their chances of surviving the fresh market. This therefore means that for the farmers to make a profit they need to consider selling locally for a low price or processing. Avocado may be processed into guacamole or oils for culinary or cosmetic use (DAFF 2016).

Former homelands are characterised by small land parcels mainly for subsistence purposes (Groenewald and Nieuwoudt 2003). This means that lack of access to large stretches of land is a limiting factor to the smallholder farmers as it affects the volumes they can produce. Consequently, for farmers to penetrate the international market they may have to cooperate with other smallholder farmers in order to share resources and to produce the quality and the quantities required by the market.

International experience has also shown that for smallholder farmers to partake in agribusiness value chains and to access high-value markets, they should be able to produce high-value crops that are demand-driven (Baloyi 2010). In producing and marketing high value-added products, transaction costs tend to be high particularly for smallholder farmers in rural areas (Baloyi 2010), this therefore is an indication that competitiveness is important for smallholder farmers and their advancement in the industry.

The OECD (2010) defines competitiveness in two standpoints: (i) Competitiveness as the capability to face competition and to be successful when facing competition (ii) Competitiveness as the ability to sell products that meet demand requirements and at the same time, guarantee profits over time that enables the firm to thrive.

According to Nordin et al. (2008) the theory of competitiveness is based on comparative and competitive advantage, both of which are linked, but one is often mistaken for the other. The concept of comparative advantage is derived from traditional theory of international trade that it is more profitable for a country to export goods that it produces at a comparatively lower cost than other countries, and import goods that it produces at a comparatively higher cost than other countries.

Competitiveness has always been a challenging and debatable concept, and there are variances in its measurement and the most suitable indexes to be used. Several studies have noted that competitiveness can be linked with trade performance (Frohberg and Hartman 1997; Ezeala- Harrison 2005 and Esterhuizen 2006), trade performance is however a macro-level measure of competitiveness. Porter's Diamond model can be used as a micro-level framework to measure competitiveness (Markus 2008).

Competitiveness is an important concept in government planning and policy processes, this can be seen as it is mentioned numerous times in the Agricultural Policy Action Plan (APAP) 2014. The APAP document indicates that South Africa needs to strengthen its competitiveness by supporting localization where potential exists, it also makes mention of the fact that investment in agro-logistics is critical in determining access to market opportunities, lowering cost to business, and the overall competitiveness of the sector, and that access to information remains a challenge, especially for small-scale producers, which affects their productivity and competitiveness.

Competitiveness hinges on an industry's capability to create greater value for its consumers and better profits for all participants along the value chain (DAFF 2016). The main motive for one to sustain a competitive position is to achieve efficient production, maximising output in relation to specific inputs such as human, capital and natural resources (DAFF 2016). In order for an industry to survive and to continue to penetrate markets, companies must compete aggressively in an economically sustainable manner. If companies are unable to achieve competitive advantage they will not survive the industry.

Many analysts regard agriculture, especially smallholder agriculture as an effective instrument for sustainable economic growth and poverty reduction, particularly in the rural areas of developing countries (May 2011). It is therefore important that smallholder avocado farmers are competitive in order to effectively contribute to sustainable economic growth and poverty reduction.

A study of this nature is therefore significant in establishing the determinants and the extent of competitiveness of smallholder avocado farmers and how the competitiveness of these farmers can be enhanced to match international market standards.

1.2 Problem statement

Smallholder farmers encounter numerous challenges to access inputs and to produce and market their commodities efficiently. Market access is listed as a major obstacle for smallholder farmers in developing countries; smallholder farmers require improved access to agricultural markets to raise their farm productivity and living standards (Chamberlin and Jayne 2011). Like most smallholder farmers, smallholder avocado farmers are faced with the challenge of access to markets.

Gyau et al. (2014) indicate that smallholder farmers in rural areas frequently do not have access to information about prices in urban areas and they mostly sell at farm gate prices to local buyers who on their part have access to price and market information mainly in other markets. Gyau et al. (2014) further mentions that most production systems in Africa are on a small scale and are limiting as farmers acting individually are not able to participate in new markets such as supermarkets where higher volumes and standardization of products are often required. It is suggested that because individual farmers can only produce small quantities of produce for sale, they have minimal bargaining power with traders and often accept any price presented. The opposite applies to large-scale farmers who produce in larger volumes and are able to maintain consistent quality and, therefore, are able to attract buyers eager to purchase their products at true market prices. The challenge of economies of scale and market access affects competitiveness for these smallholder

farmers adversely. Competitiveness covers issues of distribution, allocation and use of scarce resources (labour, capital land, human resources), (Van Berkum 2004).

An extensive search for any published work on competitiveness of smallholder avocado farmers found that no known research study has been carried out and published about the competitiveness of Smallholder avocado farmers in the Vhembe District or the Limpopo Province and South Africa.

Various studies have been conducted on competitiveness of different commodities in South Africa, Venter and Horsthemke (1999), Vink *et al* (1998), Mosoma (2008), Esterhuizen and Van Rooyen (2006) and Madima (2010). Of all the studies consulted none of them were at the level of this study as none of them focused on smallholder farmers. All the studies were at a commercial level and had a wider scope to cover; most of the studies were based on comparisons both nationally and internationally.

Numerous studies have been carried out on competitiveness of various commodities in South Africa but none have been conducted focusing mainly on Limpopo Province Venter and Horsthemke (1999), Vink *et al* (1998), Esterhuizen and Van Rooyen (2006) and Madima (2010). It is also evident that there is insufficient information pertaining to competitiveness of smallholder farmers. Thus a study of this nature is necessary to bridge the gap and add to academic literature; this study is intended to give an indication of how smallholder farmers can increase their competitiveness and enjoy equal opportunities with commercial farmers.

1.3 Motivation of the study

South Africa's National Development Plan (NDP) has assigned smallholder agriculture, to drive rural development and to improve the livelihoods of at least 370 000 people, specifically in the former homelands (NPC, 2011). This is an indication that smallholder agriculture has a huge role in the food security and livelihoods of farmers, farm workers and their families. For the smallholder farming industry to make enough profits to maintain the livelihoods of the farmers and employees, there

has to be proper enterprise development. Enterprise development is the fostering and promoting of entrepreneurship, typically in the form of small businesses. The government may play a role in assisting such smallholder farmers to graduate into commercial farmers, and in turn promote food security.

The South African government acknowledges that competitiveness is a key factor for the success of the agriculture industry. This can be seen in the Agricultural Policy Action Plan (APAP) (2014) document, the vision of this document is indicated as; An equitable, productive, competitive, profitable and sustainable Agriculture, Forestry and Fisheries to benefit of all South Africans. The APAP document further indicates that investing in agro-logistics is critical in ensuring access to market opportunities, decreasing cost to business, and the general competitiveness of the sector. Van Berkum (2004) gives an indication that competitiveness can be measured at the levels of a country, sector or firm and also at different market levels.

About 61% of the South Africa's avocado production is from Limpopo Province (DAFF 2015). Although production and export of avocado in Limpopo is mainly concentrated in the Mopani District, Vhembe District is second with its production being a combination of commercial and smallholder. "Avocados contributed 32% (R1.1 billion) to total gross value of subtropical fruits (R3.4 billion) in South Africa during 2013/14 season" (DAFF 2015: 4). The contribution that the avocado industry makes to South Africa's economy warrants an investigation on the competitiveness of the industry and how the industry's competitiveness can be further enhanced. This study focuses on the competitiveness of smallholder avocado farmers in the Vhembe district of the Limpopo province. A study of this nature is necessary to assess the competitiveness of smallholder avocado farmers and to establish how the farmers can be assisted to ensure that they are competitive.

1.4 Aim and objectives

1.4.1 Aim of the study

The main aim of this research is to analyse determinants of competitiveness among smallholder avocado farmers in the Vhembe District of Limpopo Province, South Africa based on Porter's Diamond Model.

1.4.2 Objectives of the study

The specific objectives of this study are to:

1. Identify and describe socio-economic characteristics of smallholder avocado farmers in Vhembe District.
2. Outline the determinants of smallholder avocado farmers' competitiveness.
3. Estimate the level of competitiveness of the different smallholder farmers in avocado production.
4. Examine and analyse socio-economic and Porter's model factors influencing the competitiveness of smallholder avocado farmers in Vhembe District of Limpopo Province.

1.5 Hypothesis

1. Socio-economic characteristics and Porters Diamond model determinants do not affect the level of competitiveness of smallholder avocado farmers in the Vhembe District.

1.6 Organization and structure of study

This study is organized into six chapters. Chapter one constitutes the introduction which gives a brief background of the study, problem statement, aim and objectives guiding the study, hypotheses and motivation for undertaking the study. An empirical and theoretical review of issues relating to the study is presented in chapter two. Chapter three outlines the research methodology employed in the study, including a brief depiction of the study area, data collection methods and analytical techniques used in data analysis. Chapter four focuses on describing the socio-economic characteristics of smallholder avocado farmers in Vhembe District. Chapter 5

presents an outline of the determinants of smallholder avocado farmers' competitiveness using Porter's diamond model, an estimate of the level competitiveness of the different smallholder farmers in avocado production and an outline of socio-economic and Porter's model factors that affect the competitiveness of smallholder avocado farmers in the Vhembe District of Limpopo Province. The summary and conclusion of the major empirical findings, and policy recommendations together with recommendations for future research are presented in chapter six.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

This chapter presents theoretical and empirical literature relevant to this study and gives an overview of the avocado industry in South Africa and specifically in the Limpopo Province. The chapter defines the concept of competitiveness and illustrates how it is applicable to smallholder avocado farmers in the Vhembe District. Other key concepts used in the study are also defined. Thereafter, theoretical models that are commonly used to analyse competiveness as well as other related studies that have been previously conducted in South Africa and abroad are discussed.

2.2 Definitions of key concepts

2.2.1 Smallholder farmers

Many researchers and academics in South Africa have challenged the definition of a smallholder farmer (Louw et al. 2007 and Kirsten and Vink 2002). The smallholder farmer is viewed to be the same as a black farmer in a public debate, but in actuality the smallholder farmer falls anywhere between subsistence and commercial categories. Smallholder farmers can be classified between large-scale and small-scale. They fall along a range of resource-rich and resource-poor and they fall along a range of commercial production and subsistence production. This means that a smallholder farmer can be categorised as resource-rich, resource-poor or in-between (resource-medium). Such a farmer could either be classified as a commercial producer, semi-subsistence producer or anywhere in-between the two (Chikazunga and Paradza 2012).

Smallholder farmers can be described in various ways depending on the context. The term ‘smallholder’ is often interchangeably used with ‘small-scale’, ‘resource poor’ and sometimes ‘peasant farmer’. Commonly, the term smallholder refers to their limited resource endowment as compared to other farmers in the sector (DAFF 2015). Smallholder farmers in South Africa have the following characteristics; small plots, labour intensive methods of production, low levels of technical farming skills and limited access to critical input and output markets. These characteristics indicate

that smallholder farmers generally face significant challenges in accessing value chains (Aliber et al. 2010 and Davis 2013).

Smallholder farmers are the drivers of many economies in Africa even though their potential is often not brought forward. The smallholder avocado producers like any smallholder producers are faced with numerous challenges some of which are; limited financial resources, limited land holdings, and limited human resources. Mr DJ Mmakola (LDARD Manager: Horticultural Crops Value chain) in an interview on 22/10/2014 indicated that for an avocado farmer to be considered as a commercial farmer they need to be in possession of and producing on at least 40ha. For the farmer to be competitive, there is a need for funds to utilize the entire 40ha following all the necessary requirements in place to ensure world class quality avocados. Smallholder farmers have limited capital, limited on-farm infrastructure, and limited training and management skills (Baloyi 2010). These limitations hinder the farmers' competitiveness.

Nesamvuni et al*.* (2003), indicate that smallholder farms in Limpopo are located in the former homeland areas and occupy approximately 30% of the provincial land surface area. This results in smallholder farming being characterised by a low level of production technology and the small size of farm holdings, approximately 1, 5 ha per farmer, with production mainly for subsistence and little marketable surplus.

For the purpose of this study a smallholder farmer is defined using the (DAFF 2015) definition where a smallholder is a farmer who has limited resource endowment relative to other farmers within the sector. The injection of capital is necessary for the development of any sector of an economy (Okorie 1998). Hence capital and investment funds are critical to the development and growth of agriculture in Limpopo Province.

2.2.2 Defining competitiveness

Siggel (2006) notes that the true source of competitiveness is comparative advantage, however the concepts of comparative advantage and competitiveness differ in terms of distortions created by government policies, e.g. protectionist

policies, producer price supports, etc. Actual competitiveness is then derived from comparative advantage as well as from the advantage gained by domestic firms from government support policies. At a microeconomic level, a producer has a comparative advantage if his/her costs of production are lower than those of competitors (international and domestic) at the equilibrium factor price level, implying a cost advantage.

From previous research literature it is evident that the precise definition of competitiveness is subject to ambiguity (Kennedy et al*.* 1997; Ortmann 2000; Esterhuizen 2006 and Siggel 2006). Siggel (2006) in an attempt to account for this ambiguity suggests that unlike comparative advantage, competitiveness has not been as rigorously defined in the early economic literature. The difficulty in defining competitiveness has been attributed to its multidimensional applications and interpretations. Some definitions focus more on the underlying sources of competitiveness while others place more emphasis on the indicators of competitiveness (Kennedy et al. 1997; Ortmann 2005 and Esterhuizen 2006).

There is a general consensus in the literature regarding the following characteristics of competitiveness: competitiveness is a relative concept and relates to the profitable maintenance and/or gain of domestic and/or international market share by a firm, sector or industry (Frohberg and Hartmann 1997; Kennedy *et al*. 1997; Cantwell 2005 and Esterhuizen 2006).

Another definition by Sharples (1990) states that competitiveness relates to the observable reality, by arguing that if firms and industries cannot survive by selling at the going price, they are not competitive and that if they are able to survive and increase market share, they have become more competitive. Petit et al. (1995) stated that competitiveness is the ability to produce goods and services that are able to compete in the international market. Cho (1994) argued that there is a widespread misconception about competitiveness, which is due to the fact that international competitiveness is divided into two categories, namely: price competitiveness, such as nominal wages, exchange rates and labour productivity; and non- price competitiveness, such as quality, marketing, service and market differentiation. In order to measure price competitiveness, export price, production cost and consumer

or wholesale prices indices are used and thus rising prices are seen as weakening a nation's international competitiveness. Esterhuizen (2006, 3) provides the following definition of competitiveness: "Competitiveness is the ability of a sector, industry or firm to compete successfully in order to achieve sustainable growth within the global environment while earning at least the opportunity cost of returns on resources employed".

From the definitions mentioned above, Esterhuizen's definition of competitiveness incorporates all the essential features required for the purposes of this study. Therefore, from Esterhuizen's definition, competitiveness in this study is defined as the ability of a smallholder avocado farmer to achieve sustainable business growth while earning at least the opportunity cost of production. Consequently, smallholder avocado farmer is considered competitive if positive returns to land and other utilized resources are earned.

2.3 Theoretical and Empirical framework

2.3.1 Porter's Diamond model

Disillusioned by the economic theories of trade, Porter (1990) advanced a theory to explain national competitive advantage. This theory was aimed at addressing issues such as: why other nations are competitive in some industries while others are not. In his endeavour to get explanations to this, he identified four classes of country attributes (which he called the National Diamond).

These are factor conditions, demand conditions, related and support industries, and firm strategy, structure and rivalry (Porter 1990). Porter (1990) also proposes two additional factors which are government policy and chance (exogenous shocks), these two support and supplement the system of national competitiveness but do not create lasting competitive advantages.

Porter (1990) indicates that in a world of increasing global competition, nations have become more, not less important. As the foundation of competition has shifted more and more to the creation and integration of knowledge, the role of the nation has grown. Competitive advantage is created and sustained through a highly localised

process. Differences in national values, culture, economic structure, institutions, and histories all contribute to competitive success. There are striking differences in the forms of competitiveness in every country; no nation can or will be competitive in every, or even most industries. Ultimately, nations thrive in particular industries because their home environment is the most forward-looking, dynamic and challenging.

Porter criticises the traditional doctrine by indicating that even though each company utilizes its own different approach, the underlying modus operandi of prosperous companies is basically similar and that for a company to gain competitive advantage, it has to practice innovation. Innovation may be the adaptation of new trends in the form of technologies, product design, production methods and marketing and training (Porter 1990). Porter states that the reason why some companies are consistent in innovations, and always have a competitive advantage, and ensure success lies in four broad attributes of a nation. Attributes that individually and as a system constitute the diamond of national advantage as indicated in Figure 2.1. These attributes are further broken down to get the factors that were identified and tested for the purpose of this study.

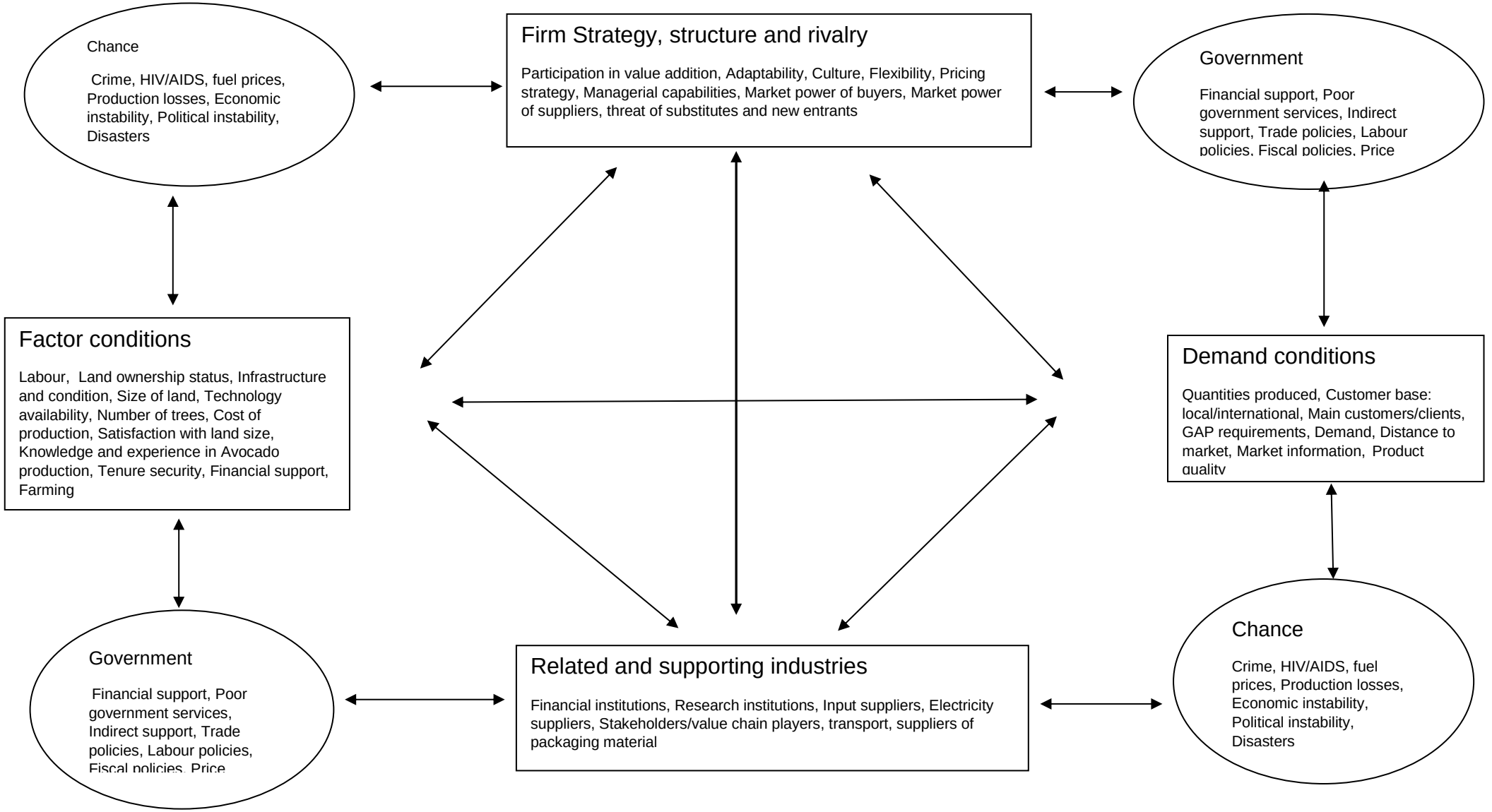

Figure 2.1: Porter's diamond (Porter, 1990)

According to Porter (1990), these determinants create the national environment in which companies are born and learn how to compete. Each point on the diamond and the diamond as system affects essential ingredients for achieving international competitive success.

2.3.1.1 Factor conditions

Factor conditions are the nation's position in factors of production, such as skilled labour, land, capital, human resources, infrastructure and technology necessary to compete in a given industry.

According to traditional trade theories, factor conditions are: land, labour and capital (including human capital). Porter (1990) however makes a distinction between: human resources, physical resources, knowledge resources, capital resources and infrastructure. Factor conditions are further broken down into basic and advanced factors that can be either general or specialised. Basic factors such as unskilled labour, raw materials, climatic conditions and water resources require no new investment to be utilised in production process. Advanced factors require further investment for them to be utilized in production.

2.3.1.2 Demand conditions

The nature of home-market demand for the industry's products or services covers the price at which the products are being sold as well as the quantities required by the markets.

Demand conditions in a country or a firm are also perceived by Porter (1990) as a source of competitive advantage for the country or the firm. According to Porter, it is not only the size of the domestic market that matters, but also the sophistication of home country buyers.

The level of sophistication of the consumer forces firms to continually innovate and upgrade their competitive positions to meet the high standards in terms of product quality, features and service demands.

2.3.1.3 Firm strategy, structure and rivalry

These are the conditions in the nation that govern how companies are created organised and managed, as well as the nature of domestic rivalry (Porter 1990). This is the presence or absence in the nation of supplier industries and other related industries that are internationally competitive; these include all stakeholders involved in the value chain of a specific commodity.

Porter (1990) emphasises the fact that the strategies and structures of firms are highly affected by the national environment, and those different countries' business sectors operate uniquely to attain a competitive advantage. Porter (1990) identifies rivalry as the most critical driver of competitive advantage of a country's firms. He believes that domestic rivalry forces firms to be cost competitive, to improve quality and to be innovative.

2.3.1.4 Related and support industries

Porter's Diamond Theory has been applauded for its introduction of related and support industry clusters as an independent determinant of national competitive advantage (Teece 1996). According to Porter (1998), the external economies of related and support industry clusters, such as networks of specialised input providers, institutions and the spill-over effects of local rivalry create the competitive advantage (Porter 2003).

The cluster represents an environment in which learning, innovation and operating productivity can flourish.

2.3.1.5 Government

The government may play a role of offering support in the form of policies that are related to that specific commodity, advisory services and services such as funding for production purposes.

The government's role in the Porter's Diamond model is very important and has a significant and direct effect to all of the main four determinants, all the policies and regulations made by policymakers at all levels of government can benefit or

adversely influence the competency of an industry. There are many policies that can impact each of the determinants in different ways. For example; subsidies, taxes, financial incentives, education policies, public procurement, quality standards, capital market regulations etc. (Bakan and Dogan 2012).

2.3.1.6 Chance

These are factors that affect the firm but cannot be controlled or regulated, these include new inventions and new technologies, disasters such as droughts, floods, wars, pest plagues and politics. How the firm responds to these factors will depend on the status of the other components of the diamond.

According to Porter (1998) chance events are matters that have little to do with situations in the nation or the industry. Chance events are usually improvements outside the control of the industries. Chance events are regarded as beyond the control of firms or industries but may make forces that remould the sector structure, allowing shifts in competitive position. “Chance” is composed of factors (mainly external to the sector) that are not well foreseen and (almost influenced by the sector) such as new inventions, political decisions by foreign governments, wars, rapid changes in financial markets or exchange rates, surges of world or regional demand, discontinuities in input costs, other radical technical changes (biotechnology and microelectronic). For instance, heightened border security may result in interruptions in imports and exports (Bakan and Dogan 2012).

2.3.1.7 Relevance of Porter’s Diamond Model to this study

There are various methods that can be employed to establish the level of competitiveness of industries or countries. These methods however differ to some extent and some are better suited for other forms of analysis than others, for example some are more suitable in a case where one wishes to look at competitiveness at a macroeconomic level and some at a microeconomic level.

Methods such as the Revealed Comparative Advantage (RCA) developed by Balassa (1965) and Relative Trade Advantage method developed by Vollrath (1991), are examples of commonly used macroeconomic measures of competitiveness. Porter et al. (2005) argues that most of the discussion regarding competitiveness is

focused on macroeconomic, social and legal policies that form the basis of a successful economy and that these factors are necessary but not sufficient in explaining competitiveness. Porter et al. (2005) maintain that although the execution of proper statutory institutions provides the opportunity to create wealth (competitiveness), these do not generate wealth themselves. This is because wealth is generated at the microeconomic level by the capabilities of a nation's companies, a process driven by the microeconomic business environment in which these companies compete.

Siggel (2006) in support of Porter et al.'s (2005) notion suggests that the microeconomic concept of competitiveness has a firmer theoretical foundation than the macroeconomic concept. He attributes this to the fact that at the microeconomic (firm or producer) level the concept of competitiveness is aimed at the particular characteristics of each individual producer or firm competing directly for market share. According to Frohberg and Hartmann (1997), competitiveness analysis may differ spatially, ranging from the farm/firm to national levels and also in terms of product aggregation.

From the above mentioned methods, Porter's Diamond model was seen as the most relevant framework since the other methods are mainly used to measure past trends to determine competitiveness and focus more on the macroeconomic other than the microeconomic analysis. The Porter Diamond model is suitable for the measurement of current trends. The other methods would not have been suitable since data on the past performance of smallholder avocado farmers in the Vhembe District has not been documented, and is not available.

2.3.2 Profitability analysis using Enterprise budgeting

An enterprise budget can reflect monetary economies of size. It is a planning document that specifies what might happen and also what almost surely will not always take place. Marginal rules play a key role in making enterprise budgets a more effective aid to farm planning (Debertin 1986).

The main function of an enterprise budget is projection and estimation of the planned returns, costs and profit per unit for the given enterprise. With its great amount of data, the enterprise budget can be used like a functional management planning tool

in the future projection of similar operations. That is useful in making many types of decisions and choice of a more profitable enterprise in the whole farm plan.

Farmers can use the enterprise budgets for identification of the possible costs and expected profit from a specific production, also in evaluation of the potential options in choice of necessary resources and determination of the break-even prices or yields of the certain production (Kay et al. 2008). Since an enterprise budget consists of information about some specific resources connected with the use of certain technology in the production process, building it entails understanding of the both sides; the production and economic conception. “Most enterprise budgets are economic budgets” (Kay et al. 2008, 161). This means that except of all fixed and variable expenses; they also include some opportunity costs, like operator labour, capital and management. Therefore, the profit or return presented on an enterprise budget is an estimated economic profit. This is different from accounting profit, where opportunity costs are not recognized.

Profit is defined as total revenue minus total cost (Erikson et al. 2004). Erikson *et al.* (2004) outlined four perspectives of profit; (i) profit is a reward for taking risks in business; (ii) profit results from the control of scarce resources; when one owns a resource that others want, the others will bid up the price which will then generate profit for the owner; (iii) profits exist because some people have access to information others do not have. This special knowledge includes secret formulas or processes, exclusive right to inventions, property rights and patents, etc., ensuring profit for the inventor; and (iv) profits could exist simply because some businesses are managed better than others; their managers are often creative planners and thinkers with efficient organizational abilities.

The accountant looks at profit as the income that remains after all contractual, measurable costs are subtracted. The economists however determine profits by examining alternative uses of resources within the firm. Hence, economic profit is defined as accounting profit less opportunity cost. It forces an examination of alternative uses of resources and helps in analysing substitute courses of action by the firm (Kay et al. 2008).

It is contended that the entrepreneur’s motive for producing any given product is that of the attainment of maximum profit, while consumers or buyers’ motive is that of

utility maximization (Olayide and Heady 1985). The profit motive is the 'spark plug' of a market oriented capitalist economy. The prospect of earning and keeping a profit serves as the incentive for creativity and efficiency among people. It stimulates risky ventures and drives people to develop ways of cutting costs and improving techniques, always in an effort to satisfy consumers desires (Erikson et al. 2004).

Kotler and Keller (2006) suggest that firms should be able to measure the profitability of their products, territories, customer groups, segments, trade channels and other sizes; emphasizing this will help the management to determine whether any products or marketing activity should be expanded, reduced or eliminated. Marketing profitability analysis generally indicates the relative profitability of different channels, products, territories or other marketing entities. More so, companies are showing interest in using market profitability analysis or broad version activity based cost accounting (ABC) to quantify the true profitability of different activities (Cooper and Kaplan 1991). Profitability can be improved by managers if there is reduction in resources needed to perform various activities or make resources more productive or acquire them at least cost; or alternatively raise prices on products that consume heavy amount of support services (Kotler and Keller 2006).

Various models of profitability have been used in production and marketing researches. Onuoha, Okereke and Asumugha (2009) applied the gross margin and net income analysis in determining profitability of feed-mills in Umudike, Abia State, Nigeria; in which profitability was reported at 1.06 for every naira spent. In similar study on paddy enterprises, Okoye and Anuebunwa (2003) reported gross margin of 33% and 27% for the two enterprises. Ezedinma (2000) noted that the profitability of a market is a direct indicator of degree of efficiency of the marketing system.

2.4 Review of local and international studies on competitiveness

Venter and Horsthemke (1999) used Porter's Diamond Model approach in their study on the competitive nature of the South African (SA) sheep meat value chain. Here Porter's Diamond Model is applied (considering the factor conditions; demand conditions; competitiveness of the related and supporting industries; firm's strategies, structures and rivalry; the role of government; and lastly, the chance factors) to analyse the competitiveness. Countries included in the analysis were

Namibia and South Africa (representing Southern Africa) and data from these countries were compared with data from Australia. The study found that Australia was more competitive than both South Africa and Namibia in terms of mutton production but was however not competitive in terms of lamb production. The study identified that an important factor hampering improvements in the competitiveness of the sheep meat value chain was the high cost associated with value adding by market players in the retail sector. The study made a recommendation that SA producers must add more features to sheep meat products thereby generating greater customer value, and also that role-players within the red meat industry must form strategic alliances to improve the overall value chain competitiveness.

Vink et al. (1998) studied the international competitiveness of Western Cape wheat production, this study made use of producer profitability comparisons of wheat production per hectare as a representation for competitiveness. Producer gross incomes and production costs were also included in the comparison. Data from international competitors used in the study included Argentina, Australia, Canada, Britain, Germany, the US and Zimbabwe. The study concluded that Western Cape wheat production was not internationally competitive.

Wheat producers in countries having lower yields per hectare were found to have three times the net gross margin of SA producers. The study linked this finding to the then recent deregulation of the wheat industry, noting that producers were still in a transition phase where production inefficiencies were still apparent. The study concluded that to thrive in the global market, SA wheat producers needed to adjust their production practices to match the market's willingness to pay.

Mosoma (2004) investigated agricultural competitiveness and supply chain interactions between South Africa, Argentina and Australia using the Relative Trade Advantage (RTA) method developed by Vollrath (1991). Using export data, this study revealed that a number of South Africa's value chains were marginally competitive relative to Australia and Argentina. These were the tobacco, maize, tomato, sugar and grape value chains. Mosoma (2004) recommended that value adding opportunities need to be deeply researched and explored in order to develop different products and production practices.

Esterhuizen and van Rooyen (2006) measured the competitiveness of the SA wine industry and identified factors affecting competitiveness using the Relative Trade Advantage (RTA) method. In this study: the operational trading performance of SA wines relative to international competitors was measured. Key success factors affecting the competitiveness of the wine industry were found to be strong competition between market players, the production of affordable, high quality products, resourceful supporting industries and the availability of internationally competitive local suppliers of primary inputs. The study found that the SA wine industry was highly competitive internationally relative to countries such as Australia, Chile, Italy and New Zealand. In conclusion, Esterhuizen and van Rooyen (2006) noted that oscillations in the exchange rate, trust in the political support system, and the proficiency of administrative personnel in the public sector and the growth and size of the SA market were important factors for market players to consider, enhancing the competitiveness of the SA wine industry in the future.

Esterhuizen (2006) analysed the competitiveness of 16 selected food commodity chains in South Africa using Balassa's (1965) Revealed Comparative Advantage (RCA) method for the period 1961 to 2002. The study uncovered the fact that most of the commodity chains are slightly competitive with an exception of pineapple, apple and maize chains. Apple and pineapple chains followed a trend of declining when moving from primary to processed products. Fresh milk showed rising competitiveness in both the long- and short-run whilst the competitiveness of other dairy products such as cheese, butter, and skim milk remained unchanged over the period 1961 to 2002. In the study it was noted that it is of vital significance that the underlying reasons for the lack of competitiveness of some commodity chains be identified. The lack of competitiveness of these commodity chains may be attributed to: unproductive labour, low technical innovation, high input costs or government trade policy. Esterhuizen (2006) concluded by noting that strategic international alliances may be a possible solution to improving the competitiveness of poorly performing commodity chains.

Esterhuizen and Van Rooyen (2006) determined the competitiveness status of the wine industry. In this study Balassa's (1989) method of determining the Relative Trade Advantage and Porter's (1998) method for determining the factors of

competitiveness was applied. The scale of classification was Relative Trade Advantage >1 meaning competitive advantage, and Relative Trade Advantage < 1 meaning competitive disadvantage. The results revealed that, starting from 2000 to 2007, the Relative Trade Advantage has been increasing and greater than 1. In 2000 the Relative Trade Advantage was 4.02 and in 2007 it was 6.81. This means that during that period the wine industry was increasingly competitive internationally and was also sustainable. Utilizing the determinants of competitiveness as described by Porter (1998), a scale of 1 to 3 was used to classify the determinants in terms of constraining or enhancing the competitiveness success of the wine industry. The value 1 indicated not constraining, 2 = moderate effect, and 3= constraining. The factor conditions, demand conditions and related and supporting industries conditions had a moderate effect on the wine industry's competitiveness. The firm's strategy, structure and rivalry conditions had a positive impact in enhancing the wine industry's competitiveness success, with a mean score of 3 and the government support conditions and chance conditions were negatively impacting the competitiveness success of the wine industry, as indicated by the mean score of 1.5.

Madima (2010) conducted a study on deciduous fruit canning industry in South Africa, using Balass's (1989) and Porter's (1998) methodologies to evaluate the competitiveness of the different players in the supply chain, namely: canning fruit producers and farmers, can manufacturers, fruit canners, labour union in the fruit canning industry and the fruit canning industry association. The purpose of the study was to investigate the competitiveness of the South African deciduous fruit canning industry in the global canned fruit market. It was revealed that the industry was internationally competitive, particularly in areas such as labour costs, product quality, efficient production technology and world class regulatory standards. Madima (2010) argued that the South African fruit canning industry had been adversely affected by European Union subsidies.

Of all the studies that were obtained, none of them were at the level of the smallholder farmer as most had a wider scope to cover and others were comparisons both nationally and internationally.

2.5 An overview of the avocado sector in South Africa

The South African avocado industry is mainly aimed at the export market with the European Union being its main destination. Avocado is produced mainly in the Limpopo and Mpumalanga province and lesser towards the Kwazulu Natal province (DAFF 2015). The variation in the growing regions of this commodity makes the commodity available over an extended period (DAFF 2016). Avocado is available in the market from end of February to the beginning of November with most of the crop available between end of February and beginning of September (DAFF 2016).

"Avocados contributed 32% (R1.1 billion) to total gross value of subtropical fruits (R3.4 billion) in South Africa during 2013/14 season" (DAFF 2015: 4). Donkin (2007) indicates that about 12 000 hectares of land in South Africa is under commercial avocado production, most of these hectares are within the Limpopo and Mpumalanga provinces. Annual production is the region of 90 000 tons, of which 40 000 tons is exported to Europe and the United Kingdom. The remainder of the crop is consumed domestically and approximately 10% is processed into oil and purée (Donkin 2007).

The total area of land used for avocado production in South Africa has expanded gradually over the past years, from an estimated 2 000 hectares in the 1970s to over 12 500 in recent years (Donkin 2007).

About 61% of the country's avocado production is from Limpopo Province (DAFF 2015). Although production and export of avocado in Limpopo is mainly concentrated in the Mopani District, Vhembe District is second with its production being a combination of commercial and smallholder.

The South African Avocado Growers Association (SAAGA) was formed in the late 1960s, the main aim of the organization was to enhance the conditions for avocado producers (Vorster 2001). SAAGA encourages coordinated fruit exports, funds limited field and postharvest research, and organizes grower meetings (Vorster 2001). SAAGA has a voluntary membership that is responsible for 85% of export production. SAAGA's activities include; technical research, extension services, generic promotion to develop the local and export market, and the provision of marketing information and all these are funded by its members (Donkin 2007).

According to industry sources (SAAGA), current trends in the industry include consolidation within the export business, private cultivar development, integrated fruit production, processing, growth of the local market and efforts to access new markets (DAFF 2015).

As indicated above, the South African avocado industry is mainly aimed at the export market. During the 2014 production season approximately 51% of total avocados produced in South Africa were exported, 21% were marketed through the National Fresh Produce Markets (NFPMs), 15% sold to the informal markets (bakkies and hawkers), 4% was sent for processing, and the remaining 8% was delivered directly to retailers (DAFF 2015).

South Africa is a net exporter of fresh and dried avocados. South Africa's trade balance has consistently been positive; the country exported more than it imported between 2012 and 2016. In 2014, South Africa's exports reached a peak value of US$ 90 million. Nevertheless, in the following year (2015), exports declined drastically by 33.7% to US$ 59 million. In 2015, South Africa's fresh and dried avocado exports were valued at US$ 72 million, while imports accounted for a value of US$ 4.619 million (NAMC 2017).

The international value of avocado imports increased between 2012 and 2015 by a significant 70.5%. In 2012, the global import value was slightly over US$ 2 billion, while in 2015 it was more than US$3.5 billion. The USA was rated as the top importer of fresh and dried avocados with a 45.6% market share, followed by the Netherlands and France with an 8.3% and 7.5% market share respectively in 2015 (NAMC 2017).

In the year 2016 South Africa's avocadoes exports were as follows: The Netherlands was the main destination for South Africa's exports with a 74% share, followed by the United Kingdom (UK), Spain and Russia with a share of 18%, 5% and 2% respectively. Lebanon was the smallest destination with a 1% market share. On the import side: Spain, Israel and Swaziland were the top three suppliers of fresh and dried avocados with a market share of 77%, 17% and 4% respectively (NAMC 2017).

2.6 Summary

Various studies on different production industries have been conducted within South Africa and internationally. Based on the different industries as well as the scope of the studies different outcomes have been achieved and documented. Some of the studies such as Madima (2010)'s study on the deciduous canning industry in South Africa has revealed that the industry is internationally competitive, while other studies such as Vink et al. (1998)'s study on the Wheat industry has revealed that the industry is not internationally competitive.

From the contrasting studies that have been documented it is important to conduct such studies within different industries and at different levels to add to information that already exists.

CHAPTER 3: RESEARCH METHODOLOGY

3.1 Introduction

In this chapter the research methods used in collecting and analysing the variables that were considered to be influencing the competitiveness of smallholder avocado farmers in the Vhembe District of Limpopo Province are presented. The chapter is intended to show how the study was conducted using various research tools. It describes the data collection and data analysis methods used in the study and data analysis. The chapter further outlines the data collection methods used in the study. The data analysis follows, outlining descriptive statistics and the models for data processing, giving reasons why the models have been chosen.

3.2 Study area

The study was conducted in the Vhembe District of the Limpopo Province. The Vhembe District is located at the far northern corner of the Limpopo Province. It shares its borders with Zimbabwe in the north, Botswana in the west and the Kruger National Park in the east, which then borders Mozambique in the far east. The district is characterised by a vibrant agricultural sector, where the commodities which smallholder farmers produce include tomato, mango, litchi, citrus, garlic, banana, macadamia, poultry, fish, guava, livestock (cattle, sheep and goats), pig, vegetables and avocado.

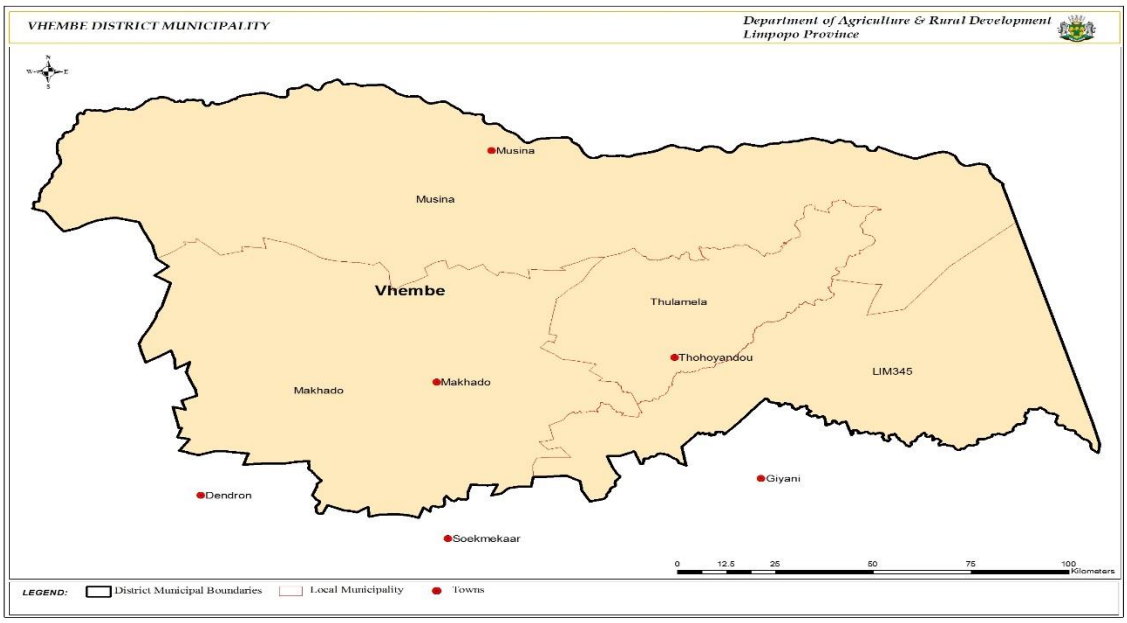

Figure 3.1: Vhembe District Municipality (Source: LDARD)

3.3 Data collection

Quantitative data was collected from primary data sources. A structured questionnaire was administered to the sampled farmers to collect data that was needed for the study. The data collection instrument covered all aspects of competitiveness as per the Porter's diamond model. Additional data were sourced from the Vhembe District office of the Limpopo Department of Agriculture and Rural Development (LDARD).

3.3.1 Population

The target population for this study was small-scale avocado farmers in the Vhembe District of the Limpopo Province. Information to identify these farmers was acquired from the Vhembe District Department of Agriculture and Rural Development (LDARD).

3.3.2 Sampling Procedures

For the purpose of this study a combination of purposive sampling and simple random sampling were used. Purposive sampling is a sampling procedure where the researcher makes specific choices about which people, groups or objects to include in the sample (Bertram and Christiansen 2014). In this case only two (Makhado and

Thulamela local municipalities) out of the four local municipalities of Vhembe District municipality were selected. The reason for selecting the two municipalities was that avocado production in the district is mainly concentrated within the two municipalities.

Kerlinger (1986) indicates that random sampling is a sampling procedure where a sample is drawn from a population in a manner that each member of the population has an equal chance of being selected. Babbie, (1973) indicates that simple random sampling is a good method despite of its laborious and not the most convenient nature; it has an advantage that every element or number of the population can equally be selected. In this study a list of 142 avocado farmers from the two municipalities was obtained from the Limpopo Department of Agriculture and Rural Development. Simple random sampling was used to select a sample of 60 farmers from a population of 142 smallholder avocado producers. The sample size of 60 farmers was informed by budgetary considerations. The sample of 60 farmers represented 42% of the population. The farmers were from a total of 14 villages.

3.4 Data analysis and motivation for models

For the purpose of this study, data were collected using a structured questionnaire which was compiled based on the principles of the Porters diamond model for competitiveness (Questionnaire attached as annexure 1). After collection, the data were captured into the Statistical Package for Social Sciences (SPSS 26.0) for Windows. Data analysis took place in three stages; first, the factor analysis method was used to reduce and group the data to make it easier to run further analysis. After running the factor analysis method, the farmers were then categorised into two groups, competitive and non-competitive using a Profitability analysis. Third, after classifying the farmers into two groups, Logistic regression was used to determine the factors that affect the competitiveness of smallholder avocado farmers in the Vhembe District.

3.4.1 Porter's Diamond model

As explained in chapter 2, Porter's Diamond model suggests four connected aspects, each of which represents a determinant of competitiveness: "factor conditions", "demand conditions", "firm strategy, structure and rivalry" and "related

and supporting industries". "Chance" and the "government" are additional factors that affect the four determinants, but are not considered determinants themselves. Collectively, the above mentioned six aspects form a system that will differ based on location and assist to solve the mystery of why other firms and industries in specific locations succeed and others do not.

When dealing with Porter's Diamond model it is important to note that industries can still be successful without all the six factors operating optimally. Thus, Porter's Diamond model was used as a base framework for this study in order to identify the factors to be tested. The Porter's Diamond model determinants were used to construct the data collection instrument. From the six Porter's Diamond model determinants, each determinant was further broken down to get factors that were identified and tested in order to establish the level of competitiveness of avocado farmers in Limpopo (see Table 3.2).

Table 3.2: Factors affecting competitiveness based on the Porter's Diamond Model

Determinant	Identified and tested factors
Factor Conditions	Labour (Skilled and unskilled usage, Cost,) Land ownership status, Infrastructure and condition, Size of land, Technology availability, Number of trees, Cost of production, Satisfaction with land size, Knowledge and experience in Avocado production, Tenure security, Financial support, Farming
Demand Conditions	Quantities produced, Customer base: local/international, Main customers/clients, GAP requirements, Demand, Distance to market, Market information, Product quality
Firm Strategy, Structure and Rivalry	Participation in value addition, Adaptability, Culture, Flexibility, Pricing strategy, Managerial capabilities, Market power of buyers, Market power of suppliers, threat of substitutes and new entrants
Related and Supporting Industries	Financial institutions, Research institutions, Input suppliers, Electricity suppliers, Stakeholders/value chain players, transport, suppliers of packaging material
The government	Financial support, Poor government services, Indirect support, Trade policies, Labour policies, Fiscal policies, Price stability
Chance	Crime, HIV/AIDS, fuel prices, Production losses, Economic instability, Political instability, Disasters

3.4.2 Factor Analysis

Factor Analysis is an econometric model that seeks to reduce a large set of measured variables in terms of relatively few new dimensions, known as factors. Factor Analysis was basically used to establish and present the covariance relationships that exist among numerous variables based on a few core, but unobservable random quantities called factors. Factor loadings are organised in a matrix and are used to interpret the factors (Johnson and Wichern1992).

Factor analysis was identified as an appropriate method to group the determinants that affect the competitiveness of smallholder avocado farmers thus also making it easier for the researcher to run further analysis with reduced data.

Factor Analysis was used to reduce the factors identified through Porter's Diamond Model, which were then further tested after the farmers were categorised into two groups, competitive and non-competitive.

The factor analysis model can be expressed in a matrix form as:
$x = \Lambda \mathrm{f} + \mathrm{e}$

Where χ is the vector of n observable variables

f is the vector of m unobservable factors

Λ is the loading matrix of the order nfm

e is the error vector of $nx1$.

For the purpose of this study, factor analysis was used to group the determinants that are essential to small scale avocado production in order to further establish the economic sustainability of a generic smallholder avocado entrepreneur in the Vhembe District. In order to run factor analysis in this study the following general steps were followed:

3.4.2.1 Determining the suitability of data for factor analysis using the KMO and Bartlett tests

The KMO (Kaiser-Meger-Olkin) index is recommended when the cases to variable ratio are less than 1:5. The KMO index can be anything between 0 and 1, however

the value of 0.50 is considered suitable for factor analysis. The Bartlett's Test of Sphericity has to be significant (Williams et al. 2010).

3.4.2.2 Determining the number of factors

It is of high importance in factor analysis to determine the number of extracted factors. Although a precise basis of determining the number of extracted factors is not given, there is a criterion for determining the number of extracted factors such as: Eigen-value criterion, the previous criterion, the criterion of variance percentage, and the test cuts criterion. Considering the fact that factor analysis is of exploratory type, the Eigen-value criterion was used to extract factors, and the aim was to extract factors with Eigen values greater than 1.5. The Eigen value of 1 is usually the default for most statistical programs and is quiet popular in many studies. However, Brown (2001) observed that eigenvalues higher than 1 can also be used for deciding on the number of factors to include in a factor analysis. In this study, the Eigen value of 1.5 was used in order to select the factors with the most variance and the ones which match the determinants of Porter's Diamond Model.

3.4.2.3 Rotating the factors

The goal of rotation in factor analysis is to rotate the factor axes around the centre of the coordinates. When interpreting the factors, it is not easy to use a simple method of rotating the factor axes. Therefore, in order to simplify the factor structure and interpretation we use Varimax rotation method. There are several methods to this aim and here Varimax rotation method was used and the factors with values greater than 1.5 were extracted as meaningful ones.

3.4.3 Profitability analysis

This was the second stage of analysis that was employed in this study, and the main aim of this method of analysis was to group the farmers into two categories (Competitive and non-competitive) in order to run further analysis. This analysis was used to address the third objective which is: Estimate the level of competitiveness of the different smallholder farmers in avocado production.

In order to assess whether or not the smallholder avocado farms were competitive a profitability analysis was conducted using enterprise budgeting. This method was adopted from a study on the profitability of small scale aquaculture enterprises in Central Uganda (Hyuha et al. 2011), in this study a generic enterprise budget is developed using data collected from the fish farmers as well as secondary sources.

For the purpose of this study an enterprise budget could not be developed from data collected from the farmers because information on the specific inputs and costs associated with the inputs was not detailed, the farmers only provided annual estimates which were not enough to create an enterprise budget. As a result, a generic enterprise budget for smallholder avocado farmers within the Limpopo Province was sourced from the Limpopo Department of Agriculture and Rural Development (LDARD). The enterprise budget was used as an instrument to provide a realistic representation of estimates of inflows and outflows related to avocado farming. The estimates were inclusive of costs and profits involved in avocado farming.

As a prelude to the estimation of the profit function, gross profit margin was adopted to estimate the average costs and returns of avocado farming annually. The model is given as;

$GM = TR - TVC$.....(1)

Where, GM = Gross Margin; TR = Total Revenue; TVC = Total Variable Cost

Net Farm Income $(NFI) = GM - TFC \; or \; TR - TC$.....(2)

Where, TFC= Total fixed costs; TC=Total costs

Net Return on Investment $(NROI) = NFI/TC$ .....(3)

From the equations above, Gross Margin (GM) is defined as the difference between total revenue and total variable costs and the Net Farm Income (NFI) is the difference between gross margin (GM) and the total fixed costs (TFC).

In economic theory, profit is maximized at output level where marginal cost equals marginal revenue (Koutsiyianis 1983). Thus, one can determine profit by comparing total revenue with total cost, or by comparing average price and average total cost.

Multiplying the difference by the total output gives the total profit or loss (Nellis and Parker 1997).

Olayide and Heady (1985) derived unconstrained profit maximization given two factors and one product production function as follows;

$Q = f(x_1, x_2)$ ……..(4)

$C = r_1x_1 + r_2x_2$ ……(5)

Where,

Q = output, C= cost,x_1, $x_2$are inputs, r= price of input, b= fixed cost.

Understanding that profit (π) is given as revenue (price multiplied by quantity) less cost, and then one has a function of the form:

$\pi = Pf(x_1, x_2) - r_1x_1 - r_2x_2 - b)$ ……(6)

To maximize profits, we set the partial derivatives of π with respect to Xs and equate to zero and solve. Hence profit is maximized at output level where marginal cost (MC) equals marginal revenue (MR), given p= price of output. This is given as

$\delta\pi/\delta x_1 = pf_1 - r_1 = 0$ ……(7)

$\delta\pi/\delta x_2 = pf_2 - r_2 = 0$ ……(8)

Solving 1and 2 then

$pf_1 = r_1; pf_2 = r_2$ ……..(9)

If the price of a commodity exceeds the average total cost (ATC) of production, supernormal (pure) profits are made as opposed to normal profits; and if the price is below average variable cost (AVC), the firm is at shut down point, in the short run (Nellis and Parker 2000). Normal profit is the minimum rate of profit which must be earned to ensure that sufficient number of people are prepared to invest, organize production and undertake risk in an industry (Nellis and Parker 2000; Frank and Bernanke 2001).

In order to have a clear representation of the profitability of the avocado farmers, each farmer's profit per hectare was represented in a scatter plot with the generic

profit represented as a benchmark. All farmers below the benchmark were considered to be making a loss and all farmers along and above the benchmark were considered to be making a profit. During this exercise two assumptions were made and the first was that any farmer that is able to make the benchmark profit or more is considered competitive, and any farmer that is unable to make that profit is considered non-competitive, the second assumption was that the expected yield per hectare for a smallholder avocado farmer in Limpopo is 11 tons per hectare and this was supported by Dorantes et al. (2004) who indicates that depending on the orchard and technical practices an avocado farmer can obtain yields of between 8 to 15 tons per hectare.

3.4.4 Logistic Regression

Regression methods are widely used for analysing the relationship between a dependent variable and one or more independent variables (Al-Ghamdi 2001). Logistic regression, like least squares regression, is a statistical technique that is used to explore the relationship between a dependent variable and at least one independent variable. The difference is that, linear regression is used when the dependent variable is continuous, while logistic regression techniques are used with categorical dependent variables.

Logistic regression, like any other model building technique in statistics is primarily aimed at finding the best fitting and most economical and yet sensible model to assess the relationship between response variables and at least one independent variables. It differs from the linear regression in that, it can be applied when the dependent variable is categorical and that it does not require severe assumptions to be met (Al-Ghamdi 2001).

The Logistic Regression Model was used to analyse the fourth objective of the study. The model allowed the researcher to determine socio-economic and Porter's Diamond model factors that affect the competitiveness of smallholder avocado farmers in the Vhembe district. For this study the response variables were "1'' if a farmer is competitive and ''0'' if a farmer is not competitive. The independent variables (Age, Gender, Marital Status, Household Size, Farm Size, Number of Avocado trees, Firm strategy structure and rivalry score, Chance score, Related and

supporting industry score, Demand conditions score and factor conditions score were used. The dependent variable is competitiveness. Quantitative data was captured in Microsoft excel package and statistically analysed using the SPSS package (SPSS 26.0). The use of SPSS facilitated the generation of frequency tables and graphs.

The Logistic Regression model is expressed as follows:

$\ln(\emptyset_i \ / \ 1 - \emptyset_i) = B_0 + \Sigma xy = 1\ B_y X_{iy} + E_i$ ..... (1)

Where:

Y denotes the response category (1 or 0) i

denotes cases occurrences (1.2.3…n)

n denotes the number of independent variables in the model

Ø denotes conditional probability

B_0 denotes the coefficients,

$B_y$denotes the coefficient of the independent variable

X_{iy}denotes the independent variables

$\frac{\emptyset_i}{1-\emptyset_i}$ denotes the odd variable/probability

$\ln \frac{\emptyset_i}{1-\emptyset_i}$ denotes the logarithm of the odd variable

E_i denotes unobserved random effects (error term)

Equation (1) will be manipulated to equation (2) below:

$(\emptyset_i \ / \ 1 - \emptyset_i) = \exp(B_0 + \sum_{xy=1} B_y X_i$..... (2)

The probability of competitiveness and the probability of non-competitiveness will be analysed using equation (3) presented below:

$\emptyset_i = \exp(B_0 + \sum_{X_{y=1}} B_y X_{iy} / \ 1 + \exp(B_0 + \sum_{X_{y=1}} B_y X_{iy}$..... (3)

The Logistic Regression model was used to determine socio-economic and Porter's Diamond model factors that affect the competitiveness of smallholder avocado farmers in the Vhembe district The independent variables were; age, gender, marital status, household size, farm size, number of avocado trees, firm strategy structure and rivalry score, chance score, related and supporting industry score, demand conditions score and factor conditions score.

The above equation function (3) was used to develop the equation below with the independent variables equated on the equation:

$$COMPETITIVENESS = \beta_0 + \beta_1 AGE + \beta_2 GENDER + \beta_3 MARITALSTATUS + \beta_3 HSEHOLDSIZE + \beta_4 FARMSIZE + \beta_5 NUMBERAVOCADOTREES + \beta_6 FIRMSTRATSTRUANDRIVSCORE + \beta_7 CHANCESCORE + \beta_8 RANDSINDUSTRYSCORE + \beta_9 DEMANDCONDITIONSCORE + \beta_{10} FACTORSCORE + E_I$$

Table: 3.3 Hypothesized influential factors of competitiveness

Variable Name	Description	Unit	Expected Sign	Source
Dependant Variable				
Competitiveness	1 if farmer is competitive and 0 if not	Dummy	-	
Independent variables				
Age	Age (Continuous)	Years	Positive	Mukwevho and Anim, 2014
Gender	1 if farmer is male, 0 otherwise	Dummy	Positive or negative	Chirigo, 2014
Marital Status	1 if farmer is married, 0 otherwise	Dummy	Positive of negative	Chirigo, 2014
HouseholdSize	Continuous	Adults and children equivalents	Positive or negative	Chirigo, 2014
FarmSize	Continuous	Hectares	Positive	Chirigo, 2014
Number_Avocado_trees	Continuous	Number	Positive	Thomas, 2007
firmstratstruandrivscore	Score calculated from all yes or no questions on Firm Strategy Structure and rivalry, where 1 is yes and 0 is no.	Number	Positive or negative	Thomas, 2007
chancescore	Score calculated from all yes or no questions on Chance, where 1 is yes and 0 is no.	Number	Positive or negative	Thomas, 2007
randsindustryscore	Score calculated from all yes or no questions on Related and Supporting Industries, where 1 is yes and 0 is no.	Number	Positive or negative	Thomas, 2007
demandconditionscore	Score calculated from all yes or no questions on Demand Conditions, where 1 is yes and 0 is no.	Number	Positive or negative	Thomas, 2007
factorscore	Score calculated from all yes or no questions on Factor Conditions, where 1 is yes and 0 is no.	Number	Positive or negative	Thomas, 2007

3.5 Ethical considerations

This study followed the prescribed standards of the ethics of the University of Limpopo Turfloop Research Ethics Committee. Since the study used primary data, the researcher ensured that (based on prescribed standards) the data collection procedure was as comfortable as possible for all the farmers, and that each farmer was made to understand the purpose of the study. All farmers who were willing to participate had been fairly and equally selected and their confidentiality was respected.

3.6 Limitations of the study

This research was carefully prepared, and the researcher ensured that all was done to minimise flaws. Despite such preparation, shortcomings were however experienced. Firstly, the research was conducted in only two municipalities within Vhembe District; therefore, the results might not represent the perceptions of all smallholder avocado farmers within the Vhembe District as a whole. Secondly, the population of the sampled group was considerably less due to time and budgetary constraints and does not represent the majority of the smallholder avocado farmers in the study area.

Thirdly, during the survey it was noticed that farmers did not keep formal records and therefore seemed to have forgotten information that was critical to the study, some farmers had no record of volumes they had harvested and costs incurred in the previous years, this therefore left the farmers giving estimates. At the inception of this study, the researcher had intended to get production and financial data for three years in order to make proper assessments based on the trends, however this limitation resulted in the researcher only making use of data from the previous production season (2014) as most farmers indicated that they did not have exact figures and thus would provide distorted information.

This study only covered smallholder avocado farmers within the Vhembe District and the results cannot be a generalised to also apply to farmers in other Districts in the Limpopo province.

CHAPTER 4: DESCRIPTIVE RESULTS AND DISCUSSION

4.1 Introduction

This chapter gives insight into the socio-economic characteristics of small-holder Avocado farmers in the Vhembe District in the Limpopo Province. The chapter specifically describes the nature of data gathered in the study and also provides a summary of the variables. The information presented in this chapter is derived from descriptive analysis of the data collected for this study. Information on the basic demographic characteristics of the sampled farmers is discussed with specific reference to competitiveness. The results are presented using descriptive statistics such as mean, maximum and minimum values, frequencies and standard deviation. This study used a sample size of 60 from a population of 142 smallholder avocado farmers in the Vhembe District Municipality. The farmers that participated in this study were from 14 villages within the Municipality.

4.2 The smallholder avocado farmer in Vhembe District

Livelihood conditions in the rural areas are to a significant extent reflected in the socio-economic factors of households, which in return influence the households' economic behaviour (Makhura 2001). Randela (2005) indicates that demographic characteristics of households are essential when analysing economic data because such factors influence the households' economic behaviour. As such, it was important to assess household demographic characteristics when analysing factors affecting competitiveness of smallholder avocado farmers.

Table 4.1: Gender, Education and Land Ownership

		Frequency	Valid Percent
Gender	Female	15	25
	Male	45	75
	Total	60	100
Level of education	Less Grade 7	22	37.3
	Matric	21	35.6
	Post Matric	5	8.5
	Other	11	18.6
	Total	59	100
Land ownership security	No	47	78.3
	Yes	13	21.7
	Total	60	100.0

Female participation in farming is highly encouraged by government as it has an impact on food security and job creation for the country. Table 4.1 depicts the gender distribution of the farmers, showing that only 25% of the farmers were females and the remaining 75% were male.

Level of education was also considered as an important factor that would have an effect on the competitiveness of the farmers. Level of education was divided into four categories, namely: Less than grade 7 (Primary), matric, post matric and other. Table 4.1 presents that 36.8% of the farmers only attained primary education and 35% had matric and only 8.5% were in possession of a post matric qualification. About 18.3% were classified under 'other', most of which indicated that they attended secondary school education but however did not get to matric.

Secure tenure to productive land is critical to the millions of poor people who live in rural areas and depend on agriculture for their livelihoods (Gyau et al. 2014). According to FAO (2003) security of tenure is the certainty that a person's rights to land will be recognized by others and protected in cases of specific challenges. People with insecure tenure face the risk that their rights to land will be threatened by competing claims, and even lost as a result of eviction. According to Randela et al. (2000), ownership of land can influence agricultural productivity, because farmers who do not own land may not have the motivation to invest in and make fixed improvements on the land. An example is a farmer operating with a permission to occupy, they might find it risky and unwise to erect a state of the art security fence around the property as they are not 100% guaranteed of ownership to the property as they would if they were in possession of a title deed which is less likely to be contested. This reduced incentive to invest on the land adversely affects production. As much as 78.3% of the farmers considered their land ownership as insecure, with only 21.7% indicating that their land ownership was secure.

Table 4.2: Age of household head

Variable	N	Range	Min	Max	Mean	Std. Deviation
Age of the household head	52	52	26	78	57.79	12.377
Household size	48	48	2	15	6.29	2.805

The age of the farmers was regarded as one of the crucial socio-economic factors influencing the competitiveness of the smallholder avocado farmers. As indicated in Table 4.2 the age of the household heads ranged between 26 and 78 with the average of the household heads being 58. The mean age was an indication that most of the farmers involved in the survey were older and only a few young people showed participation in farming, this could be attributed to the fact that most young people may have been employed in the formal sector and other informal sectors as most of them view agriculture as a dirty business (Musemwa et al. 2008).

The household size plays a role in the economic decisions of a farming family; the size of the household may be a major factor in making decisions on labour. The size of the household also determines the household's monthly expenditure. In this sample, the average household consisted of 6 people, while the minimum household size was 2 and the maximum was 15.

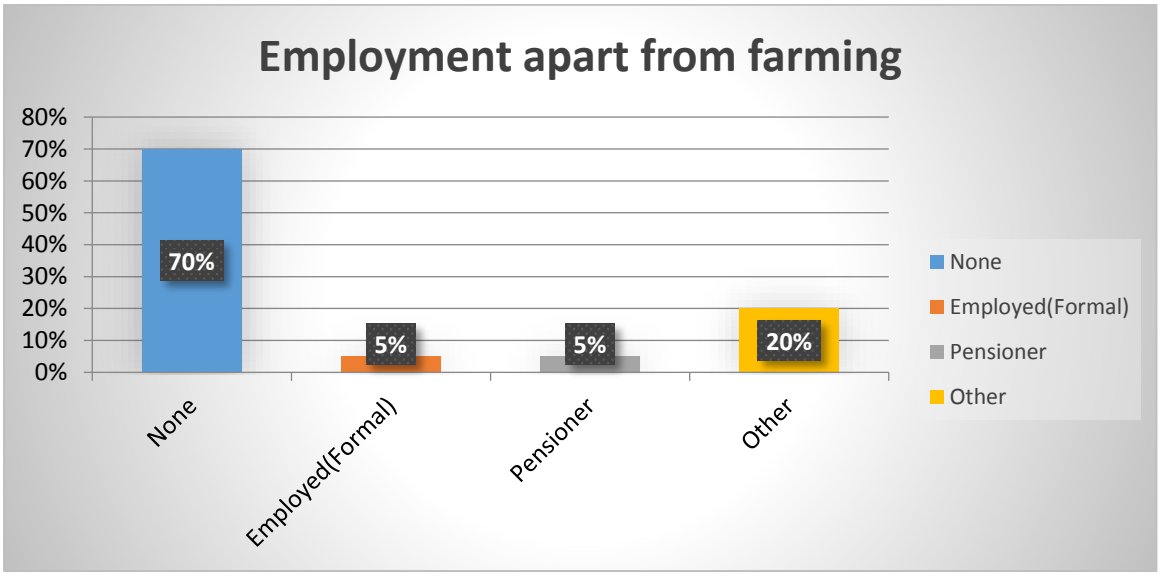

Figure 4.1: Employment apart from farming

Off-farm employment was considered as a significant factor affecting competitiveness and it will affect the amount of time and any extra income that could be invested in the farming enterprise in order to enhance competitiveness. This variable was divided into four categories namely None, Employed (Formal organisation), pensioner and other and presented in Figure 4.1. As high as 70% of the farmers indicated that they were not employed and were dependant solely on farming, 5% indicated that they were formally employed and were part-time farmers, 5% indicated that they were pensioners, while 20% were classified as 'other' (most of which indicated that they were running other business apart from farming).

Land is a very important factor in farming, in fact land is a precondition to farming as avocado farming cannot be performed in any alternative way that does not involve land. For a smallholder avocado farmer to graduate into a commercial farmer they need to be farming on at least 40ha. From Table 4.3 it is shown that the landholdings for the farmers were ranging from 1Ha to 50Ha with the average landholdings being 6.93 ha. The size of land has an impact on the volumes of avocado produced by the farmers.

Table 4.3: Farm area in ha

Variable	N	Range	Minimum	Maximum	Sum	Mean	Std. Deviation
Land Size	60	49	1	50	416	6.93	7.455

4.3 The farming business

Labour is a critical element in any farming business as it can be a major cost driver. Table 4.4 shows that most of the smallholder avocado farmers made use of unskilled labour. From the 60 farmers, 70% indicated that they employed unskilled labour.

Table 4.4: Use of permanent unskilled and skilled labour

Use of permanent unskilled labour		
	Frequency	**Valid Percent**
Yes	42	70
No	18	30
Use of permanent skilled labour		
Yes	4	6.7
No	56	93.3

The involvement of skilled labour is important in any farming enterprise as it influences the use of informed methods of production. Most of the farmers indicated that they could not employ skilled labour on their farms mainly due to financial constraints. This results in farmers depending on their own experience and also having a high dependence on extension services. Table 4.4 shows that of all the farmers interviewed only 6.7% indicated that they had employed skilled labour and the remaining 93.3% did not employ skilled labour.

The expenditure invested and income derived from avocado production is a good indication of the economic value of avocado production. Table 4.5 gives an indication of the average annual expenses, average annual incomes and profit derived from avocado production in the 2014 production season. These values indicate that the avocado farmers were not only breaking even but were in actual fact making a profit. The mean profit for the 2014 production season was R26 562.60. The amount however may not be much considering that some of these farmers were solely dependent on farming for their subsistence. This amount was not homogeneous for all farmers as these were averages for all the 60 farmers, this meant that there were farmers that were not making a profit at all, while others were merely breaking even and some that were doing exceptionally well.

Table 4.5: Expenditure and income for avocado 2014

Variable	N	Range	Min	Max	Sum	Mean	Std. Deviation
Expenditure on Avocado 2014	60	519900.0	5100.0	525000.0	2119862.7	35331.0	70814.3
Income from Avocado 2014	60	1191000.0	9000.0	12000000.0	4788635.0	79810.6	167651.0
Profit 2014	60	693991.0	-18991.0	675000.0	2668772.4	44479.5	99675.1

It is commonly known that the formal market rarely procures small amounts of produce from individual smallholder farmers. This therefore means that for farmers to secure lucrative markets they need to be able to produce and supply sufficient volumes to the market at a given time. Table 4.6 indicates that smallholder avocado farmers were able to produce on average 31.8 tons in 2014. The minimum was 0 tons (mostly from farmers whose orchards were newly planted); the maximum was 300 tons and a mean of 31.8 which was an indication that production was generally low.

Table 4.6: Tons of avocado produced in 2014

Variable	N	Range	Minimum	Maximum	Sum	Mean	Std. Deviation
Output	58	300.0	0.0	300.0	1847.0	31.845	64.4013

Delgado and Siamwalla (1997) indicate that some of the challenges facing African smallholders are lack of markets and high transaction costs. As a result of poor access to markets and high transaction costs, poorer farmers are excluded from participating in beneficial markets. Table 4.7 gives an indication of the markets that most of the farmers were selling their products to. Most of the farmers (71.2%) indicated that they were selling their produce to Informal markets; the main reason

for this was the inability to meet the quantities and quality requirements of the formal local and international markets.

Table 4.7: Marketing outlet for avocados and Export marketing

Market	Frequency	Valid Percent
Informal Markets	42	71.2
Formal Retail shop	5	8.5
Agro Processing	2	3.4
Shops	4	6.8
Other	6	10.2
Export marketing		
No	52	86.7
Yes	8	13.3

Table 4.7 also presents the percentage of farmers that indicated their participation in export marketing; only 13.3% indicated that they are able to sell their produce internationally. The main constraining factor was that most farmers were unable to meet the required export standards.

There are standards that have been set to ensure safety of agricultural produce; these are called Good Agricultural Practices (GAP's). "A GAP approach to agriculture involves the establishment of guidelines or standards for agricultural producers and post-farm handlers, the monitoring of these standards, and the communication of these standards through credible quality signals to downstream firms, consumers and the public in general" (Hobbs 2003:1). Part of the requirements of GAP are that there must be a closed fertilizer store on the farm, there must be toilets on the farm, there must be showers and washing basins on the farm. Even though these are just a few of the requirements, they are a step in the right direction for smallholder farmers. Table 4.8 shows that from the sample only 28% indicated that they had a fertiliser storage, only 5% indicated that they had showers on the farms and only 8.35 indicated that they had washing basins, 53.3 % of the farmers indicated that they had toilets on the farm.

Table 4.8: Good Agricultural practice compliance

Facilities	Frequency	Valid Percentage
Fertiliser Storage	17	28.3
Toilets	32	53.3
Showers	3	5
Washing Basins	5	8.3

One of the major constraints faced by smallholder farmers is a lack of financial support. If farmers are able to get financial support they stand a better chance of being successful and graduating to become commercial farmers. Table 4.9 shows that from the sampled farmers only 21.7% indicated that they had received financial support. Of these, 15% of the farmers indicated that they received financial support from the government, 5.1% from agricultural co-operatives and 5.1% from other sources.

Table 4.9: Financial support and Source of Finance

Received any financial support	Frequency	Valid Percent
No	47	78.3
Yes	13	21.7
Total	60	100.0
Source of finance		
Government	9	15.3
Agricultural co-operatives	3	5.1
Other	3	5.1

Inputs are a major cost driver in any production. Table 4.10 indicates the variable inputs for avocado production as well as the percentage of farmers that indicated that the inputs are cost drivers within their farming enterprises. Up to 34.6% of the farmers indicated that labour is a cost driver, 7.7% indicated fertilizer, 23.1% indicated pesticides and 34.6% indicated manure.

Agricultural production is a very vulnerable industry due to the perishability of agricultural produce. Often farmers experience losses one way or the other. Table 4.10 indicates that 23.3% of the farmers experience losses due to theft, 61.7% due to natural disasters and 73.3% due to diseases.

Agricultural production is highly dependent on water. Though some agricultural production is rain fed farmers often find an alternative source of water in order to reduce the risk involved in depending on rain. Table 4.10 indicates that 10% of the farmers make use of borehole water, 30% use river water and 3.3% use municipality water.

Electricity is important in farming as some infrastructure requires power to operate; Table 4.10 indicates that only 23.3% of the farmers have access to electricity on their farms.

Table 4.10: Variable inputs, Production losses, water and electricity sources

Variable inputs		**Y/N**	**Frequency**	**Valid**
	Labour	Yes	18	34.6
		No	42	65.4
	Fertiliser	Yes	4	7.7
		No	56	93.3
	Pesticides	Yes	14	23.3
		No	46	76.7
	Manure	Yes	21	35
		No	39	65
Production losses experienced	Theft	Yes	14	23.3
		No	46	76.7
	Disasters	Yes	37	61.7
		No	23	38.3
	Diseases	Yes	44	73.3
		No	16	26.7
Water Source	Borehole	Yes	6	10
		No	54	90
	River	Yes	18	30
		No	42	70
	Municipality	Yes	2	3.3
		No	58	96.7
Electricity	Access to Electricity	Yes	14	23.3
		No	46	76.7

As part of the survey the farmers were asked about their perceptions regarding factors that affect their competitiveness, the factors were grouped according to Porter's Diamond model and broken down further. From Table 4.11 it is indicated that for the factor conditions; labour is considered a major factor affecting the competitiveness of the farmers as 85% of the farmers agree that the cost of unskilled

labour affects their competitiveness. As high as 80% of the farmers also indicate that an insufficient source of water is a critical factor. Infrastructure was also noted as a concern as well as the cost and availability of capital finance and lack of technology.

Table 4.11: Farmer perceptions on factors affecting competitiveness (factor conditions)

Factor conditions	Frequency	Valid %
1. Labour		
- Cost of unskilled labour	51	85
- Availability of unskilled labour	37	61.7
- Cost of skilled labour	36	60
- Availability of skilled labour	18	30
- Administration cost associated with	26	46.7
2. Insufficient source of water	48	80
3. Infrastructure		
- Lack of Quality	41	68.3
- Lack of Availability	38	63.3
4. Capital / Finance		
- Cost	47	78.3
- Lack of availability	23	38.3
5. Lack of knowledge of avocado production	18	30
6. Lack of technology	46	76.7

Table 4.12 indicates that under demand conditions; the distance to the market stood out with 81.7% of the farmers indicating that it affects their competitiveness. Availability of a market for avocado as well as the road infrastructure were also a cause for concern, at 66.7% and 68.3% respectively.

Table 4.12: Farmer perceptions on factors affecting competitiveness (Demand conditions)

Demand conditions	Frequency	Valid %
1. Distance to market	49	81.7
2. Market information		
- Lack of quality	31	51.7
- Lack of availability	30	50
- Cost	22	36.7
3. Quality of products	28	46.7
4. Availability of avocado market	40	66.7
5. Road infrastructure	41	68.3

Table 4.13 indicates that with regard to related and supporting industries; the government stands out at 58.3% followed by suppliers of packaging material and financial institutions at 55% and 50% respectively.

Table 4.13: Farmer perceptions on factors affecting competitiveness (Related and supporting industries)

Related and supporting industries	Frequency	Valid %
1. Financial institutions	30	50
2. Research institutions	22	36.7
3. Suppliers of packing materials	33	55
4. Electricity suppliers	20	33.3
5. Government	35	58.3

Table 4.14 indicates that with regard to Firm strategy, structure and rivalry; the marketing power of buyers, marketing power of suppliers and the pricing strategy were considered to be constraining factors by the farmers at 63.3%, 55% and 60% respectively.

Table 4.14: Farmer perceptions on factors affecting competitiveness (Firm strategy, structure and rivalry)

Firm strategy, structure and rivalry	Frequency	Valid %
1. Adaptability	9	15
2. Culture	6	10
3. Structure	9	15
4. Flexibility	11	18.3
5. Pricing strategy	36	60
6. Managerial capabilities	9	15
7. Market power of suppliers	33	55
8. Market power of buyers	38	63.3
9. Threat of substitutes	9	15

Table 4.15 indicates that with regard to chance, Fires and frost are regarded as highly constraining factors with 83.3% and 80% respectively. Price stability, crime, drought and floods follow all at 76.7%.

Table 4.15: Farmer perceptions on factors affecting competitiveness (Chance)

Chance	frequency	Valid %
1. Economic stability	45	75
2. Aids	36	60
3. Political stability	38	63.3
4. Price stability	46	76.7
5. Crime	46	76.7
6. Drought	46	76.7
7. Floods	46	76.7
8. Fires	50	83.3
9. Frost	48	80
10. Other	37	61.7

4.4 Summary

This chapter comprised a discussion of the descriptive results for the socio-economic, commodity marketing, farm characteristics and farming business factors among the smallholder avocado farmers in the Vhembe District Municipality where 60 farmers were sampled. From the descriptive analysis results 36.8% of the farmers indicated that they only attained primary education, 35% have matric and only 8.5% are in possession of a post matric qualification. The remaining 18.3% are classified under 'other', most of which indicated that they attended Secondary education however, they did not get to matric. The mean age for the farmers was 58 with the maximum age being 78 and the minimum being 26. The mean age of 58 was an indication that most youth did not take part in agricultural activities. Men who participated in the survey outnumbered women, at 75% and 25% male and female respectively. The results also indicated that the average household size was 6 with the minimum household size being 2 and the maximum being 15. The results also indicated that most of the farmers were in possession of small units of land, with the mean farm size being 6.93 ha. Most (71.2%) of the farmers indicated that they sold their produce to informal markets mainly because they were unable to meet the quality and quantities required by the formal markets, only 13.3% of the farmers indicated that they were able to access the export market.

From the study it was also indicated that only 21.7% of the farmers had received financial support to assist with their production. 30% of the farmers indicated that they were using rivers as a source of water and only 23.3% of the farmers had access to electricity on their farms. The average tons produced for the 2014

production season were 31.845 tons, and 73.3% of the farmers indicated that the most common production loss was due to diseases.

This chapter described the sample characteristics, and showed the distribution of key variables in the study, the chapter also gave an indication of perceptions of farmers on factors that affect their competitiveness. The next chapter reflects on the empirical results from the different analytical techniques that were employed in the study, these are: Factor analysis, Profitability analysis through enterprise budgeting and Logistic regression.

CHAPTER 5: DETERMINANTS OF COMPETITIVENESS

5.1 Introduction

The preceding chapter laid a foundation for this chapter by giving an overview of basic farmer and farm characteristics that were hypothesised to be having an effect on the competitiveness of smallholder avocado farmers in the Vhembe District Municipality. This chapter empirically tests the significance of farmer and farm characteristics that are hypothesised to have an effect on competitiveness, and seeks to present the empirical results of the models that were utilized. Model specification and hypothesised variables with expected signs used in this chapter are defined in chapter 3 of the study.

This study used Factor analysis, Profitability analysis through enterprise budgeting and Logistic Regression. Factor analysis was used to outline and group the determinants affecting smallholder avocado farmers based on Porter's Diamond model. Profitability analysis through enterprise budgeting was used to estimate the level of competitiveness of the different smallholder farmers involved in avocado production. Logistic Regression was used to determine socio-economic and Porter's model factors that affect and influence the competitiveness of smallholder avocado farmers in the Vhembe District. The empirical results are presented in tabular form and graphically and are interpreted individually; thereafter a summary of the results is made at the end of this chapter based on all the employed models.

5.2 Results for empirical models

5.2.1. Factor Analysis

This section presents the empirical results from the Factor Analysis. Factor analysis was performed on a number of variables which were derived from the determinants of the Porters Diamond Model.

To determine the suitability of the collected data the analysis of the statistical properties of KMO (Kaiser Coefficient) and Bartlett test was used. In this study, KMO coefficient was 0.559, Field (2005) indicates that the KMO has to be greater than 0.5 for a satisfactory factor analysis to proceed. Therefore, a KMO value of 0.559 indicated that the data was suitable for factor analysis. On the other hand, the

Bartlett test was also used to measure the suitability of the available data for factor analysis. The value of this statistic was equal to 1284.148, and was significant at the 0.00% level. Bartlett`s test is another indication of the strength of the relationship among variables. The Bartlett`s test, tests the null hypothesis that the correlation matrix is an identity matrix. An identity matrix is a matrix in which all of the diagonal elements are 1 and all off diagonal elements are 0. The intention was to reject this null hypothesis if the Bartlett`s test was significant (i.e. 0.559). Therefore, in this case there was a relationship between the variables included in the analysis, because the Bartlett`s test was significant at 1% level. The significant level was small enough to reject the null hypothesis. This means that correlation matrix was not an identity matrix.

Table: 5.1 The KMO and Bartlett test of significance

The analysed set	**KMO**	**df**	**Barlett**	**Significance (sig)**
Factor conditions essential in smallholder Avocado production	0.559	496	1284.148	0.0000

Table: 5.2 Extracted factors with Eigen value, percentage of variance and cumulative percent of variance

Factor of	**Eigen value**	**Percentage of variance**	**Cumulative percentage variance**
1	6.726	21.020	21.020
2	5.305	16.577	37.597
3	2.908	9.087	46.684
4	2.129	6.6652	53.336
5	1.948	6.086	59.423
6	1.501	4.692	64.115

Using factor analysis, six factors with Eigen values greater than 1 were extracted. Variables that influence the competitiveness of smallholder avocado farmers

according to factor loadings after orthogonal rotation using the Varimax factors were classified. These factors explained 64.115% of the total variance, and 35.885% of variance was due to factors that were not identified through factor analysis (see Table 5.2).

Table 5.2 shows all the factors that were extracted from the analysis along with their eigenvalues and the percentages of total variance attributable to each factor.

The main aim of rotation was to reduce the number of factors on which the variables under investigation had high loadings. Looking at table 5.3 it is clear that variable 1 to variable 8 were substantially loaded on factor 1 (component 1), while variables 9 to 13 were substantially loaded on factor 2, the variable 14 to variable 18 were substantially loaded on factor 3, variable 19 to variable 25 were substantially loaded on factor 4, the variable 26 to variable 29 were substantially loaded on factor 5, and lastly variable 30 to variable 32 were substantially loaded on factor 6, these factors were later used as variables in the Logistic regression analysis.

Table: 5.3 Variables of each of the factors and factors loading value obtained of rotated matrix

	Component					
	1	2	3	4	5	6
1. Crime	.901					
2. Drought	.892					
3. Economic stability	.882					
4. Fires	.861					
5. Frost	.828					
6. Floods	.781					
7. Aids	.688		.383			
8. Political Stability	.581		.319			
9. Support from research institutions		.840				
10. Support from Electricity suppliers		.792				
11. Support from Suppliers of packing materials		.783			.335	
12. Support from government		.719				
13. Support from financial institutions		.655	.301		.408	
14. Land ownership security			.872			
15. Involvement in avocado value adding activities			.696	.313		
16. Satisfied with the size of the land			.688			
17. Availability of skilled labour			.650		.356	
18. Cost of skilled labour			.588		.455	
19. Adaptability				.776		
20. Culture				.695		
21. Structure				.627		
22. Managerial Capabilities			.355	.625	.402	
23. Flexibility		.358		.590		
24. Fertiliser storage				.566	-.345	
25. Access to electricity				.334		
26. Access to markets					.775	
27. Market information					.667	
28. Cost of Market Information			.316		.493	
29. Capital/Finance costly		.413			.416	
30. Receipt of financial support						.821
31. River water source						.610
32. Possession of an asset register				.301		.573

Table (5.2) shows the number of each extracted factor with Eigen values, percentage of variance and cumulative variance of each of the factors. The position of relevant variables indicates the determinants which play an important role in the competitiveness of smallholder avocado farmers in Vhembe District. The factors derived by assuming the variables which have loadings being greater than 0.5 after Varimax rotation method and renaming are presented in Table 5.4. From the analysis 32 variables were selected and other variables with loadings of less than 0.5 after Varimax rotation method were dropped.

Table 5.4 gives a clear description of the factors that were identified after factor analysis.

Table 5.4 Description of factors generated in factor analysis

Factor	**Source**	**Description as per porters diamond model**
FACTOR_1	Table 5.3, variables 1-8	Chance
FACTOR_2	Table 5.3, variables 9-13	Government and Related and Supporting Industries
FACTOR_3	Table 5.3, variables 14-18	Factor Conditions
FACTOR_4	Table 5.3, variables 19-25	Firm strategy, Structure and Rivalry
FACTOR_5	Table 5.3, variables 26-29	Demand Conditions
FACTOR_6	Table 5.3, variables 30-32	Not Identified

From the factor analysis, it then became easier to quantify the weight that each of the factors carries as factors that play a major role in describing the determinants affecting the smallholder avocado farmers in the Vhembe District based on Porter's Diamond model. According to extracted results and represented in Figure 5.1 "Chance" with the variance of 21.020 had the highest importance in the explanatory

variables, after that, a combination of "Government and Related and Supporting Industries", with a variance of 16.577, followed by "Factor Conditions", "firm strategy, structure and rivalry", then finally "demand conditions".

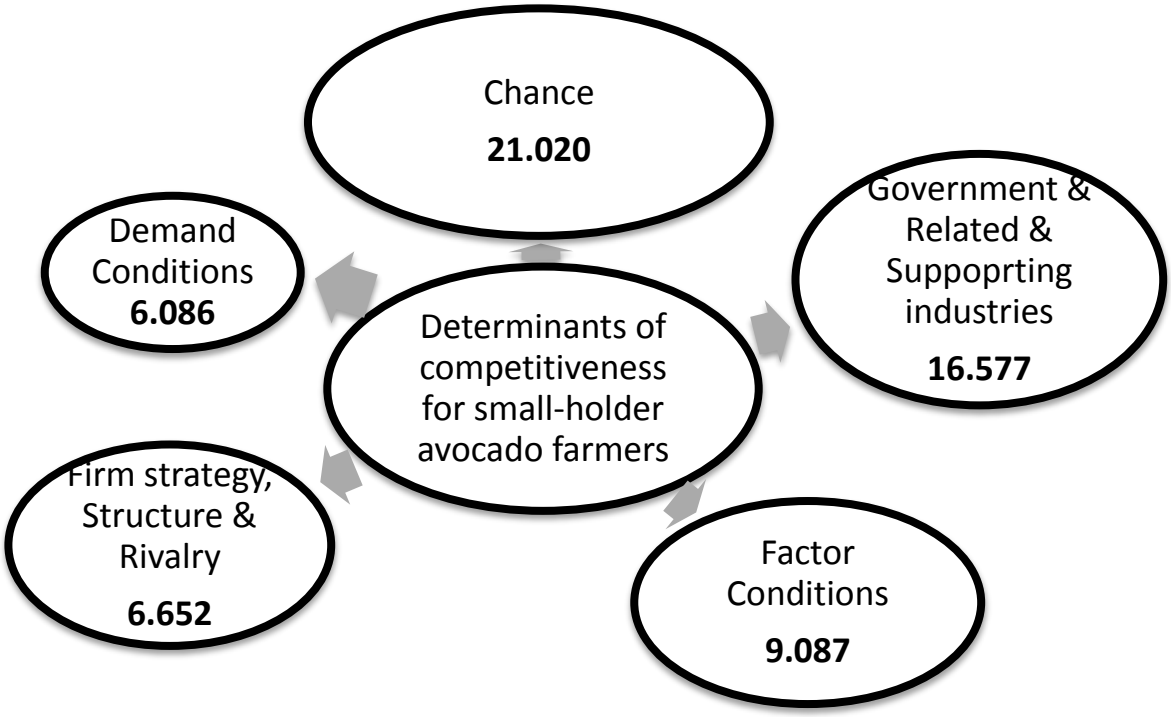

Figure 5.1: Determinants of competitiveness of small-holder avocado farmers and the percent of variance

5.2.1.1 Factor interpretation

Factor loadings and percentages of observed variance are presented in table 5.2 and figure 5.1. Factor 1 has an eigenvalue of 6.726, and explains 21.02%, highest value of the observed variance. This factor has been defined as "Chance" since it loads positive factors that fall under the determinant Chance on the Porter's Diamond model, some of these are crime, drought, economic stability, fires, frost, floods, HIV/Aids and political stability.

Factor 2 is defined as "Government, Related and Supporting industry" this is a combination of "Government" and "Related and supporting industries" in Porter's Diamond model. It loads positive for factors such as Support from research institutions, support from electricity suppliers, support from suppliers of packaging

materials, support from Government and support from financial institutions. Factor 2 has an eigenvalue of 5.305 and explains 16.577% of the observed variance.

Factor 3 has an eigenvalue of 2.908 and explains 9.087% of the observed variance. It was defined as “Factor Conditions” as it loads positive loading factors such as Land ownership security, involvement in avocado value adding activities, satisfied with land size and availability and cost of skilled labour.

Factor 4 is defined as “Firm strategy, structure and rivalry” since it loads positive factors for adaptability, culture, structure, managerial capabilities, and flexibility. This factor has an eigenvalue of 2.129 and explains 6.665% of the variance.

Factor 5 is defined “Demand Conditions” since it loads positive factors such as Lack or availability of market information, cost of market information and capital/finance cost. This factor has an eigenvalue of 1.948 and explains 6.086% of the observed variance.

Factor 6 could not be identified based on Porters Diamond model as it loaded for 3 unrelated variables which are financial support, river water source and whether or not the farmers kept an asset register.

5.2.2 Profitability analysis through enterprise budgeting

The gross margin associated with avocado production per annum for the smallholder avocado farmers of Vhembe District is presented in Table 5.5. Table 5.5 is a generic enterprise budget which was assumed to be a representative of the costs and returns for smallholder avocado farming in the Vhembe District of Limpopo Province. This enterprise budget was used as a benchmark to determine whether or not the smallholder avocado farmers in the Vhembe District were profitable or not. According to the generic enterprise budget; for an average of 11 tons avocado harvested per hectare, the total revenue that would have been obtained was R26 474. The total variable costs (TVC) would be R54 620.55, and a gross margin (GM) of R26 474.21 (representing 33%) would be obtained.

Table 5.5: Generic 1-hectare Avocado Enterprise Budget (source LDARD, 2014)

DESCRIPTION	**Unit**	**Price/Unit**	**Quantity**	**Cost**
PRE HARVEST COST				
Fertilizer				6902.7
Pest control				1504.4
Disease Control				3075.81
Weed Control				3424.4
Irrigation	R/ha	1290	7	9030
TOTAL				**23937.31**
Labour Costs				
	R/day	**Days**	**Quantity**	**Cost**
Pre-Harvest				
Pest Control	128.26	7	6	5386.92
Weed Control	128.26	5	6	3847.8
Harvest				
Picking	128.26	4	6	3078.24
Post-Harvest				
Irrigation	128.26	20	2	5130.4
Grading	128.26	2	10	2565.2
Packing	128.26	2	10	2565.2
TOTAL				**22573.76**
				54620.55
Marketing Costs				
	Unit		**Quantity**	**Cost**
Agents Commission	Percentage of sales		10	8109.475
SUMMARY				
Yield(tons)				11
Price				7372.25
Gross Income				81094.75
Gross Margin=				**26474.21**
%Gross Margin				**33%**

The key objective of using this model was to classify the avocado farmers into two categories; competitive and non-competitive. To achieve this, the above enterprise budget sourced from the LDARD (2014, Survey year) was used as a benchmark. Each farmer's profit per hectare was calculated and compared with the benchmark profit.

For a farmer to be considered competitive he/she had to have made a profit of R26 474.21 per hectare in the year 2014. Below is a table that shows each farmers profit/ha and whether or not he or she was considered competitive.

Table 5.6 Farmer status – competitive vs non-competitive

Farm code	Profit/ha	Comp(1)/ non-Comp(0)	**Farm code**	Profit/ha	Comp(1)/ non-Comp(0)
1	R 16 800.00	0	**31**	R 6 900.00	0
2	R 10 428.00	0	**32**	R 29 925.60	1
3	R 33 600.00	1	**33**	R 40 000.00	1
4	R 97 200.00	1	**34**	R 22 000.00	0
5	R 11 746.80	0	**35**	R 24 750.00	0
6	R 191 778.74	1	**36**	R 78 000.00	1
7	R 330 000.00	1	**37**	R 35 991.00	1
8	-R 16 500.00	0	**38**	R 20 857.14	0
9	R 18 750.00	0	**39**	R 58 800.00	1
10	R 10 464.00	0	**40**	R 54 000.00	1
11	R 600.00	0	**41**	R 13 500.00	0
12	R 6 098.18	0	**42**	R 36 000.00	1
13	R 3 980.00	0	**43**	R 24 000.00	0
14	R 114 000.00	1	**44**	R 675000.00	1
15	R 56 472.00	1	**45**	R 30 000.00	1
16	-R 18 991.0	0	**46**	R 26 000.00	0
17	R 7 500.00	0	**47**	R 18 000.00	0
18	R 186 000.00	1	**48**	R 14 000.00	0
19	R 22 000.00	0	**49**	R 28 000.00	1
20	R 1 200.00	0	**50**	R 34 800.00	1
21	R 6 923.08	0	**51**	R 18 120.00	0
22	R 11 400.00	0	**52**	R 27 000.00	1
23	R 4 800.00	0	**53**	R 15 771.43	0
24	R 3 600.00	0	**54**	R 22 800.00	0
25	R 6 504.00	0	**55**	R 21 000.00	0
26	-R 64.62	0	**56**	R 68 400.00	1
27	R 10 440.00	0	**57**	R 37 500.00	1
28	R 384.00	0	**58**	R 82 500.00	1
29	-R 5 400.00	0	**59**	-R 12 984.00	0
30	-R 14 000.00	0	**60**	R 10 428.00	0

From this analysis it is evident that out of 60 farmers that participated in the survey 22 are competitive and 38 are non-competitive. This number was significant enough to run further analysis (Logistic Regression) in order to establish which variables can significantly be associated with the competitiveness or non-competitiveness of these farmers. The Figure 5.2 is a scatter plot which indicates the competitive and non-competitive farmers represented through farmer codes, as well as the competitiveness cut-off line which indicates that all farmers falling on and above the line are competitive and all farmers falling below the line are non-competitive.

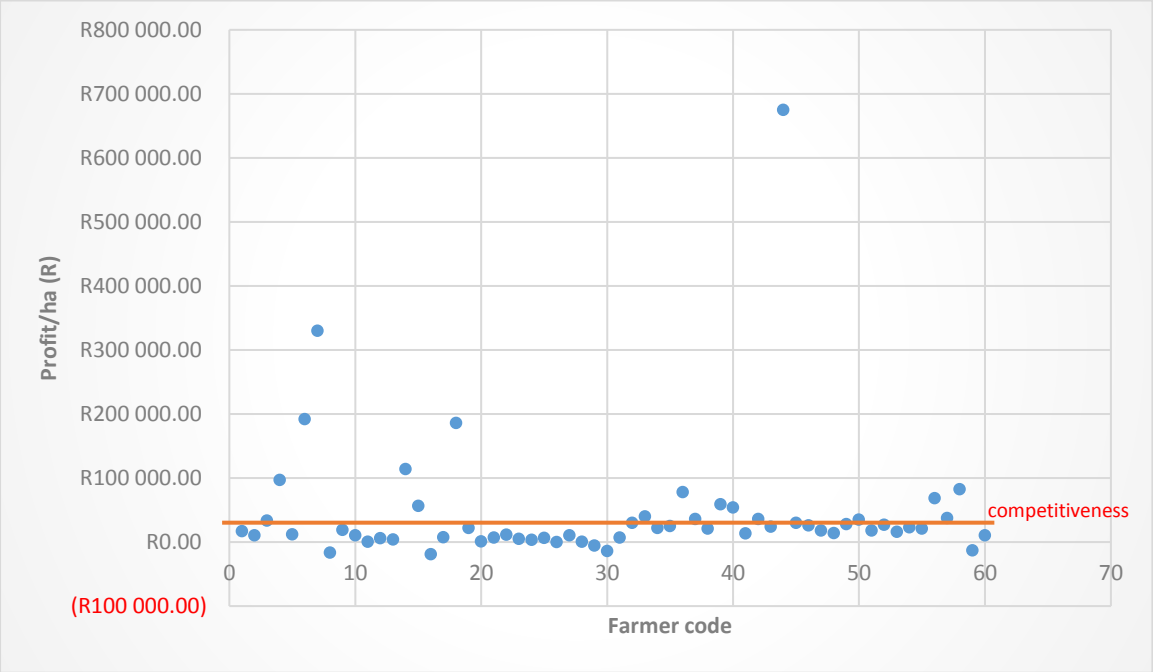

Figure: 5.2 Farmers falling below and above competitiveness frontier

5.2.3 Logistic Regression

Twelve (12) hypothesised socio-economic and Porter's Diamond model factors that affect the competitiveness of smallholder avocado farmers in the Vhembe District were empirically tested. Table 5.7 indicates that some predictor variables affect the competitiveness of smallholder avocado farmers significantly and in some cases, the signs of the estimated coefficients are in line with the expected relationships. The Pseudo R^2 was 0.19, despite this value being low it is still acceptable (Hosmer and Lemeshow 2000) which implies that the model's estimates fit the data reasonably well. The LR Statistic was 17.91% with a p-value of 0.053 indicating that all the

explanatory variables have a significant influence on the competitiveness of smallholder avocado farmers in the Vhembe District.

Only seven (7) of the twelve (12) hypothesised variables were significantly associated with the competitiveness of smallholder avocado farmers, namely; Age, Related and supporting industry score (Related industry score), Firm Strategy Structure and Rivalry score (Firm strategy score), Number of Avocado trees, Chance Score (Chance score), Demand Conditions Score (Demand condition score) and Factor Conditions Score (Factor score). Chance is the only factor that had a significant negative influence on the competitiveness of smallholder avocado farmers.

Table: 5.7 Logistic Regression estimates of competitiveness

Variables	Coef.	Std. Err.	z	p>|z|
Age	0.0442138	0.026475329	1.67	0.094*
Gender	-0.242559	0.188030233	-1.29	0.768
Related industry score	0.1929812	0.102106455	1.89	0.0633*
Marital Status	0.0726905	0.660822727	0.11	0.909
Household Size	-0.1890702	0.160228983	1.18	0.239
Firm strategy score	0.21338172	0.101128777	2.11	0.0353**
Farm Size	0.1007478	0.076324091	1.32	0.188
Number avocado trees	0.0011465	0.000335234	3.42	0.0033**
Chance score	-0.8042899	0.339362827	-2.37	0.0251**
Demand condition score	0.1311592	0.063980098	2.05	0.0499**
Factor score	0.2165228	0.123024318	1.76	0.0716*
constant	0.585364	0.233212749	2.51	0.013**

**Significant at 5% level *Significant at 10% level

Note: No of observations included in the analysis is 60.

Psuedo $R^2 = 0.19$

LR $chi^2(12) = 17.91$

Prob > $chi^2 = 0.0531$

5.3 Determinants of competitiveness

The previous section discussed the statistical relationships between the explanatory variables and the dependent variable. In order to gain a comprehensive link between

the explanatory variables and the dependent variable a detailed analysis was conducted on each of the attributes presented in Porter's model. From the analysis it could then be concluded that the statistically significant variables influence the competitiveness of smallholder avocado farmers. In this section only the variables that distinguished the likelihood of "competitiveness" and "non-competitiveness" are discussed. Based on the smallholder avocado farmers on each aspect, the analysis provided guidance on the attributes that can be positively linked with the competitiveness of the smallholder avocado farmer. Age, number of trees planted and all Porter's diamond model determinants significantly influence competitiveness of smallholder avocado farmers. If these attributes are to be improved they may induce a positive influence on the competitiveness of the smallholder avocado industry in the Vhembe district (Porter 1990).

5.3.1 Age

The results reveal an age elasticity of 0.04%, age was found to be positively significant at 90% level. This implies that age is sensitive towards competitiveness since a 10% increase will lead to a 0.04% increase in competitiveness. This implies that age is an important factor in the competitiveness of smallholder avocado farmers, this could be attributed to the fact that age is linked to farming experience.

5.3.2 Number of avocado trees planted

The results show the number of avocado trees planted elasticity of 0.001%, number of avocado trees planted was found to be positively significant at 95% level. This implies that number of avocado trees planted is sensitive towards competitiveness since a 5% increase will lead to a 0.001% increase in competitiveness. This suggests that number of avocado trees planted is an important factor in the competitiveness of smallholder avocado farmers, therefore the more the avocado trees a farmer has, the more likely they are to be competitive.

5.3.3 Chance

From the results the chance elasticity of -0.8% was observed, chance was found to be negatively significant at 95% level. This implies that chance is sensitive towards competitiveness since a 5% increase will lead to a 0.8% decrease in

competitiveness. This suggests that chance has a negative impact on the competitiveness of smallholder avocado farmers. The results showed that the farmers are highly affected by the determinant Chance which consists of the variables: Crime, HIV/AIDS, fuel prices, Production losses, Economic instability, Political instability and Disasters. The results concur with the findings of (Nesamvuni 2014).

5.3.4 Government, Related and supporting industries

This is a combination of the determinant “Related and supporting industries” and “Government”. From the results government, related and supporting industries elasticity of 0.19% was observed, government, related and supporting industries was found to be positively significant at 90% level. This implies that government, related and supporting industries is sensitive towards competitiveness since a 10% increase will lead to a 0.19% increase in competitiveness. This suggests that government, related and supporting industries is an important factor in the competitiveness of smallholder avocado farmers. From the results we see that these determinants also significantly account for the competitiveness of smallholder avocado farmers. These determinants consist of the following variables: Financial institutions, Research institutions, Input suppliers, Electricity suppliers, Stakeholders/value chain players, transport, suppliers of packaging material, Financial support, Poor government services, Indirect support, Trade policies, Labour policies, Fiscal policies, Price stability.

These results are in line with findings by (Nesamvuni et al. 2014) where it is indicated that the availability of related and supporting industries in an area determines the competitiveness of business enterprises in that area The role played by government can deter or enhance the competitiveness of an industry and has an influence on its growth.

5.3.5 Factor conditions

From the results factor conditions elasticity of 0.21% was observed, factor conditions were found to be positively significant at 90% level. This implies that factor

conditions are sensitive towards competitiveness since a 10% increase will lead to a 0.21% increase in competitiveness. This suggests that factor conditions are an important factor in the competitiveness of smallholder avocado farmers. The following variables are what constitute factor conditions: Labour (Skilled, unskilled, usage and cost,) Land ownership status, Infrastructure and condition, Size of land, Technology availability, Number of trees, Cost of production, Satisfaction with land size, Knowledge and experience in Avocado production, Tenure security, Financial support, Farming experience, Expenditure on avocado and Water resources. The results concur with (Sinngu and Antwi 2014) where it is stated that production factor conditions provide industries with competitive advantage over their competitors

5.3.6 Firm Strategy structure and rivalry

The results indicate a firm strategy structure and rivalry elasticity of 0.21%, firm strategy structure and rivalry was found to be positively significant at 95% level. This implies that firm strategy structure and rivalry is sensitive towards competitiveness since a 5% increase will lead to a 0.21% increase in competitiveness. This suggests that firm strategy structure and rivalry is an important factor in the competitiveness of smallholder avocado farmers. From the results it is evident that this determinant affects the competitiveness of smallholder avocado farmers. This determinant includes the following variables; Participation in value addition, Adaptability, Culture, Flexibility, Pricing strategy, Managerial capabilities, Market power of buyers, Market power of suppliers, threat of substitutes and new entrants. These results concur with the findings by Nesamvuni et al. 2014.

5.3.7 Demand Conditions

From the results demand conditions elasticity of 0.13% is observed, demand conditions were found to be positively significant at 95% level. This implies that demand conditions are sensitive towards competitiveness since a 5% increase will lead to a 0.13% increase in competitiveness. This suggests that demand conditions are an important factor in the competitiveness of smallholder avocado farmers. The results show that demand conditions affect the competitiveness of smallholder avocado farmers, this determinant includes the following variables: Quantities produced, Customer base (local/international), Main customers/clients, GAP

requirements, Demand, Distance to market, Market information, and Product quality. This is an indication that for competitiveness of smallholder avocado farmers to improve, there needs to be an improvement in demand conditions, this means that farmers need to be compliant with Good Agricultural Practices (GAP), they need to have access to affordable and timely market information, the quality of produce should meet market requirements. This will surely improve the quality of produce, quantity produced and will ultimately improve the competitiveness for the smallholder avocado industry.

The results concur with (Nesamvuni et al. 2014) where it is stated that any business enterprise is aimed primarily at addressing the demands for specified goods and services and therefore the condition of demand may be regarded as a critical factor in the determination of whether or not a business has to be started The demand conditions are therefore important determinants of the competitiveness of a business enterprise (Porter 1990).

5.4 Summary

Nesamvuni (2014) indicates that it is necessary to determine the important factors that influence the competitiveness of an industry. Accordingly, the seven most important factors observed to be determinants of competitiveness of the smallholder avocado industry in Vhembe District had to be identified. Considering the results of empirical models, several factors influenced whether or not smallholder avocado farmers in the Vhembe District were competitive. All Porters Diamond model determinants were found to affect the competitiveness of the farmer however, chance had a significant but negative effect on the competitiveness. Other factors that appeared to have an impact on competitiveness were age of farmer as well as the number of trees planted. All other independent variables were not found to be significant in affecting the competitiveness of smallholder avocado farmers and therefore are not included in the analysis.

Based on the results of this study, several suggestions can be made on how the competitiveness of smallholder avocado farmers can be enhanced. Generally, the findings suggest that an adjustment in each one of the significant variables can

significantly influence the probability of competitiveness in smallholder avocado farmers

CHAPTER 6: SUMMARY, CONCLUSION AND RECOMMENDATIONS

6.1 Introduction

Limpopo Province produces 61% of national avocado plantings with 9 401 ha under avocado cultivation in 2012. In the 2013/14 production season avocados made a significant contribution of 32% to total gross value of subtropical fruits in South Africa (DAFF 2015). This is a clear indication of the economic significance of the Avocado fruit in South Africa.

Smallholder avocado farmers in Limpopo Province produce and sell their produce mostly through the local market and a few sell to local supermarkets and national fresh produce markets. The main aim of this research was to unpack determinants of the competitiveness of smallholder avocado farmers in the Vhembe District of the Limpopo Province based on the Porter's Diamond model. This involved using the Porter's Diamond model as a framework as well as other analytical techniques to determine the factors that affect the competitiveness of these farmers.

The specific objectives of this study were to: (i) Identify and describe socio-economic characteristics of smallholder avocado farmers in Vhembe District, (ii) Outline the determinants of smallholder avocado farmers' competitiveness, (iii) Estimate the level of competitiveness of the different smallholder farmers in avocado production and (iv) Examine and analyse socio-economic and Porter's Diamond model factors influencing the competitiveness of smallholder avocado farmers in Vhembe District of Limpopo Province.

6.2 Research Summary

This section provides a summary of some of the important sections included in the study, and they include literature review, methodology and study results.

From literature, Smallholder farmers can be described differently depending on the context. Often the term 'smallholder' is interchangeably used with 'small-scale', 'resource poor' and sometimes 'peasant farmer'. Generally, the term smallholder is an indication of their limited resources in relation to other farmers within the sector, (DAFF 2012).

Smallholder farmers are the drivers of many economies in Africa even though their potential is often not brought forward. The smallholder avocado producers like any smallholder producers are faced with numerous challenges some of which are; limited financial resources, limited land holdings, and limited human resources. For avocado farmers to be considered as commercial farmers they need to be producing on at least 40ha.

In data analysis, Statistical Package for Social Sciences (SPSS 26.0) for Windows was used to analyse data generating descriptive statistics including means, frequencies, and standard deviations. This research used Factor analysis to reduce and group the related variables, followed by Profitability analysis through enterprise budgeting which was used to separate competitive from non-competitive farmers, then finally Logistic regression was used to estimate the factors that affect the competitiveness of smallholder avocado farmers.

From factor analysis the most significant variables that were seen to affect competitiveness were “Chance", "Government, Related and Supporting Industries”, “Factor Conditions”, “firm strategy, structure and rivalry” then finally “demand conditions”. Profitability analysis through enterprise budgeting successfully separated the farmers into competitive and non-competitive categories. Of the 60 farmers that participated in the survey 22 were found to be competitive and 38 were found to be non-competitive.

From the logistic regression results seven (7) of the twelve (12) hypothesised variables were significantly associated with affecting the competitiveness of smallholder avocado farmers. Namely; Age, Related and supporting industry score, Firm Strategy Structure and Rivalry score, Number of Avocado trees, Chance Score, Demand Conditions Score and Factor Conditions Score. Chance is the only factor that exhibited a significant negative influence on the competitiveness of smallholder avocado farmers.

6.3 Conclusion

The main aim of this research was to: (i) Identify and describe socio-economic characteristics of smallholder avocado farmers in Vhembe District, (ii) Outline the determinants of smallholder avocado farmers’ competitiveness, (iii) Estimate the

level of competitiveness of the different smallholder farmers in avocado production and (iv) Examine and analyse socio-economic and Porter's Diamond model factors influencing the competitiveness of smallholder avocado farmers in Vhembe District of Limpopo Province.

The age of the farmers and the number of trees planted were significantly associated with competitiveness and non-competitiveness of farmers, here the age was linked to the experience of the farmers and the number of trees planted was linked to economies of scale and thus they influenced competitiveness. The government, related and supporting industries were also found to be significantly associated with the competitiveness of the smallholder avocado farmers, here issues such as support from the government, electricity suppliers, suppliers of packaging material and financial institutions were found to affect the performance of the farmers. Firm strategy, structure and rivalry were found to be significantly associated with the competitiveness of the smallholder avocado farmers, here issues such as the farmers' adaptability, culture, business structure, managerial capacities and flexibility were found to affect the performance of the farmers. Demand conditions were also found to be significantly associated with the competitiveness of the smallholder avocado farmers, here issues such as the availability and cost of market information and the costs associated with capital were found to affect the performance of the farmers. Factor conditions were found to be significantly associated with the competitiveness of smallholder avocado farmers, here issues such as land ownership, involvement of farmers in value addition, satisfaction with land size and availability and cost of skilled labour were found to affect the performance of the farmers. Chance events were also seen to affect the competitiveness of smallholder avocado farmers, however the relationship between chance and competitiveness was found to be negative, this meant that the more events such as crime, drought, fires, economic instability, frost, floods, aids and political instability occur the more they affect the smallholder farmers' competitiveness negatively.

6.4 Policy implications and recommendations

Considering socio-economic characteristics of smallholder avocado farmers as well as the factors that were found to affect the competitiveness of smallholder avocado farmers in the Vhembe District Municipality revealed by empirical results, several

policy suggestions can be drawn from the results of the study. The suggestions apply to farmers' organizations, farmers, extension organizations, financial institutions and policy-makers. This study suggests ways in which competitiveness of smallholder farmers can be enhanced and how these smallholder farmers can participate in lucrative markets.

- **Mentorship and Encouragement of youth involvement in farming**

From the study it can be seen that competitiveness is linked to the age of the farmer, it can be seen that the older the farmer the more chances of him or her being competitive, this can be attributed to the experience that the older farmers may have. This is not ideal seeing as the farmers are more competitive as they get older and are not as energetic and fit as their younger counterparts.

This can be addressed by encouraging the youth to get involved in farming from a young age and encouraging the older and more knowledgeable farmers to mentor the youth and impart their knowledge and skills. This will change the status quo in the long run and younger farmers will be as competitive as older farmers.

- **Provision of land for farming**

Number of trees planted stood out to be one of the major factors which affects the competitiveness of smallholder avocado farmers and access to land is also as important since the number of trees that can be planted depends on the size of land available. Mr DJ Mmakola (LDARD Manager: Horticultural Crops Value chain) in an interview on 22/10/2014 indicated that for an avocado farmer to be considered a commercial farmer they need to be farming on a minimum of 40 ha.

Improving access to land can have a positive impact on the competitiveness of farmers by enabling smallholder farmers to achieve economies of scale. Improved access to land can be achieved by; improving the communal land systems and through land redistribution programs which seeks to increase smallholder' ownership of land as well as introducing programmes that will loosen the red tape and make it easier for farmers to acquire land independently.

- **Capacitate farmers**

It has been found in this study that the average age of these avocado farmers is 58 and that age plays a role in the competitiveness. The level of education for farmers was also an issue of concern as most farmers had only attained primary level education. The majority of smallholder avocado farmers were also found to be non-competitive this is an indication that there is a need for capacity-building for the farmers. Furthermore, farmers are continuously confronted with new technology. Various training techniques can be applied for farmers who are both literate and illiterate. Farmers will have to acquire new technological and administrative skills and receive frequent training and to keep up with changes.

The study also found that the farmers are affected by chance variables which include among others; crime, drought, fires, economic stability and political stability. This therefore creates a need for these farmers to be trained and capacitated on how to mitigate and manage such disasters.

One other factor that was found to have an effect on the competitiveness of the farmers was 'firm strategy, structure and rivalry' this includes among others; structure, managerial capabilities and flexibility. This can be addressed by capacity-building for these farmers which will cover aspects of how to conduct farming as a business and how to deal with changes within the business.

- **Government support and stakeholder mobilization**

The role played by government can deter or enhance the competitiveness of an industry and also influence its growth. The role played by government can either be direct or indirect, and is mainly through instruments such as policies and implementation strategies. Nesamvuni (2014) states that government's influence on an industry could be in the form of regular interaction with the business enterprise, development of support policies on issues such as trade, land reform, labour, and fiscal aspects, and indirect support through other services.

Government stood out as one of the factors that were found to affect the competitiveness of smallholder avocado farmers, related and supporting industries. Here it was seen that government support and the linkage or relationship between

the farmers and other related and supporting industries was seen to have an effect on the competitiveness of the farmers.

This can be addressed by having the government running individual farm assessments to determine how each of the farmers can be assisted and thereafter assisting the farmers through loans, subsidies, grants or through inputs based on the farm assessment results. The government can also assist by mobilizing stakeholders that are critical to the success of these farmers and linking the farmers to these stakeholders.

- **Specialised extension service**

One of the factors that were found to affect the competitiveness of the farmers was factor conditions, which includes among others; involvement in value addition and the costs of skilled labour. This means that their involvement or non-involvement in value addition and their ability or inability to appoint experts in fruit production affects farmers' competitiveness.

Fruit production is a complex farming practice where the quality and appearance of the produce affects the markets a farmer can access as well as the amount of money the farmer can get out of the harvest. It is therefore very important that; given the fact that these smallholder farmers cannot afford to appoint experts in the field, they get necessary attention from extension officials to assist in production and early detection of problems that may affect the quality of the produce. Furthermore, the extension officers should specialise in certain fields within the agricultural industry, such as Horticulture extension officer, livestock extension officer, crop production extension officer and so on, in order to improve the quality of services the farmers receive.

According to Moloi (2008), the current system whereby the extension officers are expected to be all-rounders and to serve a large number of farmers does not do justice to the agricultural industry, especially to the emerging farmers. The support to emerging farmers must be provided collectively in relation to production facilities; technical skills; credit access; marketing and marketing information; leadership capacity building; infrastructure support and so on. This study recommends the

provision of specialised agricultural extension services to advice smallholder farmers with better knowledge than the all-rounders system of extension service.

- **Formation of Co-operatives and encouraging commercialization**

From the empirical results of this study, it is also evident that smallholder avocado farmers' competitiveness is affected by demand conditions which include among others; access to markets, access to market information and cost of market information. One reason why access to markets is an issue for these farmers is economies of scale; due to their landholdings these farmers are unable to achieve quantities required by most formal markets. A solution to this problem would be formation of co-operatives that will enable the farmers to collectively buy inputs to take advantage of bulk discounts as well as to practice collective marketing so as to cut transport costs and also achieve economies of scale.

One other solution would be for farmers to work towards being commercial farmers. Van Zyl (1995) indicates that commercial agriculture offers economies of scale and Jayne et al. (1995) indicate that commercial orientation of smallholder agriculture leads to a gradual decline in real food prices due to increased competition and lower costs in food marketing and processing. Therefore, it is recommended that government assists these farmers with the ultimate goal of commercialization.

- **Summary**

For all the significant factors identified by this study issues of competitiveness for smallholder farmers should be considered in policy formulation processes, as smallholder farmers have a major role in the economy. Policies formulated based on such factors can help improve the process of commercialising rural or smallholder agriculture.

6.5 Areas for further research

This study only focused on competitiveness for smallholder avocado farmers in the Vhembe District of Limpopo Province based on the determinants of Porter's Diamond model; this leaves a gap for further research. There is a need to look into factors that affect the competitiveness of smallholder farmers using various competitiveness methodologies in order to compare the results yielded by the various methodologies. Additionally, this study used a small sample size of 60

smallholder avocado farmers, therefore a similar study can be conducted with a larger sample size for it to be more conclusive as this study only focused on farmers in the Vhembe District Municipality. This study only covered one commodity which is avocado; it would be interesting to have a series of studies on competitiveness for various commodities within the Limpopo Province.

REFERENCES

AL-GHAMDI, A.S., 2002. Using logistic regression to estimate the influence of accident factors on accident severity. *Accident Analysis and Prevention*, *34*(6), pp.729-741.

ALIBER, M., BAIPHETHI, M., DE SATGE, R., DENISON, J., HART, T., JACOBS, P. and VAN AVERBEKE, W., 2010. Strategies to support South African smallholders as a contribution to government's second economy strategy: Research report no. 41. Bellville: University of the Western Cape, Institute for Poverty, Land and Agrarian Studies, pp.1-44.

BABBIE, E.R., 1973. Survey Research Methods. Wadsworth, Belmont, pp.72-113.

BAKAN, I., and DOĞAN, İ.F., 2012. Competitiveness of the industries based on the porter's diamond model: An empirical study. *International Journal of Research and Reviews in Applied Sciences*, 11(3), pp.441-455.

BALASSA, B., 1989. Comparative advantage, trade policy and economic development. London, Harvester/Wheat sheaf, pp.63-158.

BALASSA, B., 1965. Trade liberalisation and "revealed" comparative advantage. *The Manchester School*, 33(2), pp.99-123.

BALOYI, J.K., 2010. An analysis of constraints facing smallholder farmers in the Agribusiness value chain: A case study of farmers in the Limpopo Province. M Inst Agrar. Department of Agricultural Economics, Extension and Rural Development. Pretoria: University of Pretoria, pp.1-3.

BERTRAM, C., and CHRISTIANSEN, I., 2014. *Understanding research: An introduction to reading research.* Van Schaik Publishers, pp 37-70

BOSC, P. M., BERDEGUÉ, J., GOÏTA, M., VAN DER PLOEG, J.D., SEKINE, K., and ZHANG, L., 2013. Investing in smallholder agriculture for food security (No. 6). HLPE, pp.11.

BROWN JD., 2001. What is an eigenvalue? Shiken: JALT Testing and Evaluation SIG Newsletter, 5 (1) April 2001 (pp.15-19). Accessed on the 03/04/2017 from, http://hosted.jalt.org/test/PDF/Brown10.pdf.

CANTWELL, J., 2005. “Innovation and Competitiveness” in Fagerberg, J., Mowery, D.C. and Nelson R.R, Oxford Handbook of Innovation. Oxford University Press, London, pp.543-567.

CHAMBERLIN, J., and JAYNE, T., 2011. Unpacking the Meaning of "Market Access". [Online] Available at: http://econpapers.repec.org/RePEc:ags:midasp:110014 [Accessed 19 August 2017]

CHIKAZUNGA, D., and PARADZA, G., 2012. Smallholder Farming: A Panacea for Employment Creation and Enterprise Development in South Africa? Lessons from the Pro-Poor Value Chain Governance Project in Limpopo Province. Strategies to overcome poverty and inequality: Towards Carnegie III, pp.6-7

CHIRIGO, K.C., 2014. *An Analysis of the Economic Competitiveness of Green Maize Production in Smallholder Irrigation Schemes: A Case of Makhathini Flats Irrigation Scheme in KwaZulu-Natal, South Africa* (Doctoral dissertation, University of KwaZulu-Natal, Pietermaritzburg).

CHO, D.S., 1994. A dynamic approach to international competitiveness: The case of Korea. *Asia Pacific Business Review,* 1(1), pp.17-36.

COOPER, R., and KALPAN. R., 1991. Profit priorities from activity based costing. Harvard Business Review. 69(3), pp.130-135.

DAVIS, N., 2013. Aspects of the citrus value chain explored in the context of Moletele restitution initiatives, Hoedspruit. *In Greenberg, S. (ed.), Smallholders and agro-food value chains in South Africa: Emerging practices, emerging challenges,* pp.43-53*.*

DEBERTIN D.L., 1986. Agricultural Production Economics, University of Kentucky, Macmillan Publishing (ISBN 0-02-328060- 3), pp.300.

DELGADO, C.L., and SIAMWALLA, A.., 1997, August. Rural economy and farm income diversification in developing countries. In 1997 Conference, August 10-16, 1997, Sacramento, California (No. 197035). International Association of Agricultural Economists, pp.5-6.

DEPARTMENT OF AGRICULTURE FORESTRY AND FISHERIES (DAFF) MARKETING. 2015. A profile of the South African avocado market value chain, pp 4-43.

DEPARTMENT OF AGRICULTURE FORESTRY AND FISHERIES (DAFF) MARKETING. 2016. A profile of the South African avocado market value chain, pp.7-25.

DEPARTMENT OF AGRICULTURE FORESTRY AND FISHERIES (DAFF), 2017. Abstract of agricultural statistics, pp 45.

DEPARTMENT OF AGRICULTURE, FORESTRY AND FISHERIES (DAFF). 2014. *Agricultural Policy Action Plan,* pp.14-19.

DOA (DEPARTMENT OF AGRICULTURE). 2001. Strategic Plan for South African Agriculture.Pretoria: Department of Agriculture, pp.2-7.

DONKIN, D.J., 2007. An overview of the South African avocado industry. South African Subtropical Growers' Association, pp.1-2.

DORANTES, L., PARADA, L., and ORTIZ, A., 2004. Avocado: post-harvest operation. AGST/FAO. Retrieved from: http://www. fao. org/inpho/content/compend/text/ch30.

ERICKSON, S.P., AKRIDGE, J.T., BERNARD, F.L., and DOWNEY, W.D., 2004. Agribusiness Management, Third Edition: New York: McGraw- Hill Higher Education.

ESTERHUIZEN, D., 2006. An evaluation of the competitiveness of the South African agribusiness sector (Doctoral dissertation). Department of Agricultural Economics, Extension and Rural Development, University of Pretoria, South Africa, pp.i-315.

ESTERHUIZEN, D., and VAN ROOYEN, C.J., 2006. An inquiry into factors impacting on the competitiveness of the South African wine industry. *Agrekon,* 45(4), pp.467-485.

EZEALA-HARRISON, F., 2005. On competing notions of international competitiveness. *Advances in Competitive Research* (13)1, pp.80-87.

EZEDINMA, C., 2000. Farm Resource Allocation and Profitability of Arable Crop Enterprises in Humid Forest Inland Valley Ecosystem: A case of Ozu abam in Southern Nigeria *UNISWA Journal of Agriculture*, vol 9 pp.48-56.

FIELD, A., 2005. Factor analysis using SPSS. Retrieved: 17 March 2017.

FOOD AND AGRICULTURE ORGANISATION (FAO).2003. Land Tenure Studies 3: Food and Agriculture Organization of the United Nations Rome, pp.18.

FRANK, R., and BERNANKE, B., 2001. *Principles of Economics* New York McGraw-Hill Higher Education, McGraw-Hill/Irwin, pp.2-215.

FREEBAIRN, J.W., 1987. Implication of wages and industrial policies on the competitiveness of agricultural export industries [Australia]. *Review of marketing and agricultural economics* 55(01), pp79-87

FROHBERG, K., and HARTMANN, M., 1997. Comparing measures of competitiveness. Discussion paper No. 2. Institute of Agricultural Development in Central and Eastern Europe. Halle, Germany, pp.3-14.

GROENEWALD, J., and NIEUWOUDT, L., 2003. Demands on and challenges for South African agriculture, in: Nieuwoudt L and Groenewald J (eds.). *The challenge of change: agriculture, land and the South African economy*. Pietermaritzburg: University of Natal Press, pp.265-282.

GYAU, A., FRANZEL, S., CHIATOH, M., NIMINO, G. and OWUSU, K., 2014. Collective action to improve market access for smallholder producers of agroforestry products: key lessons learned with insights from Cameroon's experience. *Current Opinion in Environmental Sustainability*, 6, pp.68-72.

HOBBS, J.E., 2003. Incentives for the Adoption of Good Agricultural Practices (GAPs). Food and Agriculture Organization, pp.1.

HOSMER, D.W., and LEMESHOW, S., 2000. Interpretation of the fitted logistic regression model. Applied Logistic Regression, Second Edition, pp.47-90.

HYUHA, T.S., BUKENYA, J.O., TWINAMASIKO, J. and MOLNAR, J., 2011. Profitability analysis of small scale aquaculture enterprises in Central Uganda. *International Journal of Fisheries and Aquaculture*, *3*(15), pp.271-278.

JAYNE, T.S., MUKUMBU, M., DUNCAN, J., STAATZ, J., HOWARD, J., LUNDBERG, M., ALDRIDGE, K., NAKAPONDA, B., FERRIS, J., KEITA, F. and A.K. SANANKOUA. 1995. Trends in real food prices in six sub-Saharan African countries. Policy Synthesis No. 2, US Agency for International Development (USAID), Washington, DC, pp.1-15.

JOHNSON, R. and WICHERN, D., 1992. Applied multivariate statistical methods. Prentice Hall, Englewood Cliffs, NJ, pp.481-538.

KAY D. RONALD, EDWARDS M. WILLIAM and DUFFY A. PATRICIA., 2008. Farm Management – Sixth Edition, McGraw-Hill Education, (ISBN 978-007-125953-8) pp.3- 6; 111-115; 149-172; 293- 308.

KENNEDY, P.L., HARRISON, R.W., KALAITZANDONAKES, N.G., PETERSON, H.C., and RINDFUSS, R.P., 1997. Perspectives on evaluating competitiveness in agribusiness industries. *Agribusiness: An International Journal*, 13(4):385-392.

KERLINGER, F.N., 1986. Foundations of behavioral research (3rd ed). New York, Holt, Rinehart and Winston, pp.163-183.

KIRSTEN, J.F. and VINK, N. 2002. *Pricing behaviour in the South African food and agricultural sector.* A report to the National Treasury. [Online] Available: http://www.sarpn.org/documents/d0000327/P280_Pricing.pdf Accessed: 22 August 2017

KOTLER, P., and KELLER, K.L., 2006. Marketing Management 12th Edition. New Delhi: Prentice-Hall of India Private, pp2-212.

KUTSOYIANIS, A., 1983. *Modern Microeconomics*: Second Edition London: The Macmillan Press, pp 13-66.

LOUW A., CHIKAZUNGA D., JORDAAN D and BIANABE E., 2007. *Restructuring food markets in South Africa: Dynamics within the context of the tomato sub sector*, Report Regoverning Markets Project, IIED, University of Pretoria, pp.1-53.

MADIMA, T.M., 2010. Competitiveness of the South African Deciduous fruit canning Industry. University of Pretoria. [Online] Available from UPeTD:

http://upetd.up.ac.za/thesis/available/etd-08182010-144022/unrestricted/dissertation.pdf.

MAKHURA, M.T., 2001. Overcoming transaction costs barriers to market participation of smallholder farmers in the Northern Province of South Africa. PhD Thesis, University of Pretoria, Pretoria, pp.64-95.

MÁRKUS, G., 2008. Measuring company level competitiveness in Porter's Diamond model framework. In *FIKUSZ 2008 Business Sciences-Symposium for Young Researchers: Proceedings*, pp.149-158.

MAY, J., and CARTER M., 2009. Agriculture: analysis of the NIDS Wave 1 dataset. Discussion paper no. 6, National Income Dynamics Study. Cape Town: University of Cape Town, pp.1-4.

MAY, J., 2011. Agriculture and poverty reduction. *Policy*, (3). School of Development studies, University of Kwazulu Natal, pp.2-8.

MOLOI M.J., 2008. A Comparison of Socio-economic Characteristics that Determine the Farm Income of Emerging Livestock and Horticultural Farmers in South Africa. MSc Thesis, Unpublished. Department of Agricultural Economics University of Limpopo, pp.59-70.

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

MUKWEVHO, R., and ANIM, F.D.K., 2014. Factors affecting small scale farmers in accessing markets: A case study of cabbage producers in the Vhembe District, Limpopo Province of South Africa. *Journal of Human Ecology*, *48*(2), pp.219-225.

MUSEMWA, L., MUSHUNJE, A., CHIMONYO, M., FRASER, G., MAPIYE, C. and MUCHENJE, V., 2008. Nguni cattle marketing constraints and opportunities in the communal areas of South Africa: Review. *African Journal of Agricultural Research* 3(4):239-245.

NATIONAL AGRICULTURAL MARKETING COUNCIL (NAMC). March 2017.Trade Probe. Issue 68, pp.9-10.

NELLIS, J.G., and PARKER, D., 1997. The Essence of Business Economics London: Prentice Hall. New York: McGraw-Hill inc, pp.163.

NESAMVUNI, A.E., ONI, S.A., ODHIAMBO, J.J.O., and NTHAKHENI, N.D. 2003**.** Agriculture as a cornerstone of the economy of the Limpopo Province. A study commissioned by the economic cluster of the Limpopo Provincial Government under the leadership of the Department of Agriculture. Polokwane: Limpopo Provincial Government, pp 1-20.

NESAMVUNI AE 2014. *Towards An Improved Competitiveness of Tea Industry in South Africa: A CaseStudy of Tshivhase-Mukumbani Tea Estate in Limpopo Province.* MBA Dissertation. Polokwane, South Africa: Management College of South Africa (Mancosa).

NESAMVUNI A, TSHIKOLOMO KA, NEPHAWE KA, TOPHAM RW, MPANDELI NS 2014*. Employee perceptions on determinants of tea enterprise competitiveness: A case of Tshivhase-Mukumbani Estate in Limpopo Province of South Africa. International Journal of Agricultural Extension, 2(3): 193-203.*

NORDIN, A.B.A., SHARIFF, F.M, SIMEH, A.S., and BAHARIM, B., 2008. Future competitiveness of the Malaysian PKE. *Oilpalm Industry Economic Journal*, *8*(2), pp.8-16.

NPC, 2011. *National Development Plan: Vision for 2030*. Pretoria: National Planing Commission.

OKORIE, A., 1998. Funding of Agribusiness in Swaziland, 1968-1995.*UNISWA Journal of Agriculture*, 7:78-95.

OKOYE, F.U., and ANUEBUNWA F.O., 2003. Farm Level Profitability Analysis of selected Rice Enterprises in Ayamelum LGA of Anambara State, Nigeria. Proceedings of the 43rd Annual Conference of the Agricultural Society of Nigeria held at National University Commission (NUC) and Raw Material Research and Development Council (RMRDC), Abuja. 20th-23rd October 2009

OLAYIDE, S.O., and HEADY, E.O., 1985. Introduction to Agricultural Production Economics. Ibadan University Press, University of Ibadan, pp 2-247.

ONUOHA, C., OKEREKE, C.O., and ASUMUGHA, G.N., 2009. Profitability of Feed-mill Enterprise in NRCRI Umudike. Proceedings of the 43rd Annual Conference of the Agricultural Society of Nigeria held at National University Commission (NUC) and Raw Material Research and Development Council (RMRDC), Abuja. 20th-23rd October 2009.

ORTMANN, G,F., 2000. Promoting competitiveness in South African agriculture and agribusiness: the role of institutions. *Agrekon*, 39(4):367-400.

ORTMANN, G.F., 2005. Promoting the competitiveness of South African agriculture in a dynamic economic and political environment. *Agrekon*, 44(3), pp.286-320.

PETIT, M., GNAENY, S., PETERS, G.H., and HEDLEY, P.D., 1995. A*gricultural competitiveness and Global trade: Looking at the future of agriculture through a crystal ball* (No. 183374). International Association of Agricultural Economists, pp.46-48.

PORTER, M.E., 1990. The competitive advantage of nations. *Harvard business review*, *68*(2), pp.73-93.

PORTER, M.E., 1998. The Competitive Advantage of Nations, Free Press. New York, pp 2-357.

PORTER, M.E., SCHWAB, K., and SACHS, J., 2005. *The global competitiveness report 2004-2005*. New York, NY: Palgrave Macmillan, pp.2-47.

PORTER, M.E., 2003. The economic performance of regions. *Regional studies*, *37*(6-7); 549-578.

RANDELA, R., 2005. Integration of emerging cotton farmers into the commercial agricultural economy. PhD thesis, University of the Free State, Bloemfontein, RSA, pp 1-56.

RANDELA, R., LIEBENBERG, G.F., KIRSTEN, J.F., and TOWNSEND, R.F., 2000. Demand for livestock tick control service in the Venda region, Northern Province. *Agrekon*, *39*(4), pp.644-655.

SHARPLES, J.A., 1990. Cost of production and productivity in analyzing trade and competitiveness. *American Journal of Agricultural Economics*, 72(5), pp.1278-1282.

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

SINNGU T, ANTWI M 2014. Determinants of competitiveness in the South African citrus fruit industry. *Journal of Agricultural Science*, 6(12): 1-16.

TEECE, D.J., 1996. 'Firm organization, industrial structure, and technological innovation', *Journal of Economic Behavior and Organization*, 31(2), pp.193-224.

THE ORGANIZATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT (OECD)., 2010. Competitiveness, productivity and efficiency in the agricultural and agri-food sectors: definition, measurement and evidence from a literature review. OECD working paper on agricultural policies and markets, pp.5-12.

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 (Doctoral dissertation, Stellenbosch: Stellenbosch University), pp.32-61.

VAN BERKUM, S., 2004. The role of government in enhancing competitiveness in the agrifood sector. Report presented at the OECD Workshop on Enhancing competitiveness in the agrofood sector: making policies work. 16-17 June 2004, Vilnius, Lithuania, pp.1-15.

VAN ZYL, J., 1995. The farm size efficiency relationship in South African commercial agriculture. *Agrekon* 34 (4):127-137.

VENTER, R.H., and HORSTHEMKE, O., 1999. Analysis of the competitive nature of the Southern African sheep meat value chain. *Agrekon,* 38(4), pp.716-725.

VINK, N., KLEYNHANS, T.E., and STREET, K., 1998. The competitiveness of Western Cape wheat production: an international comparison. *Agrekon*, 37(3): 255–267. [Taylor and Francis Online] [Google Scholar]

VOLLRATH, T.L., 1991. A theoretical evaluation of alternative trade intensity measures of revealed comparative advantage. *Review of World Economics*, 127(2), pp.265-280.

VORSTER, L.L., 2001. Avocado Production in South Africa. California Avocado Society, Westfalia Estate, Duiwelskloof, South Africa, 2001 Yearbook 85, pp.51-63.

WILLIAMS, B., ONSMAN, A., and BROWN, T., 2010. Exploratory factor analysis: a five step guide for novices. *Journal of Emergency Primary Health Care* (JEPHC), Vol. 8, Issue 3, 2010 - Article 990399, pp1-11.

Appendix 1: Questionnaire

FARMERS QUESTIONAIRE ON THE PROJECT: DETERMINANTS OF COMPETITIVENESS: A CASE OF SMALLHOLDER AVOCADO FARMERS IN THE VHEMBE DISTRICT OF THE LIMPOPO PROVINCE

Date: DD – MM - YYYY

Questionnaire no:

Researcher: Humbulani Masikhwa

Mobile: 082 698 2886 Email: masikhwahumbu@gmail.com

GENERAL INFORMATION

GPS Readings:

a) Name of interviewee	
b) Name of the farm	
c) Local Municipality	
d) Telephone /cell number	
e) Village if the same as the location	
f) District	

1. DEMOGRAPHIC INFORMATION OF HOUSEHOLD

1.1 Gender of the household head	Female
	Male

1.2 Age of the household head in years		**Years**

1.3 Marital Status	Single	1	Married	2	Divorced	3	Windowed	4

1.4 Household size		

1.5 Level of education	Less Grade 7(Primary)	1
	Matric	2
	Post Matric	3
	Other	4

1.6 Occupation (apart from farming)	

2. LAND AND AGRICULTURE

2.2 How did you acquire the land?

Bought (Title deed)		1
Leased		2
Inherited		3
Given by Government		4
Allocated by the Headman		5
Renting and /or share		6
0ther		7

2.3 What is the total area of the farm?	
2.4 Total number of trees?	

2.5 Are you satisfied with the size of the land that you have?	1	Yes
	2	No

2.6 Do you feel secure with land that you have in terms of ownership?	1	Yes
	2	No

3 HUMAN CAPITAL ENDOWMENTS

Knowledge – farming experience

3.2 Are you involved in any other farm activities, apart from growing Avocado (e.g., value addition)?	1	Yes
	2	No

4. PRODUCTION RELATED BACKGROUND INFORMATION	

4.1 How long have you been involved in the production of Avocado?	

4.2 What has been your production on average for the period you have been in the business in terms of tons?

Year 1	
Year 2	
Year 3	

4.3 How much was your total expenditure of Avocado?

Year 1	
Year 2	
Year 3	

4.4 How much was your total income from Avocado?

Year 1	
Year 2	
Year 3	

4.5 Can you please indicate any type of production loss when practising Avocado production?

Post-harvest loss	
Theft	
Disaster	
Diseases	
Other	

5. Labour usage

5.1 Questions on skilled labour	Yes	No
Do you employ permanent skilled labourers on your farm?		
Number of labourers		
Days per year		

5.2 Questions on unskilled labour	**Yes**	**No**
Do you employ permanent unskilled labourers on your farm?		
Number of labourers		
Days per year		

6. Fixed Infrastructure usage

Available infrastructure

6.1 Do you have an asset register?

Yes	
No	

6.2 Can you please indicate any five (5) most important infrastructures and technology that you use for farm production?

Type of infrastructure	Condition (e.g. poor, good etc.)	Quantity	Age (years)	Estimated value (R)

7.2 Can you please indicate the variable inputs that you use for production in the farm?

Variable inputs	Estimated costs

7. Water source

What is the source of water for your farm?	Yes	No
Borehole	1	2
River	1	2
Municipality	1	2

8. Electricity source

Do you have electricity on your farm?	Yes	No
	1	2
Type of electricity		
Estimated amount per month		

9. Financial support

Indicate the type of financial support farmers received		Loan	Grant	Subsidy	Other (Specify)
1. Commercial banks	1				
2. Government	2				
3. Agricultural cooperatives	3				
4. Other (Specify)	4				

10. Demand conditions

11.1 Internationalisation of local buyers

Do you sell produce to international buyers?	Yes	1
	No	2

11.2 Can you please indicate by a tick where you sell your Avocado?

Informal market	
Formal retail shop	
Agric processing	
Shops	
Other	

11.3 European Good Agricultural Practice

Do you have the following European Good Agricultural Practices in your farm?	**Yes**	**No**
1. Fertilizer storage		
2. Toilets		
3. Showers		
4. Washing basin		

11.4 Importance of ethics and production methods for local buyers

Is there a demand for your types of Avocado that is produced in a particular production method?	Yes	1
	No	2

11.5 Importance of environmentally friendly products for local consumers

Do you use fertilizers when growing crop?	Yes	1	No	2
Option	Organic	Inorganic	Both	

Types used			
How much of fertilizer in kg or number of bags (kg) do you use?			

11.6 Do you use pesticides?

Yes/No ……...

The factors investigated, based on the determinants of competitive advantage as described by Porter (1990, 1998), can be classified as follows:

PERCEPTION ON CONSTRAINTS TO COMPETIVENESS OF AVOCADO

To what extent do you agree with the following comments on competiveness of Avocado? Please tick (□) in the relevant box that best describes your view(s).

(NB*: the table below will be used to score the average factor condition)*

Views The following production factors are causing the decrease in competiveness of Avocado.	Yes	No
Factor conditions		
7. Cost of production		
8. Labour		
- Cost of unskilled labour		
- Availability of unskilled labour		
- Cost of skilled labour		
- Availability of skilled labour		
- Administration cost associated with labour matters		

9. Insufficient source of water		
10. Infrastructure		
- Lack of Quality		
- Lack of Availability		
11. Capital / Finance		
- Cost		
- Lack of availability		
12. Lack of knowledge of avocado production		
13. Lack of technology		
Views The following production factors are causing the decrease in competiveness of Avocado	Yes	No
Demand conditions		
6 Distance to market		
7 Market information		
- Lack of quality		
- Lack of availability		
- Cost		
8 Quality of products		
9 Is there a market for avocado?		
10 Road infrastructure		
Views The following production factors are causing the decrease in competiveness of Avocado.	Yes	No
Related and supporting industries		
6. Financial institutions		
7. Research institutions		
8. Suppliers of packing materials		
9. Electricity suppliers		
10. Government		
Views The following production factors are causing the decrease in competiveness of Avocado.	Yes	No
Firm strategy, structure and rivalry		

10. Adaptability		
11. Culture		
12. Structure		
13. Flexibility		
14. Pricing strategy		
15. Managerial capabilities		
Views The following production factors are causing the decrease in competiveness of Avocado.	Yes	No
16. Market power of suppliers		
17. Market power of buyers		
18. Market power of buyers		
19. Threat of substitutes		
20. Threat of new substitutes		
Views The following production factors are causing the decrease in competiveness of Avocado.	Strongly disagree	Disagree
Chance		
11. Economic stability		
12. Aids		
13. Political stability		
14. Price stability		
15. Crime		
16. Drought		
17. Floods		
18. Fires		
19. Frost		
20. Other		