ECONOMIC ANALYSIS OF SUPERMARKETS AS A MARKETING CHANNEL CHOICE FOR FRESH PRODUCE SMALLHOLDER FARMERS IN ESWATINI

by

Bongiwe Porrie Dlamini-Mazibuko

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PREFACE

The research contained in this thesis was completed by the candidate while based in the Discipline of Agricultural Economics, School of Agricultural, Earth and Environmental Sciences of the College of Agriculture, Engineering and Science, University of KwaZulu-Natal, Pietermaritzburg Campus, South Africa.

The contents of this work have not been submitted in any form to another university and, except where the work of others is acknowledged in the text, the results reported are due to investigations by the candidate.

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Signed: Dr SRD Ferrer

Date: July 2020

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Signed: Prof. GF Ortmann

Date: July 2020

DECLARATION 1: PLAGIARISM

I, Bongiwe Porrie Dlamini-Mazibuko, declare that:

(i)   the research reported in this dissertation, except where otherwise indicated or acknowledged, is my original work;

(ii)   this dissertation has not been submitted in full or in part for any degree or examination to any other university;

(iii)   this dissertation does not contain other persons' data, pictures, graphs or other information, unless specifically acknowledged as being sourced from other persons;

(iv)   this dissertation does not contain other persons' writing, unless specifically acknowledged as being sourced from other researchers. Where other written sources have been quoted, then:

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

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

(v)   where I have used material for which publications followed, I have indicated in detail my role in the work;

(vi)   this dissertation is primarily a collection of material, prepared by myself, published as journal articles or presented as a poster and oral presentations at conferences. In some cases, additional material has been included;

(vii)   this dissertation does not contain text, graphics or tables copied and pasted from the Internet, unless specifically acknowledged, and the source being detailed in the dissertation and in the References sections.

Signed:

Bongiwe Porrie Dlamini-Mazibuko

Date: November 2019

DECLARATION 2: PUBLICATIONS

The following articles, published or under review, form part of the research presented in this thesis:

Article 1 – Chapter 3 of this thesis:
Dlamini-Mazibuko, B.P., Ferrer, S. R.D. and Ortmann, G. F. A Theme network analysis of pertinent issues in the nexus between smallholder farmers and supermarkets in the vegetable value chain of Eswatini. *Agroecology and Sustainable Food Systems Journal*. (Under review)

Article 2 – Chapter 4 of this thesis:
Dlamini-Mazibuko, B.P., Ferrer, S. R. D. and Ortmann, G. 2019. Examining the farmer-buyer relationships in vegetable marketing channels in Eswatini. *Agrekon* 58(3):369-386. DOI: 10.1080/03031853.2019.1596824.

Article 3 – Chapter 5 of this thesis:
Dlamini-Mazibuko, B.P., Ferrer, S. R. D. and Ortmann, G. F. 2019. Factors affecting the choice of marketing outlet selection strategies by smallholder farmers in Swaziland. *African Journal of Science, Technology, Innovation and Development* 11(5):567-577. DOI:10.1080/20421338.2018.1554323.

Article 4 – Chapter 6 of this thesis:
Dlamini-Mazibuko, B.P. Ferrer, S. and Ortmann, G. Smallholder farmers' choice of marketing channels: the impact of supermarket participation on farm incomes in Eswatini. *Journal of International Development*. (Under review).

This work is an analysis of data collected, analysed and discussed by Bongiwe Porrie Dlamini-Mazibuko with technical assistance from Dr Stuart Ferrer and Professor Gerald Ortmann. Similarly, the tables and figures were produced by the same, unless referenced in the respective publications.

Signed:

Bongiwe Porrie Dlamini-Mazibuko (student)

Date: November 2019

ABSTRACT

The growth of supermarkets in Eswatini has been dominated by South African supermarket chains that typically have access to established procurement channels from South Africa. Whilst some supermarkets do procure some fresh produce from local farmers, others exclusively procure from South Africa. This facilitation of market access for imported fresh produce in Eswatini – a threat for local farmers - differentiates this study from previous research on the impacts of supermarkets on farmers in developing countries. In particular, supermarket requirements imposed on producers in conjunction with competition from imports has important implications for local farmers' direct access to these markets, the types of fresh produce procured, and the relationships formed, which therefore, impact on farm incomes of smallholder farmers in Eswatini. Therefore, the primary objectives of the study are to show the procurement system of vegetables in Eswatini as a complex system; analyse the nature of the farmer-buyer relationships; determine the factors affecting the choice of marketing outlets; and estimate the impact of supermarket participation on income of smallholders in Eswatini.

The study focused on the procurement of fresh produce, namely cabbages, spinach and lettuce from Hhohho and Manzini, where the majority of supermarkets in Eswatini are located. A combination of sampling methods has been used in the study. A random sampling method was used to select a sample of 110 smallholder farmers supplying vegetables to traditional markets and NAMBoard, (a parastatal that, amongst other functions, assists farmers with production, processing, storage, transportation, distribution of their produce and the sale of scheduled products) and about 60 smallholders were supplying supermarkets. Informants from the vegetable supply chain were purposely selected with the view of being directly and indirectly, involved in the chain.

The thesis is structured as four research papers that address the above-stated objectives. The first research paper examines the procurement system of vegetables in Eswatini as a complex system using the Theme Network Analysis (TNA). TNA allows for the identification of linkages of key themes associated with the procurement of vegetables by formal markets and other pertinent themes that can be further investigated for solutions to the system.

In the second paper, factor analysis and discriminant analysis were used to determine farmer-buyer relationships between informal and formal marketing channels based on relationship satisfaction, trust and commitment. Results from the discriminant analysis revealed that there is a statistical significant difference between formal and informal marketing channels, and those farmers supplying formal markets perceived levels of satisfaction, trust, and commitment better than for informal markets.

The third research paper involved the application of the Multivariate Probit (MVP) model to estimate the factors influencing the choice of marketing outlet selection strategies. The marketing outlets observed were supermarkets, NAMBoard and traditional markets, and the results showed that these outlets were substitutes. This implies that when it comes to marketing outlet selection, farmers would select one outlet over the other based on economic and practical factors; if the conditions for supplying one market outlet are inaccessible for smallholders, another market will be selected. The selection decision is influenced by risk attitude, assets ownership, institutional variables, transaction costs and market attributes.

Lastly, the fourth paper involved the application of the Endogenous Switching Regression model to determine the factors influencing participation in supermarkets and the effect participation has on income of suppliers. The results revealed structural differences between farmers supplying supermarkets and traditional markets, particularly with respect to the size of the farm and off-farm income. The result also revealed that smallholders supplying supermarkets earned a relatively higher income than those supplying traditional participants.

The main conclusions of the study are as follows: the characteristics of supermarkets and farmers, as well as the nature of the product, add to the complexity of the procurement system. The TNA enhanced the understanding of the identified issues contributing to the complex procurement systems; hence, strategies for improvement can be investigated. The key challenges identified were inconsistent supply of produce, lack of finance, and transport, high procurement requirements and high transaction costs. The social responsibility approach that supermarkets use for smallholders is attributed to these procurement challenges, which means that buying from local smallholders is not one of the business strategies for retailers.

Therefore, policy regulations set to limit imports and encourage domestic procurement while developing smallholders to be able meet procurement requirements are necessary. The introduction of such policies may reduce imports, which are regarded as a threat to local farmers. Secondly, the nature of the buyer-seller relationships between the marketing channels is discrete, which is characterised by flexibility and lack of commitment between farmers and the buyers. The factors affecting the choice of marketing outlets and the effect on supermarket participation are crucial for the sustainable growth of smallholder vegetable farmers in Eswatini. The farmers' risk preference, different assets owned, institutional factors, and the duration the marketing outlet takes to make payment for produce influence supermarket channel selection decisions. The implications of these results (factors) provide empirical guidelines necessary for farmers when selecting marketing channels. Policies aimed at the commercialization of smallholder farmers involving the establishment of institutions and the acquisitions of assets such as the provision of education (skills training), improved market information, extension services, mobile phone, transportation and farm size to produce marketable surplus are critical for the improvement of supermarket participation leading to improvement of farmers' income. The study, therefore, recommends a coordinated and comprehensive supply chain approach, which will enhance a broader understanding of the vegetable marketing system and the achievement of a mutually beneficial relationship that will enhance smallholder farmers' access to markets and further improve their household welfare from income earned from participating in these markets.

DEDICATION

To my beautiful, kind, bubbly and loving daughter: Neliswa.

ACKNOWLEDGMENTS

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ATT	Average Treatment Effect on the Treated
ATU	Average Treatment on the Untreated
BH1	Base Heterogeneity
DA	Discriminant Analysis
DC	Distribution Centres
ENAU	Eswatini National Farmers Union
ESR	Endogenous Switching Regression
EU	European Union
EuroGAP	European Good Agricultural Practices
FAO	Food and Agriculture Organization
FIML	Full Information Maximum Likelihood
HACCP	Hazard Analysis and Critical Control Points
KMO	Kaiser-Meyer-Olkin
GAP	Good Agricultural Practices
GDP	Gross Domestic Product
IFAD	International Fund for Agricultural Development
MANOVA	Multivariate Analysis of Variance
MoA	Ministry of Agriculture
MVP	Multivariate Probit
NAMBoard	National Marketing Board
NGO	Non-Governmental Organization
OLS	Ordinary Least Squares
PCA	Principal Components Analysis
PSM	Propensity Score Matching
SA	South Africa
SADC	Southern African Development Community
SADP	Swaziland Agricultural Development Programme
SNL	Swazi Nation Land
TDL	Title Deed Land
TNA	Theme Network Analysis
TH	Transitional Heterogeneity
VIF	Variance Inflation Factor
WFP	World Food Programme

CHAPTER 1: INTRODUCTION

1.1 Background information

Eswatini is a small landlocked country, bordered by South Africa (SA) and Mozambique (FAO/WFP 2015). The country's agricultural sector is dualistic. It consists of the Swazi Nation Land (SNL) comprising 60% of arable land, held under traditional tenure arrangements and occupied by a large number of smallholder farmers (FAO/WFP 2015). The free-hold Title Deed Land (TDL) is the modern sector, accounting for 40% of arable land, and is characterized by commercial plantations and estates; farms which are relatively more productive and owned by a few number of large-scale producers (Xaba and Masuku 2012). The agricultural sector has a high potential due to favourable climate and good soils that allow for a variety of produce to be grown throughout the year (Mhlanga and Hladka 2015).

Agricultural development is an important strategy for growth of developing countries like Eswatini. Over 70% of the population in Eswatini rely on agriculture as their major source of employment and income, particularly rural households (Thompson 2011). The contribution of agriculture to Eswatini's Gross Domestic Product (GDP) was estimated at 8.6% in 2018 (World Bank 2019). Despite the relatively low contribution, agriculture remains an important sector that has a considerable impact on rural food security and poverty alleviation amongst smallholder farmers (from now on called smallholders).

Smallholders in SNL areas mostly grow vegetables for traditional markets (World Bank 2011). Some, however, do supply various formal markets, either directly or indirectly via NAMBoard or pack-houses. Production of vegetables has the potential to enhance farm income, generate additional employment as well as save natural resources from further degradation (Sharma *et al.* 2009). They are essential for rural livelihoods as they are a source of food and income, but also contributes to employment creation and GDP growth (Akinlade *et al.* 2013).

The government of Eswatini is committed to the diversification of the sector from concentrating on the sugar industry (World Bank 2011). In 2009 the Ministry of Agriculture (MoA) of Eswatini, the Food and Agriculture Organization (FAO) and the European Union

(EU) implemented the Swaziland Agricultural Development Programme (SADP), which was a 5-year programme meant to create a vibrant commercial agricultural sector. One of the outcome targets was to increase smallholder links to formal markets, which include both local and international markets. Through this programme, a €1 million Marketing Investment Fund (MIF) was established (Perry 2014). Similarly, TechnoServe Eswatini for years had also tried implementing market linkage initiatives to promote food security and growth of smallholders. However, the success stories from these initiatives are limited. Smallholder farmers are still unable to access formal markets, are faced with limited access to inputs, finance, farm storage facilities, transport and marketing information (World Bank 2011). The country imports substantial quantities of vegetables from SA despite having abundant good soils and climate. Formal markets in Eswatini were estimated to import over 90% of all fresh produce in 2010 (World Bank 2011). Mhlanga and Hladka (2015) indicate that weak supply chains result in lower benefits, if any, from agricultural manufacturing. This leads to the country relying heavily on imports, in particular agricultural products (Mhlanga and Hladka 2015).

Boselie *et al*. (2003) suggest that increasing demand for food quality can provide opportunities for improved smallholder producers' livelihoods. Smallholder vegetable farmers have a potential to earn more income by adopting a diversified approach, i.e. supplying formal and informal marketing channels. Formal markets like supermarkets offer stable income and competitive prices which are used to enhance farmers' livelihoods (Chege *et al.* 2015). There is evidence that a producer's livelihood is enhanced by participating in formal supply chain markets such as supermarkets (Emongor and Kirsten 2009a; Rao and Qaim 2011; Andersson *et al.* 2015); however, there is need for support from both public and private stakeholders (Boselie *et al.* 2003).

Support in terms of packaging facilities, transportation, etc, are some of the supermarket procurement requirements, and is necessary due to supermarket procurement practices, the nature of the relationship between producers and the buyers and the factors affecting marketing outlet selection strategy. Consequently, in the absence of suitable support, the opportunities for smallholder farmers to benefit from the growth of supermarkets in developing countries are limited. The establishment of produce marketing organizations to tackle transport and packaging activities and collective action are some of the ways of supporting producers to be able to meet procurement requirements.

The opportunities for perishable products such as green vegetables are greater than for relatively less perishable products. This is because supermarkets already have well-established procurement channels for relatively less perishable fresh produce products from SA. Supermarket procurement practices are important regarding market participation decisions. Louw *et al*. (2007) argue that intense competition in the retail industry pushes supermarkets to be more committed to delivering what the consumers want and provide excellent customer service to retain customers and increase their market share. Hartmann *et al.* (2010) concur that food quality concerns force retailers to acquire more information regarding food products along the supply chain to ensure that products are in accordance with food standards and consumer preferences.

Although, the emergence and growth of supermarkets create opportunities for vegetable smallholder farmers to supply formal markets, in practice, smallholders face considerable competition from large -scale farmers and imports from SA in that marketing channel. Poor access can be attributed to many challenges encountered by farmers when supplying supermarkets, such as high procurement requirements, and lack of finance to meet procurement requirements consistently (e.g. quality, quantity, packaging material and transport). These strict procurement requirements increase transaction costs and further reduce the opportunity for participation in modern markets (Neven *et al.* 2009; Mmbando *et al.* 2016). Competition from imports is exacerbated by most supermarkets in Eswatini being part of South Africa supermarket chains that have extended well-established procurement networks within SA to also supply their supermarkets in Eswatini, which makes procuring from smallholders more of a social responsibility locally. This facilitation of market access for imported fresh produce in Eswatini – a threat for local farmers - differentiates this study from previous research on the impacts of supermarkets on farmers in developing countries. In particular, supermarket requirements imposed on producers, in conjunction with competition, has important implications for local farmers' access to these markets and the types of fresh produce procured, thus affecting farm incomes of smallholders in Eswatini. However, the same procurement channels also present opportunity for SA owned supermarkets to backhaul fresh produce from Eswatini to supply to supermarkets in SA. For this to be possible, farmers would need to be well organised and supported to take up this opportunity.

Research has shown that most smallholders are not able to supply these lucrative markets (Louw *et al.* 2009). Some of the contributing issues are: firstly, the nature of the relationship

is different in all marketing channels, due to the factors that distinguish each marketing channel as well as the nature of the product, which may affect the farmer's farm income. Secondly, supermarkets' procurement practices are much more integrated than traditional supply chains (Rao and Qaim 2011).

Supermarkets and producers consider many factors before they engage each other for purposes of trading (Shepherd 2005). The interconnection between trading parties and the issues in the supply chain system is a source of complexity (Hualda 2015), implying that addressing one factor would affect the other. Investigating the linkages could assist in finding long-term solutions to the complexity that would assist smallholders to sustain their livelihoods. These linkages could be best displayed using network analysis; Hualda (2015) states that the interconnections can be used as a strategy to encourage efficiency and growth within the system. Overcoming the issues is critical for farmers to access high-value markets (Matsane and Oyekale 2014). It is, therefore, important to begin with understanding the roots of the issues in the procurement system prior to developing strategies to remove and manage the issues.

Supermarkets generally prefer to procure from producers who are well informed and have enough resources (capital, infrastructure) to meet their requirements, in particular large-scale farmers (Richards *et al.* 2013). Many participants in formal markets avoid having contracts with smallholders as they are often regarded as lacking business and agricultural skills to become primary suppliers (World Bank 2011; WFP 2015). Smallholder farmers are then left with informal markets to supply their produce for survival. These market outlets include individuals and vendors who are associated with random sales, immediate payment for produce with no additional transaction costs (Chege *et al.* 2015). The benefit of establishing and improving quality relationships amongst trading partners contributes to reduced uncertainties, lower transaction costs, loyalty creation between the partners, improved competitive advantage and increased profitability (Puspitawati 2013; Aji 2016). Stringer *et al.* (2012) concur that business partners prefer to trade with partners who enhance the relationship in terms of satisfaction, trust and commitment.
Smallholder farmers have options to supply produce to more than one marketing outlet from different marketing channels to minimise market risks, increase income and farm performance (LeRoux *et al.* 2010). The authors argue that adopting such a strategy enables the farmer to

have a ready market for all produce grown. However, factors that differentiate the marketing channels play an important role in the decision-making process of producers. Traditional supply chains are composed of street or city vendors and small community stores; formal marketing channels include supermarkets, private pack-houses, food processors, hotels, restaurants and export markets. It follows that there is a need to understand the characteristics of the various vegetable marketing channels, and to enhance the capacity of farmers to make informed decisions regarding marketing channels. Understanding the factors influencing the choice of marketing outlet selection strategies is imperative since the information would enhance the exploitation of strategies that have a potential to increase vegetable production, investment and farm income (Soe *et al.* 2015).

In spite of the expansion of supermarkets, empirical research examining supermarket procurement practices, farmer-buyer relationships based on satisfaction, trust and commitment, factors affecting marketing outlet selection strategy, as well as the effect of supermarket participation regarding farm income is still limited, especially in Eswatini. The impact of supermarket channels has been explored by Emongor and Kirsten (2009a), who showed how supermarkets' sourcing and procurement decisions impact smallholder farmers in the host country. However, Emongor and Kirsten (2009a) failed to show the interconnection of the procurement issues pertaining to sourcing vegetables from smallholder farmers. Policy-makers, therefore, have to understand the procurement practices, the nature of the relationships between farmers and buyers, and the factors affecting marketing outlets selection as well as the effects of supermarket participation by vegetable smallholders. Policy-makers need to initiate policies aimed at protecting and supporting producers to be able to access formal markets sustainably and earn income to enhance their livelihood (Mhlanga and Hladka 2015).

1.2 Problem statement and justification of the study

Despite recognising that supermarkets provide opportunities for smallholders, programmes by government and social responsibility objectives of supermarkets, smallholders continue to account for only a small proportion of fresh produce traded at supermarkets in Eswatini, especially cabbages, spinach and lettuce. Previous studies indicate that smallholders are excluded from modern marketing channels because they lack technical, financial and managerial capacity to compete (Bienabe and Vermeulen 2007; Louw *et al.* 2007; Louw *et al.*

2008c). The increase of large retail stores represent, on one hand, opportunities for some farmers, particularly large-scale farmers, who are more likely to comply with new sets of requirements, whilst there is increased marginalization of those who are not prepared to market to these retail chains due to these requirements. Barriers to market access discourage production and negatively affect farmers' sales revenue. Poor market linkages and low-incomes negatively affect resiliencies to withstand food production and supply shocks. With small volumes of produce by smallholder farmers, distribution and transaction costs are high, which then lead to supermarkets preferring to deal with large producers who already have the resources and ability to comply with the supermarket requirements (Louw *et al.* 2008a). This affects smallholder farmers' marketing preferences and opportunities. In addition, smallholders in Eswatini are faced with high prices for imported farming requisites and they are characterised by very low farm income levels, which are the main drivers of food insecurity (FAO/WFP 2015). Moreover, large foreign supermarkets tend to bring their own international business practices which include high standards (Hualda 2015) and also procuring produce through distribution centres or importing from parent countries they trust (Dolan and Humphrey 2000; Ruben *et al.* 2007; Gagalyuk and Hanf 2009).

Boselie *et al.* (2003) conducted a study on procurement practices by supermarkets in developing countries. The authors' main focus was on the roles played by the public and private sectors. Yet prior to establishing roles, a full understanding of the issues pertaining to the procurement practices from key stakeholders is important. These include understanding perspectives from producers, regulators, distributors and markets (retailers) that are linked to the supply chain. Boselie *et al.* (2003) indicate that the interconnection of participants and the procurement issues result in a complex supply chain system. A broad understanding from relevant supply chain participants could enhance supply chain efficiency. There is a need to analyse these complexities to address challenges of inefficiencies and improve the capacity of smallholder farmers to be able to supply produce consistently and earn income to improve their livelihoods. Bezuidenhout *et al*. (2013) argued that complexity within industries inhibits identification of opportunities for improvement. De Nooy *et al.* (2011) indicated that network analysis may be used to explore and understand connections between issues better. Hence, this method of analysis is deemed appropriate to enhance the identification and presentation of the connectivity of pertinent issues in the procurement of vegetables from smallholder farmers raised by key informants in the supply chain.

Little research has been undertaken regarding the exploration of the dynamics of the nature of farmer-buyer relationships between two marketing channels (formal and informal), in particular involving highly perishable green leafy vegetables, and how the nature of the commodity influences the establishment of the relationships. Yet, Aji (2016) and Puspitawati (2013) state that buyer-seller relationships improve supply chain efficiency by reducing uncertainty, lower transaction costs, improve partner loyalty and promote competitive advantage.

Understanding the relationships between marketing outlets and factors that determine the selection of each market outlet is fundamental in profiling the markets as well as establishing policy interventions that are carefully designed to benefit farmers (Muricho *et al.* 2015). Considering that each market channel is characterized by different profitability, risk, cost structure and other requirements (Soe *et al.* 2015), understanding these characteristics is of value to a smallholder who aims to access these market outlets. Furthermore, very few studies have empirically investigated the factors affecting marketing outlet selection using a Multivariate Probit (MVP) regression model. Previous studies have only focused on smallholders' decision behaviour focusing on single market participation (supermarkets or traditional markets) applying a univariate binary logit, probit or censored Tobit model (Moyo 2010; Ramoroka 2012) and multinomial regression methods (Mmbando *et al.* 2016). However, farmers adopt a diversified approach in their quest to increase revenue, maximize profit and reduce marketing risks (Hardesty and Leff 2010). Therefore, ignoring simultaneous decision making, interdependency, and self-selection by market participants could lead to misleading results of inefficient parameter estimates (Winters *et al.* 2002; Yirga *et al.* 2015). Hence, this study uses Multivariate Probit (MVP) regression, which allows for the possible contemporaneous correlation in the decisions to supply the three marketing outlets (supermarkets, NAMBoard, traditional markets). It assumes correlation and interdependence in the farmer's marketing outlet selection decision (Cappellari and Jenkins 2003).

Furthermore, Xaba and Masuku (2012) studied the marketing channel choice for vegetable farmers in Eswatini. However, the authors focused on the produce marketing organization (NAMBoard) without concentrating on retailers who have been reported to be expanding operations in developing countries, including Eswatini. Yet there is increasing research about the role multinational firms play in the welfare of producers in developing countries like Eswatini. On another note, various studies on the effects of supermarket participation in

developing countries have been conducted (Barrett 2008; Emongor and Kirsten 2009a; Reardon *et al.* 2009; Rao and Qaim 2011; Chege *et al.* 2015; Mmbando *et al.* 2015). Rao & Qaim (2011) discovered that, in a study conducted in Kenya, farmers participating in supermarket channels earned higher household income and their poverty rates were 20% lower than they would be in the absence of supermarkets. Mmbando *et al.* (2015) reported that participating in agricultural markets increased consumption expenditure per capita within a range of 19.2-20.4% for maize farmers and 28.3–29.4 % for pigeon pea smallholders in Tanzania. Chege *et al.* (2015) discovered that participation in supermarket channels had positive effects on household nutrition for vegetable farmers in Kenya (increase of more than 15%). The authors also reported that supermarket participants had higher incomes than non-participants. Narayanan (2014) reported that farmers with contracts to supply supermarkets earned higher net income than those without contracts and those supplying other markets. However, studies of this nature (supermarket participation and its effects) are scarce in Eswatini.

This study is different from those carried out previously because Eswatini is a country that is highly dependent on SA for goods and services, including retailers. The retailers are part of foreign-owned supermarket chains with well-developed procurement channels from SA and company policies that generally require various regulations. The net result is that smallholder farmers in Eswatini cannot compete with the imported fresh produce, except for relatively more perishable produce such as green leafy vegetables. Since marketing of relatively more perishable products is challenging, information on procurement practices, farmer-buyer relationships, factors affecting marketing outlet selection strategies and the effects of supermarket participation are essential. Therefore, this study aims to contribute to the literature on the expansion of supermarket chains in Eswatini in the following ways: firstly, use network analysis to display the issues pertaining to the complexity of supermarket procurement practices. Bezuidenhout *et al*. (2012) suggest that the use of network analysis enhances understanding of complex linked issues better, which will further allow the establishment of solutions. Secondly, to close the gap on seller-buyer relationships by examining dynamics of the nature of farmer-buyer relationships between formal and informal marketing channels, in particular involving highly perishable green leafy vegetables, and show that formal market suppliers perceive formal markets better in terms of satisfaction, trust and commitment compared to informal market suppliers. Thirdly, the use of Multivariate

Probit analysis (MVP) to investigate the factors influencing marketing outlet selection strategies, unlike previous studies that dwelled much on using binary methods of analysis. Yet farmers access multiple outlets in their quest to increase revenue, maximize profit and reduce marketing risks. This study recognizes the possibility of joint selection decisions and correlation among them.

This study provides interesting perspectives on the dynamics of supermarket participation and its effects as perceived by the farmers supplying supermarkets, considering that smallholders are the most vulnerable in developing countries regarding land ownership, transport, access to credit, marketing information, etc. If participation in supermarkets has the potential of providing smallholders with more stable incomes and accumulate assets, which could be used to improve their livelihoods (access to nutritious food, productive assets), every opportunity should be explored to ensure that positive effects are realised. Therefore, the results from this study should be very useful to the government of Eswatini (as the policy-maker and service provider of agricultural technical support), the supermarkets (the buyer), the national produce market organizations (buyer, service provider and regulator), with regard to the impact of supermarkets. It will also assist in developing a picture from the farmers' perspective about the nature of the business relationship they have with the buyers.

1.3 Objectives

The general objective of this study is to investigate the economic analysis of supermarkets as a marketing channel choice for smallholder fresh produce farmers in Eswatini. The specific objectives are to:

  i.   determine the pertinent issues in the nexus between smallholder farmers and supermarkets in the vegetable value chain of Eswatini.

 ii.   examine the farmer-buyer relationships (satisfaction, trust and commitment) in vegetable marketing channels in Eswatini.

iii.   identify the factors affecting the choice of marketing outlet selection strategies by smallholder farmers in Eswatini.

 iv.   estimate the impact of supermarket marketing channels on farm incomes in Eswatini.

The above-stated objectives were achieved through the use of key informants and farmers' surveys from two regional zones in Eswatini, namely the Manzini and Hhohho regions.

Different conceptual and empirical methods have been employed and the empirical results are presented in chapters two to five.

1.4 Outline of thesis structure

The remaining part of this study is organized into seven chapters. The review of literature is presented in Chapter 2. Chapter 3 to 6 consist of four studies, each addressing the specific objectives stated in section 1.3. These are: (1) the pertinent issues in the nexus between smallholders and supermarkets in the vegetable value chain of Eswatini; (2) the nature of the farmer-buyer relationships (assessed based on satisfaction, trust and commitment); (3) the factors affecting choice of marketing outlet selection strategies; and (4) the impacts of supermarket participation on farm income in Eswatini. Each chapter is mostly self-contained, containing a literature review, materials and methods, results and discussion, and a summary. The final chapter presents the conclusions, recommendations and policy implications, and associated recommendations for further research.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

A review of the literature on the theory and empirical studies relating to the procurement practices by supermarkets from smallholder farmers, farmer-buyer relationships, factors affecting marketing outlet selection strategies and the impact of supermarket participation on smallholders' welfare is presented in this chapter. A comprehensive review of these concepts provides understanding of the complexity of supermarkets' procurement practices, the relationship status between suppliers and buyers, as well as the farmers' decision process regarding marketing channels and supermarket participation effects. Related empirical studies on supermarket procurement practices, factors affecting marketing channel selection and the effects of supermarket participation are also presented.

2.2 Vegetable production in Eswatini

In Eswatini, vegetables are grown in all four administration regions, namely Hhohho, Manzini, Lubombo and Shiselweni regions. The climate allows all-year-round production of different vegetables (World Bank 2011). Vegetable production is practised by both small and large scale farmers. However, most of the vegetables are grown under Swazi Nation Land (SNL). In Eswatini, a smallholder farmer is characterised as a farmer that has a farm size less than a hectare and limited productive resources. Often smallholder farmers produce mainly for subsistence purposes and the surplus is sold for income generation. The smallholder farmers are highly dependent on rainfall for vegetable production. The main vegetables grown include cabbages, spinach, lettuce, green peppers, beetroot, and butternuts. Nevertheless, there has also been an increase in the production of baby vegetables such as baby marrow and patty pan (NAMBoard 2016). There is a high increase in vegetable imports and the factors contributing to the increase in imports are scarce and erratic rainfall (NAMBoard 2016).

2.3 Marketing of vegetables in Eswatini

The supply chain for vegetables in Eswatini consists of the input supply, production, distribution, packaging and retailing sub-sectors (Figure 2.1). Different stakeholders participate in these sector divisions. It is worth noting that the interest in this study is on the pathways vegetables produced by the farmers are channelled through; hence, the input supply has been left out. The produce is channelled through formal and informal marketing channels. From the farm, the produce can be sold directly to informal marketing channels comprised of hawkers (vending in local towns and street corners) and individuals. Depending on the agreements between the farmer and the trader (vendor), the produce can be collected directly at farm-gate or the farmer delivers the produce to the vending market station. On the other hand, formal marketing channels comprise of selling via market intermediaries (private pack-houses, NAMBoard) and directly to supermarkets, the hospitality industry (hotels, fast food restaurants, etc.) and through exports.
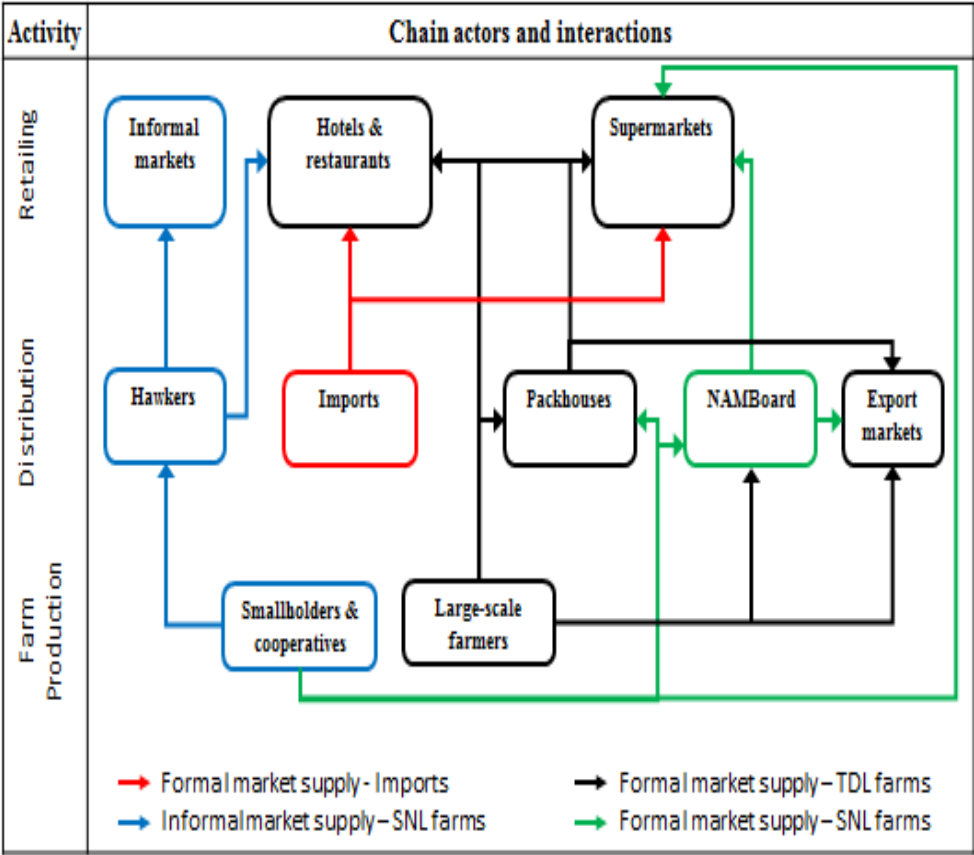

Figure 2.1: Vegetables supply chain in Eswatini
Source: Field survey (2017)

Modern and traditional marketing channels have different procurement processes and activities, which attract costs (transaction costs) such as post-harvest handling, quality control, transportation or delivery and packaging requirements. However, to increase their revenue and spreading market risks, some farmers opt to sell in more than one marketing outlet.

The National Marketing Board (NAMBoard): this is a government parastatal which was established through the Act of 1985 of Eswatini to provide technical support to farmers to enhance local production and marketing of agricultural produce. NAMBoard's activities include registration of wholesale distributors, importers and exporters; and to perform various activities in the value chain of agricultural produce from production to selling (NAMBoard website 2016). The organization facilitates market linkages, distribution (transportation), training and quality control. It has a fresh wholesale produce market that is located at Ncabeni in the Manzini region (the hub of Eswatini), where produce from farmers is graded, packed and stored for distribution to the local markets (retail stores, large scale vendors) and exports (NAMBoard website 2016). The organization has the infrastructure, facilities (refrigerated transport, packaging) and man-power to ensure collection from smallholder farmers and distribution to retailers and restaurants countrywide. The extension officers carry out site visits to the farms and issue farmers with production schedules of the types of vegetables demanded by NAMBoard customers before the season resumes. Once the produce is ready, the farmers inform NAMBoard who then conduct quality inspections. Upon completion of inspection at farm-gate, the produce is then taken to the produce market at Ncabeni for final quality inspection, where grading and proper packaging according to the specifications of the customers is done. The produce that does not meet the quality standards is taken back to the farmer and payment for the produce that was approved during the final inspection is processed and received by the farmer 5-8 weeks later.

The parastatal plays a role in the marketing of vegetables as the produce marketing organization. Bienabe *et al.* (2007) suggest that produce marketing organizations strengthen the position of smallholder farmers in traditional and modern markets through the provision of technical support and enabling policies. NAMBoard procured an equivalent of 9.6 million Emalangeni worth of conventional vegetables from local smallholder farmers in 2016; which is equivalent to 2,600 metric tonnes (NAMBoard 2016). Produce purchased by retailers from

local suppliers increased from 5,622 to 5,900 metric tonnes in 2016. This translates to an increase from 21.7 million Emalangeni to 45 million Emalangeni (NAMBoard 2016).

2.4 The retail industry in Eswatini

The emergence of chain supermarkets in Eswatini dates back to 1986; however, a majority of the country's supermarkets started operations early in the 21st century. The rapid growth of the sector is, therefore, a fairly recent phenomenon and is mostly dominated by South African large chain supermarkets, namely Spar, Pick 'n Pay, Shoprite, Woolworths, Boxer and Savemore, (recently renamed the OK Mini Market). Emongor (2008) reported that in 2007 there were 21 large chain supermarket outlets in Eswatini; Shoprite and Spar had even stores each. Table 2.1 shows that the number of outlets has more than doubled to 49 by 2017, and new chain stores such as Boxer and Food Lovers Market have entered the market. Shoprite currently has the most outlets (15), followed by Spar.

Table 2.1: Number of retail food supermarkets in Eswatini in 2008 and 2017

Store Name	Number of chain outlets (2008)	Number of chain outlets (2017)	Percentage of Stores (2017)
Shoprite	7	15	30.6
Spar	7	11	22.4
OK food market	N/A	8	16.3
Pick n Pay	4	6	12.2
Boxer superstore	-	4	8.2
Woolworths	3	4	8.2
Food Lovers Market	N/A	1	2.1
TOTAL	**21**	**49**	

Source: Emongor (2008); Field survey (2017).

A majority of these supermarkets are strategically located in the Manzini-Mbabane corridor, which is a relatively populated area with a mixture of low to moderate-income earners. Figure 2.2 shows a map of Swaziland and the geographical location of the chain supermarket outlets.
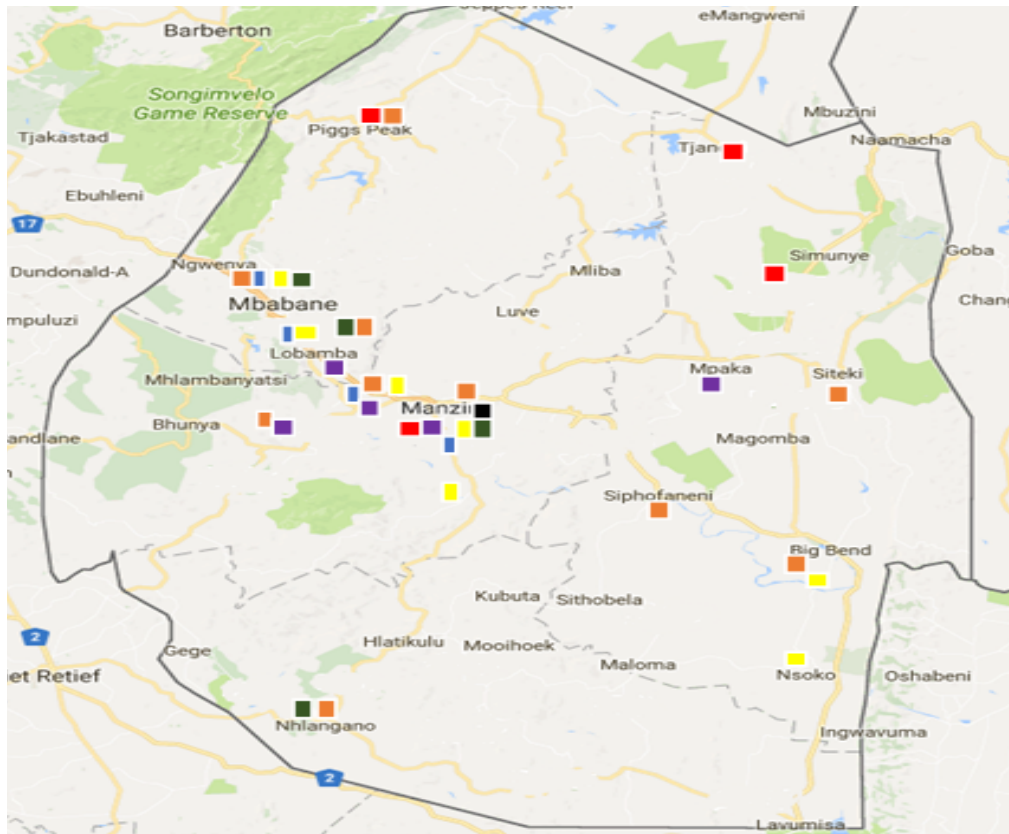
Figure 2.2: Map of Eswatini showing the location of chain supermarkets
Source: Field survey (2017)

Key:

🟧	**Shoprite**
🟪	**Savemore/Ok mini market**
🟥	**Boxer**
🟦	**Pick n Pay**
⬛	**Woolworths**
🟩	**Food lovers market**
🟨	**Spar**

The food retail chains include large chain supermarkets such as Pick n Pay, Spar, Shoprite, Boxer, Food Lover's Market and Woolworths Foods, under different management. These retailers are mostly located in shopping malls and at city outskirts, i.e. Manzini-Mbabane corridor. Local entrepreneurs have also entered the industry by operating under foreign companies such as OK food market and are also strategically located in the most populated areas with a mixture of low to moderate-income earners, i.e. Matsapha-Manzini corridor.

2.5 Supermarket procurement practices and its impact on smallholder farmers

Retailers increasingly specify stronger standards for fresh produce and suppliers have no choice but to satisfy these requirements in order to be included in the chain (Zeller *et al.* 1998;

Bienabe and Vermeulen 2007; Van der Heijden and Vink 2013). Louw *et al*. (2009) state that the evolution of supermarkets involves strict coordination and integration within a supply chain to meet consumer demands. Supermarkets require good quality packed ready to be shelved produce to be delivered to the outlets which requires the implementation, maintenance and auditing systems and procedures to be put in place, which may be complex, costly and requires time (Bienabe and Vermeulen 2007). To ensure continued delivery of the promise to consumers, supermarkets opt to engage suppliers that have the ability to deliver the right product at the right time and place (Boselie *et al.* 2003; Bienabe and Vermeulen 2007). Retailers may monitor suppliers if they are found to be lacking technical competence and market knowledge (Dolan and Humphrey 2000). Farmers have no choice but to adapt to being included in formal marketing channels. Large-scale farmers have the capacity to meet the quality and quantity requirements set by supermarkets consistently, unlike smallholder farmers (Pingali *et al.* 2005). Most often, foreign supermarkets tend to bring their international business practices which include standards (Hualda 2015), procuring produce through distribution centres, or importing from parent countries they trust (Dolan and Humphrey 2000; Ruben *et al.* 2007; Gagalyuk and Hanf 2009). In Eswatini, the active role played by NAMBoard of providing technical support, global Good Agricultural Practices (GAP) skills and transport provides an opportunity for smallholder farmers to supply supermarkets indirectly since NAMBoard also supply retailers.

2.6 Relevancy of buyer-seller relationships

Procurement changes by formal markets have resulted in the establishment of sustainable inter-organizational relationships within the supply chains, involving contractual arrangements binding the relationships (Fischer and Hartmann 2010). Relationships can be used as a resource for creating other resources, product innovation, process improvement or access to other parties (Batt 2003). The new procurement requirements emphasise mutual benefits between collaborating trading partners (Shahab 2014). The buyer-supplier relationships are related to working together for a mutually beneficial relationship. Its importance has been recognized due to the globalized, competitive and complex market place (Shahab 2014). Shahab (2014) urges that the procurement decision is related more to the relationship between the trading partners than the price. Relationship quality involves the assessment of the strength of a business relationship (Schulze *et al.* 2006; Hartmann *et al.*

2010). Aji (2016) concurs that a buyer-supplier relationship based on trust and commitment brings in benefits for both parties. New quality requirements by the buyers boost the need for supply chain transparency and good relationship quality between trading partners; this leads to loyalty on the farmer's side and lower buyer switching behaviour is expected (Schulze *et al.* 2006). Hartmann *et al.* (2010) state that food retailers have been forced to get more product information along the food supply chain to ensure food quality and consumer preferences. Therefore, collaborative efforts involving information asymmetry with trading partners in the supply chain are fundamental. Buyer-seller relationship quality has been described as involving three dimensions: satisfaction, trust and commitment (Schulze *et al.* 2006; Hartmann *et al.* 2010; Aji 2016). These three dimensions are described below.

Satisfaction

Hartmann *et al.* (2010) state that relationship satisfaction is the feeling of contentment and gratification that arises when the needs or desires have been fulfilled. It arises when the exchange performance between the parties exceeds expectations (Batt and Rexha 2000; Batt 2003). Trading parties evaluate the degree to which their expectations have been met and a sustainable relationship is the one with met expectations, which further enhances continuity of the relationship (Hartmann *et al.* 2010). Relationship satisfaction is influenced by good previous experiences between supplier and buyer (Hartmann *et al.* 2010; Aji 2016). It indicates an equitable relational exchange which gives both parties assurance about each other's welfare. The more satisfied the partners are by the economic rewards from the relationship, the more they feel the relationship is based on trust (Batt 2003). Therefore, repeated successive transactions lead to an increase in relationship satisfaction and trust (Batt 2003).

Trust

Masuku and Kirsten (2004) regard trust as an asset that creates benefits for a firm. It is developed by a constant and detailed exchange of information which reduces the uncertainty of performance. Relationship trust involves repeated relational encounters between trading parties (Hartmann *et al.* 2010). With commercial transactions occurring globally, trust has become increasingly important. Batt and Rexha (2000) argue that trust is not necessary if there is no vulnerability and uncertainty. Hartmann *et al.* (2010) regard trust as a safeguard mechanism which can be replaced with a marketing contract. The authors add that due to high

uncertainty and risk in international business, trust influences the way transactions are done (Liu *et al.* 2009). Ruben (2007) states that relationship trust safeguards opportunistic behaviour and reduces transaction costs. Trading partners use previous experience (honesty, integrity, competence, reliability, considerations or responsibility of the other partner) to gauge trust (Ruben 2007).

Commitment

Batt (2003) states that when one of the trading partners feels that the relationship has been undermined, the partner might reduce commitment in the relationship. When the supplier and buyer are both confident of trust in the relationship they become committed to the relationship. Relationship commitment refers to an implicit or explicit pledge of relational continuity between exchange partners (Dwyer *et al.* 1987) which is indicated by the resources dedicated to the contract by the buyer and seller (Naidu 2012). Committed partners are prepared to make short-term sacrifices for long-term gain (Dwyer *et al.* 1987). However, when one party is not certain about the product price, commitment in the relationship is reduced (Darroch and Mushayanyama 2006). Hartmann *et al*. (2010) argue that the more committed one is in the relationship the less likely that person would switch business partners. Commitment enhances sustainability in the relationship since the partners are likely to continue working with each other (Hartmann *et al.* 2010). Darroch and Mushanyama (2006) argue that for the partners in the supply chain to cooperate and show more commitment in the relationship, a higher level of trust is required. Continuous communication and information sharing are other contributing factors in the buyer-seller commitment to the relationship, which augments proper planning concerning the crop to be cultivated and its location on the farm (Darroch and Mushayanyama 2006).

2.7 Traceability in agricultural food supply chains

Changing lifestyle and rising income have resulted in a shift from quantity-oriented agriculture to a "quality, safety, functional and sustainable agriculture". This has further led to an emphasis on the adoption of traceable supply chains (Opara 2003). Modern consumers demand food that is fresh, palatable, nutritious and safe. The link between consumer demands and the reputation of outlets encourages supermarkets to adopt good practices to compete with other marketing outlets. Supply chain traceability is part of good quality management systems in agriculture. The food quality management system integrates traceability for improved

product quality, safety management and strengthening overall agribusiness coordination. All participants (producers, processors, manufacturers, distributors) in supply chains have the responsibility to ensure food safety. They need to ensure that every precaution has been taken to prevent contamination.

Food quality management systems ensure products can be traced back to the inputs and the original producer and any other participant in the supply chain. Nowadays, traceability has become a new index of quality and a basis for trade in agricultural products (Opara 2003).

Traceability reduces inefficiencies and problems in the firm, thereby influencing the firm's effectiveness and performance. The firm that implements traceability is able to put in place operational procedures and use resources efficiently (Alfaro and Rábade 2009). In addition, it reduces information asymmetry within the supply chain, which further enhances timely reporting and planned decision making within the supply chain (Buhr 2003). Furthermore, traceability improves effectiveness and enhances customer satisfaction by providing product information (Khan *et al.* 2018).

2.8 Factors influencing marketing channel selection

Marketing channels involve the integration of smallholder farmers in input and output markets (Adenegan *et al.* 2012). Understanding the factors influencing the choice of marketing channels is important since it could enhance the exploitation of production possibilities, farm income and investment (Soe *et al.* 2015). The information helps in the development of mitigation strategies of the factors thereby encouraging farmers to achieve their goals (Park and Lohr 2006). Each marketing channel is characterized by different profitability and cost structures (Soe *et al.* 2015) and for that reason, it is important for the smallholder producer to understand the characteristics of each channel. Park and Lohr (2006) state that producers' marketing choices influence the gross income earned at the end of the season. However, access to the different marketing channels is limited by poor infrastructure, poor access to credit and marketing facilities and information (Soe *et al.* 2015).

2.8.1 Socio-economic characteristics

Most prior research and more recent studies have shown that the farmers' characteristics have a significant influence on supermarket participation (Adenegan *et al.* 2012; Akinlade *et al.* 2013)**.** Education helps farmers better adjust to new production and marketing requirements and become more innovative, hence, more likely to participate in supermarket channels (Rao and Qaim 2011). Namazzi *et al.* (2015) posited that age and education influence the decision to participate in modern marketing channels for grain amaranth in Uganda using a Heckman two-stage regression model. Siziba *et al.* (2011), using the same model, showed empirical evidence in their study of a significant negative effect of household size on marketing channel participation for cereal in eight Sub-Saharan African (SSA) countries. Rao and Qaim (2011) state that farmers engaged in off-farm employment are more likely to participate in supermarket channels since the income obtained from the employment is used to acquire capital to create marketable surplus necessary for participation in the channel; especially when the farmer has credit constraints. The additional capital is used to meet the procurement requirements such as quality, quantity, transport, and packaging (Reardon *et al.* 2009). Assets such as land, irrigation facilities, storage infrastructure and transport facilities could result in the exclusion of farmers in the supermarket channel (Louw *et al.* 2008a). Being a member of a farmer association or cooperative is perceived to lower average fixed transaction costs since, as a group, farmers have bargaining power and financial muscle to take legal actions in cases when there is a breach of contract by the buyers. Therefore, being a member of a cooperative has a positive effect on the welfare of those participating in the modern markets (Barrett *et al.* 2012).

2.8.2 Institutional variables

Support from Non-Governmental Organizations (NGOs) influences farmers' access to supermarket channels. In Kenya, the Farm Concern International (FCI) NGO negotiated with supermarkets on behalf of farmers and facilitated farmers' collective action, training on production techniques and supermarket requirements (Rao and Qaim 2011). The activities provided by NGOs enhanced the reduction of transaction costs that would have been incurred; instead, it contributed to making smallholder farmers more reliable (consistent supply) trading partners for supermarkets (Rao and Qaim 2011) which is the main challenge faced by smallholder farmers when supplying supermarkets. Natawidjaja *et al.* (2014) argue that

farmers' associations or cooperatives enhance farmers' participation in modern marketing channels. Collectively, farmers can mobilize the procurement of inputs, transport, packhouse, etc. (Natawidjaja *et al.* 2014). This reduces the transaction costs associated with supplying supermarkets such as delivery, packaging, etc. Access to credit increases the production and marketing possibilities for the farmer to participate in modern marketing channels (Natawidjaja *et al.* 2014). Therefore, a positive relationship between access to credit and modern marketing channel choice is expected. Contrastingly, Rao & Qaim (2011) found a negative significant relationship between supermarket participation and access to credit. The availability of marketing information also influences channel choice decisions of farmers (Soe *et al.* 2015). Soe *et al*. (2015), using the multinomial logistic regression model, revealed that the availability of marketing information was statistically negative at the 5% level in selling paddy rice at farm-gate in Myanmar.

2.8.3 Market attributes

Incentives such as a contract offer and premium prices for produce significantly influence the decision to select a supermarket channel (Natawidjaja *et al.* 2014). Andersson *et al.* (2015) concur that the decision to participate in the marketing channel depends on whether the farmer has been offered a contract. The provision of a resource contract, where the farmer will receive production inputs and credit, would influence the farmer to participate in a supermarket channel (Reardon *et al.* 2009). Farmers accept procurement contracts when the subjective expected welfare level to participate in the modern channel exceeds that of not participating in the channel. The farmer's subjective expected welfare level is perceived to be changed by what is provided in the contract, which could be price stability, credit, production inputs and technical support (Barrett *et al.* 2012). On another note, a higher price paid by modern marketing channels relative to the price paid by traditional marketing channels acts as an incentive for farmers to adhere to the contract between the supplier and the buyer and reduces price risk (Reardon *et al.* 2009; Siziba *et al.* 2011).

2.8.4 Transaction costs

Procurement requirements associated with production volumes, quality (storage facilities), consistency and transportation to the marketing outlet are costly and may reduce the farmers' choice of marketing channel participation (Barrett *et al.* 2012; Natawidjaja *et al.* 2014). These

may include physical structures, roads and communications. Natawidjaja *et al*. (2014), using the probit model, showed empirical evidence of a significant positive effect of the distance from the farm to the main road on participation in modern marketing channels.

2.9 Empirical evidence of impacts of modern marketing channel participation

Many sections of the literature (Barrett *et al.* 2012; Ismail 2013; Arinloye *et al.* 2015; Muricho *et al.* 2015; Muriithi and Matz 2015; Mmbando *et al.* 2016) in agricultural marketing have shown that marketing channel participation had significant effects resulting in improved livelihoods.

2.9.1 Impact on household welfare

Mmbando *et al.* (2015) used consumption expenditure per capita to measure household welfare and discovered that, on average, maize and pigeon pea market participation increased consumption expenditure per capita by a range of 19-20% for households participating in the maize market and 28.3-29.4% for households participating in the pigeon pea market. Rao and Qaim (2011) used the Endogenous Switching regression model and discovered that participating in supermarket channels in Kenya reduced the incidence of extreme and moderate poverty by 20% for vegetable farmers. This was due to higher prices and productivity achieved by suppliers participating in the supermarket channels. Muriithi and Marts (2015) also found similar results and concluded that the commercialization of vegetables had positive effects on household welfare.

2.9.2 Increase in household income

Rao and Qaim (2011) discovered a positive net income effect of 48% with supermarket participating households than with non-participants in Kenya. Andersson *et al.* (2015) explored income differences between farmers who continued supplying High-Value Markets (HVMs) and farmers supplying traditional markets. The authors concluded that being in HVMs was associated with higher incomes while dropping out led to significant income loss. Rising incomes contribute to better dietary quality and higher demand for more nutritious foods, including vegetables, fruits and animal products (Andersson *et al.* 2015). Reardon *et al*. (2009) argue that farmers selling through the modern channel could receive a relatively higher price for the product than in traditional markets to encourage the farmer to adhere to the

contract and provide consistent product supply. The higher price could also be compensation for sorting, grading and higher quality produce which is not catered for in the traditional market. Besides the higher price, the farmers could also have a resource-provision contract, enabling the farmer to have access to production inputs and credit (Reardon *et al.* 2009).

2.9.3 Increase in crop productivity

The modernization of food supply chains presents great opportunities for agricultural development and poverty in developing countries (Rao *et al.* 2012). Using propensity score matching (PSM) and a meta-frontier approach, Rao *et al.* (2010) reveal that participation in supermarkets increased productivity for vegetable farmers in Kenya by 35-38%. Reardon *et al.* (2009) concur that participation in the modern market can impact overall crop productivity. Barrett *et al.* (2012) argue that farmers that have procurement contracts are motivated to efficiently allocate their resources for optimum production since exposure to price and output risk is reduced. These farmers are motivated to invest in high yield stability technology, e.g. irrigation facilities, fertiliser or improved varieties which have the potential to increase crop productivity.

2.10 Chapter Summary

In this chapter, a general overview of vegetable production, marketing and retailing in Eswatini has been presented. The relevancy of the supplier-buyer relationship has also been reported, which has narrated the relationship attributes of interest in the study. The empirical evidence on the determinants of the choice of marketing channel by smallholder farmers was also presented. The chapter also examined some theoretical and empirical literature on the effects on modern marketing channel participation. The literature has shown that there are several techniques used in determining the effects of supermarket channel participation.

So far, the pieces of the literature reviewed indicated that supermarket participation and its impact on smallholder farmers is very rare in Eswatini. Hence, the study aims to fill the void in the literature.

CHAPTER 3: A THEME NETWORK ANALYSIS OF PERTINENT ISSUES IN THE NEXUS BETWEEN SMALLHOLDER FARMERS AND SUPERMARKETS IN THE VEGETABLE VALUE CHAIN OF ESWATINI[1]

3.1 Introduction

In this chapter, the methodology and the empirical results regarding supermarket procurement practices and pertinent issues in the vegetable value chain are presented and discussed. The rest of the chapter is structured as follows: Section 3.2 presents the theoretical foundation, conceptual framework, estimation techniques and the description of variables used in the empirical models. Section 3.3 constitutes the research design and study area. The sampling and data collection technique is presented in section 3.4 and data analysis follows the section. In section 3.6, the empirical results and discussions are presented while section 3.7 concludes the chapter with a summary.

3.2 Theoretical foundation

3.2.1 Complex system and network analysis

Network analysis can be used to study the supply chain ecosystem (Battini *et al.* 2007) and to improve the performance of an organization. The greater the number of connections, system integration and product varieties the greater is the complexity of the supply chain. Complexity causes the supply chain to be inflexible thereby increasing indirect costs (Battini *et al.* 2007). According to Ladyman *et al.* (2013), a complex system is a structure with variations and is difficult to understand. It is determined by the number of components in the system and the intricacy of interfaces between the components (Ladyman *et al.* 2013). It involves multiple interactions between many different components that are interdependent (Ladyman *et al.* 2013). Bozarth *et al.* (2009) describe a complex system as a complicated structure with multiple interactions among many components. It is characterised by continued adjustment

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[1] This chapter is based on the following paper: Dlamini-Mazibuko, B.P., Ferrer, S.R.D. and Ortmann, G.F. A theme network analysis of pertinent issues in the nexus between smallholder farmers and supermarkets in the vegetable value chain of Eswatini. Submitted to *Agroecology and Sustainable Food Systems Journal*. (Under review)

and reaction by economic agents[2] because of changes in the environment and market behaviour of others (Bozarth *et al.* 2009; Li *et al.* 2010; Butler 2016). Changes in the environment may include policy regulations, competition, and interactions with others which compel economic agents to evolve and self-organize over time (Pathak *et al.* 2007; Li *et al.* 2010).

These key informants (retailers, distributors, producers, regulators, etc.) form a complex supply chain network. Alexander *et al.* (2011) define a supply chain network as a network of independent individuals involved in different activities that provide goods and services to customers. The interdependence amongst these economic agents contributes to the complexity (Pathak *et al.* 2007; Bellamy and Basole 2013; Hualda 2015). The complexity can be internal and external with regard to the interactions or connections with the other stakeholders in the system (Bozarth *et al.* 2009). Internal complexity is displayed by the retailers' procurement requirements, procedures, planning and control systems put in place (Bozarth *et al.* 2009). However, external complexity is outside the control of the retailers; it comes from the interaction of the stakeholders in the supply chain such as regulators, input providers, producers and consumers (Bozarth *et al.* 2009). Battini *et al.* (2007) state that there is a need to improve internal and external processes in order to achieve the goals of reducing transaction costs and improving consistent supply.

Bezuidenhout *et al.* (2013) suggest the use of Theme Network Analysis (TNA) to understand complexity in supply chains. TNA is defined as a systematic tool used to identify critical points within a network where interventions could be targeted (Bezuidenhout *et al.* 2013). It has the potential of proving a more informed and holistic internal supply chain approach (Alexander *et al.* 2011). Network analysis is described as a valuable tool for enhancing organizations and supply chain performance (Battini *et al.* 2007; Alexander *et al.* 2011). Bezuidenhout *et al.* (2013) argue that complexity within industries inhibits the identification of opportunities for improvement. Therefore, the study employed the TNA to understand the complex procurement system of vegetables by formal markets in Eswatini.

TNA can be used to assess coordination in the supply chain (Kaur *et al.* 2006). When the system has limited knowledge, network analysis is appropriate (Bezuidenhout *et al.* 2012).

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[2] Consumers, retailers, distributors, farmers, etc.

There is a growing recognition of TNA in supply chain studies (Battini *et al.* 2007; Pathak *et al.* 2007; Bellamy and Basole 2013; Pennacchioli *et al.* 2014). These authors have argued that TNA enhances the performance of supply chains by enabling understanding of the supply chain.

3.3 Research design and study area

The empirical basis for this research is qualitative data co-constructed through semi-structured interviews with key informants working in the vegetable supply chain in the kingdom of Eswatini. The key informants included personnel from major supermarket chains, distributors (pack-houses), a farmers' union representative, a regulator (state-owned produce marketing organization), extension officer, exporter, and large-scale farmers within the Manzini and Mbabane corridor. Respondents were purposively selected with the view of being, directly and indirectly, involved in the vegetable supply chain as buyers (supermarkets), producers, distributors and serving the interest of farmers (farmers union). Large-scale farmers are regarded as the suppliers of retailers since they have the capacity and resources to meet the procurement requirements set by supermarkets (Gagalyuk and Hanf 2009). Two cities, Manzini and Mbabane, were selected for the study because the majority (71%) of the chain supermarkets are located in these areas. The Manzini region is the most populated area in the country with nearly one-third of the population (31.3%); it covers the city (Manzini), which is the hub of Eswatini, and the industrial site Matsapha (Kariuki and Leigh 2016). The Hhohho region, where the capital city Mbabane is located, is the second largest with 28% of the population (Kariuki and Leigh 2016).

3.4 Sampling and data collection

Two approaches were adopted for this study. The first approach is an inquiry involving all the key informants. The purpose of the inquiry process was to establish the issues pertaining to the procurement of vegetables from smallholder producers. Interviews were initiated through telephone calls and personal contact. In total, 15 face-to-face interviews were conducted (Table 3.1), where each interview took 15 to 30 minutes.

Table 3.1: Profiles of stakeholders interviewed during the inquiry stage

	No. of respondents
Supermarket representative	7
Distributors	3
Large-scale farmer	1
Farmer/exporter	1
Smallholder farmer	1
Extension officer	1
Farmers' union representative	1
Total	15

Source: Field survey (2017)

Out of 15 interviews held, eight were with retailers. Since some chain supermarkets were under the same management, only one representative was interviewed in order to avoid repetition. The interviews were also divided into two sessions; the first session involved asking the respondents seven open-ended questions. This session allowed the respondents to elaborate more on procurement issues (challenges and strategies). The questions asked were based on procurement aspects by formal markets from smallholders. The questions have been stated in Appendix F.

The second session of the interviews was only applicable to supermarkets and distributors, where a structured questionnaire was used to acquire information about the procurement practices adopted, such as the arrangements with producers, proportion of vegetables procured, procurement criteria, etc.

In the second approach, network analyses were employed to structure and present the information acquired, where responses from informants were used to develop the theme network of pertinent issues (challenges and strategies) in the procurement system. The responses were first captured on notepad software, where each issue identified became a separate vertex (dot) in the network. Then issues that were directly related to each other were connected. For instance, the vertex 'supply inconsistency' was directly related to the lack of finance (Figure 3.4). The notepad file was then opened in Pajek software, which facilitated the network analysis, connection, visualization, and presentation of the issues (De Nooy *et al.* 2011). Following Bezuidenhout *et al.* (2013), the network of issues was then energized by the Kamada and Kawai (1989) transformation technique which enhances the connectivity of the issues raised (Kamada and Kawai 1989). Closely related vertices are systematically

positioned close to one another using the energizing technique (De Nooy *et al.* 2011). The size of the vertex indicates the relative importance of the vertex/issue and also indicates where intervention needs to be targeted (Bezuidenhout *et al.* 2013).

3.5 Data analysis and network development

Responses from informants were used to develop the theme network of pertinent issues (challenges and strategies) in the procurement system. The responses were first captured on notepad software, where each issue identified became a separate vertex (dot) in the network. The notepad file was then opened in Pajek software, which facilitated the network analysis, connection, visualization, and presentation of the issues (De Nooy *et al.* 2011). Then issues that were directly related to each other were connected. For instance, the vertex 'supply inconsistency' was directly related to the lack of finance (Figure 2.4). Following Bezuidenhout *et al.* (2013), the network of issues was then energized by the Kamada and Kawai (1989) transformation technique which enhances the connectivity of the issues raised (Kamada and Kawai 1989). Closely related vertices are systematically positioned close to one another using the energizing technique (De Nooy *et al.* 2011). The size of the vertex indicates the relative importance of the vertex/issue and also indicates where intervention needs to be targeted (Bezuidenhout *et al.* 2012).

3.6 Results and discussion

In this section of the chapter, the empirical findings that emanated from the theme network analysis used to identify the pertinent issues in the procurement of vegetables by supermarkets from smallholders are presented.

3.6.1 Description of the Case Study Supermarkets

The supermarket chains that participated in the study operated more than one outlet (range 2-15). The estimated number of employees from some of the chain stores ranged between 80 and 280. The case study supermarkets procured vegetables from three channels: 100% procure directly from smallholders, 87.5% from South Africa and 62.5% from local distributors. The retailers mostly procured highly perishable green vegetables (e.g. spinach, lettuce and cabbage) from the local farmers. These findings are similar to those obtained by

(Moyo 2010), who found that supermarkets tend to specialize by buying particular categories of products from local farmers and use other market channels to procure other products.

Producers are expected to deliver the produce more especially the green leafy vegetables (cabbages, spinach, lettuce) directly to supermarkets relatively early in the morning of the harvest period between 06:00-09:30 hours. Delivery depends on the time of the month and season; otherwise, on average, it is between two to three days per week. For instance, with lettuce, a farmer may be expected to deliver 150 to 200 heads per day twice per week. The payment duration and method varies from one supermarket to the next. It takes between one to 30 days for payment to be made to smallholders depending on the quantity delivered and the value of the produce. Some respondents stated that deliveries valued at less than E1000[3] are paid for by cash and those valued above are paid for within 14 to 30 days through electronic funds transfer or by cheque.

3.6.2 Criteria for supplying supermarkets

Figure 3.1 shows the top three criteria that smallholders need to meet to supply the stores. As reported by all respondents these were: bringing a sample of fresh produce, having access to transport, and meeting quality and quantity requirements. Once the sample is approved then the two parties agree on the quantity to be supplied. Retailers use observable output characteristics such as size, colour and quantity to select farmers to supply their outlets (Ruben *et al.* 2007). However, it is evident that quantity and access to transport are more important in Eswatini.

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[3] 1 Lilangeni (E1), Swazi currency is equivalent to 1 Rand
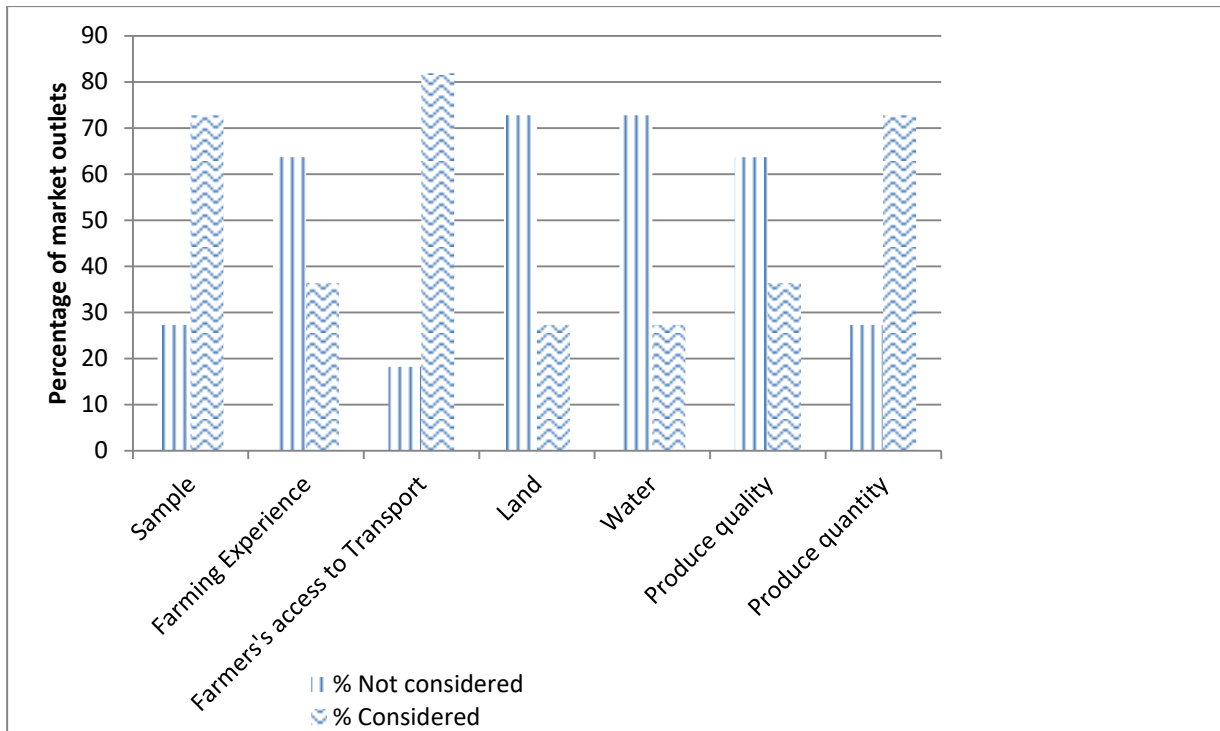
Figure 3.1: Sourcing and procurement criteria for vegetables from smallholders by case study supermarkets, 2017

Source: Field survey (2017)

Contrary to expectations that institutional buyers would engage in contractual agreements with suppliers of produce as a risk management and coordination strategy, none of the supermarkets in this case study had formal written contracts with the smallholders. Reasons for the lack of written contractual agreements are linked to the challenges faced by the farmers (lack of finance to adhere to the requirements consistently). Instead, the supermarket representatives stated that procurement from smallholders was more of social responsibility and following the country's regulations of procuring local produce.

3.6.3 Proportion of vegetables procured by supermarkets from smallholders in 2014-2016

The average proportion of green vegetables procured from local smallholders was fairly constant over the past three years ranging from around 17% in 2014 to 12% in 2016 (Figure 3.2). Some respondents reported that some of their usual suppliers were greatly affected by the El Niño drought that occurred in the 2015-2016 season; hence, the further decrease of supply in 2015-2016.
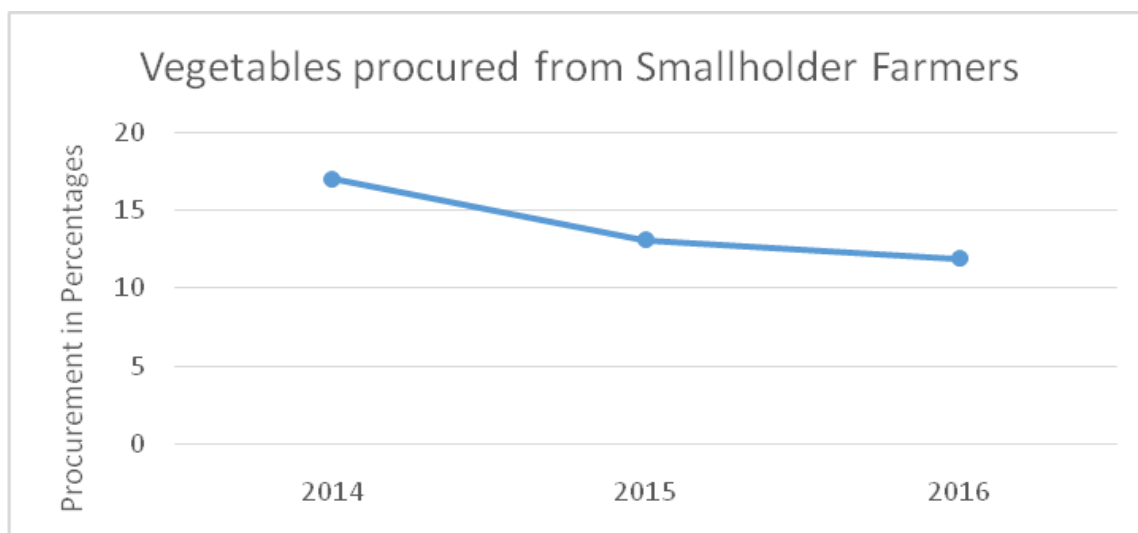
Figure 3.2: Proportion of vegetables procured by supermarkets in Eswatini from smallholders in 2014 to 2016

Source: Field survey (2017)

3.6.4 Pertinent issues raised by informants[4]

The theme network shown in Figure 3.3 identified pertinent issues in the nexus between smallholders and supermarkets in the vegetable value chain. The key themes are inconsistent supply, high procurement requirements, lack of finance and transport, and high transaction costs as indicated by the large size of the vertexes. Furthermore, these themes are closely linked to each other, which could imply that solving one theme may have spill over effects on the other. For instance, inconsistency with supply is closely related to lack of transport. Producers are expected to deliver fresh produce to the market outlets consistently if they want to be included in the marketing channel, which has the potential of providing consistent income to improve their livelihoods (Rao and Qaim 2011). Lack of finance is closely related to low produce quality and the access to finance that will enable the producer to procure the right quality of inputs and be able to handle fresh produce at farm level to retain quality (Louw *et al.* 2008b; Asfaw *et al.* 2010; Natawidjaja *et al.* 2014). Therefore, these issues cannot be resolved in isolation; all the other related issues would need to be considered by all stakeholders in supply chains such as policy-makers, distributors, retailers, and producers.

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[4] Supermarkets, distributors, farmers union representative, exporter, large-scale farmer and extension officer
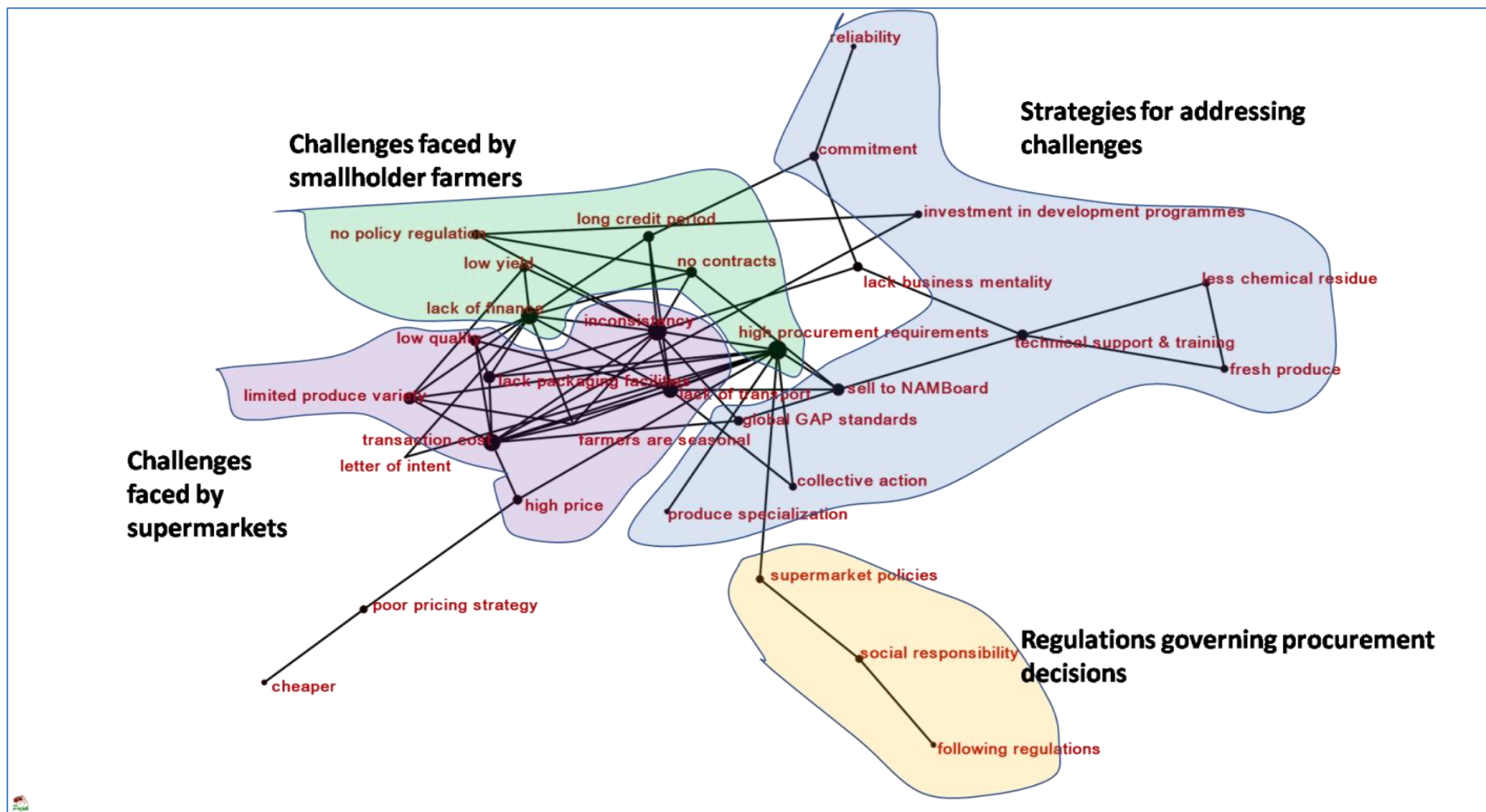
Figure 3.3: Theme network of pertinent issues related to the procurement of vegetables from smallholder producers and their connectivity, 2017

Source: Field survey (2017)

The five major interrelated key themes have been extracted from Figure 3.3 and presented in Figure 3.4 for further clarification. The analysis depicts that inconsistent supply and high transaction costs are also directly linked to three key themes. Specifically, the inconsistent supply theme is directly linked to poor access to finance, transport and high procurement requirements; and high transaction costs are directly linked to inconsistent supply, poor access to transport and high procurement requirements.
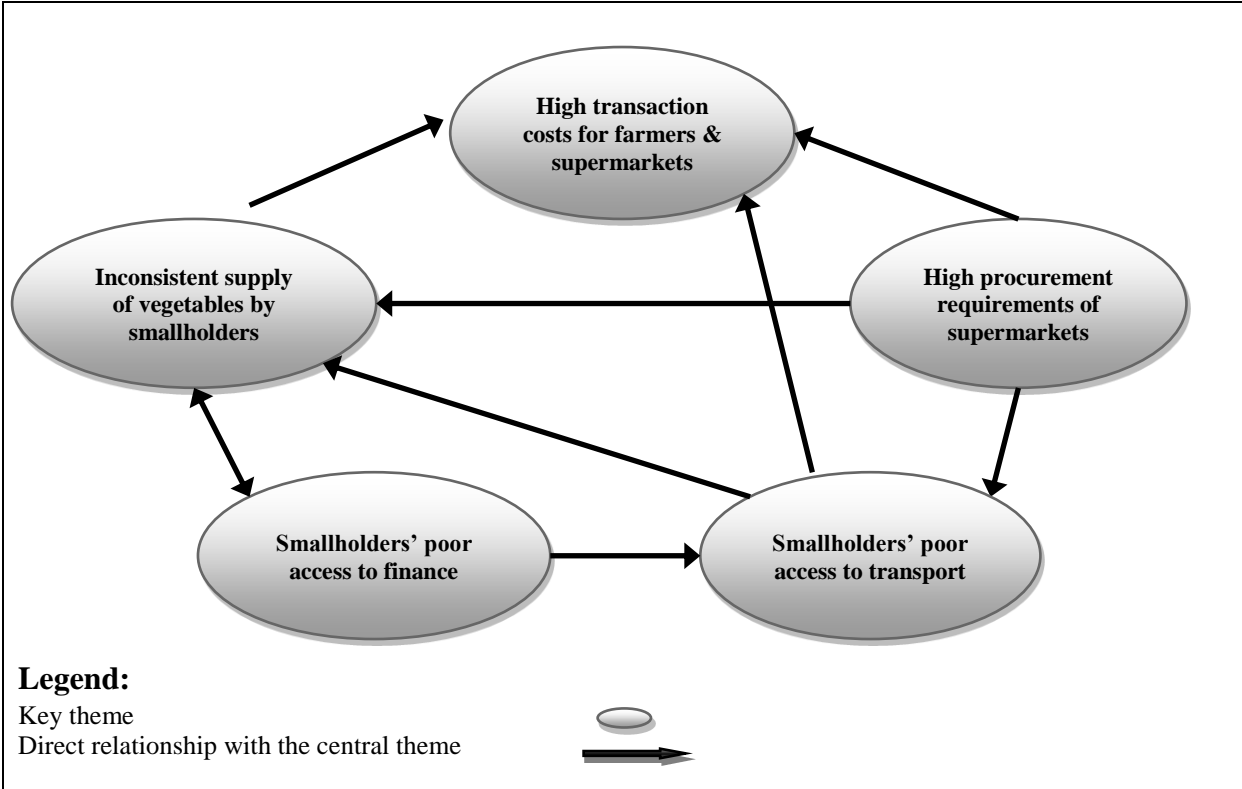
Figure 3.4: Key interrelated challenge themes in the smallholder farmer-supermarket nexus in the vegetable value chain of Eswatini
Source: Field survey (2017)

All issues relating to the inconsistent supply of vegetables by smallholders in Eswatini are depicted in Figure 3.5. The figure illustrates that 11 themes have a direct link to inconsistent supply and these include three key themes. This implies that reasons for the inconsistent supply of produce include high procurement requirements by supermarkets, poor access to finance and transport, long payment duration (long credit period) by supermarkets, seasonal production by farmers, low quality produce, lack of packaging facilities, unavailability of policy regulation governing the industry, no marketing contracts issued to farmers by supermarkets, and farmers lack of business acumen (commitment, reliability and training). Bienabe and Vermeulen (2007) agree that supermarkets require a high quality and food safety

systems in place at the farm level and pack-houses such as global Good Agricultural Practices (GAP) and Hazard Analysis and Critical Control Points (HACCP). According to Pritchard *et al.* (2010), producers may be required to acquire specialized equipment, technology and/or certification to comply with requirements set by the buyers. The cost of compliance with these "regulations" creates a barrier to market entry for many smallholder farmers (Pritchard *et al.* 2010; Richards *et al.* 2013).
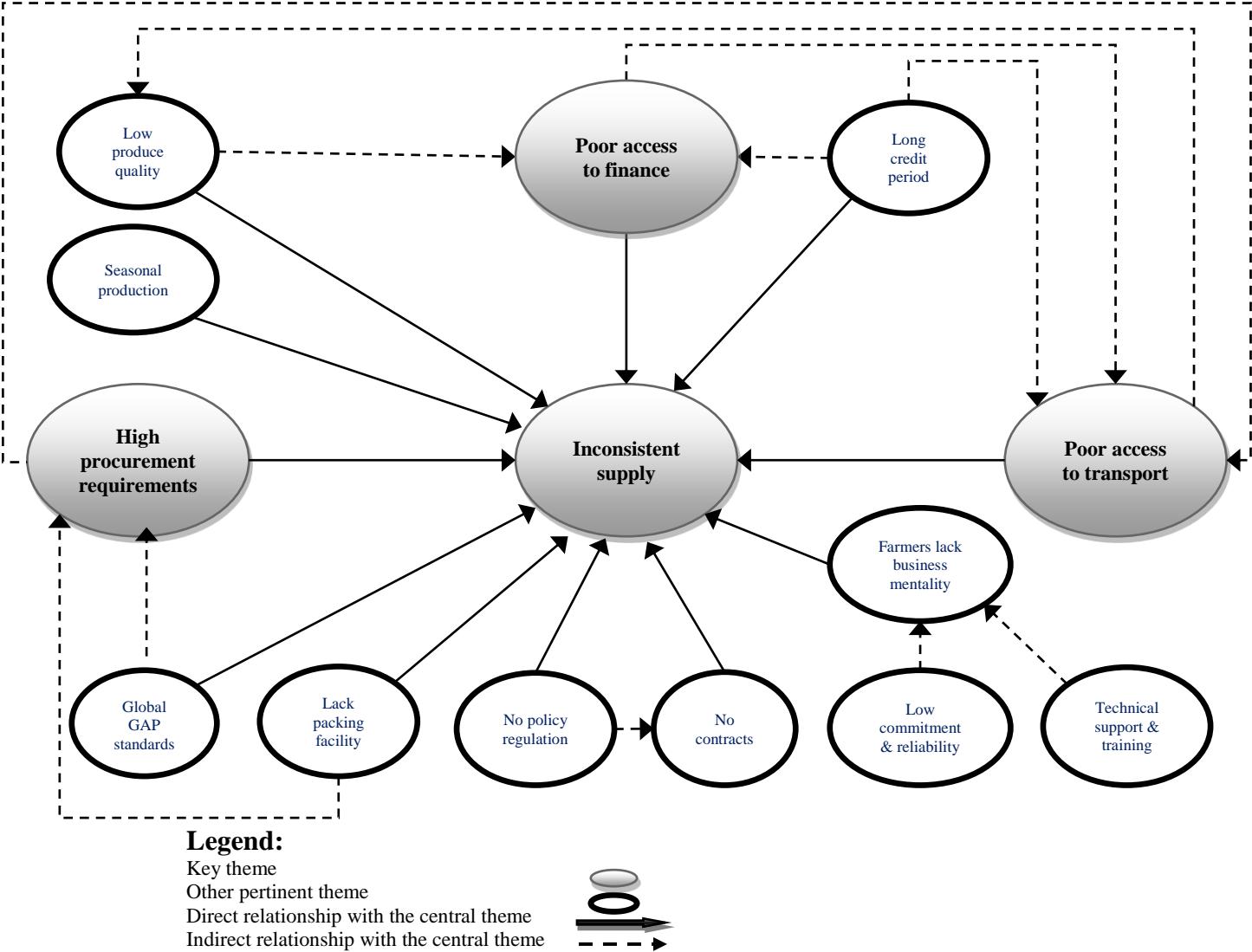
Figure 3.5: Themes relating to the inconsistent supply of vegetables by smallholder farmers to supermarkets in Eswatini
Source: Field survey (2017)

Issues pertaining to high procurement requirements by supermarkets are depicted in Figure 3.6. These issues pertain to supermarkets demanding a variety of produce that meets international standards, and well-packaged produce. Theme network analysis also identified

that produce from local producers is seasonal and that retailers procure from producers for social responsibility reasons.
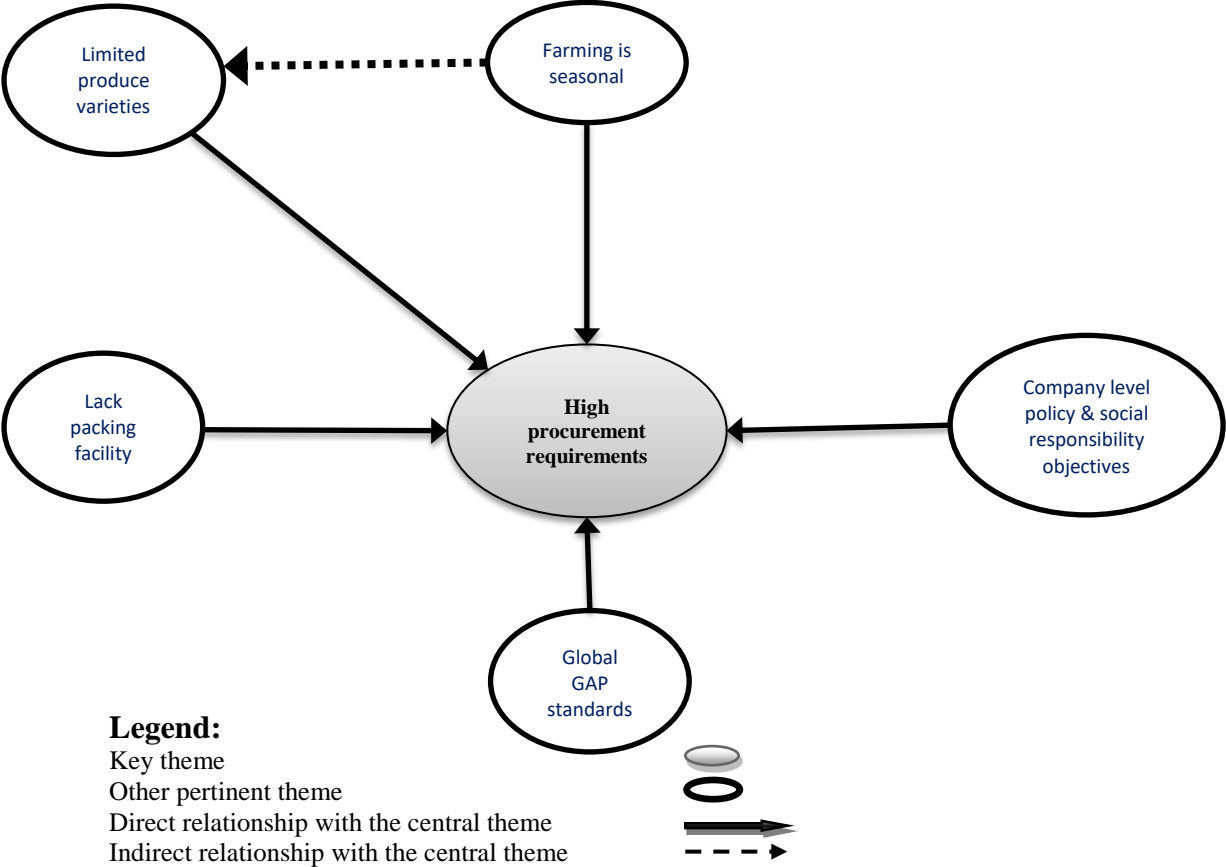
Figure 3.6: Themes relating to high procurement requirements by supermarkets
Source: Field survey (2017)

Themes relating to high procurement requirements in the smallholder-supermarket nexus in Eswatini are shown in Figure 3.7. As highlighted earlier, high procurement requirements have a direct link to three key themes and three other pertinent themes. The other three themes provide possible solutions to the high procurement requirement theme that can be implemented by smallholder farmers in this regard and these solutions include selling to NAMBoard, produce specialization strategy and collective action.
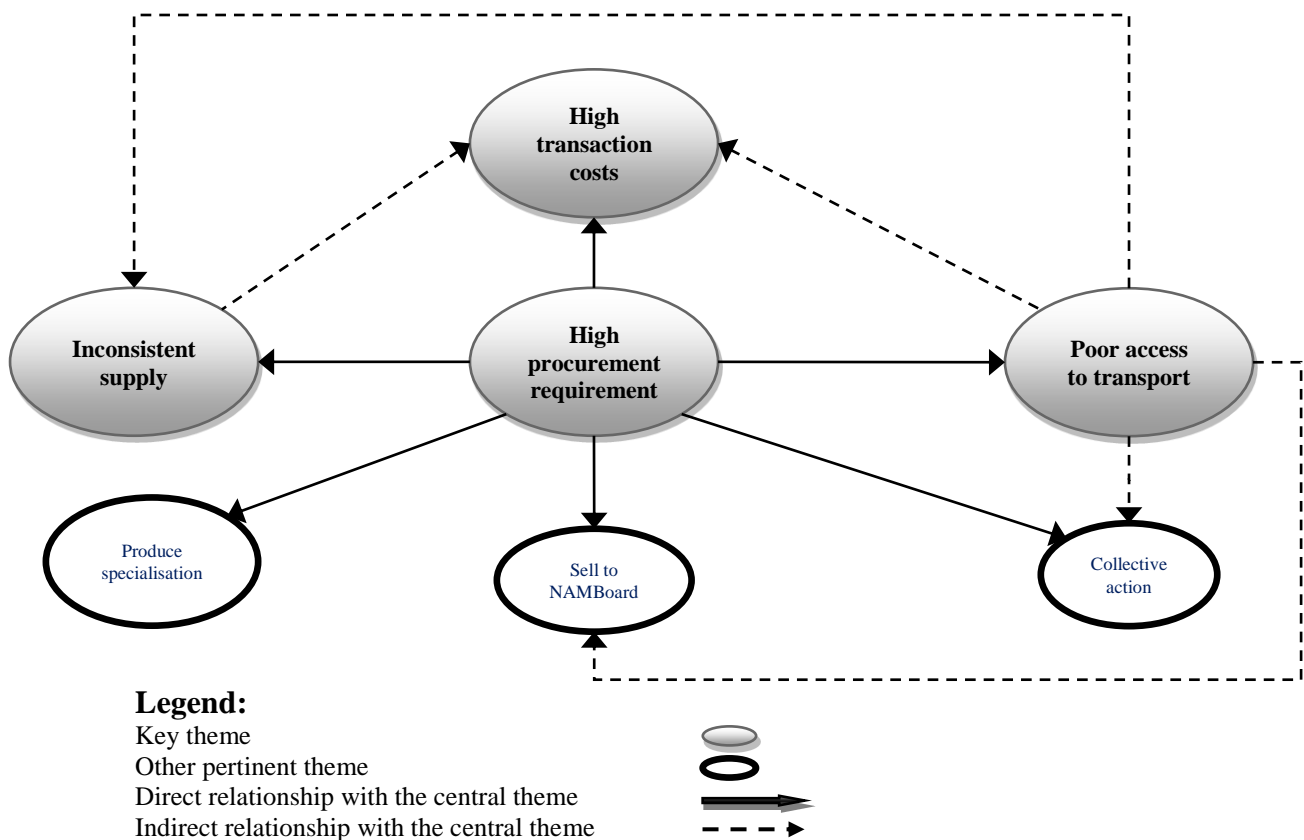
Figure 3.7: Themes that stem from high procurement requirements in Eswatini
Source: Field survey (2017)

Themes relating to transaction costs in the farmer-supermarket nexus are presented in Figure 3.8. With the exception of the three key themes, the other pertinent issues associated with the central theme (high transaction costs) are low produce quality, lack of packaging material, inability to adhere to Global GAP standards and limited produce varieties. These other pertinent issues are further linked to the other key themes. Previous studies (Bienabe and Vermeulen 2007; Stringer *et al.* 2009; Fischer and Qaim 2012) report that transaction costs associated with sourcing produce from smallholders are higher compared to sourcing from larger-scale farmers. Ruben, Boselie and Lu (2007) and Louw *et al.* (2009) reported that procuring from smallholder farmers increases transport, negotiation and monitoring costs. Bienabe and Vermeulen (2007) also support that supermarkets require high quality and food safety systems in place at the farm level and pack-houses.

Legend:
Key theme
Other pertinent theme
Direct relationship with the central theme
Indirect relationship with the central theme
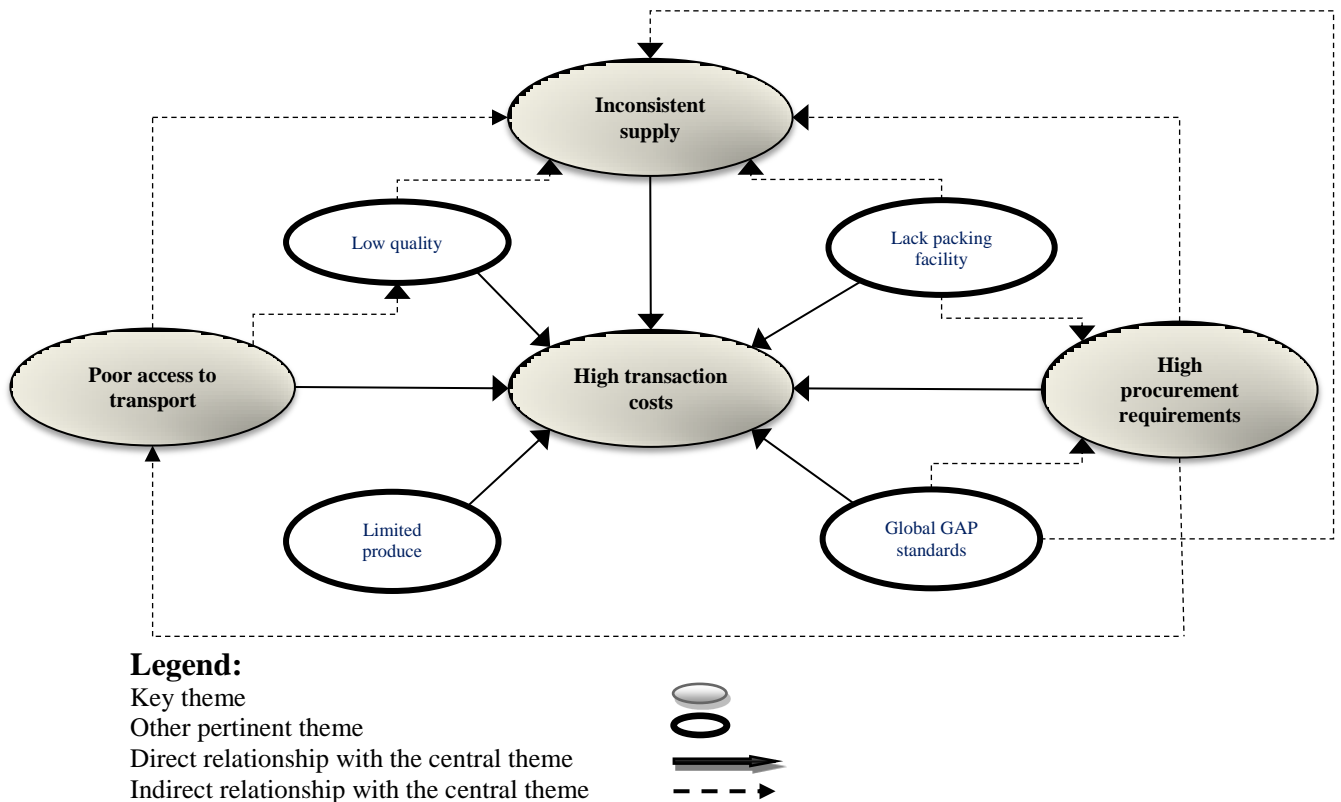
Figure 3.8: Themes relating to high transaction costs in the smallholder-supermarket nexus in Eswatini
Source: Field survey (2017)

Figure 3.9 depicts themes related to poor access to transport by smallholder vegetable farmers in Eswatini. One of the procurement requirements by supermarkets to smallholder producers is to deliver fresh produce at the store location; however, due to limited access to finance and long credit periods by supermarkets, farmers end up delivering low quality produce. Theme network analysis also depicts a vicious cycle between the central key theme (poor access to transport) and low-quality produce theme; and low-quality produce due to lack of finance; and lack of finance resulting in poor access to transport. This means that poor access to transport leads to low produce quality, which is as a result of the lack of finance that further leads to poor access to transport. Therefore, policy implications could include providing producers access to finance, which could address the issue of quality produce and transport.

Legend:
Key theme
Other pertinent theme
Direct relationship with the central theme
Indirect relationship with the central theme

Wide arrows identify a vicious circle
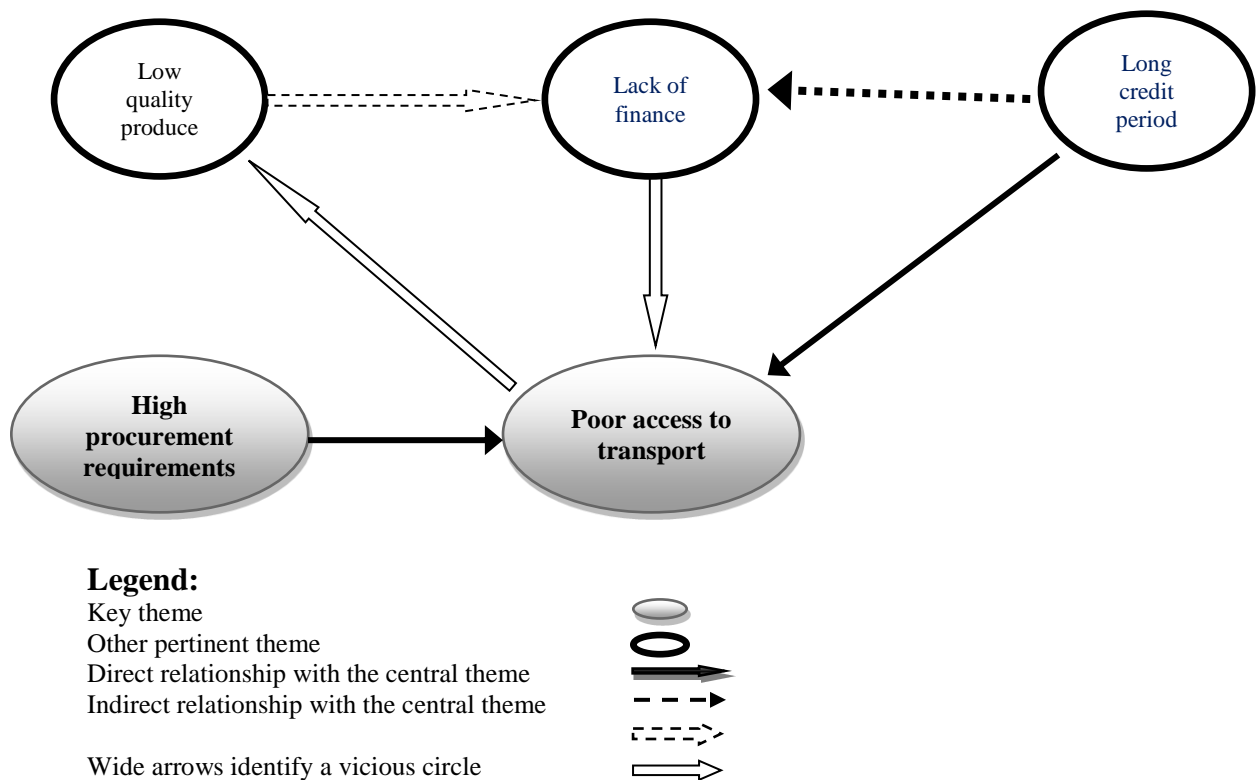
Figure 3.9: Themes relating to challenges in accessing transport for delivering produce to supermarkets
Source: Field survey (2017)

Figure 3.10 shows other issues that stem from poor access to transport associated with smallholders. In this diagram, theme network analysis has identified possible solutions to the challenges faces by smallholders, which are selling to NAMBoard and adopting a collective action strategy. Delivering the produce is one of the requirements that becomes a cost to the farmer and lack of finance becomes a barrier for the farmer to access supermarket channels. Poor access to transport affects the quality of the highly perishable produce that has to be delivered to the supermarkets. Therefore, in order for the farmers to make a sale, they will have to sell their produce to NAMBoard, which has the appropriate transport facility to handle the produce or to market their produce collectively as a way to minimise transport costs.

Legend:
Key theme
Other pertinent theme
Direct relationship with the central theme
Indirect relationship with the central theme
Wide arrows identifying a vicious circle
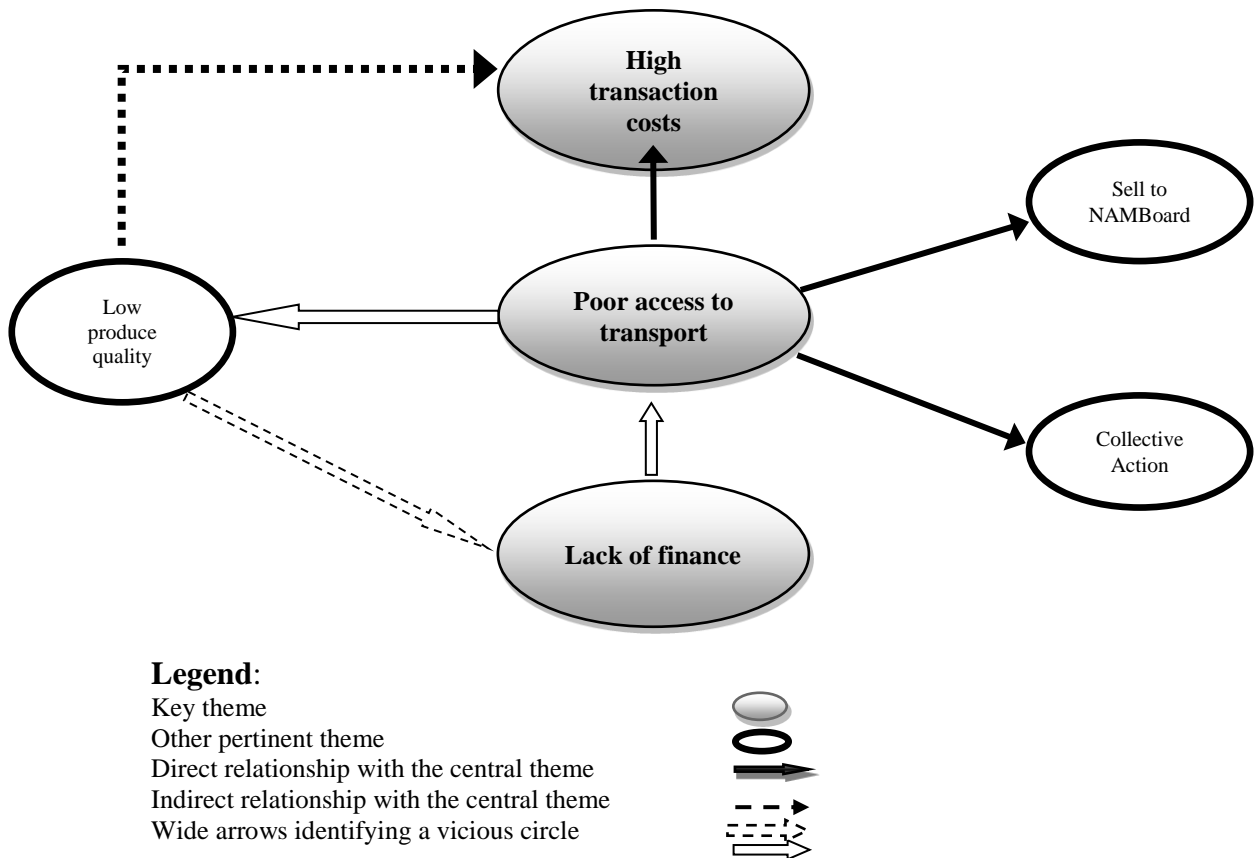
Figure 3.10: Themes that stem from smallholders' poor access to transport for delivering produce to supermarkets
Source: Field survey (2017)

Figure 3.11 depicts themes related to smallholder farmers' poor access to finance. Theme network analysis also shows the vicious cycle between the central theme, poor access to transport and low-quality produce themes. Furthermore, it is also shown that late payment by supermarkets to producers often leads to farmers not having sufficient funds to finance their business operations (inputs, marketing, etc.) which leads to inconsistent produce supply and poor access to transport. Poor access to finance results in lower productive investments along the supply chain (World Bank 2007). This implies that access to finance could reduce the pressure for a written contract, delayed payments for produce and inconsistent supply since farmers will be in a position to purchase adequate relevant inputs and meet supermarket requirements. These issues have been raised before in previous studies (Bienabe and Vermeulen 2007; Stringer *et al.* 2012); however, the linkages between the issues have not been emphasised.
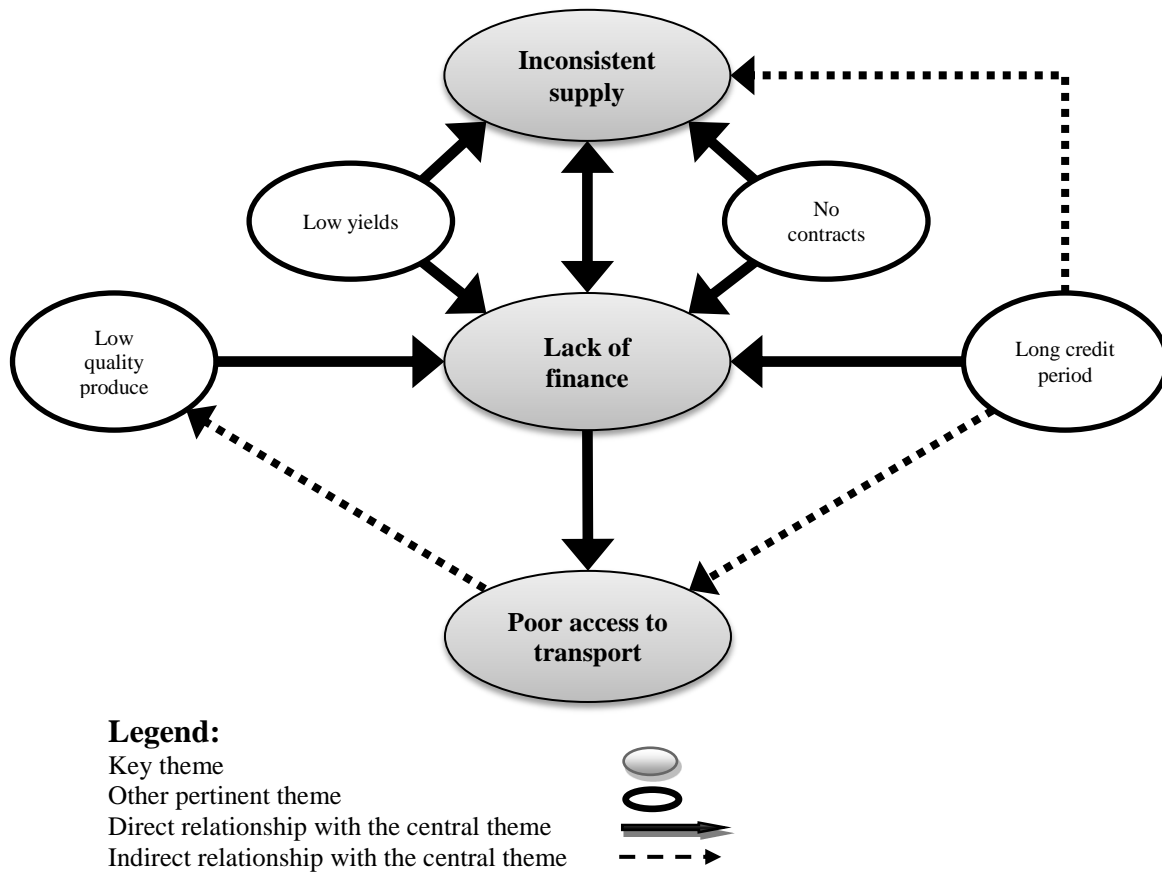
Figure 3.11: Themes related to smallholders' poor access to finance
Source: Field survey (2017)

In Figure 3.12 it is shown that selling to NAMBoard seems to be one of the solutions to the challenges faced by smallholders in Eswatini. NAMBoard being a state-owned institution that has adopted both internationally recognized systems, addresses the transport and other procurement requirements required by supermarkets, such as packaging, storage facilities, technical assistance to farmers supplying the organization, and Global GAP standards accreditation.
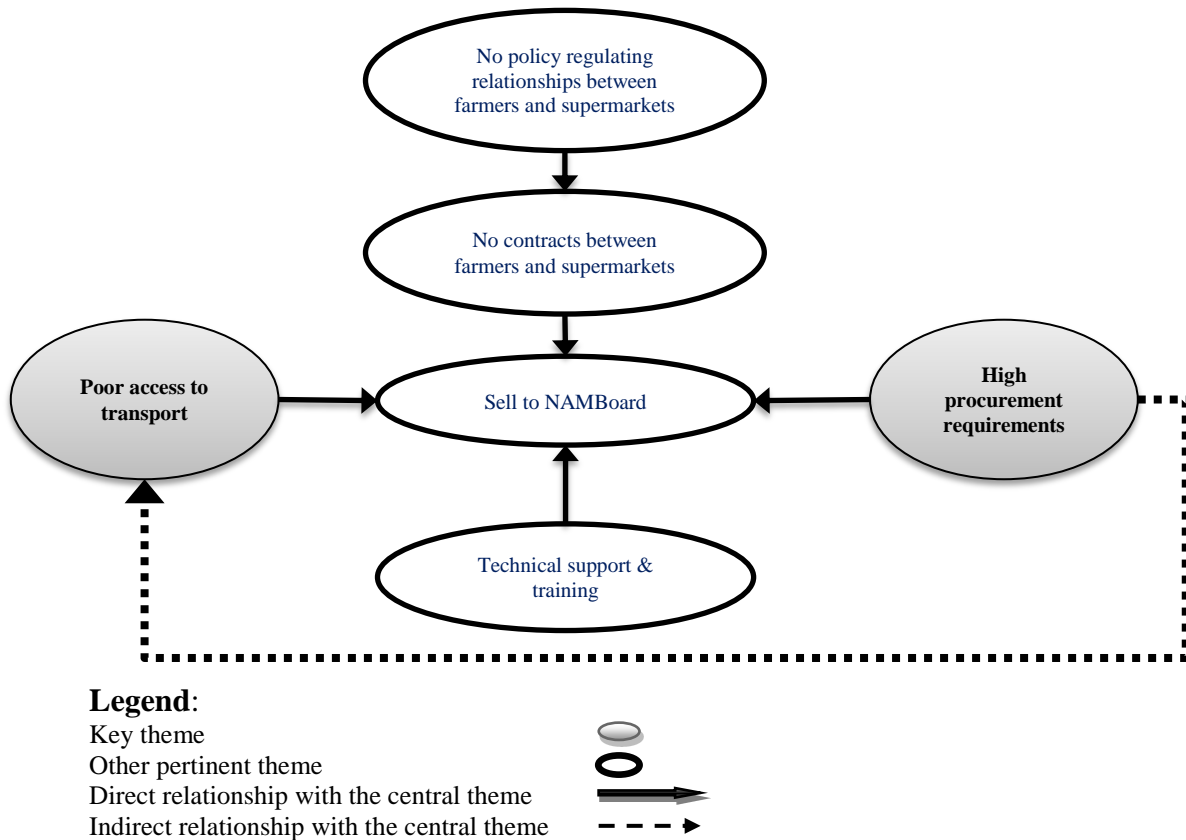
Figure 3.12: Themes relating to smallholders' choice of marketing channels (NAMBoard vs Supermarkets)
Source: Field survey (2017)

3.7 Chapter summary

The use of theme network analysis has enhanced knowledge by providing insights into stakeholder perceptions and connections regarding the procurement of vegetables from smallholders in Eswatini. The study showed how the challenges faced by producers and markets are linked to each other and went further to show linkages of possible solutions to the challenges faced. Using theme network analysis enhanced the identification of priority areas for further investigation, which will possibly provide implementable solutions to the challenges faced by producers and formal markets. It is suggested that further studies focus on those issues that are centrally located as "important", namely supply inconsistency, lack of finance, and high procurement requirements, amongst others, considering that there is evidence that producers' livelihoods are enhanced by participating in supermarket supply chains.

In addition, inconsistent supply is one of the key themes with many associated links compared to the other themes. This is not new knowledge; however, it does suggest that this issue is very important in the vegetable value chain between smallholders and formal markets in Eswatini.

CHAPTER 4: EXAMINING THE FARMER-BUYER RELATIONSHIPS IN VEGETABLE MARKETING CHANNELS IN ESWATINI[5]

4.1 Introduction

The purpose of this chapter is to examine relationship constructs between smallholders and buyers as perceived by the smallholders. The rest of the chapter is structured as follows: section 4.2 presents the economic theory on the nature of supplier-buyer relationships, followed by the conceptual framework in section 4.3. Study area, sampling and data collection technique are discussed in section 4.4, which is followed by the analytical framework in 4.5. Section 4.6 constitutes empirical results and discussion while section 4.7 presents the marketing channel differences of relationship constructs in the vegetable value chain. The chapter then concludes with the summary of the chapter in section 4.8.

4.2 Economic theory on the nature of supplier–buyer relationships

The nature of supplier-buyer relationships may be described in terms of three relationship constructs: satisfaction, trust, and commitment (Dwyer *et al.* 1987; Batt 2000; Batt and Wilson 2000; Schulze *et al.* 2006; Hartmann *et al.* 2010; Aji 2016). Satisfaction is the feeling of contentment and gratification that arises when needs or desires have been fulfilled (Hartmann *et al.* 2010). Relationship satisfaction occurs when exchange performance between trading parties exceeds their expectations (Batt and Rexha 2000; Batt 2003; Batt 2004; Schulze *et al.* 2006) and is influenced by positive economic rewards from the exchange (Batt 2004). A satisfied partner feels pleased with the relationship based on financial reward, frequent contact, concern, and respect shown in the relationship. The greater the mutual satisfaction the more sustainable the relationship will be, which in turn translates to continuity (Fischer and Reynolds 2010; Hartmann *et al.* 2010), loyalty and retainment of trading partners.

In an environment characterised by risk, uncertainty and information asymmetry, trading partners need trust for transactions to succeed (Batt 2004). Relationship trust is an asset that

creates benefits for a firm (Masuku and Kirsten 2004), which arise from a constant and detailed exchange of information or repeated relational encounters between trading parties (Hartmann *et al.* 2010). It reflects the degree to which a trading partner views another partner as being honest (Roberts-Lombard *et al.* 2017). Trust reduces performance uncertainty and therefore plays a crucial role in a relational transaction (Li and Nicholls 2000). It safeguards opportunistic behaviour and reduces transaction costs (Batt 2003; Ruben 2007). Trust, therefore, plays a major role in buyer-supplier relationships in any market environment (Dwyer *et al.* 1987; Schulze *et al.* 2006); it influences the way transactions are done considering high uncertainty and risk faced in business (Liu *et al.* 2009). Trust is very important, more especially with high technology products that contribute to the buyer's competitive edge (Handfield *et al.* 2006). Trading partners use previous experience (honesty, integrity, competence, reliability, or considerations of the other partner) to gauge trust (Ruben 2007). Batt and Rexha (2000) argue that trust is not necessary if there is no vulnerability and uncertainty. Roberts-Lombard *et al.* (2017) state that the establishment and building of a mutually beneficial relationship based on satisfaction and trust leads to long-term commitment.

Relationship commitment refers to an implicit or explicit pledge of relational continuity between exchange partners (Dwyer *et al.* 1987). It symbolises the value of the relationship between the trading partners (Masuku *et al.* 2003). Committed partners are prepared to make short-term sacrifices for long-term gain (Dwyer *et al.* 1987). Commitment enhances sustainability in a relationship because committed partners are more likely to continue working with each other and less likely to switch business partners (Hartmann *et al.* 2010). Macchiavello and Morjaria (2015) state that sellers are able to plan their production activities better when buyers show commitment to the relationship. Trading partners may indicate their commitment to the relationship by providing resources dedicated to the contract (Naidu 2012; Macchiavello and Morjaria 2015). Batt (2003) points out that when one of the trading partners perceives that the relationship has been undermined, the partner might reduce commitment in the relationship. For instance, when one party is not certain about the product price being exchanged, commitment in the relationship is reduced (Darroch and Mushayanyama 2006). Dwyer *et al.* (1987) state that maintaining the buyer-seller relationship comes at a cost. The opportunity cost of association with one partner may result in loss of an alternative trading

partner. Trading partners need to estimate the cost and benefits from the total association against the expected outcome of the next alternative.

4.3 Conceptual framework

To investigate the nature of the relationships in the formal and informal marketing channels, this study uses the three relational constructs, namely satisfaction, trust, and commitment, following ideas from Dwyer *et al.* (1987), Batt and Rexha (2000) and Schulze *et al.* (2006). These authors have investigated these variables, but in other markets and for other types of products. The conceptual framework for the vegetable farmer (supplier) and buyer (retailers, distributors, vendors, and consumers) relationship is depicted in Figure 4.1, based on a model by Batt and Rexha (2000).
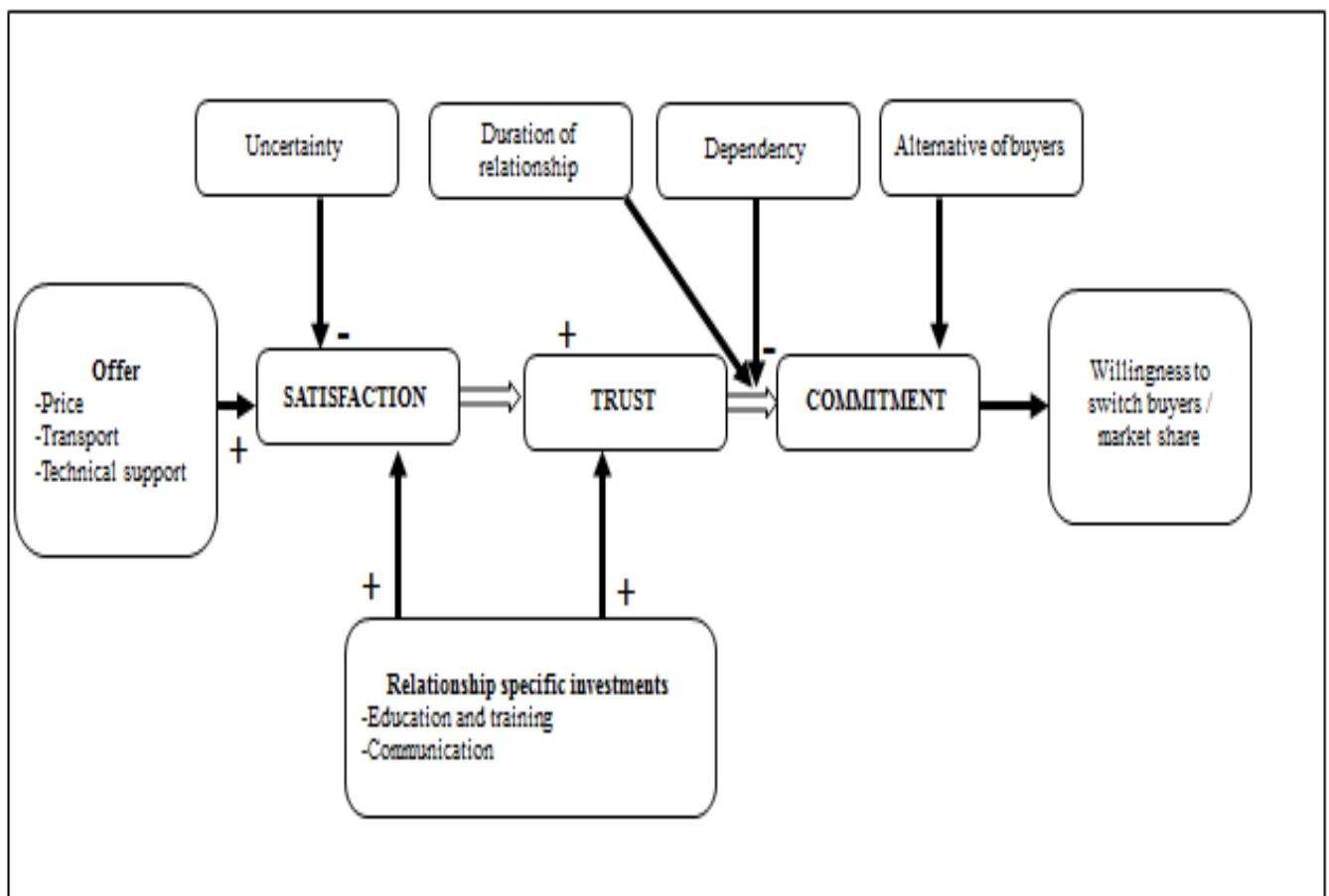
Figure 4.1: Model of seller-buyer relationships in the vegetable industry in Eswatini
Adapted from Batt and Rexha (2000)

The relational variables for satisfaction are offer, uncertainty and relationship-specific investments (Batt and Rexha 2000). It is conceptualised that farmers offered a good price (for their produce), transport and technical support are more likely to perceive a high level of satisfaction in the exchange. Relationship-specific investments (communication and training) by the buyer motivates both trading partners to maintain the relationship (Batt 2003; Naidu 2012). Such investments offer mutual benefits to trading partners; formal markets may offer inputs and technical support to ensure the product meets the quality and quantity requirements (Boselie *et al.* 2003; Rao and Qaim 2011). Therefore, the provision of training and communication between the two parties is expected to also improve relationship satisfaction.

Uncertainty is described as the unanticipated changes in the relationship which may arise from the price, quantity, and quality of the produce. Noordewier *et al.* (1990) argue that unanticipated changes in prices, quantity and quality, which bring difficulties, may strain the relationship for both partners. Uncertainty is managed by the implementation of adaptation procedures established during the planning stage of the relationship (Noordewier *et al.* 1990). Therefore, the more unanticipated changes surrounding the relationships, the less satisfied the partners would be. Based on this, it is hypothesised that farmers supplying formal market channels perceive a higher level of satisfaction than farmers supplying informal markets.

According to Batt and Rexha (2000), the relational variables for trust are satisfaction, duration of the relationship, relational specific investments, and dependency. They state that the more reliable, loyal and willing to refrain from opportunistic behaviour the higher is the level of trust. Batt (2003) further suggests that the duration of the relationship between the farmer and market agent boosts trust levels. A close relationship enriches the supplier's understanding of the needs of the buyer thereby enhancing loyalty and repeated sales (Kalwani and Narayandas 1995). Naidu (2012) states that close relationships enhance innovation and competitive advantage by understanding the needs of the buyer.

Liu *et al.* (2009) state a long-term relationship between trading partners enhances market access and reliable information sharing. Therefore, a positive relationship between trust and the duration of the relationship is expected. Çerri (2012) states that consistency with relationship-specific investments by one partner in an exchange increases dependence by the other partner. For instance, consistent sharing of information enhances efficient planning,

collaboration, mutual trust and understanding in the relationship (Boselie *et al.* 2003; Çerri 2012; Msemwa *et al.* 2017). Handfield *et al.* (2006) concur that ineffective lines of communication have an influence on trust. Trust is strengthened when both trading parties believe that they are concerned about each other's welfare, which could be through determining and understanding the needs and expectations of each party (Roberts-Lombard *et al.* 2017). Therefore, a positive relationship between communication and trust is expected. A trading partner is said to be dependent on another when the outcome of the relationship is very important and is larger than what other alternative firms would offer (Batt 2004).

Farmers supplying formal markets tend to be highly dependent on their buyers, who control the information and resources necessary for the exchange since they want to gain access to the markets, capital and credit (Batt 2004). Li and Nicholls (2000) suggest that informal transactions are characterised by minimal interdependence. Dependency on the relationship is reduced by the availability of alternative exchange partners (Heide 1994; Batt and Wilson 2000). Heide (1994) concurs that trading partners tend to supply multiple firms as a strategy to reduce dependency. Therefore, due to the differences in the characteristics of the channels, it is hypothesised that farmers supplying formal market channels perceive higher levels of trust than informal market channel suppliers.

The relational variables for commitment are trust, duration, dependency, and the availability of alternatives (Batt and Rexha 2000). Trust is a key determinant and antecedent of commitment (Morgan and Hunt 1994; Schulze *et al.* 2006; Hasche *et al.* 2017; Roberts-Lombard *et al.* 2017). Darroch and Mushayanyama (2006) and Hasche *et al.* (2017) concur that higher levels of trust in relationship marketing result in trading parties showing commitment. The availability of alternative buyers reduces the commitment of honouring the relationship with the current buyer; hence, a negative effect is expected between availability of alternatives and commitment. It is hypothesised that farmers supplying formal market channels perceive higher levels of commitment than informal suppliers. Schulze *et al.* (2006) state that the output variables from the relational constructs are the seller's willingness to switch buyers versus their willingness to forge strong collaboration and increased business dealings with the current business partner. Naidu (2012) states that farmers who trust their buyer will not switch the buyer even if other buyers offer similar economic incentives.

4.4 Study area, sampling and data collection technique

Data used in the analysis were elicited from smallholder vegetable farmers from the Manzini and Hhohho regions. These regions were selected because most of the formal markets are in these regions. A list of 450 smallholder farmers was obtained from the National Marketing Board (NAMBoard) and the Swaziland National Agricultural Union (SNAU) and a further 63 were from retailers. The list of 450 comprised of 270 farmers from Manzini and 180 from the Hhohho region. A sample size of 110 was randomly selected from the list where 66 respondents were from Manzini and 44 from the Hhohho region. Out of the 63 from the retailers, only 60 were available for the interviews, to make a total sample of 170 respondents. To test the hypotheses formulated, a list of statements on farmers' perceptions of the relationship between sample farmers and the primary buyer were presented in a questionnaire where face-to-face interviews were carried out to elicit responses from the sample of farmers. The statements were adapted from Batt (2000), Batt and Wilson (2000) and Schulze *et al.* (2006). Farmers were asked to respond to 37 statements which were measured using a 7-point Likert scale, where 1 indicated "totally disagree" up to 7 indicating "totally agree". The statements were divided into11 sections: satisfaction, price satisfaction, offer, trust, commitment, communication, uncertainty, education and training, duration of the relationship, dependence, and availability of alternatives. The farmers were also asked to list their buyers, indicate the main buyer, the type of vegetables they sell the most, the associated price received, and to indicate if they had a contractual arrangement with their main buyer as well as the benefits of selling to their main buyer.

4.5 Analytical framework

Factor Analysis with Kaiser Normalisation was used to analyse the various measures of relationship constructs. The Kaiser-Meyer-Olkin (KMO) approach is the measure of sampling adequacy which ranges between 0 and 1; values closer to 0 indicate that variables have little in common to justify the analysis, and values close to 1 indicate that patterns of correlations are relatively compact; therefore, factor analysis should yield distinct and reliable factors (Field 2009). KMO values over 0.5 are considered satisfactory for an analysis (Field 2009).

Further clarification of the items contributing to each factor was achieved by applying the reliability coefficient (Cronbach's alpha). This measure the reliability of the factors extracted from the analysis. The alpha ranges between 0 and 1; values closer to 0 imply that items are entirely independent of one another and values close to 1 imply that the items have shared covariance and probably measure the same underlying concept. An alpha value of 0.7 is most acceptable (Field 2009). To determine the influence of the variables on the level of satisfaction, trust, and commitment in the relationships between farmers and their main buyers, linear regression analysis was applied. This involves regressing the resultant factor scores of the relationship constructs against the variables that were deemed to have an influence as identified in Figure 1. The possible presence of multicollinearity was assessed by estimating the Variance Inflation Factor (VIF) in all equations. The degree of multicollinearity in the explanatory variables is deemed to be high if VIF values exceed 10 (Wooldridge 2016).

A discriminant analysis (DA) was then estimated to identify statistically significant differences in the relationship constructs between formal and informal suppliers. Discriminant function analysis is multivariate analysis of variance (MANOVA) reversed (Field 2009). Unlike with MANOVA where the dependent variable must be continuous, in DA the dependent variable must be categorical. It is used to determine the relationship between a dependent variable and one or more independent variables. The discriminant function is expressed as follows:

$$D = \beta_1 X_1 + \beta_2 X_2 + ...\beta_k X_k$$

(3.1)

Where D is the discriminant function score, β is the discriminant function coefficient relating the independent variable to the discriminating function score, and X is the value of the independent variable (discriminating variable). The DA uses the Wilks lambda as the test statistic; it tests if there are differences between group means for a combination of dependent variables. In this section when applying the DA, the independent variables are satisfaction, trust, and commitment and the dependent variables are the two channels.

4.6 Results and discussion

4.6.1 Analytical framework descriptive characteristics of sample farmers

For purposes of the analysis, respondents were classified according to whether their main buyer was part of a formal or informal channel (Table 4.1). The formal marketing channels consist of farmers' sales to retailers (60), NAMBoard (28), fast food restaurants (2) and private pack-house (1). Informal channels consist of sales to hawkers (40) and direct to consumers (42).

Table 4.1: Marketing outlets for vegetables, Eswatini, 2017

Formal Marketing Channels	Number of farmers	Informal Marketing Channels	Number of farmers
Direct to Retailers	60	Hawkers	40
NAMBoard	28	Traditional markets	42

Figure 4.2 depicts the vegetable marketing channels in Eswatini.
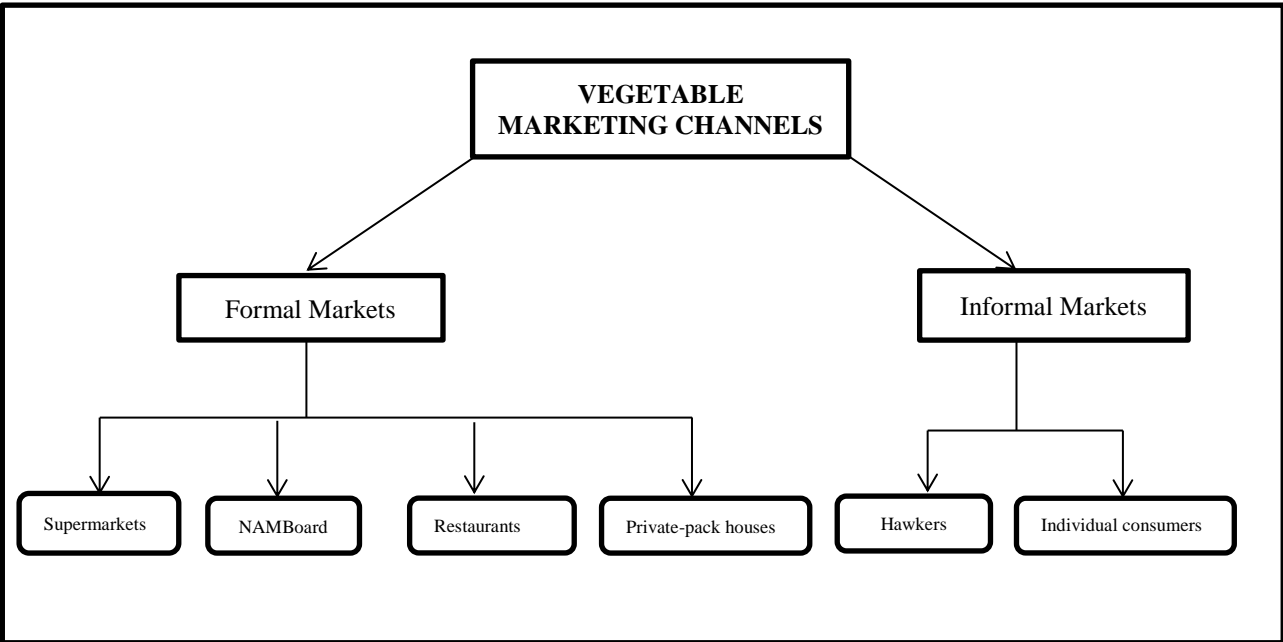
Figure 4.2: The structure of the vegetable marketing channels in Eswatini

Producers either sell to formal or informal marketing channels. Formal markets are those registered market outlets that have a fixed structured location and this includes supermarkets, NAMBoard, restaurants and private-pack houses. To supply these markets, producers need to meet certain requirements (consistent quality, quantity, etc). With the exception of NAMBoard, (a state-owned entity) that collect the produce from smallholder

farmers, and provide technical assistance; the other markets in the formal channel expect the farmer to deliver the produce at the market outlet. On the other hand, the informal channel consists of hawkers and consumers who purchase the produce at farm-gate. Unlike the formal markets, there are no strict procurement requirements in this channel.

Table 4.2 presents the descriptive statistics of suppliers from both channels, where 52% (88) predominately supplied formal channels and 48% (82) supplied informal channels. The formal channel was further sub-divided into two categories, namely supermarkets (60) and NAMBoard suppliers (28). The demographic characteristics of the farmers were measured in frequencies and in percentages. Previous studies have shown similarities and differences between formal and informal channels (Neven *et al.* 2009; Stringer *et al.* 2012; Puspitawati 2013). Farmers characteristics that are statistically significant between the groups are; the proportion of household members between 18 and 65 years, farm size, vegetable farm size and distance to the market. The results also show that both channel categories are dominated by male farmers of similar age group, with an average of 45 years for formal and 47 years for informal suppliers. Stringer *et al.* (2012) found that farmers supplying supermarkets were younger and had more years of education. The results for the formal marketing channel category were further split into two; supermarket and NAMBoard marketing outlets. Within the formal category, NAMBoard farmers were much older, with an average of 50 years compared to those supplying supermarkets (42 years). The average years of schooling of respondents were also similar (10.9 and 10.7) for formal and informal channels. However, within the formal channel category, farmers' predominantly supplying supermarkets had more years of schooling than all the other outlets. Contrary to these results regarding the proportion of household members between 18 and 65 years, Stringer *et al.* (2012) found no statistical significance between chilli farmers supplying supermarkets and those supplying traditional markets.

Table 4.2: Descriptive statistics for respondents by primary marketing channels category for vegetables, Eswatini, 2017

Particulars	Formal Marketing Channels					Informal Marketing Channels		Significance[1]
	Supermarket		NAMBoard		Total			
	N	%	N	%		N	%	
Total Sample	60		28		88	82		
Gender								
Male	45	75	16	57.1	69.3	45	54.9	
Female	15	25	12	42.9	30.7	37	45.1	
Mean age (years)	42.5	-	50.3	-	45	46.6	-	0.82
Mean schooling years	11.6	-	9.1	-	10.9	10.7	-	0.13
Mean experience in vegetable farming	11.7	-	13.1	-	12	9.8	-	1.65
Mean household size	5.68	-	5.82	-	5.73	4.98	-	1.56
Proportion of household members between 18 -65 years	55.57	-	42.89	-	51.53	59.89	-	2.14**
Is farming the only source of Income?					-			
No	22	36.7	7	25	33.0	36	43.9	
Yes	38	63.3	21	75	67.0	46	56.1	
Member of a farmers' organization								
No	47	78.3	14	50	69.3	48	58.5	
Yes	13	21.7	14	50	30.7	34	41.5	
Mean farm size (ha)	2.2	-	2.4	-	2.3	1.5	-	2.86***
Mean vegetable farm size (ha)	1.1	-	1.4	-	1.2	0.6	-	3.79***
Number of outlets supplied								-
1	11	18.3	4	14.3	17.1	81	98.8	
2	41	68.3	24	85.7	72.7	1	1.2	
3	8	13.3	0	0	10.2	0	0	
Owning a contract								-
No	60	100	13	46.4	83.0	82	100	
Yes	0	0	15	53.6	17.0	0	0	
Access to credit								-
No	46	76.7	19	67.9	73.9	65	79.3	
Yes	14	23.3	9	32.1	26.1	17	20.7	
Distance to the market (kilometres)	28.67	-	6.79	-	21.70	8.29	-	4.98***

NB: [1] Based on t-test; Significant at 1% (***), 5%(**) and (*) 10% levels of probability

The results also show that there is no significant difference in average years of vegetable farming experience between farmers in the formal and informal channel. About 67% of the formal market respondents were full-time farmers, reporting that farming was their only source of income, compared to 56% of those supplying primarily the informal channel. The proportion of respondents who were members of a farmers organisation was higher for those

supplying primarily informal channels (42%) than those supplying formal channels (31%). Formal market suppliers have a larger average farm size (2.3 hectares), where an average of 1.2 hectares of the total land is allocated to vegetables, compared to an average farm size of 1.5 hectares for informal market suppliers. The coefficients for the size of the farm and land allocated to vegetables are statistically significant at 1% level. The results are similar to those obtained by Neven *et al.* (2009). Within the formal category, farmers supplying NAMBoard had a slightly greater farm size (2.44 ha) compared to those supplying supermarkets (2.14 ha). This could be explained by the fact that one of the requirements required to supply NAMBoard is access to greater farm size. Most farmers (83%) supplying formal markets were supplying multiple markets, unlike informal market suppliers where 99% supplied a single market. Within the formal marketing channel category, about 13% supplied three market outlets, which is not a surprise since other markets are needed for produce that does not meet the requirements of formal marketing channels in particular retailers.

Only farmers supplying NAMBoard (54%) within the formal channel had written contracts. Stringer *et al.* (2012) observed similar results with tomato farmers in Indonesia, where written contracts were not offered in both supermarket and traditional markets. This is contrary to other studies, which highlight that buyers in modern markets tend to issue farmers with contracts and provide inputs to reduce the risk of product quality and quantity problems (Van Der Meer 2006; Naidu 2012; Puspitawati 2013; Chege *et al.* 2015). When asked about the vegetables they were cultivating, the farmers reported that they mostly grew green leafy vegetables, mainly cabbage, spinach and lettuce. Though farmers may choose any channel, the prices were almost similar. Table 3.3 reports that for a lettuce, formal markets pay a premium of 10% above the informal markets and 7% more for a cabbage. However, on average formal markets pay 6% less for a bunch of spinach than informal markets. As expected the distance to formal channels is longer (22 km) than the distance to informal marketing channels (8.3 km) and statistically significant.

Table 4.3: Average prices of the most commonly grown vegetables by marketing channel category, Eswatini, 2017

Vegetable	Formal Channels Average Price (E) [2]	Informal Channels Average Price (E)	Price Differences (%)
Lettuce	3.28	2.97	10
Spinach	4.34	4.61	6
Cabbage	7.08	6.60	7

[2] *One Lilangeni (Eswatini's currency) is equivalent to one Rand (South Africa's currency;*

4.6.2 Nature of farmer-buyer relationships within the marketing channels

The results are divided into three parts: first, preliminary analysis using descriptive statistics (mean and standard deviations); followed by factor analysis; then linear regression results using factor analysis results, and finally, discriminant analysis. Table 4.4 presents initial impressions of the nature of the relationship from suppliers of the two channels. The results are from a 7-point Likert scale where; 1 = strongly disagree, and 7 = strongly agree. Significant differences are observed between the channels regarding the relational variables. Generally, formal channel suppliers reported to be pleased with the relationship (mean score = 5.3) and perceived the relationship to be stable (5.08), which is enhanced by the fact that they could easily contact their main buyer (5.49). With respect to trust, formal suppliers were less confident about the relationship perceiving low levels of concern for farmers' welfare (3.05) by the main buyer, no assistance and could not count on the main buyer to consider them in decision making (3.89). However, they generally believed the information shared and that their main buyer kept promises. The results are similar to the ones obtained by Batt (2004) in a study about smallholder potato farmers and traders regarding information and keeping promises. However, the author obtained contradictory results regarding trust.

The farmers perceived the duration of the relationship with the main buyer neither close nor long (mean score = 4) and they indicated that they could readily choose an alternative buyer (5.15), though they would neither drop nor remain (indifferent) in the relationship (4.84). It can be acknowledged that vegetable vendors in Eswatini are located at fixed places (city centres) and that set-up allows farmers to communicate and observe their buyers' behaviour, practices, requirements and adapt. Formal marketing suppliers reported that their main buyer seldom determined the crop variety (2.8) nor controlled marketing information (2.92) and had difficulty with finding alternative buyers as 83% were supplying multiple buyers. Supplying multiple buyers and the freedom of selecting any buyer reduces relationship dependency (Naidu 2012). Informal suppliers were indifferent (mean score = 4.17) about the stability of the relationship and were relating more willingness to drop their main buyer for an alternative buyer (3.78). Because of the variations in the quantity of vegetables bought by informal buyers, informal suppliers perceived the least amount of trust in the relationship with their main buyer. As anticipated, informal suppliers perceived low dependence with respect to the

selection of the crop variety, control of information (2.33), finding alternative buyers (3.05) and adhering to buyers' demands (3.66).

Furthermore, suppliers in both marketing channel categories felt indifferent about the price offered by their main buyer (4.48). Batt (2003) reports that commodities traded in an open market are exposed to high price volatility. All the suppliers perceived high uncertainty with the vegetable price (formal markets mean score = 5.22; informal markets mean score = 5.54) and quantity (5.24 for informal channel) and were indifferent about remaining in their main buyer's network, which is not surprising considering that the majority (83%) of the formal market suppliers had no contract with the main buyer. Naidu (2012) states that in contract farming, farmers commit to supply the specified crop quality and quantity and the buyer in-turn contributes inputs, extension support and has a say in production decisions.

Table 4.4: Relationship constructs using descriptive statistics, Eswatini, 2017

Relationship Construct	Statements	Formal channels Mean	marketing Std. Dev	Informal channels Mean	marketing Std. Dev	Significance[1]
Satisfaction	I am pleased with the relationship	5.3	1.64	4.21	1.61	4.37***
	I am able to reduce total cost	3.89	1.66	3.43	1.53	1.87*
	The relationship is stable	5.08	1.35	4.17	1.55	4.08***
	I feel that I am rewarded adequately	4.26	1.62	3.56	1.66	2.78***
	I frequently reject other buyers	3.02	1.92	2.32	1.39	2.73***
	Buyer keeps promise regarding commodity price	4.76	1.58	3.93	1.51	3.52***
	I do not believe other buyers will have the same price	3.82	1.66	2.82	1.63	3.95***
	I am satisfied with grading system	4.25	1.88	3.17	1.84	3.77***
Offer	I sell to a buyer that offers transport	2.83	2.44	2.24	1.78	1.78*
	I sell to a buyer that offers technical support	2.58	2.2	1.23	0.66	5.42***
	I sell to a buyer that offers a good price	4.48	1.97	4.23	1.79	2.4*
Communication	The buyer provides relevant market information	4.31	1.72	3.2	1.58	4.37***
	Information sharing is important	4.32	1.6	3.38	1.79	3.61***
	It is relatively easy to contact buyer	5.49	1.24	4.6	1.41	4.38***
	My buyer keeps me informed on technical matters	3.89	1.91	2.54	1.6	4.97***
Uncertainty	The vegetable prices are very unstable	5.22	1.63	5.54	1.29	1.42
	The quantity requirement is highly unstable	4.39	1.74	5.24	1.38	3.54***
	The quality requirement is highly unstable	2.74	1.95	3.78	1.91	3.52***
Education & Training	My buyer regularly provides training programs	2.67	2.08	1.46	1	4.76***
Trust	My buyer will be ready to assist	3.48	1.75	2.67	1.62	3.11***
	When making decisions, my buyer is concerned about my welfare	3.05	1.61	2.68	1.55	1.49
	I can count on the buyer to consider his decision affect	3.89	1.59	2.99	1.68	3.59***
	The buyer usually keeps the promises made	4.76	1.48	3.91	1.49	3.72***
	I believe the information provided by the buyer	4.55	1.54	3.84	1.56	2.96***
	I can count on the buyer to be sincere	4.45	1.36	3.74	1.59	3.15***
	My buyer has a good reputation	4.41	1.57	3.48	1.58	3.87***
Duration of Relationship	I have a close relationship with the buyer	4.14	1.53	3.45	1.71	2.76***

	My buyer and I have a long-standing relationship	4.42	1.72	3.73	1.74	2.59**
Dependence	My buyer determines what varieties to grow	2.8	1.82	2.63	1.54	0.62
	My buyer controls information	2.92	1.42	2.33	1.02	3.09***
	Have great difficulty finding alternative buyers	2.99	1.81	3.05	1.51	0.23
	I have no choice than to adhere to buyer	4.56	1.55	3.66	1.63	3.67***
Commitment	I am not going to drop main buyer	4.84	1.69	3.78	1.69	4.09***
	I want to remain in buyer's network	4.91	1.58	4.1	1.5	3.43***
	My positive feelings towards the buyer is the major reason I want to continue with buyer	4.34	1.74	3.72	1.5	2.44**
Availability of Alternatives	I supply many buyers	4.73	1.44	4.16	1.37	2.63***
	I am free to choose another buyer	5.15	1.41	5.35	1.08	1.06

NB: 1=Strongly disagree; 2= Disagree; 3= Slightly disagree; 4= Indifferent; 5= Slightly agree; 6= Agree; 7=Strongly Agree;
[1] Based on t-test; Significant at 1% (***), 5%(**) and (*) 10% levels of probability

An initial factor analysis was run and produced only one eigenvalue above the Kaiser's criterion of 1 in both channels, hence rotation was not necessary. Results of the analysis are presented in Appendix 1 and variables with factor loadings below 0.4 were excluded. The three relationship constructs' (satisfaction, trust, commitment) accounted for above 80% of the variation (Table 4.5). The KMO measure verified the adequacy of the analysis since all KMO values were equal to 0.7 and above; apart from commitment items from the formal channels. However, all the values are considered acceptable as they are all above the acceptable threshold of 0.5. The reliability of the items in measuring the relationship constructs are confirmed by the Cronbach's alpha coefficients all exceeding 0.7 (Field 2009). As such factor analysis was considered appropriate.

Table 4.5: KMO and Cronbach's alpha values for formal and informal vegetable marketing channels, Eswatini, 2017

	Formal Marketing Channels			Informal Marketing Channels		
	Variation Explained	KMO	Cronbach's Alpha	Variation Explained	KMO	Cronbach's Alpha
Satisfaction	0.93	0.79	0.77	0.85	0.83	0.86
Trust	0.87	0.81	0.77	0.91	0.89	0.91
Commitment	0.93	0.65	0.77	0.93	0.70	0.74

4.6.2.1 Satisfaction

Results reported in Table 4.6 show that the level of relationship satisfaction in both categories of marketing channels is determined by the price offered and communication. It is not surprising that perception of price has a strong positive influence at all levels of significance for the formal and informal channels ($\beta = 0.29$, p , 0.01; $\beta = 0.12$, p , 0.01), respectively. Naidu (2012) observed that the unit price for tomatoes, overall profit and services offered and practices followed by buyers were important determinants of continuity in the relationship. Xaba and Masuku (2013) state that low product prices decrease the motivation of farmers to participate in formal markets and instead prefer to side sell to traditional channels.

Table 4.6: Estimated coefficients for *satisfaction* regression for formal and informal marketing channels, Eswatini, 2017

Satisfaction		Formal Marketing Channels		Informal Marketing Channels	
		Coefficient	Std. Err.	Coefficient	Std. Err.
Offer	Transport	0.02	0.05	0.04	0.04
	Technical Support	-0.07	0.06	-0.06	0.12
	Price	0.29***	0.05	0.12**	0.05
Uncertainty	Quantity	-0.09*	0.05	-0.09	0.12
	Quality	-0.05	0.04	-0.12**	0.05
	Price	0.05	0.05	-0.07	0.11
Training &Education		0.02	0.05	0.07	0.07
Communication	Relevant information	0.12**	0.05	0.15**	0.06
	Technical Support	0.01		0.14**	0.06
Constant		-1.49		-0.12	0.51
F		13.4		6.57	
R²		0.61		0.45	
VIF		2.06		1.53	

NB: Dependent Variable: Satisfaction; statistically significant at the 1% (***), 5% (**) and (*) 10% levels, respectively

Uncertainty with quantity has a negative influence on relationship satisfaction in the formal channels as expected ($\beta = -0.09$, p, 0.1)). This implies that satisfaction would significantly decrease as uncertainty with produce quantity increases which could be arising from uncertainty about whether the quantity of produce of specified quality will be accepted. In the informal sector, the uncertainty with quantity coefficient was not significant, but the uncertainty coefficient with quality was ($\beta = 0.12$, p, 0.05), implying that informal suppliers' relationship satisfaction would significantly decrease as uncertainty with produce quality requirements increases. This is contrary to expectations since informal buyers consist of individuals and vendors who have flexible procurement practices.

Communication statements have positive signs as expected. A significant relationship is observed in communication based on the provision of relevant marketing information and satisfaction in the formal channel ($\beta = 0.12$ at the 5% level of significance). This suggests that provision of relevant information is important in improving relationship satisfaction with formal suppliers. Aji (2016) obtained similar results in a study on potato seeds in Indonesia. Batt (2004) states that communication between exchange partners is a sign of respect and being pleased with the exchange. Likewise, communication statements from informal suppliers have a positive influence on relationship satisfaction as indicated by statistical significance at 5% level, which is contrary to expectations.

However, this could be explained by the fact that almost half (48.8% in Table 4.1) of the respondents supplying predominately informal channels were supplying hawkers. No statistically significant relationship was observed between training and education and relationship satisfaction in both channels. The R^2 indicates that 61% and 45% of the variance in satisfaction from both categories of marketing channels, respectively, was explained by the variables included in each equation. The degree of multicollinearity was low as indicated by the VIF values.

4.6.2.2 Trust

Table 4.7 presents the estimated coefficients from the Trust regression equation for formal and informal market suppliers. The results indicate that the level of trust in both channel categories is to a great extent determined by satisfaction and the provision of relevant marketing information by the main buyers. The strong positive and significant relationship between relationship satisfaction and trust was anticipated. Batt (2003) concurs that the more satisfied trading partners are with the economic rewards from the relationship, the more they feel the relationship was based on trust.

Table 4.4 (presented earlier) had shown that both categories of suppliers were indifferent to the price offered for their vegetables sold to formal and informal markets. Communication regarding sharing relevant information also has a strong influence on trust ($\beta = 0.15$, p, 0.05) in the formal and ($\beta = 0.07$, p, 0.01) informal marketing channels. Çerri (2012) found out that communication was the second most important factor influencing trust. The more formal suppliers feel close to their main buyer, the more they perceive trust in the relationship ($\beta = 0.25$, p, 0.05), as anticipated. The results also show that buyers in the informal channel inform producers on marketing issues which has a positive influence on relationship trust. This could be explained by the presence of hawkers who are some of the buyers in the informal channel.

Table 4.7: Estimated coefficients for *trust* regression for formal and informal marketing channels, Eswatini, 2017

Trust		Formal Marketing Channels		Informal Marketing Channels	
		Coefficient	Std. Err.	Coefficient	Std. Err.
Satisfaction		0.51***	0.10	0.47***	0.09
Communication	Relevant marketing information	0.15**	0.05	0.09***	0.05
	Easy to contact	-0.11	0.08	-0.07	0.05
	Keeps me informed	0.02	0.05	0.17***	0.05
Duration	Close relationship	0.25***	0.07	-0.04	0.06
	Good long-term relationship	-0.11*	0.06	0.13**	0.06
Dependence	Determines crop variety	-0.01	0.05	0.08*	0.05
	Difficulty finding alternative	-0.01	0.05	0.02	0.04
	Free to choose	-0.01	0.06	-0.07	0.06
Regular Training & Education		-0.02	0.05	-0.05	0.07
Constant		0.69	0.51	-0.58	0.48
F		9.30		26.24	
R²		0.55		0.73	
VIF		1.82		1.80	

Dependent variable: Trust; statistically significant at the 1% (***), 5% (**) and 10% (*) levels, respectively

An unanticipated negative influence of the length of the relationship on trust from formal suppliers is also observed ($\beta = -0.11$, p, 0.1). It is then believed that levels of trust may be naively high at the start of a relationship and the longer the relationship lasts, the more likely the seller will adjust to the realities of the relationship. This could imply that successively repeated transactions with formal buyers enact high expectations in the relationship on the side of the farmers, such as issuing of contracts, technical support, and providing transport. However, without these services, the farmers' level of trust is reduced. Regarding the informal channel, farmers supplying the sector perceived the duration of the relationship having a positive influence on relationship trust. Again, this could be the influence of trading with hawkers, where repeated transactions seem to occur as indicated by the statistical significance of relationship trust. Fischer *et al.* (2008) concur that a non-formal relationship can also involve repeated market transactions with the same buyer.

The observed positive relationship between trust and informal buyers regarding crop variety to be grown could be explained by that many smallholder farmers in Eswatini depend largely on agriculture for their livelihood, hence their decision-making process becomes complex.

Again, no significant relationship is observed in the training and education variable in both channels.

4.6.2.3 Commitment

As expected, trust has a strongly significant and positive relationship in the formal marketing Channels (β = 0.43; p = 0.001) and the informal channels (β = 0.55; p = 0.000) with relationship commitment (Table 4.8). Darroch and Mushayanyama (2006) concur that for the partners in the supply chain to cooperate and show more commitment to the relationship a higher level of trust is required. This argument is supported by Roberts-Lombard *et al.* (2017) asserting that buyers would show more commitment to trustworthy suppliers. Stringer *et al.* (2012) argue that farmers need to commit to delivering what is required by the buyers, and buyers should commit to support the farmers and respect the contractual arrangement.

Table 4.8: Estimated coefficients for *commitment* regression for formal and informal marketing channels, Eswatini, 2017

Commitment		Formal marketing channels		Informal marketing channels	
		Coefficient	**Std. Err.**	**Coefficient**	**Std. Err.**
Trust		0.43***	0.10	0.55***	0.09
Alternatives	Supply many buyers	0.13***	0.05	0.01	0.05
	Free to choose	0.16***	0.05	0.06	0.06
Dependence	Determines variety	-0.06	0.04	-0.11**	0.05
	Finding alternatives	0.02	0.03	-0.02	0.05
Duration	Close relationship	0.06	0.09	-0.04	0.05
	Good long relationship	0.13**	0.05	0.19***	0.06
Constant		-2.14	0.36	-0.62	0.40
F		26.10		20.4	
R²		0.60		0.64	
VIF		1.70		1.83	

Dependent variable: Commitment; statistically significant at the 1% (***), 5% (**) and 10%(*) levels, respectively

Contrary to expectations, the availability of alternative buyers (supplying many buyers and the freedom to select any buyer) has a positive and significant relationship with commitment. This suggests that regardless of having alternatives and the freedom to choose other buyers do not prevent the suppliers from showing commitment to the formal markets. The duration of the relationship between formal suppliers and markets has a positive influence on commitment as perceived by the farmers. Contrary to expectations, there is a strong relationship between commitment and the length of the relationship in the informal channel. However, this could be explained by the presence of hawkers.

4.7 Vegetables marketing channels differences of relationship constructs

Table 4.9 depicts the group statistics of means and standard deviations of satisfaction, trust and commitment using Discriminant Analysis. As expected, formal markets are perceived better by smallholder vegetable farmers in terms of satisfaction (4.3 against 3.6), trust (4.1 against 3.3) and commitment (3.4 against 2.9) compared to informal markets. Stringer *et al.* (2012) obtained similar results where potato farmers perceived supermarkets better with respect to satisfaction and commitment than the traditional market. However, in terms of the Likert scale, farmers supplying formal marketing channels were indifferent regarding relationship satisfaction and trust whilst those supplying informal markets disagreed as shown in the table. The results also show that both categories of farmers did not perceive commitment in the relationship which is consistent with the results obtained.

Table 4.9: Mean and standard deviation of relationship constructs in the informal and formal marketing channels, Eswatini, 2017

Variable	Formal Marketing channels		Informal marketing channels	
	Mean	Std. Dev.	Mean	Std. Dev.
Satisfaction	4.291	1.122	3.556	1.093
Trust	4.063	1.057	3.326	1.248
Commitment	3.402	1.019	2.920	0.946

NB: Means based on Likert scale of 1 (totally disagree) to 7 (totally agree)

Table 4.10 presents the tests of equality of means for all the variables in the analysis. There is a statistically significant difference between the formal and informal channels with respect to satisfaction (p = 0.000), trust (p = 0.000), and commitment (p = 0.002). Wilks' lambda is statistically significant for each relationship construct (predictor) with a p = value below 0.05, which is appropriate for the analysis. This also implies that there are significant differences with respect to satisfaction, trust, and commitment between formal and informal marketing channels. Stringer *et al.* (2012) obtained similar results where statistically significant differences in satisfaction and commitment were observed among chilli farmers supplying supermarkets than traditional markets. The standard discriminant function shows the relative importance of the relationship constructs. The results suggest that relationship satisfaction is the best predictor (0.631), followed by trust (0.591), while commitment is the worst predictor (−0.072) of the nature of the relationship. Again these results are still consistent with the results obtained earlier pertaining to relationship satisfaction, trust and commitment. The

canonical correlation coefficient of 0.357 implies a low level of association between the groups, and the discriminant function though Wilks' lambda is statistically significant at the 1% level, suggesting that the prediction model fits well.

Table 4.10: Vegetable marketing channels relationship constructs based on discriminant analysis, Eswatini, 2017

Variable	Wilks' Lambda	F-ratio	Standard Discriminant Function	Significance
Satisfaction	0.900	18.663	0.631	0.000
Trust	0.907	17.308	0.591	0.000
Commitment	0.943	10.207	-0.072	0.002

Note: Canonical correlation coefficient = 0.357; Wilk's Lambda = 0.872; Chi-square = 22.732; p=0.000

4.8 Chapter summary

This chapter examines relationship constructs, namely satisfaction, trust, and commitment between smallholder vegetable farmers and buyers as perceived by smallholder farmers supplying the formal and informal marketing channels. The results reveal important differences between the categories of marketing channels. Farmers supplying these categories are similar in relation to some aspects of the farmer-buyer relationships. Firstly, both categories perceived the nature of the relationship based on satisfaction regarding price, communication and trust. The price of the produce and communication between buyers and sellers has a positive influence on satisfaction as perceived by both categories of the channels. Secondly, most of the suppliers did not receive training and education from the buyers, except those supplying NAMBoard, though still no significant influence was observed. This could be due to the perceived quality of the information received during the training sessions. Lastly, the results also reveal that most of the formal buyers have a flexible non-binding (no written contract) relationship with the buyer which is also common in the informal category; this is contrary to expectations and results in low levels of commitment. Dissimilarities have been observed in relation to uncertainty, which confirms the different characteristics of formal and informal marketing channels. Formal markets require produce of high quality at all times, yet informal marketing channels concentrate on making as many sales as possible.

The research findings also indicate the nature of the trading relationship between smallholder farmers and their buyers as being discrete. This is evidenced by the low linkage between the trading parties (lack of commitment) and flexible relationship with no contractual

arrangements. The presence of already established procurement channels in South Africa, where most of the supermarket chains come from, contributes to the status of the relationship.

This chapter has provided insight to guide policy-makers and supply chain participants in Eswatini on the different relationship marketing variables that should be considered when developing relationship-building strategies. The farmers' perspective is important since it provides different dynamics in each channel. This provides an understanding of the trading environment smallholder farmers are operating in. This could enhance the development of procurement regulations that will allow farmers to work in a fair environment and in an efficient supply chain where all supply chain participants benefit as well as ensuring the provision of support services to strengthen the relationships.

CHAPTER 5: FACTORS INFLUENCING THE CHOICE OF MARKETING OUTLET SELECTION BY SMALLHOLDER FARMERS IN ESWATINI[6]

5.1 Introduction

This purpose of this chapter is to identify the factors influencing marketing outlet selection by smallholder farmers cultivating cabbages, spinach and lettuce. The sections are divided as follows: the conceptual framework and the estimation technique presented in section 5.2, which is then followed by the study area, sampling and data collection technique in section 5.3. The variables used in the model are presented in section 5.4. Section 5.5 presents the empirical results and the corresponding discussion. The last section presents the chapter summary.

5.2 Conceptual framework and estimation technique

A smallholder farmer's decision to sell in a given market can be conceptualized by the Random Utility Model (Greene 2002). The objective of the decision process is utility maximization, and farmers evaluate different markets and select the outlet that maximizes utility (Baltas and Doyle 2001). Suppose that utility U_j and U_k represent a farmer's perceived utility for two market choices j and k, respectively. Therefore, the utility function of the farmer can be presented as follows:

$$U_j^* = \beta X_j + \varepsilon_j \text{ and } U_k^* = \beta X_k + \varepsilon_k \tag{5.1}$$

Where U_j *and* U_k are the farmers' utility derived from selecting market j and k which are unobservable; X_j *and* X_k are the vectors of explanatory variables (individual, farm characteristics, transaction cost, institutional) that influence the choice of marketing outlet; β is the vector of parameter coefficients and ε_j and ε_k are the error terms, assumed to be independently and identically distributed. If farmer *'i'* chooses the *'j'* option, then it is assumed that U_j is the maximum among the utilities (Greene 2002).

$$U_{ij}(\beta_j'X_j + \varepsilon_j) > U_{ik}(\beta'X_k + \varepsilon_k), k{\neq}j \tag{5.2}$$

Suppose Y is the decision to supply channel j where Y takes the value 1 if selected and 0 otherwise. Therefore, the probability that a farmer selects channel j conditional on X can be presented as:

$$P(Y = 1/X) = P(U_{ij} > U_{ik})$$

(5.3)

$$P(\beta'_j X_j + \varepsilon_j - \beta'_k X_k + \varepsilon_k) > 0/X$$

$$P(\beta'_j X_j - \beta'_k X_k + \varepsilon_j - \varepsilon_k) > 0/X$$

$$P(\beta^* X_i + \varepsilon^*) > 0/X = F(\beta^* X_i)$$

Where P is the probability function, $\varepsilon^* = \varepsilon j - \varepsilon k$ is the random disturbance term, and $\beta^* = (\beta'_j - \beta'_i)$ is the vector of parameter estimates which indicate the influence of the independent variables influencing marketing strategy selection. $F(\beta^* X i)$ is the cumulative distribution of the random disturbance term ε^*.

5.2.1 Marketing outlets choice selection-estimation procedure- multivariate probit model

Given that there's a possibility that information about the farmer's choice of a market outlet does affect the prediction of the same farmer's probability of selecting another market outlet. In that case, using a univariate probit or logit, which assumes that the error terms are distributed independently, thereby ignoring correlations amongst the outcomes will lead to inefficient parameter estimates (Corsi and Salvioni 2012). Ignoring these correlations in analysing the simultaneous marketing participation decision will produce biased and incorrect estimates of standard errors (Yirga *et al.* 2015).

In this study, MVP is used to test different factors in the selection of a vegetable market outlet. The MVP allows for the possible contemporaneous correlation in the decisions to supply the three marketing outlets. It assumes correlation and interdependence in the farmer's marketing channel selection decision (Cappellari and Jenkins 2003). A MVP model is specified as follows:

$$Y^*_{ij} = \beta_j X_{ij} + \varepsilon^*_{ij}$$

(5.4)

$$Y^*_{ij} = 1 \text{ if } Y^*_{ij} > 0 \text{ and } 0 \text{ otherwise}$$

Y^*_{ij} is a latent variable and Y_{ij} denoted the actual outcome, which represents the binary dependent variable; $(j = 1..., 3)$ represents the marketing outlets (supermarket, traditional and

NAMBoard) used by the ith farmer *(1,....n)*, X_{ij} is a vector of observed variables that affect the marketing participation strategy decision and do not differ for each marketing outlet, β_j is a vector of unknown parameter estimates and ε_{ij} is the unobserved error term.

The error terms $\varepsilon_{ik} = mi$ are assumed to be distributed as multivariate normal, with zero mean and variance-covariance matrix ε and has values of 1 on the leading diagonal and correlations $\rho_{jk} = \rho_{ij}$ as diagonal elements, where $\varepsilon \sim N (0, \sum)$. The covariance matrix $\sum$ is expressed as follows:

$$
\Omega = \begin{matrix} 1 & \rho ST & \rho SN \\ \rho TS & 1 & \rho TN \\ \rho NS & \rho NT & 1 \end{matrix}
$$

$\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad$ (5.5)

Where ρ denotes the pairwise correlation coefficient of the error terms of any two of the marketing outlet participation in the variance-covariance matrix; and *S*, *T* and *N* denote supermarket, traditional market and NAMBoard market, respectively. The pairwise correlation coefficient signs represent complementarity or substitutability of the marketing channels (Teklewold *et al.* 2013). A positive correlation coefficient indicates that farmers' decisions for a particular marketing channel is dependent on another marketing channel (complementarity), whereas a negative correlation coefficient indicates that farmers' decisions for a particular marketing channel are influenced by a set of available substitutes (Teklewold *et al.* 2013).

5.3 The study area, sampling and data collection technique

The data used in the empirical application are from a sample of 170 smallholder vegetable farmers from the Manzini and Hhohho regions of Swaziland. The farmers were sampled from a list of farmers issued by the Swaziland National Union (SNAU) and NAMBoard. These regions were selected because they have the highest number of large chain supermarkets, private and public pack-houses and have ideal climatic conditions (middleveld and high-veld, respectively) for vegetables. The three marketing channels studied are supermarkets, traditional markets and the National Marketing Board (NAMBoard). These channels are important as they are commonly used markets by smallholder farmers and consumers. The supermarkets referred to in this study are large multinational chain stores, which have been in the country since 1986. Supermarkets are characterized by their strict procurement

requirements of high quality, quantity, and consistency; however, they are deemed to offer stable and competitive prices (Rao and Qaim 2011; Andersson *et al.* 2015). Produce is to be delivered to the outlet ready for selling and farmers need to comply with these requirements if they want to enter the channel (Vermeulen *et al.* 2008). NAMBoard is a state-owned enterprise that performs three functions simultaneously: farm development, marketing (import and export of fresh produce) and a regulatory function (World Bank 2011). NAMBoard have extension officers that provide extension services, issue marketing contracts (to farmers that meet their criteria, i.e. land and water) and collect produce at farm-gate, which is taken to their packhouse for sorting and distribution to local and export markets. Traditional markets, on the other hand, are informal markets which consist of individuals and vendors who operate in city centres and on street corners. They are characterized by small quantities of different produce of varying size and quality (Zúñiga-Arias and Ruben 2007). To determine the factors that explain participation in the three channels, a quantitative structured questionnaire was used to collect the following: farmers' characteristics, asset ownership, institutional variables, and transaction cost variables. The questionnaire was first pre-tested for relevancy and ambiguity. The framework in Figure 5.1 depicts the marketing strategy selection decision. The farmers' demographics, asset ownership, institutional and transaction cost factors are perceived to influence the smallholder vegetable farmers' decision on market participation strategy decisions.
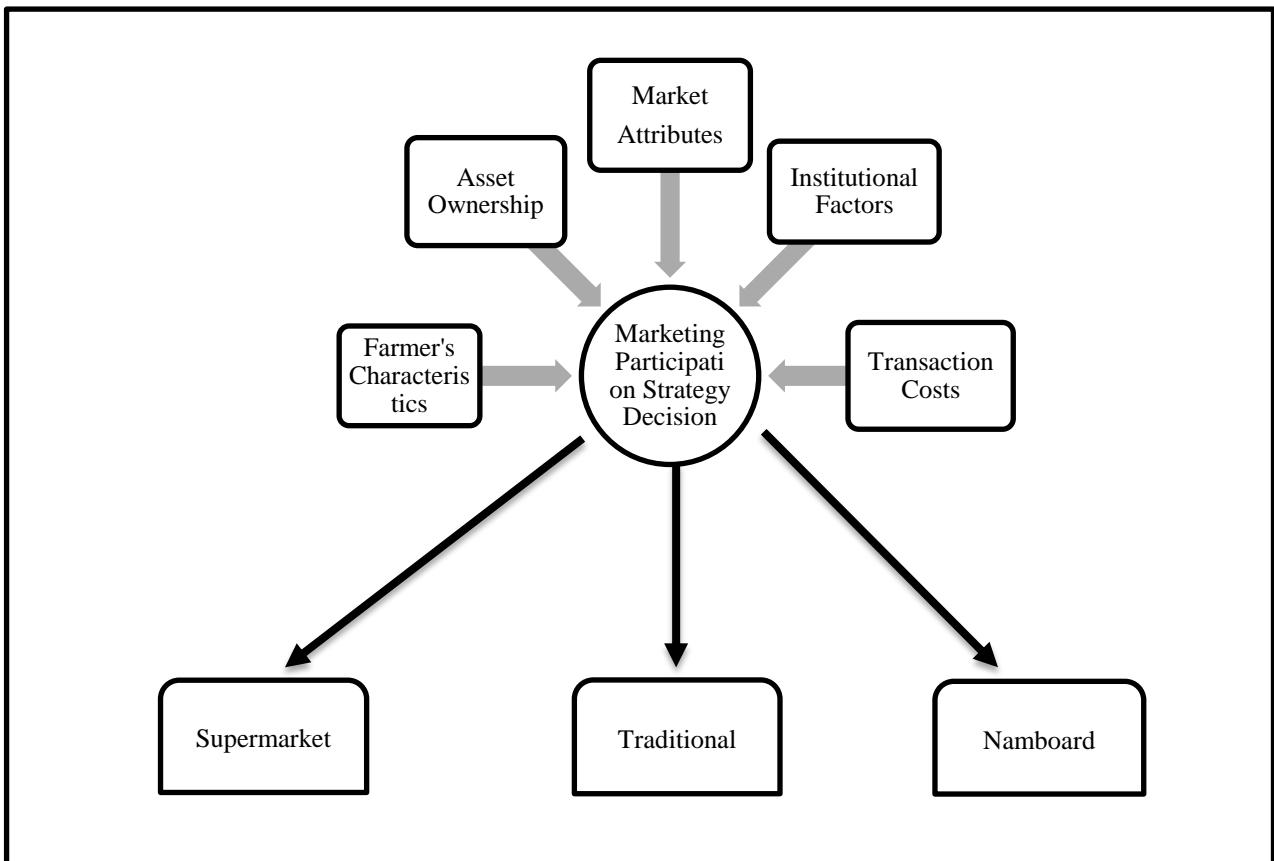
Figure 5.1: Conceptual framework for marketing strategy decision

5.4 Definition of variables and summary statistics

Dependent variables

The choice related to each market outlet selected corresponds to a binary (yes or no) situation. Thus, the three marketing channels formulate a multivariate probit model with the three sets of binary dependent variables (supermarket, traditional and NAMBoard).

Independent variables

Independent variables included in the model are the age of the farmer, level of education, risk attitude, farm size, access to credit and extension services, transport ownership and the quality of the road to the market as presented in Table 5.1.

Table 5.1: Definition and summary statistics of explanatory variables used in the analysis, n=170

Variable	Description	Values	Mean	Std. Dev.
Dependent variables				
Supermarket (n=60)	Sell predominantly to Supermarket	1=yes, 0=no		
Traditional (n= 82)	Sell predominantly to Traditional market	1=yes, 0=no		
NAMBoard (n=28)	Sell predominantly NAMBoard market	1=yes, 0=no		
Independent variables				
Farmer's characteristics				
Age	Average age of the farmer	Years	45.81	13.94
Education	Average years of formal education of the farmer	Years	10.78	8.17
Risk attitude	Farmer's risk attitude	1=averse; 2=neutral; 3=prefer	2.11	0.79
Asset ownership				
Farm-size	Total farm size	Hectares	1.87	1.85
Number of family labour	Number of family members currently working in the farm	Number	1.48	1.63
Mobile phone	Own mobile phone	1=yes, 0=no	0.88	0.33
Radio	Own radio	1=yes, 0=no	0.56	0.50
Off-farm	Access to off-farm	1=yes, 0=no	0.38	0.49
Own transport	Own means of transportation	1=yes, 0=no	0.27	0.45
Institutional variables				
Access credit	Access to credit	1=yes, 0=no	0.24	0.43
Extension service	Frequency of extension support	Days/season	0.85	1.20
Market information	Access to market information	1=yes, 0=no	0.82	0.39
Transaction cost				
Road quality	Quality of the road to the market	1-very poor; 2-poor; 3=average; 4=good; 5=very good	2.44	1.63
Market attributes				
Payment duration	Number of days to receive payment	Days	11.31	14.75

NB: Std. Dev.-standard deviation

5.5 Empirical results and discussion

In this section of the chapter, the empirical findings that emanated from the MVP model used to identify the factors influencing the choice of marketing outlets are presented.

5.5.1 Descriptive statistics

Farmers' characteristics

The results in Table 5.1 indicate that the average age of the smallholder farmers is 46 years. Young farmers are more adventurous risk takers than older farmers (Maspaitella *et al.* 2018) and are willing to incur costs to reach markets that offer better prices. Therefore, age is expected to have a negative relationship with formal markets (supermarkets and NAMBoard participation). Education is a significant predictor of the choices to sell to formal markets. On average, respondents have attained a secondary level of education (11 years of formal education). High levels of education indicate the availability of human capital and management capability (Muricho *et al.* 2015). Therefore, the higher level of education of the farmer translates into knowledge regarding production and marketing risks which enhance understanding of the importance of adopting a diversified marketing strategy to reduce market risks and optimize sales as well as identifying marketing opportunities (Sebatta *et al.* 2014). A positive correlation between education, supermarket and NAMBoard market participation is expected. Risk attitude indicates the level of risk aversion of farmers towards each of the marketing channels. Each marketing channel is associated with risks and the farmer's decision to use the channel is influenced by the characteristics of the channel (LeRoux *et al.* 2010). Market risks include low sales volume, high labour and marketing costs, the ability to provide a product of consistent quality and quantity, competition, low prices, unpredictable customer turn-out and buyer's failure to fulfil commitments (LeRoux *et al.* 2010). Traditional markets are associated with unpredictable customer turn-out and low sales volume. Formal markets may be regarded as less risky if they offer contracts to farmers. However, uncertainty of meeting procurement requirements may influence farmers in viewing formal markets as too risky. Therefore, a positive and negative effect is expected. In this study, risk attitude is measured in three categories, where 1 indicated risk averse, 2 = risk neutral and 3= risk seeking.

Asset ownership

Assets are a form of wealth that farmers can use to invest in their farming business such as buying inputs and paying for the associated marketing costs, e.g. delivery. Owning assets such as family labour, farmland, transport, mobile phone and off-farm income is hypothesized to positively influence the strategic marketing selection decisions. The average farm size is

1.9 hectares and about a half (0.93) of that is allocated to vegetables. In this study, it is hypothesized that the greater the farm size allocated to vegetables, the more likely it is that the farmer participates in all the available outlets to maximize sales revenue and reduce market risks. A majority (88%) of the farmers owned mobile phones. Owning a mobile phone has a positive influence on marketing participation by reducing buyer and supplier searching costs (Camara 2017). Camara (2017) suggests that off-farm income is an additional asset that can be used to procure production inputs. The results indicate that about 38% of the farmers had off-farm income.

Institutional variables

Access to support services such as research institutions, financial institutions and extension support are hypothesized to influence the selection of marketing channels. Access to credit (finance, inputs, transport) enables farmers to produce and deliver enough marketable surplus of high quality (Abu *et al.* 2016). Therefore, farmers with access to credit are expected to be positively influenced to participate in marketing channels. To access markets, smallholder farmers need information about the buyer's requirements and produce prices (Zoltner and Steffen 2015). The information is then used to make informed production and marketing decisions as well as price negotiations with the buyer (Blandon *et al.* 2009b; David-Benz *et al.* 2012; Arinloye *et al.* 2015). Therefore, access to market information will enhance the farmer's decision in selecting markets that will maximize utility. Marketing information can be disseminated through radio and mobile phones, and 88% of the farmers own cellular phones and 56% own radios. David-Benz (2012) suggests that mobile phones and radios can be used to disseminate marketing information to enhance farmers' production and marketing decisions. The provision of extension services and training is fundamental for disseminating information, technology and new farming activities (Poole 2017). The author found that access to extension services and training increases market access by 58.5%; where market access was measured by the increase in prices received and improvement in produce quality and quantity.

Transaction costs

Transaction costs are the observable and unobservable costs of market exchange (Fischer and Qaim 2012) such as packaging, transportation and administration (Hardesty and Leff 2010). Smallholders need to meet both observable and unobservable costs in order to participate in

the market (Poole 2017). Several studies have argued that these costs hinder smallholder farmers' participation in formal markets due to the added cost (Louw *et al.* 2007; Poole 2017). In this study, road quality is used as a proxy for transaction costs. Considering the perishable nature of vegetables, a good road system is required to enhance product quality while the product is in transit to markets. Sebatta *et al.* (2014) state that poor road quality constrains smallholder commercialization. Tura and Hamo (2018) concur that poor roads force famers to sell in their immediate environment to reduce transport costs. The average state of the road was recorded at 2.44, indicating poor road conditions. Therefore, a negative effect is expected between the state of the road and marketing channel decision.

Market attributes

Market attributes include payment duration by the markets to the farmers. Therefore, payment duration is expected to influence the selection decision for supermarkets and NAMBoard positively. Traditional transactions are completed at the point of sale and supermarkets and NAMBoard payments are made on average within 11 days.

Hypothesis testing

The null hypothesis (H_o) states that all the correlation coefficients are simultaneously equal to zero suggesting that there are no interactions amongst the equations. The Wald test is used to test the H_o. If the H_o is not rejected, it means that the models are independent of each other or there are no interactions, implying that the equations can be estimated individually as independent univariate probit models. Conversely, if the H_o is rejected, it suggests that estimation of M (the marketing outlets, i.e. supermarkets, NAMBoard, traditional) independent univariate probit models for each channel would lead to inefficient estimates, signalling the need for the simultaneous estimation of all M equations using MVP.

5.5.2 Selling patterns by smallholder farmers

The probability distributions of the marketing outlets used by the case study of smallholder farmers are presented in Table 5.2. The majority of smallholder farmers channel their produce to traditional markets. The combination that involves this market is almost 60%. This is not surprising since the literature suggests that procurement requirements by formal markets constrain farmers from accessing these markets and farmers have no option but to sell to

traditional markets (Louw *et al.* 2007). About 7% of farmers strictly sell to supermarkets and 25% use multiple channels that involve supermarkets.

Table 5.2: Frequency distribution for single or multiple marketing channel selection by survey respondents, n=170

Market Outlets	Frequency	Percent (%)
Traditional market	80	47.1
Supermarkets	11	6.5
NAMBoard market	4	2.4
Traditional & Supermarket	41	24.1
Traditional & NAMBoard	24	14.1
Supermarket & NAMBoard	4	2.4
Traditional & Supermarket & NAMBoard	6	3.5

5.5.3 The nature of the relationship between the marketing outlets

The multivariate outcomes of farmers' participation in supermarkets, NAMBoard and traditional marketing channels is estimated using the MVP model. The Wald test of chi-square of 104.64; $p = 0.000$ in Table 5.4 implies that the model fits the data reasonably well. The estimated correlation coefficients among the dependent variables are presented in Table 5.3.

Table 5.3: Correlation coefficients for the marketing channels from the MVP model

Parameter	Coefficient	Standard error
$\rho 21$	-0.6196***	0.2300
$\rho 31$	-0.3042*	0.1773
$\rho 32$	-0.0863	0.2203

Likelihood ratio test of $\rho 21 = \rho 31 = \rho 32 = 0$

Chi2 (3) = 10.2402; p=0.0166

Joint Probability (success)	*0.0408*
Joint Probability (failure)	*0.0061*
Linear predictions (supermarket)	*-0.4887*
Linear predictions (traditional)	*2.7898*
Linear predictions (NAMBoard)	*-1.1613*
Marginal predictions (supermarket)	*0.3646*
Marginal predictions (traditional)	*0.9006*
Marginal predictions (NAMBoard)	*0.2362*

*NB: -**and * indicate significance at the 5% and 10% levels respectively.*
- *The indexes refer to the equation: 1=Supermarket; 2=Traditional; 3= NAMBoard*

They have a negative sign; however, only $\rho 21$ (correlation for supermarkets and traditional markets) and $\rho 31$ (correlation for supermarkets and NAMBoard) are statistically significant. This suggests that unobservable factors which increase the probability of choosing the supermarket channel reduce the probability of selecting the traditional market; similarly with the supermarket and NAMBoard. Moreover, the negative sign on the correlation coefficients of the proportion of produce marketed at each of the three categories of marketing outlets suggests that the outlets are substitutes. This implies that if the conditions for supplying one market outlet are inaccessible for smallholder farmers, another market will be selected over the other (Jansen 1996). Therefore, smallholders would have to produce high-quality vegetable products to meet the requirements of the market outlet that offers a competitive produce price.

The likelihood ratio test for the overall correlation (independence between the error terms) rejects the null hypothesis that all correlation coefficients of the equations were zero ($\rho 21 = \rho 31 = \rho 32 = 0$) as indicated by the Chi2 (3) = 10.2402; p=0.0166. These results justify the use of the MVP model that there are interactions among the marketing outlets, and that there are unobserved variables that influence selection decisions. The joint probability that all the respondents supply to all three marketing outlets is about 4%. The small value is not surprising since the study was targeted at smallholder farmers, who are faced with both

production and marketing constraints, and they do not have the capacity or the economies of size to spread the fixed costs of accessing all three market outlets at once. The joint probability of failure (none of the farmers supplies any of the outlets) is about 0.6%, which is very low. This confirms the economic importance of smallholder agriculture in Swaziland. The linear predictions for each marketing channel equation are: −49%, 278% and −116%, respectively, and the marginal probability for the channels are: 36%, 90% and 24%, respectively. This suggests that the probability that a smallholder vegetable farmer will select a supermarket channel is 36%; 90% for traditional markets and 24% for NAMBoard. The probability to supply traditional markets is very high because this channel does not have strict product specifications or requirements, unlike supermarkets. The higher marginal probability of supplying supermarkets than NAMBoard can be explained by the fact the some of the respondents lamented the low price offered by NAMBoard for their produce. This suggests that they would rather sell to supermarkets that offer a more competitive price than NAMBoard that uses the transport services they provide to justify the low price they offer.

5.5.4 Factors influencing the choice of marketing channel strategy decisions

The MVP estimates for the factors influencing marketing channel choice decision are presented in Table 5.4. Age and education variable coefficients were insignificant in explaining marketing outlet selection decisions. Arinloye *et al.* (2015) obtained similar insignificant results for age and education in a pineapple marketing channels research study in Benin. Soe *et al.* (2015) also obtained similar results regarding education and concluded that education had no influence on marketing channel selection for paddy rice in Myanmar. However, Tura and Hamo (2018) in a tomato study in Ethiopia found that education had a negative significant effect on the retailer market outlet selection.

Table 5.4: MVP estimates for the factors affecting marketing channel selection decisions

	Supermarket		Traditional		NAMBoard	
Individual characteristics	**Coefficient**	**Std. Error**	**Coefficient**	**Std. Error**	**Coefficient**	**Std. Error**
Age	-0.0065	0.0098	0.0242*	0.0136	0.0170	0.0126
Education	-0.0017	0.0178	-0.0131	0.0169	0.0043	0.0181
Risk attitude	0.3950**	0.1695	0.0102	0.2074	-0.0993	0.2117
Asset ownership						
Number of family labour	0.0005	0.0815	-0.0262	0.0708	0.1397*	0.0769
Farm size	0.1448*	0.0879	-0.1513*	0.0774	-0.0140	0.0861
Own means of	1.1052***	0.2711	-0.4024	0.3747	-0.7141*	0.3973

transportation						
Mobile phone	0.7297*	0.4400	-3.6419	192.6914	0.0891	0.4773
Off-farm	0.2305	0.2550	-0.0957	0.3576	0.0158	0.3722
Institutional variables						
Access to credit	-0.5182	0.3273	-0.1098	0.3907	0.5105	0.3766
Extension services	-0.4152***	0.1305	0.3266**	0.1631	0.4834***	0.1290
Market information	0.7353*	0.3774	-0.4756	0.5411	1.2793*	0.6997
Transaction cost						
Road quality	-0.0100	0.0110	0.3165**	0.1514	0.0107	0.0070
Market attribute						
Payment duration	0.0351***	0.0084	-0.0319***	0.0107	0.0600***	0.0126
CONSTANT	-2.7797***	0.9247	4.5778	192.6943	-4.1523***	1.3371

Wald Test Chi2 (39) = 104.64; p> chi2= 0.0000
*NB: Significant at 1% ***,5% ** and 10%**
Std. Error= standard error

The results show that risk attitude does significantly affect the farmers' decision to sell to supermarkets. This suggests that the higher the risk attitude (risk preference) the farmer has, the more likely it is that the farmer will select supermarkets. This could be explained by the fact that supermarket participation is still a new endeavour to smallholder farmers and the issues of procurement requirements could cause uncertainty. However, supermarkets are regarded as stable and offer better prices than traditional markets (Rao and Qaim 2011). The size of the household has a positive significant influence on the farmers' decision to select NAMBoard and no effect on supermarkets or traditional markets, implying that the larger the number of family members involved in farming the produce, the more people available to do cultivation and marketing activities. Though not statistically significant, the positive and negative results from the supermarket and traditional marketing channels respectively are not a surprise; Abu *et al.* (2016) suggest that household size has both a significant negative and positive influence on market participation. An increase in the number of family members could enhance market participation through provision of cheap labour but also reduce the likelihood of participating in multiple market channels due to limited surplus produce available for sale (Abu *et al.* 2016). Tura and Hamo (2018) found that family size negatively affected the decision to select the wholesale market and had a positive influence on the consumer market outlet. The authors explained that larger families assist each other in selling directly to consumer markets rather than wholesale market outlets.

Farm size positively and negatively influences participation in supermarket and traditional marketing channels but does not affect the farmers' decision to sell to NAMBoard. This

implies that farmers with more farmland are more likely to select supermarkets and less likely to select traditional channels as marketing outlets for the vegetables. Tura and Hamo (2018) found no significant effect of farmland on market outlet selection (wholesaler, retailer and consumer). The results further indicate that farmers who own transport are more likely to participate in supermarket channels. Access to reliable transport is one of the requirements for supermarket channel participation, therefore, farmers owning a means of transport stand a chance of supplying to this market that offers more stable prices (Namazzi *et al.;* Rao and Qaim 2011; Camara 2017). Farmers that own means of transportation have the ability to distribute the produce to the market and acquire marketing information during distribution (Camara 2017). However, owning transport negatively influenced the farmers' decision to select NAMBoard as an outlet, which could be due to NAMBoard collecting produce at the farm-gate from farmers. Owning a mobile phone has a positive effect on the vegetable farmers' supermarket outlet choice. Supermarkets require consistent farmers who can be easily contacted to replenish stock. Mobile phones enable farmers to communicate easily with buyers and input suppliers and to access marketing information such as price (Slamet *et al.* 2017).

The estimated coefficient for access to extension services (days per season) is significant for all the marketing outlets at 1% statistical level of significance for supermarkets, 5% level of significance for traditional markets and 1% for NAMBoard. This reflects that farmers who have access to extension services are more likely to choose traditional and NAMBoard marketing outlets and less likely to select supermarkets. This somewhat surprising result possibly reflects that access to extension services is linked to supplying NAMBoard. Many farmers who mainly supply traditional markets also supply to NAMBoard, whereas fewer farmers who supply to supermarkets also supply to NAMBoard. Therefore, the reason for some farmers choosing NAMBoard in preference to supermarkets may be to improve their access to extension services. The negative effect of access to extension services on supermarket participation could also be attributed to the limited human and financial resources of the Ministry of Agriculture in offering critical extension services including sanitary and phytosanitary (SPS) skills required to access formal markets, such as supermarkets and exports (World Bank 2011). Moreover, investigating the quality and method of extension services offered could provide more clarification since the literature states that access to technical support is positively associated with market participation due to

the enhanced knowledge skills and support obtained (Ismail 2013; Sebatta *et al.* 2014; Abu *et al.* 2016). As expected, access to marketing information has a positive influence on the decisions to select supermarkets and NAMBoard. Farmers with access to information have the ability to make informed decisions concerning production and marketing matters (Batt 2001). For instance, they would know the crop to grow (demand) and the market to supply. Therefore, it can be argued that some farmers choose NAMBoard as a marketing channel for their produce over supermarkets in order to improve their access to agricultural extension services.

Surprisingly, access to credit does not have any influence statistically in the choice of any of the marketing outlets. The plausible reason could be that very few (24%) respondents had access to credit. The results show that road quality has a statistically significant positive effect on the farmers' decision to supply the traditional markets. This could be attributed to the fact that traditional markets consist of individual consumers residing within the community and vendors/hawkers who collect produce at the farm-gate, implying that the associated marketing cost could be attached to the vendor, not the farmer. Poor road quality limits the transportation of produce to better markets (Matsane and Oyekale 2014) and instead farmers opt to sell in neighbouring communities (traditional market) to reduce transport costs (Tura and Hamo 2018). Hence, the negative sign of the coefficient from the supermarket equation was expected though insignificant, since most supermarkets are in urban areas.

The payment duration variable is highly significant at the 1% level in all three equations, confirming that payment duration influences the marketing outlet choice decision. The more the number of days taken to receive payment, the more likely farmers would choose to supply supermarkets and NAMBoard marketing outlets and less in traditional markets. This could be explained by the benefits of selling to these markets (quick process, bulk purchasing and lump sum payments) as reported by the respondents.

5.6 Chapter summary

This study examined market participation strategy decisions of supermarket, traditional and NAMBoard channels in the Manzini and Hhohho regions of Eswatini. The MVP analysis method was employed to jointly estimate the marketing channels' choice equations. The

results justified the use of MVP since the null hypothesis of no correlation of the errors terms of the equations was significant at the 1% level of significance, confirming that the decision to participate in supermarkets, traditional and NAMBoard markets are made jointly and are correlated. The study also found that the channels are substitutes, implying that in most cases one channel is selected over the other. Considering the study was based on smallholders who are faced with market access barriers and do not have the economies of scale to spread fixed costs associated with participating in all three markets, it is, therefore, essential that policies aimed at smallholder commercialization focus on supporting farmers so they can make informed decisions regarding marketing channels, in particular with access to marketing information. Marketing information has a positive statistical influence on the farmers' decision in choosing supermarket and NAMBoard. Contrary to expectations, age, education, having off-farm income and access to credit could not explain the selection decision of any of the three marketing outlets as indicated by the statistically insignificant coefficients. An observation made from the data is that only a few (24%) of the farmers had access to credit. Therefore, a deeper investigation of the specific terms and conditions related to the acquisition of credit access by smallholder farmers would be of interest, which is likely to explain the low mean rate and the negative effects.

CHAPTER 6: THE IMPACT OF SUPERMARKETS AS A MARKETING CHANNEL ON FARM INCOME AMONG SMALLHOLDER FRESH PRODUCE FARMERS IN ESWATINI[7]

6.1 Introduction

This chapter identifies factors influencing smallholder farmers' decisions to participate in supermarket channels, the impact thereof on farm income as well as the supermarket participation dynamics. In section 6.2 the study area, sampling and data collection technique are presented, followed by a short description of the variables used in the model in section 6.3. The conceptual framework is discussed in section 6.4 and the empirical results are discussed in section 6.5, while the chapter summary is presented in section 6.6.

6.2 The study area, sampling and data collection technique

Data for the study were collected from 142 smallholder vegetable farmers that were cultivating green leafy vegetables (cabbages, spinach and lettuce) in the Manzini and Hhohho regions of Eswatini. A list of vegetable producers was obtained from the national produce marketing organization, NAMBoard and from the farmers' union, SNAU and 82 farmers that were predominately reported to be producing green leafy vegetables i.e. cabbages, spinach and lettuce were then randomly selected. The sixty farmers whose primary market was supermarkets came from a list of 63 farmers obtained from the supermarkets. The intention was to interview all 63; however, three farmers were not available during the time of data collection. The collection method involved face-to-face interviews using a structured questionnaire. The questionnaire contained information on a range of socio-economic attributes, asset holdings, vegetable production attributes, institutional attributes and transaction cost aspects, among others. Since the focus is on farm income as a result of participation in the supermarket channel, the value of sales of vegetables to supermarkets is used as a proxy.

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[7] This chapter gave rise to the following article: Dlamini-Mazibuko, B.P., Ferrer, S. R. D. and Ortmann, G. F. Smallholder farmers' choice of marketing channels: the impact of supermarket participation on farm incomes in Eswatini. Submitted to *The Journal of International Development*. (Under review).

6.3 Definition of variables

Information elicited from respondents included socio-economic characteristics, marketing channels supplied, and perceived benefits and changes since supplying supermarkets with fresh produce (cabbage, spinach and lettuce) for a given period.

Outcome variables: farm income (a proxy for the value of sales of vegetables to supermarkets)

Dependent variables: The dependent variable in the income effect equation is binary, with (1) indicating supermarket participation and (0) otherwise.

Independent variables: farmer's socio-economic characteristics (age, gender, level of education, farming experience, risk attitude), asset ownership (farm size, livestock), off-farm income, and transaction costs (quality of the road, number of family members working on the farm).

6.4 Conceptual framework and impact estimation techniques

Two methods commonly used in impact assessment, welfare, and agricultural technology adoption studies are Propensity Score Matching (PSM) and Endogenous Switching Regression (ESR). However, PSM does not account for unobservable heterogeneity, which results in inconsistent estimates (Narayanan 2014). Individual farmers could possess inherent characteristics such as entrepreneurial skills or motivation (Rao and Qaim 2011) which cannot be observed. ESR, on the other hand, addresses that problem and accounts for both observable and unobservable characteristics in an efficient manner (Rao and Qaim 2011).

The effects of supermarket participation on farm income could be measured using the following Ordinary Least Squares (OLS) expression:

$$Y = \beta X_i + \gamma I + \mu \qquad (6.1)$$

Where *Y* is farm income, *X* are explanatory variables influencing income, *I* is a dummy variable (I=1 if the farmer participates in supermarket channel and zero otherwise) and γ indicates the impact of supermarket participation on income. However, since the farmers self-select themselves into marketing channels, unobserved variables may influence both the supermarket participation decision and the outcome variable. If unobserved variables

significantly affect the treatment and outcome simultaneously, the OLS model will produce incorrect estimates and the treatment will be regarded as endogenous (Maddala 1986). Therefore, estimating equation (6.1) with the OLS estimator is likely to produce biased parameters (Rao and Qaim 2011).

One of the assumptions made about the ESR model is that the marketing channel is endogenous to income received. Some unobserved factors that influence the probability to choose a particular marketing channel could also influence the income farmers receive from supermarkets for the vegetables. Lokshin and Sajaia (2004) argue that ignoring these selectivity effects will likely give misleading results about the marketing channels. Therefore, the ESR model corrects for selection bias in the marketing channel income estimates and endogeneity. Moreover, the model allows for interactions between participants and other covariates in the outcome function (Asfaw and Shiferaw 2010). In addition, it determines the relationship between the outcome variable and the set of explanatory variables. This method of analysis treats participation and non-participation as regimes and allows for structural differences in the income function between the regimes to be identified. The impact equation is expressed as regimes in the following set of equations:

Regime 1 (supermarket suppliers): $\qquad Y_s = \beta_s X_i + \mu_s \qquad$ if $I= 1$ $\qquad\qquad$ (6.2)

Regime 2 (traditional suppliers): $\qquad Y_t = \beta_t X_i + \mu_t \qquad$ if $I=0$

Selection equation: $\qquad\qquad\qquad I_i^* = \beta Z_i + \varepsilon_i$

Where Y_s and Y_t are outcome variables representing income from supermarket and traditional channels, respectively, β_s and β_t are vectors of parameters, X_i are vectors of exogenous variables such as the farmer's characteristics, and μ_s and μ_t are the error terms. The error terms have a trivariate normal distribution with mean vector zero and covariance matrix:

$$\Omega = \begin{bmatrix} \sigma_s^2 & \sigma_{st} & \sigma_{s\varepsilon} \\ \sigma_{st} & \sigma_t^2 & \sigma_{t\varepsilon} \\ \sigma_{s\varepsilon} & \sigma_{t\varepsilon} & \sigma^2 \end{bmatrix} \qquad\qquad (6.3)$$

Where σ^2 is the variance of the error term in the selection equation, σ_s^2 and σ_t^2 are variances of the error terms in the outcome equations, $\sigma_{s\varepsilon}$ is a covariance of ε_i and μ_s, and σ_{st} is a covariance of ε_i and μ_t. The covariance (σ_{st}) between μ_s and μ_t is not defined since Y_s and Y_t are never observed simultaneously (Lokshin and Sajaia 2004). Using this assumption, Equation (1) is then written as follows:

$$Y_s = \beta_s X_i + \sigma_{s\varepsilon} \lambda_s + \mu_s \qquad if\ I = s \qquad\qquad (6.4)$$

$$Y_t = \beta_t X_i + \sigma_{t\varepsilon} \lambda_t + \mu_t \qquad if\ I = t \qquad\qquad (6.5)$$

Where λ is the Inverse Mills Ratio (IMR), ESR estimates the IMR (λ_s and λ_t), and the covariance terms ($\sigma_{s\varepsilon}$ and $\sigma_{t\varepsilon}$) have been added to equation (2) as auxiliary regressors to correct selection bias. When the error covariances are equal to zero (i.e. $\sigma_{s\varepsilon} = \sigma_{t\varepsilon}=0$), it means a switching regression model with exogenous switching, and if non-zero, the model has endogenous switching (Maddala 1986). This is achieved by testing the correlation coefficients between μ_s and ε ($\rho_{s\varepsilon}$) calculated as $\sigma_{s\varepsilon}/ \sigma_s\sigma_\varepsilon$, and between μ_t and ε ($\rho_{t\varepsilon}$) calculated as $\sigma_{t\varepsilon}/ \sigma_t\sigma_\varepsilon$. If the signs of the estimated correlation coefficients alternate across the regimes, it means that farmers are in regimes that offer a comparative advantage. However, if both estimated coefficients have the same sign, its evidence of hierarchical sorting. This means those in regime 1 (supermarket participants) have below average income in both regimes, but are better off in regime 1, and those in regime 2 have below average income in both regimes but are better off in regime 2 (Maddala 1986; Rao and Qaim 2011).

Conditional expectations and treatment effects

Once the parameters have been estimated, the average treatment effect (ATT) and the average treatment on the untreated (ATU) are measured. To be specific, the expected outcome of the treated (supermarket participants) and untreated (non-participants) in actual and counterfactual scenarios are compared. The conditional expectations for the outcomes are expressed as follows:

$$E(Y_{si} / I = 1) = \beta_s X_{si} + \sigma_{\varepsilon s} \lambda_{si} \qquad\qquad (6.6)$$

$$E(Y_{ti} / I = 0) = \beta_t X_{ti} + \sigma_{st} \lambda_{si} \qquad\qquad (6.7)$$

$$E(Y_{ti} / I = 1) = \beta_t X_{si} + \sigma_{\varepsilon t} \lambda_{si} \qquad\qquad (6.8)$$

$$E(Y_{si} / I = 0) = \beta_s X_{ti} + \sigma_{\varepsilon s} \lambda_{ti} \qquad\qquad (6.9)$$

Equations (6.6) and (6.7) represent the actual expectations observed in the sample and the counterfactual outcome is represented by equations (6.8) and (6.9). The difference between equations (6.6) and (6.8) represents the ATT, which is the effect of supermarket participation on the outcome (income) of the participants and is expressed as:

$$ATT = E(Y_{si} / I = 1) - E(Y_{ti} / I = 1) \qquad\qquad (6.10)$$

$$= X_{si} (\beta_s - \beta_t) + \lambda_{si} (\sigma_{\varepsilon s} - \sigma_{\varepsilon t})$$

Likewise, the difference between equations (6.7) and (6.9) represents the treatment on the untreated (ATU), which is the effect for the farmers that did not participate, and it is expressed as:

$$ATU = E(Y_s / I = 0) - E(Y_t / I = 0) \qquad (5.11)$$

$$= X_t(\beta_s - \beta_t) + \lambda_t(\sigma_{\varepsilon s} - \sigma_{\varepsilon t})$$

The first parts on the right-hand side of equations (6.10) and (6.11) represent the expected mean outcome of supermarket participants if they had the same characteristics. The second part, which is the selection term, captures the potential effects of differences in unobserved variables.

The identification of the ESR model requires the addition of at least one variable that is correlated with the treatment but not with the outcome indicator. Following (Rao and Qaim 2011; Mmbando *et al.* 2015), the study added access to marketing information and risk attitude as instruments in the selection equation of the income model (Appendix 1). Transport ownership could have been a potential instrument; however, Qaim and Rao (2013) advised against that variable, stating that owning transport could have been induced by participating in the supermarket channel.

The base heterogeneity effect (BH$_1$) for the treated (supermarket participants) is defined as the mean difference between supermarket participants observed in the sample (equation 6.6) and the counterfactual scenario (equation 6.7). It is specified as:

$$BH_1 = E(Y_{si} / I = 1) - E(Y_{si} / I = 0) \qquad (6.12)$$

Likewise, in the equation for the control group (non-participants), the base heterogeneity effect (BH$_2$) is the mean difference between non-participant observed in the sample and the counterfactual scenario. It is specified as:

$$BH_2 = E(Y_{ti} / I_i = 1) = E(Y_{ti} / I_i = 0) \qquad (6.13)$$

The transitional heterogeneity (TH) is then the difference between ATT and ATU. It indicates whether the effect of supermarket participation is larger or smaller for farmers supplying supermarkets or for those that did not participate in the counterfactual scenario that they did participate;

$$TH = ATT - ATU \qquad (6.14)$$

6.5 Empirical results and discussion

6.5.1 Descriptive statistics

The descriptive statistics for farmers who predominately supply fresh farm produce to supermarkets and those who supply to traditional markets based on selected explanatory variables are presented in Table 6.1.

Table 6.1: Descriptive statistics of selected variables

	Supermarket	(n=60)	Traditional	(n=82)
	Mean	Std Dev.	Mean	Std Dev.
Dependent/Outcome variable				
Gross vegetable income	21,970.65***	3,313.47	8,884.52	1,558.79
Farmers' characteristics				
Gender (1=male, 0=female)	0.750**	0.437	0.549	0.501
Education (years)	11.650	3.848	10.695	10.843
Age (years)	42.467*	13.158	46.720	13.432
Marital status (1=married,0=no)	0.667	0.475	0.598	0.493
Dependency ratio[8]	1.361	1.475	0.994	1.144
Risk attitude (1=averse, 2=neutral, 3=seeker)	2.417***	0.107	1.915	0.078
Assets				
Farm size (hectares)	2.171**	2.256	1.458	1.100
Vegetable size (hectares)	1.128***	1.097	0.624	0.573
Experience in vegetable farming(years)	11.465	10.793	9.756	8.395
Ownership of transport (1=yes ,0=no)	0.583***	0.671	0.171	0.379
Ownership of livestock (1=yes, 0=no)	0.317*	0.469	0.341	0.477
Mobile phone (1=yes, 0=no)	0.950*	0.028	0.854	0.039
Institutional support				
Farmer's membership (1=yes, 0=no)	0.217**	0.415	0.415	0.496
Access to credit (1=yes, 0=no)	0.233	0.427	0.207	0.408
Access to marketing information (1=yes, 0=no)	0.917***	0.279	0.720	0.452
Extension services (1=yes, 0=no)	0.366	0.599	0.533	0.700
Off-farm employment (1=yes, 0=no)	0.367	0.486	0.439	0.499
Transaction cost				
Transport cost	809.167***	926.807	176.220	548.580
Distance marketing	28.667***	19.143	8.293	14.118
Road quality (1=very poor, 2=poor, 3= good, 4=very good)	2.600	1.224	2.5	1.057
Packaging cost	101.333***	247.259	3.122	16.382
Amount of labour (number)	3.717**	7.682	1.793	0.223

Mean values are significantly different at the 10% level of statistical confidence.

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[8] Dependency ratio is measured by dividing the number of individuals under 15 years of age and the number of individuals over 64 years of age by the total number of individuals in the household.

Statistically significant differences between the groups are observed. Regarding the outcome variable: supermarket participants earned significantly (60%) more income than traditional market suppliers from the sale of vegetables. Younger, educated married men are more likely to supply supermarkets. Older farmers use experience to make marketing decisions and in most cases are unwilling to divert from the status quo (Franken *et al.* 2014); therefore, a negative relationship between supermarket participation and the age of the farmer was recorded. Education assists farmers to adjust to new market requirements that will enhance entry to the modern market channel (Slamet *et al.* 2017); hence, a positive relationship is expected between the dependent and the independent variable. The average risk attitude for farmers who supply produce to supermarkets is 2.4, suggesting that a majority of these farmers were more risk-neutral.

Significant differences were observed in respect to farm size; the average farm size of farmers who chose supermarkets as a marketing channel is (2.2) which is significantly larger than for farmers who chose traditional outlets (1.5). Farmers who sell to supermarkets also devoted significantly more (1.1) of the farmland to vegetable cultivation than farmers who chose traditional outlets (0.6). Large land size allows farmers to increase production so that they can meet the consistent requirements demanded by supermarkets (Slamet *et al.* 2017). Farmers supplying supermarkets were more experienced in vegetable farming than those supplying traditional markets.

Access to assets such as livestock, family labour and access to off-farm income provides the farmer with leverage to invest in market participation (Randela *et al.* 2008). Regarding transport ownership, supermarket suppliers significantly owned more transport facilities than farmers selling to traditional markets. Transportation is one of the procurement criteria specified by supermarkets in selecting fresh produce farmers (Hernández *et al.* 2007). Traditional suppliers are more likely to own livestock than supermarket suppliers and are also more likely to be members of farmers' organisations. Farmers that engage in off-farm employment were more likely to be supplying traditional markets with fresh produce. Rao and Qaim (2011) state that off-farm income assists farmers to acquire the necessary requirements (such as packaging) to enable entry into supermarket channels as well as liquidity due to payment delays by supermarkets.

Farmers supplying their vegetable produce to supermarkets have more access to credit and marketing information than those who use traditional marketing outlets.

Significant differences were also observed with respect to transaction cost variables (transport cost, distance to the market, road quality and packaging cost). Supermarket suppliers face higher transaction costs due to procurement requirements, including transport and packaging. As expected, supermarket participants employ more labour than those who participate in traditional markets. This could be explained by the procurement requirements imposed by supermarkets such as post-harvest operations involving cleaning and packaging of produce, which require extra labour (Miyata *et al.* 2009; Rao and Qaim 2013). These results are similar to those of (Emongor and Kirsten 2009b) who found that supermarket suppliers in Zambia used twice as many labourers than traditional suppliers.

6.5.2 Comparison of vegetable prices across the different marketing channels

Data on vegetable (lettuce, spinach, cabbage) prices were also obtained from the sampled farmers supplier channels. The prices were based on average price per head or bundle and were analysed using one-way analysis of variance to test for equality of means between prices in supermarkets and traditional channels. The results presented in Table 6.2 indicate that supermarkets offered significantly higher prices to smallholder farmers for lettuce.

Table 6.2: Comparison of average green vegetable prices by the formal and traditional markets in Eswatini

	Formal marketing channel	Informal marketing channel		Informal marketing channels		
Vegetable type	Supermarkets (n=60)	Traditional (n=82)	P-value	Vendors (n=42)	Consumers (n=40)	P-value
Lettuce	3.30	2.98	0.0040***	2.81	3.14	0.0195**
Spinach	3.84	4.62	0.0000***	4.54	4.71	0.1624
Cabbage	6.92	6.60	0.2217	6.76	6.10	0.0746*

Source: Field survey, 2017
[2]*One Lilangeni (Swazi currency) is equivalent to one Rand (South Africa's currency)*
*10% significance level, ** 5% significance level, ***1% significance level

The average price for a cabbage was high relative to the traditional market price; however, the difference was not statistically significant. The results further showed that the average price for spinach was significantly higher for traditional markets compared to supermarkets. These observations are consistent with (Blandon *et al.* 2009a; Andersson *et al.* 2015; Slamet *et al.* 2017). However, it should be noted that the price paid by supermarkets to farmers is not the

price paid by consumers for the produce at the store. Similarly, with traditional markets, the price paid by the vendors/hawkers is not the price paid by final consumers. This implies these markets further set their own price for these products. However, these price differences are negligible and do not imply that supermarket prices are much better than traditional markets.

The analysis of prices from the traditional channels indicates that there are significant differences between prices paid by vendors and individuals, in particular, with lettuce and cabbage. As expected, individuals paid slightly more for lettuce and spinach than vendors.

6.5.3 Determinants of supermarket participation and gross vegetable income

The statistics in Table 6.1 do not allow for an analysis of the impact of supermarket participation on farmers' income from vegetable sales. Therefore, the ESR is applied and the full information maximum likelihood (FIML) parameter estimates of the ESR regression treatment and the outcome is presented in Table 6.3. The joint estimation of the selection equation and the outcome equations by the FIML method enhances the attainment of efficient estimates (Rao and Qaim 2011). The independent variables used (age, gender, education, farming experience, access to off-farm income, livestock, farm size, quality of the road, risk attitude, marketing information) in the model are based on a number of studies (Randela *et al.* 2008; Rao and Qaim 2011; Natawidjaja *et al.* 2014; Andersson *et al.* 2015).

Table 6.3: Full information and maximum likelihood parameter estimates for vegetable income

Variables	Selection equation Coefficient	Std. Err.	Regime 1: Supermarket Participants Coefficient	Std. Err.	Regime 2: Traditional Participants Coefficient	Std. Err.
Age	-0.021	0.013	-0.020	0.020	-0.022*	0.012
Gender	0.502*	0.264	0.346	0.319	0.534**	0.267
Education	0.001	0.013	0.077**	0.035	0.001	0.012
Farming experience	0.019	0.015	0.014	0.019	0.031*	0.018
Family labour	0.072*	0.038	0.084*	0.043	0.052	0.044
Off-farm income	0.057	0.250	-0.453*	0.268	-0.513**	0.255
Livestock ownership	-0.101	0.267	0.506*	0.273	-0.191	0.281
Farm size	0.136*	0.079	0.226***	0.073	0.349***	0.115
Quality of road	0.016	0.111	-0.029	0.109	0.042	0.120
Risk attitude[9]	0.368**	0.144				
Market information	0.645**	0.313				
Constant	-1.798**	0.832	7.642***	0.927	8.533***	0.683
Sigma (σ_j)			0.988	0.189	1.137	0.138
Rho (ρ_i)			-0.624	0.365	0.642**	0.220
Wald chi^{2}s(9)	24.66***					
LR Test of independent	4.29**					

*, ** and *** denote significance at 10%,5% and 1% levels, respectively*
Dependent variable =Log gross vegetable income

Results presented in Table 6.3 show that the correlation coefficients (rho) $\rho_{s\varepsilon}$ and $\rho_{t\varepsilon}$ have alternate signs, which implies that smallholder vegetable farmers choose supermarket channels based on their comparative advantage. However, these are significant only for the correlation between the selection equation (marketing channel choice) and the traditional marketing channel participation equation. This suggests that selection bias from unobserved factors would have been a problem if it had not been controlled. This also implies that farmers who participate in traditional channels earn lower vegetable income in that channel than smallholders from the sample would have earned. The likelihood-ratio test for joint independence of the three equations is significant at the 5% level of significance suggesting that there is significant dependence or interaction between the treatment and the outcome (Rao and Qaim 2011), which justifies the use of this method of analysis. The Wald chi-square is also statistically significant at the 1% level of significance, indicating the variables used fit the model well.

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[9] The correlation coefficients between the instruments, treatment and outcome variable are: marketing information and supermarket participation is $\rho=0.249^{***}$ and marketing information and vegetable income is $\rho=0.028$; risk attitude and supermarket participation is $\rho=0.312^{***}$ and risk attitude and farm income is $\rho=0.081$.

The estimated coefficients in Table 6.3 highlight that the gender of the farmer, number of family members working at the farm, farm size, farmer's risk attitude and access to marketing information significantly affect supermarket participation. The level of education, family labour, farm size and livestock ownership influence farm income positively and significantly only for supermarket participants. Interestingly, access to off-farm income has a negative influence on farm income for supermarket participants. This could be attributed to the possibility that the farmer may be spending more time in other off-farm income generating activities and less on farming activities.

The age, gender, farming experience, farm size and access to off-farm income variables have a statistically significant effect on traditional marketing channel participation. However, the age of the farmer and access to off-farm income have a negative effect on traditional marketing channel suppliers. However, Franken *et al.* (2014) reported a positive relationship between the age of agricultural producers and the use of spot markets in Illinois of the United States of America.

Moreover, these results indicate that there are indeed structural differences between the farmers supplying these marketing channels, particularly with off-farm income and farm size variables which are negative and positive, respectively, and statistically significant. However, the effect of the variables varies in each marketing channel. The effect of access to off-farm income is much larger among supermarket suppliers and that of farm size is much larger for traditional marketing channels. This suggests that supermarket suppliers use off-farm income more productively than those supplying traditional marketing suppliers. On the other hand, traditional suppliers use farm size more productively than those supplying supermarkets. In this study, this could be explained by the fact that supermarket participation is a relatively new phenomenon in Eswatini, and a relatively small proportion of smallholders have access to supermarket channels. Uncertainty on both sides regarding quality rejection could play a role.

Furthermore, it can be observed that more than half of the estimated variables (farmer's age, gender, farming experience, farm size) had higher effects on traditional participants than supermarkets. This could indicate that participating in supermarkets in Eswatini does not mean the producer would be much more efficient or productive to enhance farm income. For instance, Rao & Qaim (2011) reported higher income effects amongst supermarket suppliers

of vegetables in Kenya and reported that the participants used off-farm income and vehicles in a more productive way than traditional suppliers.

6.5.4 Effects of supermarket participation on vegetable income

The effect of supermarket participation on vegetable farmers' income is presented in Table 6.4. The results show that vegetable supermarket participation increased farm income by 146% (treatment effects) from the average effect of 9.704. The results are consistent with findings by Slamet *et al.* (2017). For non-participants, vegetable income would have decreased by 199% (treatment effects) from the average effect of 9.674 had they participated in supermarket channels. This could be attributed to the inherent characteristics of supermarket participants influencing a difference in farm income. Narayanan (2014) suggests that there are variabilities in treatment effects across marketing channels and within farmers from a particular group. The author argues that among various groups of farmers some will do well by participating and others may fare poorly irrespective of whether they are participating or not. Therefore, a broader understanding of the dynamics of farmer participation and selection is essential to ensure sustained participation in modern markets.

Table 6.4: Average effects of supermarket participation on smallholders' vegetable farmers' income

Outcome Variables		With supermarket	Without supermarket	Treatment effects	
Gross vegetable income	Participation	9.704	8.242	ATT =	1.461(0.067)***
	Without participation	7.686	9.674	ATU =	-1.987(0.069)***
	Heterogeneity effects	2.017	-1.431	TH =	3.448(0.030)***

*, ** and *** denote significance at 10,5 and 1% level, respectively and standard errors in parentheses

The study further estimated the transitional heterogeneity (TH) effects of the outcome variable with respect to supermarket and non-supermarket participation. The results show that the heterogeneity effects are positive for supermarket participation, suggesting that the effect of participation on the farm income of participants is greater than non-participants.

6.5.5 Supermarket participation dynamics

This section presents the perceived impacts (benefits, disadvantages, and observed changes) of supermarket participation. Farmers were asked several questions to ascertain their feelings toward supermarket participation since they started selling to supermarkets.

6.5.5.1 Benefits of selling to supermarkets

Smallholder vegetable farmers have been supplying vegetable produce to supermarkets for an average of four years in the study area; hence, they were asked to state the benefits realised since they have been using the supermarkets as a marketing channel. These are presented in Table 6.5.

Table 6.5: The perceived benefits of supplying supermarkets reported by survey respondents

	Frequency (n= 60)	Percentage (%)
Lump-sum	31	52
Stable market	15	25
Better price	14	23
Bulk purchases	13	22

Source: Field survey, 2017

- **Lump-sum payment –** About 52% of respondent farmers preferred supermarkets because of the lump-sum payment issued for produce unlike traditional market transactions, which are characterized by random unit purchases without assurance for repeated transactions (Andersson *et al.* 2015).

- **Stable market –** Another 25% of the respondents believed supermarkets provided a more stable market than traditional markets. Rao and Qaim (2011) and Andersson *et al.* (2015) concur that supermarkets offer relatively more stable markets and prices for smallholder farmers. This gives farmers the incentive to intensify vegetable production (Rao and Qaim 2011).

- **Better price –** About 23% of the respondent farmers believed supermarkets offer better and more stable prices than the alternative markets (traditional). These observations are consistent with (Blandon *et al.* 2009a; Andersson *et al.* 2015; Slamet *et al.* 2017). However, the results (Table 2a) only show a relatively small difference in particular, lettuce and cabbages.

- **Bulk purchases** – About 22% of respondents preferred supermarkets because of consistent bulk purchases.

6.5.5.2 Disadvantages of supplying supermarkets as perceived by smallholders

The top three drawbacks of supplying supermarkets as perceived by the respondent farmers in the study area are presented in Table 6.6.

Table 6.6: Disadvantages of supplying supermarkets as perceived by the respondents

	Frequency (n=60)	Percentage (%)
Long payment period	18	30
Not reliable	8	13
Co contract	7	12
Corruption	6	10

Source: Field survey, 2017

- **Long payment period –** About 30% of the respondents supplying supermarkets had to wait for 18 days on average to receive payment, unlike with traditional channels where payments are made upon purchases. Anderson *et al.* (2015) point out that supermarkets pay farmers after 1 to 2 weeks in Kenya. Emongor and Kirsten (2009b) reported that payment delays constrained production processes.

- **Unreliable market –** About 13% of the farmers felt supermarkets were not reliable with their purchases regarding produce quantity requirements.

- **No contract offered –** About 12% of the respondent farmers were unhappy that supermarkets were not issuing contracts for produce. They felt that having contracts will enable them to plan and market their produce more efficiently.

6.5.5.3 Changes associated with supermarket participation

This section presents information about changes observed by respondent farmers supplying supermarkets. The farmers were asked to state the changes they have experienced since they started supplying to supermarkets. A 5-category Likert-scale was used to measure their responses, and are presented in Table 6.7.

- *Increase in farm income -* the farmers reported having observed a slight increase in farm income. This corresponds with the results in Table 6.1 and 6.4 that farmers supplying supermarkets earn more income than farmers supplying traditional markets. Emongor and Kirsten (2009b) also reported similar results that farmers supplying supermarkets in Zambia earned higher incomes than traditional farmers.

Table 6.7: Observed changes for supermarket channel participation as perceived by respondents

Variable	Mean	Std. Dev.
Gross Farm Income	4.033	0.938
Number of labourers	3.500	0.725
Total cost of production	4.051	0.705
Area planted	3.467	0.769

Source: Field survey, 2017
Key: 1=Huge decrease; 2=slight decrease; 3=no change; 4=slight increase; 5=huge increase

- *Amount of labour -* farmers that supply supermarkets use more labour than farmers supplying traditional marketing channels (Rao and Qaim 2013). These perceived results have been confirmed by the general differences between the supermarket and traditional marketing channels in Table 6.1. Supermarket procurement requirements include consistency in product quality and quantity and increased labour (for value-added activities) to meet these procurement requirements (Emongor and Kirsten 2009b).

- *Transaction cost –* in contrast to traditional channels, supermarkets require farmers to package and deliver quality produce consistently, leading to increased production and transaction costs (fertilizer, chemicals, packaging, transport). The farmers reported increased costs associated with participation which is consistent with the literature (Osebeyo and Aye 2014; Mmbando *et al.* 2016). These requirements can reduce market accessibility for farmers.

- *Area planted -* farmers stated they have increased the area allocated to producing vegetables in order to meet weekly requirements.

6.6 Chapter summary

Information provided offers economic evidence of the impact of supermarket participation on farm income. The hypothesis that farmers participating in supermarket channels earn a higher income than those in traditional channels has been verified in the case of Eswatini, which is consistent with other findings published in the literature. The ESR results showed that sample selection bias would have resulted in inconsistent estimates had it not been corrected. The findings further indicate a positive influence of farm size on farm income. Moreover, family labour has a positive influence on participation and effect on farm income, which assists in lowering labour costs. The findings indicate that the farmer's level of education, the number

of family members working on the farm and owning livestock have a positive effect on farm income for supermarket participants. Supermarket participation is also positively associated with male farmers, risk attitude of the farmer and access to marketing information.

The ESR results also indicated structural differences between participants in supermarket channels and non-participants. In particular, this pertains to farm size and access to off-farm income. It is worth noting that the effects of these variables were higher on traditional suppliers than supermarket suppliers. The fact that supermarket participation is a relatively new phenomenon in Eswatini offers some explanation to this scenario. The results further showed that supermarket participation has positive heterogeneity effects, which suggest that the effects of participation on farm income for participants are greater than for non-participants. Therefore, understanding the potential role of such heterogeneity is essential, particularly when devising commercialisation strategies to benefit smallholder farmers.

Perceived information about the dynamics of selling to supermarkets presented in this chapter enlightens supermarkets and other important stakeholders in the vegetable supply chain about the relevance of participation in the livelihood of smallholder vegetable farmers, specifically with regard to gross vegetable income. It could be used as a base to improve procurement arrangements and relationships between smallholder farmers and retailers. In a nutshell, given the marketing opportunities and the perceived benefits of supermarket participation identified, it is important that the challenges faced by smallholder vegetable farmers be addressed by all stakeholders in the supply chain to promote their income.

CHAPTER 7: CONCLUSIONS, POLICY RECOMMENDATIONS AND FURTHER RESEARCH

7.1 Conclusions

Despite the contributions of supermarkets in the economy, such as employment creation and access to a variety of food items to consumers, supplying supermarkets is also plagued with many challenges for smallholder farmers. Smallholders struggle to meet procurement requirements set by supermarkets, thereby supplying traditional marketing channels. However, these channels are characterised by random purchases and are, therefore, not sustainable. As a result, the quest to increase access to modern marketing channels for fresh produce, subsequently increasing farm income, cannot be over-emphasised. Therefore, the following are gaps in the literature that the study has strived to address. First, the use of theme network analysis enabled the visualisation of these challenges as a network, i.e. their connectivity with one another. This showed that addressing one challenge could have a spill over effect on the other. Not only were the challenges shown, but, possible solutions to the challenges were also discussed in Chapter 2. The key challenges identified were inconsistent supply of produce, lack of finance, and transport, high procurement requirements and high transaction costs. The social responsibility approach that supermarkets use for smallholders is attributed to these procurement challenges. This means that buying from local smallholders is not one of the business strategies for retailers. Therefore, policy regulations set to limit imports and encourage domestic procurement while developing smallholders to be able meet procurement requirements are necessary. The introduction of such policies may reduce imports, which are regarded as a threat to local farmers.

Second, the empirical results from the factor analysis and discriminant analysis indicate that the nature of the relationship between smallholder vegetable producers and buyers of fresh produce is discrete as demonstrated by the flexible non-contractual relationship and low level of relationship commitment between the trading parties. The fact that the supermarket chains in Eswatini are foreign-owned and are importing most of their supplies from the parent country could attribute to the low level of relationship commitment. This is useful information for policy-makers to devise policy measures and support structures that would enable smallholder farmers to become important suppliers to supermarket chains, to increase the relationship commitment. Hence, the introduction of policies or regulations may stimulate and

ensure local production and procurement through the introduction of a quota, i.e. a certain percentage of fresh produce sourced locally, especially from smallholder farmers. Furthermore, to ensure consistent supply of fresh produce to supermarkets, farmers can be organised to work collectively to minimize transaction costs, to enhance marketing access and the establishment of a pack-house that could not only provide a reliable supply of high quality fresh produce to Eswatini supermarkets but also to export to SA via the existing procurement channels of those supermarket chains (backhaul vegetables to SA from Eswatini), including relatively less perishable fresh produce.

Third, use of the MVP model was justified, implying that there were indeed interactions amongst the three marketing outlets (supermarkets, NAMBoard and traditional). The study acknowledged that smallholder farmers adopt a diversified approach in their quest to increase revenue, maximise profit and reduce marketing risks. The diversified strategy has a potential of enhancing the distribution of produce to more than one marketing outlet thereby increasing farm earnings. The farmers' risk preference, different assets owned, institutional factors, and the duration the marketing outlet takes to make payments for produce influence supermarket channel selection decisions. The implications of these results provide empirical guidelines necessary for farmers when selecting marketing channels. Policies aimed at establishing institutions and the acquisition of assets, such as improved market information, extension services, mobile phones, transportation and farm size to produce marketable surplus, are critical for the improvement of supermarket participation.

Finally, chapter 5 estimated the impact of supermarket participation on farm income. The coefficient of correlations from the endogenous switching regression model had alternate signs, which implies that smallholder farmers choose supermarket channels based on their comparative advantage. This also suggests that smallholders participating in traditional channels earn lower vegetable income in that channel than smallholders from the sample would have earned. Therefore, policies aimed at the commercialization of smallholder farmers, such as the provision of education (skills training), livestock production and farm land to produce surplus production are critical for the improvement of farmers' incomes. Furthermore, the analysis included prices of the selected green vegetables, where it was noted that the price differences were relatively small, therefore, would not be in a position to state that supermarkets offer better prices than traditional marketing channels.

7.2 Recommendations for policy implications

Some key lessons have emerged from this study that are imperative in creating an enabling environment for smallholder farmers to access markets for fresh produce and generate adequate income, subsequently improving the standard of living. First, one of the major findings from the theme network analysis is inconsistent supply of produce. This is a major bottleneck facing smallholder farmers, which is influenced by access to finance, high transaction cost, and poor access to transport. Therefore, policies aimed at promoting smallholder participation in formal markets could resume with investigating these key themes. Specifically, the provision of production and marketing facilities that will enhance the farmers' business operations through access to finance, packaging facilities and transport to be able to supply produce of high quality consistently.

In addition, collective action could also be a solution to some of the challenges faced by farmers, to coordinate production and improve the reliability of supply, improve the provision of marketing information and access to extension services. This could be made possible by the formulation of farmer companies that would assume the role of a produce collection and information centre (CIC). This would facilitate the collection of produce from individual farmers and distribution to the market as well as dissemination of marketing information to the farmers. Organized farmers are better able to receive extension support. However, research is necessary to identify suitable arrangements for such collective action.

Furthermore, the results also showed that the price offered by buyers in both marketing channels to producers has a positive and statistically significant influence on relationship satisfaction. Therefore, it is recommended that buyers need to offer competitive product prices, which could further enhance the farmers' trust and commitment in the long-run. Considering the low level of relationship commitment observed, buyers, in particular, those in the formal marketing channels need to make long-term sustainable relational specific investments such as providing consistent relevant information to their buyers since it has been reported to have a positive influence on relationship satisfaction and trust. This could be through the adoption of coordinated supply chains and supplier-development approaches, which could complement the logistics requirements associated with fresh and highly

perishable produce. This is likely to create mutual benefits by enhancing exchange efficiency and reduction in product quantity and quality uncertainty.

The significant role of access to extension services for explaining farmers' market outlet selection strategy cannot be over-emphasized. Therefore, investing in quality extension services (relevant and technology provision) would be a driving force for increasing market participation and, consequently, boost smallholder farmers productivity and sales. This could be through the provision of sufficient funding for training personnel and relevant facilities for demonstrations.

From the study, access to market information is essential for the selection of supermarket and NAMBoard marketing outlets. Therefore, programmes to improve the provision of market information to farmers are important. The programmes could include dissemination of the information by qualified extension officers (regarding marketing outlets requirements) and the use of mobile phones, amongst others, which could enhance market participation.

This study is also consistent with other studies regarding transaction costs. These have been noted as one of the key challenges in the theme network analysis and it has a negative effect on supermarket participation (though not statistically significant). It is, therefore, recommended that investing in infrastructure is required; in particular improving road quality, which could reduce transaction costs and improves the reliability of supply (e.g. reduced likelihood that roads will be impassable following rain).

The significant role of education in the decision to supply supermarkets by smallholder farmers cannot be over-emphasised. This suggests that policies that enhance smallholders' knowledge and skills would go a long way to facilitate their participation in supermarkets. Therefore, promoting capacity building and skills of the farmer, coupled with the dissemination of marketing information, using technologies such as mobile phones and land ownership have a great potential for increasing supermarket participation and increasing the farmers' incomes. However, it should be noted that land alone does not guarantee effective participation, but rather land in conjunction with infrastructure development, technical support and marketing information from private and public organisations.

7.3 Future research possibilities

Future research areas have been identified from this study's empirical results. To begin with, NAMBoard has been identified as one of the solutions to the supermarket procurement challenges faced by smallholder vegetable producers supplying cabbages, spinach and lettuce. Therefore, a further investigation is deemed appropriate, specifically on information pertaining to the organization's operational system with producers supplying the organization, the number of farmers supplying NAMBoard and the potential welfare effects on smallholder producers.

Second, the study explored relationship constructs from the viewpoint of the suppliers (farmers) only, which means that there is a possibility that buyers could have a different view about the nature of their relationship with suppliers. Therefore, further research is recommended to address this gap.

Third, the study explored the supplier-buyer relationship model of satisfaction being the antecedent for trust, yet other studies argue for the opposite. A study based on this model strengthens the marketing relationship literature regarding the positioning of relationship constructs. Therefore, a study of a similar nature with trust as the antecedent for satisfaction and commitment is recommended.

Fourth, another interesting aspect of this study is that it includes supermarkets from several supermarket chains; however, in the analysis, no differentiation was made between the various supermarket chains and outlets, yet each chain imposes different rules (internal policies) on its outlets, which have implications for the nature of their marketing relationships with farmers. Therefore, future research could compare the marketing relationships with smallholder farmers at the level of supermarket chains, or individual outlets.

Lastly, due to the variability in the results pertaining to price differences between supermarkets and traditional markets for vegetables, one cannot state with confidence that supermarkets offer better prices than traditional markets. Hence, further analysis is recommended for future research studies, which could assess how smallholder farmers are impacted by the emergence of supermarkets by studying the price differentials using time series data and production decisions of farmers without supermarket scenarios.

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APPENDICESAPPENDIX A: FACTOR ANALYSIS

Factor and Items	Formal Suppliers	Informal Suppliers
Satisfaction	**Factor Loading**	**Factor Loading**
I'm pleased with the relationship	0.86	0.73
I'm able to reduce total cost	0.47	0.52
We have a stable relationship	0.67	0.67
Buyer keeps promises	0.75	0.41
I do not believe other buyers	0.56	0.49
Trust		
Buyer will be ready to assist	0.57	0.89
Buyer is concerned	0.57	0.68
Can count on buyer's decision	0.62	0.75
The buyer keeps promises	0.75	0.74
I believe information from my main buyer	0.73	0.72
I can count on my buyer to be sincere	0.73	0.74
My buyer has a good reputation	0.54	0.68
Commitment		
Not going to drop my main buyer	0.85	0.77
Want to remain in the buyer's network	0.90	0.82
My positive feeling with buyer	0.78	0.72

APPENDIX B: CORRELATION COEFFICIENTS FOR VARIABLES USED IN THE SELECTION EQUATION

Variable	Income	Supermarket participation
Income	1.000	
Supermarket participation	0.446***	1.000
Marketing information	0.028	0.249***
Risk attitude	0.081	0.312***

***, **, and * denote significance level at 1%, 5% and 10%.

APPENDIX C: FARMERS' QUESTIONNAIRE

FOR FARMERS

University of KwaZulu-Natal

The information to be captured in this questionnaire is strictly confidential and will be used for research purposes by staff and students at the University of KwaZulu-Natal working on a project **"The procurement of fresh produce from smallholders by supermarkets"**. There is no wrong or right answer to these questions. You are free to be part or not part of this survey and you can withdraw from the survey anytime you feel like doing so. However, your cooperation is greatly appreciated.

Would you like to participate in this survey?   1 = Yes   2 = No
Name and signature of Respondent: ……

Date of Interview:		Respondent Name:		Mobile #	
Region:		Area Name:			
Questionnaire No.:		Enumerator's Name			

A. HOUSEHOLD DEMOGRAPHICS

	Question	**Response**
A1	Gender of decision maker (farming) *1= Male 2=Female*	
A2	Marital status of farmer *1=Single 2= Married 3= Divorced 4= Widowed 5=Cohabiting*	
A3	Age of farmer (years)	
A4	Relationship of the farmer with the household head *1=self 2=spouse 3=child 4= relative 5=other (please specify)*	
A5	Level of education of farmer (years)	
A6	Household size (total number of household members residing in the household)	Below 18yrs= 19-65yrs= Above 65 yrs=
A7	Employment Status of the farmer	

A8	Number of years of experience in vegetable farming?	
A9	Are you a member of a farming group (e.g. Association/Cooperative)? *0= No 1=Yes*	
A10	Is farming your only source of income? *0= No 1=Yes*	
A11	If no, which other sources do you have?(specify)	
A12	What proportion of your income is from vegetable production?	_____% Average _____amount E
A13	What proportion of your income was from vegetables five years ago?	_____% Average _____amount E

NB: A7. *1=Full-time Farmer   2=Part-time farmer (formal employment)   3=Part-time farmer (informally-employed) 4= Other (specify)_____*

Complete the following table on ownership of and access to assets

Assets	A14.Own the asset *0=No 1=Yes*	A15.Quantity	A16.Year of Purchase	A17.Market Value of asset (s) (Emalangeni)
a. Cell phone				
b. Radio				
c. Planter, harrow/ cultivator				
d. Tractor				
e. Other (specify)				
Type of livestock	A18. Own the livestock *O=No 1=Yes*	A19. Quantity	A20. Current market value **per unit** (Emalangeni)	
a. Cattle				
b. Goats				
c. Pigs				
d. Chickens				
e. Other(specify)				
f. Others (specify)				

B. FARM ENTERPRISE

B1. What is the size of your arable farm land?_____ Hectares_____tractor hours

B2: Farm size allocated for vegetables?_____Hectures_____tractors hours

	B9.Supermarket	B10. NAMBoard	B11. Input Supplier	B12. Commercial Banks	B13.Farmer Association/ Cooperative	B14. NGO	B15. Other (specify)
Response 0=No, 1=Yes							

B3. Do you find it difficult to make land use decisions due to the current land ownership system?   1= Yes   0= No

B4. When did you start growing vegetables for marketing (selling)? Year_____

B5. Do you irrigate your vegetables? 0=No   1=Yes

B6. Do you keep written records of your vegetable production?   0=No   1=Yes

B7. If no, why?_____

B8. Do you have access to credit for your vegetable production?   0=No   1=Yes

If Yes, who provides you access to credit?

C1. PRODUCTION AND MARKETING
Please complete the table about crops grown in the farm

	C1. Area under use(ha)
a. Vegetables	
b. Maize	
c. Fallow	
d. Other (specify)	
e. Total farm Size	

C2. What is the average proportion/percentage of your vegetables was sold to each of the following   during last season (Summer 2016) and 5 years ago?

Vegetable Buyer	Previous season Percentage (%)	Value of produce sold Previous season (E)	Percentage 5 years Ago
Supermarket/s			
NAMBoard			
Street Vendors			
Individuals from community			
Fresh-mark			
TOTAL	**100**		**100**

Complete table for vegetables grown in the last season

Vegetable Type	C3. Area under production (ha)	C4. Quantity harvested (units/ bags /ha)	C5. Quantity consumed (units/bags)	C6. Quantity sold (units /bags/kg)	C7. Average selling price per unit (E)	C8. Market outlet (see key below & specify)	C9. Market distance from farm (km)	C10.Contract 0=No, 1=Yes	C11. Type of contract
Lettuce (heads)									
Cabbage (heads)									
Carrots (kg)									
Spinach (bundle)									
Green pepper (kg)									

Key:C8: 1=Community   2=Vendors   3=Supermarket 4=NAMBoard   5=Fresh-mark   6=Other (specify)
C11: 1=Written 2=Verbal   3= Other (specify)_____ 4= N/A
NB:C6,C7,C8 & C9 please use other space (row) to specify other details when a particular vegetable is sold through more than one market outlet
C12. Do you sell some of your produce collectively as a group? *1=Yes   0=No*

If yes, explain how and for which market outlet and why?_____

_____

C14. What means of transport do you use the most to get to the nearest market?_____

C15. What is the quality of the road to the main market?

1= Very poor   2=Poor   3=Average   4=Good   5=Very good

C16. What major constraints do you face when transporting your produce to the distribution centre or market?

_____
_____

C17.C omplete the following table for production inputs used for Vegetable during last season *(for fertilizer, agro-chemicals and manure please indicate type)*

Crop	Inputs	**C17.**Quantity used//litres / number	**C18.** Average Unit Price (E)	**C19.** Total Cost (E)
Vegetables	a. Seedlings/seeds			
	b. Basal fertilizer			
	c. Top fertilizer			
	d. Manure			
	e. Chemicals			
	f. Pesticides			
	g. Tractor/ ox			
	h. Packaging material			
	i. Transport cost			
	TOTAL			

C18. Complete the following table for **hired labour** for each vegetable operation (whenever applicable)

Vegetable	C20. Planting		C21. Weeding		C22. Fertilizer Application		C23. Watering		C24. Harvesting		C25. Sorting & Grading		C26. Marketing		C27. Daily labor Rate	C28. Average working hrs per Day
	Days	# of People	Days	# of People	Days	# of People	Days	# of People	Days	# of People	Days	# of People	Days	# of People		
Casual labour																
Permanent labour																
Household labour																

D. ACCESS TO MARKETS: *THIS PART OF THE QUESTIONAIRE IS FOR SUPERMARKET SUPPLIERS ONLY*

Please complete the table about the marketing channels used to sell during the past season (spring 2016)

	D1.Supermarkets	D2.Traditional	D3.NAMBoard	D4. Other (specify)
Market	O=No 1=Yes	O=No 1=Yes	O=No 1=Yes	
Year started				
Value of vegetables sold/week/ month				
Distance to the market				

Complete the table below about your supply of vegetables to various supermarkets? (**Select top 3 vegetables mostly grown**)

	D5.Pick n Pay	**D6.Spar**	**D7.Shoprite/ Freshmark**	**D8.Boxer**	**D9.Savemore**	**D10. Food Lovers market**
Market (Circle that apply)	*O=No 1=Yes*	*O=No 1=Yes*	*O=No 1=Yes*	*O=No 1=Yes*	*O=No 1=Yes*	*O=No 1=Yes*
Year started						
Supply Lettuce?						
Qty sold/week/ month						
Unit Price (E)						
Value addition (0=No, 1=Yes)						
Supply Cabbage?						
Qty sold/week/ month						
Unit Price (E)						
Value addition (0=No, 1=Yes)						
Supply Spinach?						
Qty sold/week/ month						
Unit Price (E)						
Value addition (0=No, 1=Yes)						
Supply Green pepper?						
Qty sold/week/ month						
Unit Price (E)						
Value addition (0=No, 1=Yes)						

Changes that occurred since you started supplying supermarkets?

	1=Huge decrease	2=Slight decrease	3=Not changed	4=Slight increase	5=Huge increase
D12. Output of vegetables					
D13. Gross Income (for vegetables)					
D14. Number of workers on the farm					
D15. Costs (transport, packaging, quality assurance)					
D16. Area allocated to vegetables					
D17. Other(specify)					

D18. What are the three main advantages of supplying to supermarkets?
1._____
2._____
3._____
4. Don't know

D19. What are the three disadvantages of supplying to supermarkets?
1._____
2._____
3._____
4. Don't know

D20. Are you still going to sell to the supermarkets during the next season?   0=No   1=Yes

Explain your answer_____

E. TERMS AND CONDITIONS
E1. What conditions do you have to meet in order to supply to the supermarket?(select all that applies)

1=Sign contract   2=Meet certain quality standards   3=Bing produce sample

4=Formed relationships of trust   4=Other (specify)_____   5=N/A

What are the main points you agree on with your buyer? Fill in with 0=No, 1=Yes

	E2.Price	E3.Quantity	E4.Time of Payment	E5.Quality (grading)	E6.Packaging	E7.Transportation	E8.Credit repayment for advances	E9.Other (specify)_____
Response 0=No, 1=Yes								

How long does it take for you to receive your payments after supplying to the supermarket?

Question/statement	E10. Supermarket (specify name of supermarket)	E11. NAMBoard	E12. Traditional market (vendors)	E13. Fresh-mark
Number of days for payment				

E14. Does you' the supermarket provide any incentive to encourage product quality? 0= No   1=Yes
If Yes, what incentives does your buyer/market provide?

Buyer/Market	E15.Higher Prices	E16. Access to credit	E17. Advance Payment	E18. Transportation	E19. Other (specify) _____
Supermarket					
NAMBoard					
Fresh-mark					
Traditional market					

E20. How much trust do you have in the buyer you sell the most to (highest proportion of produce)?
1=Very low   2=Low   3=Moderate   4=High   5=Very High

F. GRADES AND STANDARDS
F1. What grades and standards and cost incurred do you have to meet in order to supply to each market channel?
_____
_____

F2. What cost do you incur in meeting this grades and standards?

_____

_____

F3. What problems/constraints have you experienced in adhering to these grades and standards?

_____

_____

_____

G. PROVISION OF SERVICES

Complete table about extension assistance provided by the market/s you supply to?

	G1.Supermarkets *(specify name of supermarket)*	G2.Traditional	G3.NAMBoard	G4.Fresh-mark
Technical assistance (0=No 1=Sometimes 2=Yes(specify) 3=Not applicable				
Frequency (per month /week / season)				

G5. Who is your source of market information? (select all that apply)

1. Government extension office   2. Other farmer   3. NAMBoard extension officer

4. Supermarket produce   5. Traditional markets   6. Other (specify)_____

G6. Channel of market information (select all that applies)

1. Direct contact   2. Print media   3. Cellular phone

4. Radio   5. TV   6. Other (specify)_____

G7. Do you use the market information before selling decision? 0=No   1=Yes

H. PERCEIVED RISK FOR MARKET CHANNEL

H1. Risk preference: 1= Risk averse   2=Risk neutral 3= Risk Seeker

H2. Please rank the level of risk associated with operating in the following channels

Market Channel/Outlet	Level of Rank	Strategies to minimise the effect
Supermarket/Fresh-mark		
NAMBoard		
Traditional		

Key: 1=Low Risk 2=Medium   3=High Risk

I. RELATIONSHIPS WITH THE MAIN BUYER
NAME OF BUYER:_____

Relationship Construct	Measure statement	1=Strongly disagree	2=Disagree	3=Indifferent	4=Agree	5=Strongly agree
Satisfaction	I am very pleased with the relationship with my buyer					
	I have been able to reduce my total cost of vegetable production as a result of my relationship with my buyer					
	My relationship with my buyer is very stable					
	I feel I am adequately rewarded by my buyer					
	I frequently reject other buyers					
Price Satisfaction	The buyer keeps all promise regarding commodity price					
	Price changes are communicated to me properly and timely					
	I do not believe other buyers will have the same or even better offer					
	I am convinced that my buyer is the best choice					
	I am satisfied with the grading system					
	The buyer offers me a fair and reasonable vegetable price					
Offer	My buyer is able to collect/accept produce as soon as it is ready					
	I sell to a buyer who is able to offer credit					
	I sell to a buyer who is able to offer transport					
	I sell to a buyer who is able to offer technical support					
	I sell to a buyer who is able to offer a good price					
	I sell to a buyer who is able to offer letter of intent					
Trust	Though circumstances change, I believe that the buyer will be ready and willing to offer me assistance and support					
	When making important decisions, the buyer is concerned about my welfare					
	When I share my problems with the buyer, I know that he					

Category	Statement					
	will respond with understanding					
	In the future, I can count on the buyer to consider how his decisions and actions will affect me					
	The buyer usually keeps the promises made					
	I believe the information provided by my buyer					
	I can count on the buyer to be sincere					
	My buyer has a good reputation for being reliable and honest					
Commitment	Even if I could, I would not drop the buyer because I like to be associated with the organization					
	I want to remain a member of the buyer's network because I genuinely enjoy our relationship					
	My positive feelings towards the buyer are a major reason why I continue to work with them					
	My buyer is willing to share the risk of crop failure					
	My supplier provides financial assistance during difficult times					
Communication	I frequently share general information with my buyer(s)					
	The buyer provide's me with all relevant market information on time					
	Information sharing on important issues has become a critical element to maintain our partnership					
	It is relatively easy to contact my buyer					
	My buyer keeps me informed on technical matters					
	The majority of communication between me and my buyer occurs through written communication					
Uncertainty	Vegetable prices in the market are very unstable					
	The quantity requirements are highly unstable					
	The quality requirements are highly unstable					
Education and Training	My buyer regularly provides training programs					
Duration of the relationship	I have a close relationship with my buyer					
	My buyer and I have a good long-standing relationship					

Dependence	Independence: My buyer determines what varieties to grow, when to plant and when to harvest					
	My buyer controls all the information in our relationship					
	If my relationship with my preferred buyer was suddenly terminated, I would have great difficulty finding an alternative buyer					
	I have no choice other than to adhere to my buyer's demands					
	My preferred buyer provides all the inputs for the vegetables produced					
	Availability of alternatives: I supply vegetables to a number of buyers					
	I am free to choose another vegetable buyer at any time					

APPENDIX D: SUPERMARKETS REPRESENTATIVE QUESTIONAIRE

FOR PROCUREMENT MANAGER OF SUPERMARKET

University of KwaZulu-Natal

The information to be captured in this questionnaire is strictly confidential and will be used for research purposes by staff and students at the University of KwaZulu-Natal working on a project **"The procurement of fresh produce from smallholders by supermarkets in Eswatini"**. There is no wrong or right answer to these questions. You are free to be part or not part of this survey and you can withdraw from the survey anytime you feel like doing so. However, your cooperation is greatly appreciated.

A. Identification

Name of supermarket:_____ _____Date:_____

Name of Interviewee:_____ Position:_____Address:_____

Tel:_____E-mail address:_____

B. Company profile (growth and expansion):

1. When was your company established in Swaziland (Year when started operations in this country):_____

2. Is this supermarket an independent store or is it part of a chain?   1. Independent   2. Chain

3. If it is an independent supermarket, what is the average number of employees?_____

4. If it is part of a chain how many branches does it have in this country?

Region	Number of Branches	Average Number of Employees	
		Permanent	*Casual*
1.Manzini			
2. Mbabane			
3. Shiselweni			
4. Lubombo			

C: Procurement/Sourcing/Supplier

5. How is the procurement of the vegetables organised? 1. Buying Centre/company   2. Directly from producers   3. Both

6. What proportion (percentages and value) of your vegetables was procured during the stated period on average?

Producers/ Suppliers	2016		2015		2014		2013		2012	
	%	Value in Emalangeni[10] (E)	%	Value in Emalangeni (E)	%	Value in Emalangeni (E)	%	Value in Emalangeni (E)	%	Value in Emalangeni (E)
Local-smallholders (individuals)										
Local smallholders (groups)										
Local large-scale farmers										
NAMBoard										
Fresh-mark										
South Africa										

7. Who are your vegetable producers/suppliers and what percentage is sourced from the producer/supplier on average?

Vegetables	Local small-scale farmers (individuals)		Local small-scale farmers (groups)		Local large-scale farmers		NAMBoard 0=No,1=Yes		Fresh-mark 0=No,1=Yes		South Africa		Reason for sourcing from the supplier
	0=No, 1=Yes	%	0=No, 1=Yes	%	0=No, 1=Yes	%	0=No, 1=Yes	%	0=No, 1=Yes	%	0=No, 1=Yes	%	
Lettuce													
Cabbages													
Carrots													
Spinach													
Green pepper													
Beetroot													
Tomatoes													
Butternut													
Sweet potatoes													

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[10] Swazi currency, 1 Lilangeni =1 Rand

8. If sourcing direct from smallholder farmers, how did you approach them?

1=No, farmers approached the supermarket   2= The supermarket advertised

3=referral by (specify)_____   4=Other (specify)_____

9. What sourcing arrangements do you make with your suppliers?   1=Contract   2=Other (please specify)

10. If you buy by contracting with producers/suppliers, what types of contracts?

1=Formal (written)   2=Non-formal (Verbal)   3=N/A

11. If you have a contract with the producer/supplier, what is the duration of the contracts?_____months

12. What type of support do you give to your producers/suppliers?   1=Input credit 2=Technical Support 3=Transport   4=Other (specify)_____

13. What is the nature of the supply relationship with the smallholder farmers?

1=None   2=Individual Contracts   3=Group contracts   4=Via Marketing agent/ Intermediary

14. How long do you take before payment is made to producer after delivery of produce?

Vegetable Producer/ Supplier	Number of Days	Form of Payment *1=Cash,2=Cheque, 3=Electronic transfer*
Local smallholder (individual)		
Local smallholder (Groups)		
Local large-scale		
NAMBoard		
Fresh-mark		
SA Supplier/s		

D: Quality, Grades and Standards:

15. Is procuring from smallholder farmers relatively risky with respect to grades and standards met? Please explain your answer.

_____

16. What percentage/proportion of deliveries from smallholder farmers are rejected?_____

_____

17. What is done to the rejected produce?_____

 18. Does the supermarket label any produce procured from smallholders?   0=No   1=Yes

Please explain your answer_____

19. How do you ensure that your suppliers meet these grades and standards?

_____ _____

20. Has the enforcement of grades and standards made it difficult for smallholder farmers to supply to your supermarket? Please explain your

answer_____ _____

E: Criteria influencing Sourcing and Procurement Decisions

21. What are the 3 main criteria for selecting smallholder farmers to supply the supermarket?

_____

_____

 22. What are the constraints in your current sourcing strategy?

Vegetable Producer/Supplier	Challenge/constraint faced	Recommendations to addressing challenges
Local Smallholder Farmers (individual)		
Local Smallholder Farmers (groups)		
Local Large-scale farmers		
NAMBoard		
Fresh-mark		
South Africa		

23. AVERAGE NUMBER OF LOCAL VEGETABLE PRODUCERS FOR THE PAST 5 YEARS

Region	Smallholders						Large-scale farmers					
	2011	2012	2013	2014	2015	2016	2011	2012	2013	2014	2015	2016
Manzini												
Mbabane												
Shiselweni												
Lubombo												

Thank you for your participation!!!

APPENDIX E: NAMBOARD REPRESENTATIVE QUASTIONAIRE

FOR AGRIBUSINESS MANAGER FROM NAMBoard

University of KwaZulu-Natal

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A. Identification

Date of interview_____Name of Interviewee:_____

Resignation:_____Address:_____

Tel.:_____E-mail address_____

B. Company Profile

1. When was the organization established (Year when started operations)_____

C: Vegetables Procurement/Sourcing

2. What proportion (percentages and value) of your vegetables was procured during the stated period on average?

Producers/Suppliers	2016		2015		2014		2013		2012	
	%	Value in Emalangeni[11] (E)	%	Value in Emalangeni (E)	%	Value in Emalangeni (E)	%	Value in Emalangeni (E)	%	Value in Emalangeni (E)
Local smallholders (individuals)										
Local smallholders (groups)										
Local large-scale farmers										
South Africa										

---

[11] Swazi currency, 1 Lilangeni =1 Rand

3. Who supply you with the following vegetables and what percentage is sourced from the producer/supplier **per month on average**?

Vegetables	Local small-scale farmers (individuals)		Local small-scale farmers(groups)		Local large-scale farmers		South Africa		Reason for sourcing from the supplier
	0=No, 1=Yes	*%*	*0=No, 1=Yes*	*%*	*0=No,1=Yes*	*%*	*0=No,1=Yes*	*%*	
Lettuce									
Cabbages									
Carrots									
Spinach									
Green pepper									
Beetroot									
Tomatoes									
Butternut									
Sweet potatoes									

4. What are the 3 main criteria for selecting smallholder farmers to supply NAMBoard?

_____
_____
_____

5. What is the nature of the supply relationship with smallholder farmer?

1=None   2=Individual Contracts   3=Group Contracts   4=Other specify)_____

6. If you buy by contracting with producers/suppliers, what types of contracts?

1=Formal (written)   2=Non-formal (Verbal)   3=Other(specify)_____

7. If you have a contract with the producer/supplier, what is the duration of the contracts? _____months

8. What type of support do you give to your producers/suppliers? (select all that apply)

Support	Response *0=No,1=Yes*
Inputs Credit	
Technical Support	
Transport	
Other (specify)	
Other (specify)	

9. How is the procurement of the vegetables organised for imports?

1=Directly from producers   2= Through a distribution centre/company   3=Both   4= Other (specify)_____

10. How long do you take before payment is made to the producer after delivery of produce?

Vegetable Producer/ Supplier	Number of Days	Form of Payment *1=Cash,2=Cheque, 3=Electronic transfer*
Local smallholder (individuals)		
Local smallholders (groups)		
Local large-scale farmers		
SA Supplier/s		

11. Do you export any produce from smallholder farmers?   0= No   2= Yes
 Explain youranswer:_____

12. If yes, which vegetables do you export? _____

D: Quality, Grades and Standards:
13. After collecting produce from the producers/suppliers what quality assurance activities are done at the produce shop before selling to your market?
_____
_____
14. Does quality play an important role in your sourcing decisions?   0=No   1=Yes
 15. What percentage/proportion collection/deliveries from smallholder farmers are rejected?_____

16. What is done with the rejected produce?_____

_____ _____
17. How do you ensure that suppliers meet quality, grades and standards?_____

_____

18. Does NAMBoard label produce procured from smallholder farmers?   0= No   1= Yes
Please explain your answer_____

_____
19. Who are your main competitors? (Select all that applies)
1= Smallholder farmers (individuals)   2=Smallholder farmers (groups)   3=Large-scale farmers
4=Fresh-mark   5= Other (specify)_____

F: Marketing of Vegetables
20. Where do you sell your produce?

Local Markets	Proportion of total supply (%)	Year started selling	Type of Vegetables sold	Frequency of Delivery to the market
Chain Supermarkets				
Wholesalers				
Small retailers				
Fresh-mark				
Street Vendors				
Other(specify)				
Export Markets (list)	**% of total supply**	**Year started selling**	**Type of Vegetables sold**	

21. How has your output supply changed since you started supplying to local supermarkets?

1= Decreased   2=Consistent   3=Increased

Explain your answer _____

22. How have your sales changed since you started supplying to local supermarkets?

1= decreased   2=Consistent   3=increased

Explain your answer_____ _____

23. What constraints do you face when sourcing from your vegetable suppliers?

Vegetable Producer/Supplier	Challenges/constraints faced	Recommendations to addressing the challenges
Local Smallholder Farmers (individuals)		
Local Smallholder Farmers (groups)		
Local Large-scale farmers		
South Africa		

24. What is the average Number of Local Vegetable Producers/Suppliers in the past 5 years?

Region	Smallholders						Large-scale farmers					
	2011	2012	2013	2014	2015	2016	2011	2012	2013	2014	2015	2016
Manzini												
Mbabane												
Shiselweni												
Lubombo												

Thank you for your participation!!!

APPENDIX F: QUESTION GUIDE FOR INFORMANTS

1. How has the proliferation of supermarkets in Swaziland impacted on smallholder vegetable farmers, if at all?

2. What factors hamper/constrain supermarkets in Swaziland from procuring vegetables directly from smallholder vegetable farmers?

3. What factors facilitate/ promote supermarkets in Swaziland to procure vegetables directly or indirectly from smallholder vegetable farmers?

4. What constraints do farmers face in accessing supermarkets and other markets?

5. What do you think can be done to ensure that smallholder farmers participate in the supermarket channels?

6. What support do you offer to ensure that farmers are able to participate in the supermarket channel?

7. Any legislation that regulate the relationship between supermarkets and farmers?

8. Are there any other important and relevant issues we have missed?