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Participation by smallholder farming entrepreneurs in agro-processing activities in South Africa

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Participation by smallholder farming entrepreneurs in agro-processing activities in South Africa

Lesibana Mahlogedi Victor Thindisa

A research report submitted to the Faculty of Commerce, Law and Management, University of the Witwatersrand, in partial fulfilment of the requirements for the degree Master of Management in Entrepreneurship and New Venture Creation

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ABSTRACT

South Africa faces numerous economic and social challenges. Three very important challenges are high unemployment rate, high poverty rate and high inequality. Agriculture is identified as a sector with the potential to contribute towards the amelioration of high unemployment and high poverty rates. Agro-processing in particular is identified as having the potential to improve the sustainability and profitability of farming enterprises. The potential of agro-processing remains unexploited. Agro-processing refers to a set of technological and economic activities undertaken on a basic agricultural product with the aim of transforming it into a usable item such as food, fibre, fuel or industrial material. The study addressed a research gap by focusing on smallholder farmers and linking entrepreneurship with agro-processing.

This research empirically tested the relationships between participation in agro-processing activities by smallholder farming entrepreneurs and human capital, social capital and market access and the degree to which each was moderated by the transaction cost. Further, the study tested the relationship between participation in agro-processing activities, all variables jointly and cumulatively. Structured questionnaires were administered during smallholder farmer meetings in three provinces namely, Western Cape, Limpopo and Gauteng. A hierarchical multi-regression analysis was used as the main statistical tool to test hypotheses.

The main findings of the study were that the relationship between human capital and participation in agro-processing activities by smallholder farming entrepreneurs is positive and significant. Similarly, the relationship between social capital and participation in agro-processing activities is positive and significant. However, the relationship between market access and participation in agro-processing activities was negative and significant. Finally, transaction cost had an enhancing moderating effect on the relationship between market access and participation in agro-processing activities by smallholder farming entrepreneurs.

Findings further suggest that human capital is fundamental to sustainable development considering participation in agro-processing activities. Social capital of smallholder farming entrepreneurs may be enhanced through mentorships and partnerships with neighbouring commercial farmers and agro-processors. Lower transaction costs were likely to enhance market access by smallholder farmers.

DECLARATION

I, Lesibana Mahlogedi Victor Thindisa, declare that this research report is my own work except as indicated in the references and acknowledgement. It is submitted in partial fulfilment of the requirement for the degree Master of Management in the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination in this or any other university.

_____

Lesibana Mahlogedi Victor Thindisa

Signed at_____

On the _____day of _____2014

DEDICATION

This research study is dedicated to all agripreneurs, smallholder farmers, SME agro-processors and agricultural economist students. Lehumo letswa mmung!!

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Sincere and heartfelt appreciation to Almighty JEHOVAH for the strength and courage to complete this character-testing project. No words can fully appreciate all the blessings and protection from above.

Thanks to my WIFE, Lindiwe Thindisa and my daughters Kgotso and Mmoni for the tireless support and unwavering encouragement. I will forever be grateful for the encouragement to invest time and finances in this project. There were times I thought dropping-out was an option, but your words of encouragement motivated me to keep going to conclude this project.

Thanks to my parents, Mr MW Thindisa and Mrs MJO Thindisa for their wisdom and articulating the importance of education and learning in one's life journey. In your own words "education has the potential to take sons and daughters of the working class out of poverty to a better life".

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TABLE OF CONTENTS

ABSTRACT ..... **ii**

DECLARATION ..... **iv**

DEDICATION ..... **v**

ACKNOWLEDGEMENTS ..... **vi**

TABLE OF CONTENTS ..... **vii**

LIST OF TABLES ..... **xi**

LIST OF FIGURES ..... **xiii**

CHAPTER 1: INTRODUCTION **1**

1.1 PURPOSE OF THE STUDY 1

1.2 CONTEXT OF THE STUDY 3

1.2.1 DESCRIPTION OF STUDY AREA 3
1.2.2 AGRO-PROCESSING IN CONTEXT 5

1.3 PROBLEM STATEMENT 8

1.3.1 MAIN PROBLEM 9
1.3.2 SUB-PROBLEM 1 10
1.3.3 SUB-PROBLEM 2 10
1.3.4 SUB-PROBLEM 3 10
1.3.5 SUB-PROBLEM 4 10
1.3.6 SUB-PROBLEM 5 10
1.3.7 SUB-PROBLEM 6 11
1.3.8 SUB-PROBLEM 7 11
1.3.9 SUB-PROBLEM 8 11

1.4 SIGNIFICANCE OF THE STUDY 11

1.5 DELIMITATION OF THE STUDY 15

1.6 DEFINITION OF TERMS 16

1.6.1 AGRO-PROCESSING INDUSTRY AND SECTOR 16
1.6.2 ALERTNESS 16
1.6.3 ENTREPRENEURIAL COGNITION 16
1.6.4 DEMOGRAPHICS 17
1.6.5 SMALL FARMING ENTREPRENEUR 17
1.6.6 SMALLHOLDER FARMERS 17
1.6.7 VALUE ADDING 17
1.6.8 NEW GROWTH PATH (NGP) 18
1.6.9 INDUSTRIAL POLICY ACTION PLAN (IPAP) 18
1.6.10 ACCESSIBILITY 18

1.7 ASSUMPTIONS 19

CHAPTER 2: LITERATURE REVIEW 20

2.1 INTRODUCTION 20

2.2 AGRO-PROCESSING 21

2.3 ENTREPRENEURSHIP 25

2.4 SMALLHOLDER FARMING ENTREPRENEURSHIP 30

2.4.1 HUMAN CAPITAL 32
2.4.2 SOCIAL CAPITAL 39
2.4.3 HYPOTHESES 45

2.5 THE EFFECT OF TRANSACTION COSTS ON ACCESS TO MARKET BY SMALLHOLDER FARMING ENTREPRENEURS 45

2.5.1 LACK OF ACCESS TO MARKETS BY SMALLHOLDER FARMERS 50
2.5.2 HYPOTHESES 57
2.5.3 TRANSACTION COST AS A MODERATOR VARIABLE 58

2.6 CONCLUSION OF LITERATURE REVIEW 62

2.6.1 HYPOTHESES 63
2.6.2 CONCEPTUAL MODEL 64

CHAPTER 3: RESEARCH METHODOLOGY 66

3.1 INTRODUCTION 66

3.2 RESEARCH METHODOLOGY / PARADIGM 66

3.3 RESEARCH DESIGN 67

3.4 POPULATION AND SAMPLE 68

3.4.1 POPULATION 68
3.4.2 SAMPLE AND SAMPLING METHOD 69

3.5 RESEARCH INSTRUMENT 70

3.6 PROCEDURE FOR DATA COLLECTION 75

3.7 DATA ANALYSIS 77

3.7.1 CRITERIA TO DISTINGUISH LOW, MEDIUM AND HIGH HUMAN CAPITAL 82
3.7.2 CRITERIA TO DISTINGUISH LOW FROM HIGH SOCIAL CAPITAL 84
3.7.3 CRITERIA TO DISTINGUISH LOW FROM HIGH TRANSACTION COST 87

3.8 VALIDITY AND RELIABILITY OF THE RESEARCH 89

3.8.1 EXTERNAL VALIDITY 89
3.8.2 INTERNAL VALIDITY 89
3.8.3 RELIABILITY 89

3.9 LIMITATION OF THE STUDY 90

CHAPTER 4: PRESENTATION OF RESULTS 91

4.1 INTRODUCTION 91

4.2 DESCRIPTIVE STATISTICS 91
4.2.1 DESCRIPTIVE STATISTICS OF DEMOGRAPHICS 92
4.2.2 DESCRIPTIVE STATISTICS OF CONSTRUCTS 94
4.3 CORRELATION MATRIX ANALYSIS 95
4.4 TESTING HYPOTHESES USING HIERARCHICAL MULTIPLE REGRESSION 96
4.4.1 TESTING HYPOTHESIS H1 97
4.4.2 TESTING HYPOTHESIS H5 98
4.4.3 ASSESSMENT OF MODERATION EFFECT (H5) 99
4.5 TESTING HYPOTHESES H2 AND H6 USING HIERARCHICAL MULTIPLE REGRESSION 99
4.5.1 TESTING HYPOTHESIS H2 100
4.5.2 TESTING HYPOTHESIS H6 101
4.5.3 ASSESSMENT OF MODERATION EFFECT (H6) 102
4.6 TESTING HYPOTHESES H4 AND H7 USING HIERARCHICAL MULTIPLE REGRESSION 102
4.6.1 TESTING HYPOTHESIS H4 103
4.6.2 TESTING HYPOTHESIS H7 104
4.6.3 ASSESSMENT OF MODERATION EFFECT (H7) 105
4.7 TESTING HYPOTHESIS H3 105
4.8 TESTING RESEARCH QUESTION 106
CHAPTER 5: DISCUSSION OF FINDINGS 109
5.1 INTRODUCTION 109
5.2 DEMOGRAPHIC PROFILE OF RESPONDENTS 109
5.3 DISCUSSION OF HYPOTHESES 110
5.3.1 DISCUSSION OF HYPOTHESIS H1 110
5.3.2 DISCUSSION OF HYPOTHESIS H2 112
5.3.3 DISCUSSION OF HYPOTHESIS H3 113
5.3.4 DISCUSSION OF MODERATOR HYPOTHESIS H4 114
5.3.5 DISCUSSION OF MODERATOR HYPOTHESIS H5 115
5.3.6 DISCUSSION OF MODERATOR HYPOTHESIS H6 116
5.3.7 DISCUSSION OF HYPOTHESIS H7 117
5.4 CONCLUSION 118
CHAPTER 6: CONCLUSIONS AND RECCOMENDATIONS 119
6.1 INTRODUCTION 119
6.2 CONCLUSION OF THE STUDY 119
6.3 RECOMMENDATIONS 121
6.4 SUGGESTION FOR FURTHER RESEARCH 122
REFERENCES 124
ANNEXURE 1: CONSISTENCY MATRIX 137

ANNEXURE B: LETTER AND STRUCTURED QUESTIONNAIRE 139

LETTER 139

QUESTIONNAIRE 140

ANNEXURE C: PICTURES CAPTURED DURING DATA COLLATION 146

LIST OF TABLES

Table 1: Key labour market indicators 9

Table 2: List of farmer gatherings and meetings attended for data collation 76

Table 3: Descriptive statistics of demographic characteristics 92

Table 4: Descriptive statistics of scales measuring constructs 95

Table 5: Pearson correlation matrix 96

Table 6: Regression summary for participation and human capital (model 1). 97

Table 7: Regression summary for participation and human capital + transaction cost (Model 2) 98

Table 8: Regression summary for moderation effect - HC*TC (Model 3) 98

Table 9: Analysis of the moderation effects between human capital + TC + HC*TC 99

Table 10: Regression summary for participation and social capital (model 1) 100

Table 11: Regression summary for participation and social capital + transaction cost (Model 2) 101

Table 12: Regression summary for moderation effect - SC*TC (Model 3) 101

Table 13: Analysis of the moderation effects between social capital + TC + SC*TC 102

Table 14: Regression summary for participation and market access (Model 1) 103

Table 15: Regression summary for participation and market access + transaction cost (Model 2) 104

Table 16: Regression summary for moderation effect - MA*TC (Model 3)..... 104

Table 17: Analysis of the moderation effect between market access + TC + MA*TC 105

Table 18: Regression summary for participation and transaction cost 106

Table 19: Regression model summary..... 106

Table 20: Analysis of independent variables jointly..... 107

LIST OF FIGURES

Figure 1: Integrated farming value chain 14

Figure 2: Different phases of agro-processing activities..... 22

Figure 3: Employment trends in primary agriculture and agro-processing, formal versus informal, from Q1, 2008 through Q4, 2011 23

Figure 4: Entrepreneurship motivation and entrepreneurial process..... 29

Figure 5: Pattern of opportunity recognition 37

Figure 6: Model of opportunity identification and development theory 42

Figure 7: Typology of market contracts 47

Figure 8: Porters five forces for milling industry 49

Figure 9: Conceptual model of market access and transaction cost 52

Figure 10: Upgrading required by smallholder farming entrepreneur to access retail markets..... 54

Figure 11: Factors affecting market participation by smallholder farmers 55

Figure 12: Marketing options for smallholder farming entrepreneurs 56

Figure 13: Growth Strategy Matrix 57

Figure 14: Transaction cost as moderator construct – Human capital 59

Figure 15: Transaction cost as moderator construct – social capital..... 60

Figure 16: Transaction cost as moderator construct – access to markets 60

Figure 17: Factors constraining and limiting participation in agro-processing activities by smallholder farmers 63

Figure 18: Conceptual theoretical model 65

Figure 19: Interaction effect 80

Figure 20: Criteria to distinguish low, medium and high human capital 84

Figure 21: Criteria to distinguish low from high social capital 86

Figure 22: Criteria to distinguish low from high transaction cost 88

Figure 23: Scatterplot 108

CHAPTER 1: INTRODUCTION

This section explains the purpose of the study followed by the context of the study and then a description of the problem statement informing this study. The significance of the study articulates, among other things, the gap in theory informing this study. This is followed by the delimitations of the study and finally the assumptions of the study.

1.1 Purpose of the study

The purpose of this research study was to investigate those factors that restrict and limit participation by smallholder farming entrepreneurs in agro-processing activities. Participation by smallholder farming entrepreneurs in agro-processing activities is likely to contribute to increased profitability and sustainability of enterprises (World Bank Report, 2013).

Participation by smallholder farming entrepreneurs in agro-processing activities is likely to be influenced and affected by their cognitive abilities, including exogenous factors at the disposal of individual smallholder farmers (GEM Report, 2011). Cognitive abilities include the farmer's background, education levels, prior business and farming experience while exogenous factors include institutional support and socio-economic dynamics (Thompson, 2009).

Exploitation of agro-processing business opportunities has the potential to enhance competitive advantage of farming enterprises (World Bank, 2007). Exogenous factors that are supportive of entrepreneurial behaviour, including low transaction costs and improved access to markets by smallholder farming entrepreneurs, are likely to encourage participation of smallholder farmers in agro-processing activities and business ventures (Mosey, Noke and Binks, 2012).

The emphasis of this study was on human capital, social capital, transaction costs and market access at the disposal of smallholder farming entrepreneurs in

the quest to participate in agro-processing activities. Human and social capital are antecedents and fundamental to opportunity discovery, recognition and exploitation (Ardichvili, Cardazo and Ray, 2003; Davidsson and Honig, 2003; GEM Report, 2011; Shepherd and DeTienne, 2005; Venter, Urban and Rwigema, 2008). Exploitation of agro-processing business opportunities are reliant on capability and ability of smallholder farming entrepreneurs to discover, recognise and exploit opportunities. Personality variations and intrinsic motivations have the potential to affect a farmer's persistence to pursue agro-processing opportunities (Dimov, 2007).

Human capital (Shane, 2000; Sherperd and De Tienne, 2005) and social capital (Hoang and Antoncic, 2003) were proven to significantly influence the entrepreneurial intent of individuals.

One of the significant challenges faced by smallholder farming entrepreneurs is lack of information, poor infrastructure and inappropriate technologies including insufficient and inadequate financing options (World Bank Report, 2013). A major constraint in improved competitiveness within the agricultural sector and agribusinesses is an acute lack of capacity, skills and knowledge at all levels (Louw, Jordan, Ndanga and Kirsten, 2008; Ortmann and King, 2010; Uchezuba, Moshabele and Dipogo, 2009).

This study endeavoured to identify and explain factors that limit and constrain participation in agro-processing activities by smallholder farming entrepreneurs. The study further determined relationship between participation in agro-processing activities and human capital, social capital, transaction cost and market access. Results and findings of the study provided guidance to policy makers on possible mitigating alternatives that may encourage and enhance smallholder farming entrepreneur's participation in agro-processing activities.

Improved understanding of factors affecting participation of smallholder farmers in agro-processing activities will assist to identify aspects crucial for cultivating entrepreneurial behaviour among smallholder farming entrepreneurs. Linking entrepreneurship and agro-processing is likely to ensure financial and economic

sustainability of smallholder farming enterprises but also extend and increase the value chain activities within smallholder farming enterprises (GEM Report, 2011; World Bank, 2007).

Vertical integration of farming activities is likely to enhance and improve competitiveness and financial sustainability of farming enterprises. Vertical integration involves performing all activities of production, manufacturing and marketing under single ownership, thus minimising the role of the intermediary and interacting directly with the formal market (Fiet, 2000).

1.2 Context of the study

1.2.1 Description of study area

The Republic of South Africa is located in the Southern tip of the African continent. The country has a surface area of 1.22 million square kilometres and a population of approximately 53 million people, 38 percent of who reside in the rural areas. Many of these rural dwellers rely on agriculture as the source of livelihood (StatsSA, 2012).

South Africa is the biggest economy in the African continent with per capita GDP of USD 10 500, more than three times the African continent average, but also characterised by GINI-coefficient measuring level of inequality at 0.68 classifying South Africa as one of the most unequal countries in the world (Vietor and Comin, 2012). South Africa is classified as an efficiency driven economy (GEM Report, 2011). The unemployment rate is at 25 percent considering the stricter definition, which only accounts for those individuals currently looking for jobs (StatsSA, 2013).

The contribution of agriculture to the GDP of the economy has substantially declined over the past decades (World Bank Report, 2013). The agriculture, forestry and fisheries sector contributed five percent to the GDP in 1994, which dropped to three percent in 2012 and accounted for seven percent of the overall employment (StatsSA, 2012). The agriculture sector includes all economic

activities from the provision of farming inputs to actual farming and production. The agriculture sector is important to the economy, notwithstanding the small share of GDP at three percent (StatsSA, 2012). The agriculture sector provides food and fibre to meet basic human needs.

Many sectors in the economy rely on agriculture to provide raw material for production. This sector remains crucial to the economy considering not only the forward and backward linkages (Asokan and Singh, 2003; World Bank Report, 2013), but also that 38 percent of the population resides in rural areas where agriculture is the mainstay of local economies (StatsSA, 2012). The agriculture sector is crucial in addressing the triple challenges of poverty, unemployment and inequality (DAFF, 2012; IPAP, 2013; NGP, 2010; Ortmann and King, 2010; Shiimi, Taljaard and Jordaan, 2012).

Farm workers and families contribute to rural local economies when they spend wages on consumer goods and services. Equally, farmers contribute to the economy when buying inputs for production. Increasing agricultural productivity makes it possible to feed a growing population. More food produced with less labour, considering effectiveness and efficiencies of production systems, releases labour for manufacturing employment. The high income generated in agriculture enhances domestic and local demand for manufacturing the goods produced. Lastly, increases in income precipitates domestic savings required to finance entrepreneurial activities (Matsuyama, 1992; World Bank, 2003; World Bank Report, 2013).

South African agriculture is highly dualistic, characterised by a small (46 000) number of commercial farming operations that are managed mainly by successful farmers and a large (450 000) number of smallholder farming enterprises consisting mainly of struggling black farmers (DAFF, 2012). The opportunities and challenges are different for each group. Government has put in place policies and programmes, one of which aims to migrate smallholder farming entrepreneurs from the informal sector towards integration with the commercial agricultural economy (Randela, Alemu and Groenewald, 2008).

Some of the challenges facing smallholder farming entrepreneurs include lack of access to finance, lack of access to markets, inadequate and insufficient infrastructure, low human capital and low investment in technology (Louw, Jordan, Ndanga and Kirsten, 2008; Makhura, 2001; Ortmann and King, 2010; Randela *et al.*, 2008; Shiimi *et al.*, 2012; Uchezuba, Moshabele and Digopo, 2009). Smallholder farmers are confined to economic participation within the informal sector with a focus on primary agriculture while commercial farmers are located within the formal economy with footprints along the value chain (DAFF, 2012; World Bank Report, 2013).

1.2.2 Agro-processing in context

Agro-processing initiatives refers to those activities that change the form of agricultural product into various or different forms to enhance and facilitate easier handling but also increase shelf-life including adding value to product (Staatz, 2010). Agro-processing refers to a set of technological and economic activities undertaken on a basic agricultural product with the aim of transforming it into usable items such as food, fibre, fuel and industrial raw material (FAO, 1997; Mhazo, Mvumi, Nyakudya and Nazare, 2012).

According to the United Nations International Standard Industrial Classification System (ISIC, 2013) agro-processing is demarcated into the following sub-sectors and/or components:

- Food and beverages;
- Tobacco products;
- Paper and wood products;
- Textiles, footwear & apparel
- Leather products; and
- Rubber products.

The Standard Industrial Classification further demarcates and disaggregates food and beverage sub-component into codes 301 to 304 demarcated as follows (Mather, 2005):

- *Code 301* refers to manufacturing, processing and preservation of meat, fish, vegetables, oils, and fats;
- *Code 302* refers to manufacturing, processing and preservation of dairy products;
- *Code 303* refers to manufacturing and processing of grain mill products, starch products and prepared animal feeds; and
- *Code 304* refers to manufacturing and processing of other food products like bread, sugar, chocolate, pasta, coffee, nuts, and spices.

Another classification of the agro-processing industry may be in the upstream and downstream component. Upstream industries are engaged in initial processing of primary agricultural products such as flour milling, leather tanning, cotton ginning, oil pressing and fish canning. Downstream industries undertake further manufacturing operations on intermediate products emanating from primary agricultural products such as bread, biscuit, paper production, and textile spinning and weaving (FAO, 1997; Limpopo Agro-processing Strategy, 2012).

The food and beverage sub-component of agro-processing is mostly homogenous and easier to classify than the non-food. In most instances, preservation and processing techniques are similar over a wide variety of perishable food and beverage products such as fruit, vegetables, milk, meat or fish.

This study will focus on food and beverages component of the agro-processing sector mainly because of the significant role the food sub-sector can play towards amelioration of the high poverty and unemployment rates (DAFF, 2012; IPAP, 2013; NGP, 2010; Ortmann and King, 2010; Shiimi, Taljaard and Jordaan, 2012).

The value of processed agricultural product exceeds that of the basic commodity (Louw *et al.*, 2008). The growth of the smallholder agro-processing initiative has the potential to increase the profitability and sustainability of smallholder producers and trigger development in other sectors of the economy through the multiplier effect (Asokan and Singh, 2003; FAO, 1997; IPAP, 2012; Mather, 2005).

Agro-processing activities has the potential to contribute to sustainable livelihoods through food availability, improved income resulting in increased profitability, employment, social and cultural well-being from limited land (Mhazo *et al*, 2011; World Bank Report, 2013).

Agro-processing is suited to developing countries context because food-processing plants are not always scale dependent. Small enterprises have the potential to operate as economically efficient as larger plants whose competitive advantage is economies of scale (FAO, 1997; Mather, 2005). Competitive advantage stems from possession of unique set of various assets such as locational advantages, natural resources, social capital, human capital and proximity to inputs whose efficient utilisation give an enterprise the edge over others.

Benefits that accrue from participation in agro-processing activities by smallholder farming entrepreneurs include:

- Rural industrialisation through establishing agro-processing industries closer to primary products;
- Local economic growth through increased trade of processed agriculture, forestry and fisheries products;
- Job creation encouraged by increased productivity resulting from lower transaction costs;
- Improved livelihoods of both SME agro-processor and smallholder producer;
- Enhanced food security and increased food availability resulting from reduced post-harvest loses; and

- Overcoming seasonality and perishability of agriculture, forestry and fisheries products.

The demand for processed, healthy and quality food is increasing owing to growth in urbanisation and the middle class. In the agro-processing sector, the potential for growth that remains untapped is huge (Louw *et al.*, 2008; World Bank Report, 2013). Through vertical integration of farming activities, retailers and wholesalers are likely to reduce transaction costs while ensuring sustainability of smallholder farming enterprises (Jagwe and Machethe, 2011).

The South African agro-processing sector contributed 30.5 percent of the real value added GDP to manufacturing sector. It also comprised 14 percent of the total manufacturing exports. Agro-processing further contributed 39.2 percent of the total manufacturing employment. Considering the contribution of agro-processing to the overall employment, the contribution of agriculture to the total employment is higher than the seven percent (Vietor and Comin, 2012).

1.3 Problem statement

South Africa faces numerous economic and social challenges. Of importance are the high unemployment rate, high poverty rate and high inequality (IPAP, 2013; NGP, 2010; GEM Report, 2011). Over the period, 2000 to 2012, the unemployment rate averaged 26 percent, the *gini*-coefficient, measuring inequality, was at its highest at 0.68 (Vietor and Comin, 2012) and the unemployment rate was recently places at 25 percent, from 26 percent previously (StatSA, 2013).

Table 1: Key labour market indicators

(Stats SA, 2013)

	Jul-Sep 2012	Apr-Jun 2013	Jul-Sep 2013	Qtr-to-qtr change	Year-on-year change	Qtr-to-qtr change	Year-on-year change
	Thousand					Per cent	
Population 15–64 yrs	**33 018**	**33 352**	**33 464**	**112**	**446**	**0,3**	**1,4**
Labour force	**18 313**	**18 444**	**18 638**	**194**	**325**	**1,0**	**1,8**
Employed	**13 645**	**13 721**	**14 029**	**308**	**383**	**2,2**	**2,8**
Formal sector (non-agricultural)	9 663	9 694	10 008	314	346	3,2	3,6
Informal sector (non-agricultural)	2 197	2 221	2 182	-39	-15	-1,8	-0,7
Agriculture	661	712	706	-6	45	-0,9	6,8
Private households	1 124	1 093	1 132	39	8	3,6	0,7
Unemployed	**4 667**	**4 723**	**4 609**	**-114**	**-58**	**-2,4**	**-1,2**
Not economically active	**14 705**	**14 908**	**14 826**	**-82**	**121**	**-0,5**	**0,8**
Discouraged work-seekers	2 170	2 365	2 240	-125	70	-5,3	3,2
Other (not economically active)	12 535	12 543	12 586	43	51	0,3	0,4
Rates (%)							
Unemployment rate	25,5	25,6	24,7	-0,9	-0,8		
Employment/population ratio (absorption rate)	41,3	41,1	41,9	0,8	0,6		
Labour force participation rate	55,5	55,3	55,7	0,4	0,2		

The agricultural sector remains the backbone of rural local economies (StatSA, 2012; World Bank, 2007). Improving and enhancing growth of the agro-processing sector through participation in agro-processing activities by smallholder farming entrepreneurs has the potential to enhance sustainability and profitability of farming operations (Louw *et al.*, 2008; Mhazo *et al.,* 2008).

In South Africa, the potential of agro-processing is not fully exploited (IPAP, 2013). Smallholder farming is confined to the informal sector mainly in primary agriculture. Encouraging participation of the smallholder farming entrepreneurs in agro-processing activities has the potential to improve sustainability of farming operations but also contributes to job creation, reduction of poverty and unemployment that are defined as national objectives (NGP, 2010; World Bank Report, 2013).

1.3.1 Main problem

Identify and explain factors that constrain and limit participation in agro-processing activities by smallholder farming entrepreneurs. (Key words: Agro-

processing, entrepreneurship, smallholder-farmers, human capital, social capital, transaction cost, market access).

1.3.2 Sub-problem 1

The first sub-problem is to determine the perceived human capital factors that affect participation in agro-processing activities by smallholder farming entrepreneurs.

1.3.3 Sub-problem 2

The second sub-problem is to determine the perceived social capital factors that affect participation in agro-processing activities by smallholder farming entrepreneurs.

1.3.4 Sub-problem 3

The third sub-problem is to determine the perceived transaction factors that affect participation in agro-processing activities by smallholder farming entrepreneurs.

1.3.5 Sub-problem 4

The fourth sub-problem is to determine the perceived market access factors that affect participation in agro-processing activities by smallholder farming entrepreneurs.

1.3.6 Sub-problem 5

The fifth sub-problem is to determine the moderation effects of transaction costs on the relationship between human capital and participation by smallholder farming entrepreneurs in agro-processing activities. When transaction costs. When transaction costs are high, it is anticipated that there will not be a relationship. When transaction costs are low the relationship is expected to be positive.

1.3.7 Sub-problem 6

The sixth sub-problem is to determine whether the moderation effects of transaction costs on the relationship between social capital and participation by smallholder farming entrepreneurs in agro-processing activities. When transaction costs are high, it is anticipated that there will not be a relationship. When transaction costs are low the relationship is expected to be positive.

1.3.8 Sub-problem 7

The seventh sub-problem is to determine the moderation effects of transaction costs on the relationship between market access and participation by smallholder farming entrepreneurs in agro-processing activities. When transaction costs are high, it is anticipated that there will not be a relationship. When transaction costs are low the relationship is expected to be positive.

1.3.9 Sub-problem 8

The eighth sub-problem is to determine the extent to which variation in participation in agro-processing activities by smallholder farming entrepreneurs may be explained jointly by the independent variables of human capital, social capital, market access and the interaction of these variables with transaction costs.

1.4 Significance of the study

This study fills a gap in the knowledge in that it provides for a better understanding of factors that limit and constrain participation of smallholder farming entrepreneurs in agro-processing activities within South Africa. Participation in agro-processing initiatives by smallholder farming entrepreneurs is critical because:

- *National and provincial level*: It has the potential to contribute to poverty reduction, employment creation and sustainable agriculture (Alene *et al.*,

2007; Mhazo *et al.*, 2012; Watanabe *et al.*, 2009; World Bank, 2007; World Bank Report, 2013).

- *Farm-gate level*: Smallholder farming entrepreneurs are likely to derive benefits such as access to niche markets, business opportunities and income generation (Jari and Fraser, 2009; Louw *et al.*, 2008; World Bank Report, 2013).

Exploitation of agro-processing by smallholder farming entrepreneurs remains limited in South Africa (IPAP, 2013; NGP, 2010). This study intends to contribute and encourage participation of smallholder farming entrepreneurs in agro-processing initiatives through determining the relationship between participation of smallholder farming entrepreneurs in agro-processing activities as the dependent/outcome variable and the perceived level of human capital, social capital and market access as the independent/predictor variables and the interaction of these variables with transaction costs.

Empirical research conducted on agro-processing focused on the impact of agro-processing on economic growth and development (Mather, 2005; Mehta, 2012; Ramabulana, 2009; Watanabe, Jinji and Kurihara, 2009; Wilkinson and Rocha, 2008). The focus of such empirical research is located within the agro-processing industries with the exclusion of smallholder farmers as potential agro-processors.

Traditional analyses of economic growth and competitiveness tends to neglect the critical and important role played by small firms such as smallholder farming firms (GEM Report, 2011).

In a study conducted by the Industrial Development Corporation (IDC, 2010 cited in Louw, Troskieand Geyser, 2013) the focus was on identifying factors constraining and limiting the development of agro-processing in the wheat industry in South Africa. The focus and thrust of the study was the milling industry to the exclusion of other food and beverage components of the agro-processing sector. Smallholder farming entrepreneurs were not viewed as entrepreneurs subject to processing activities.

Trade and Industrial Policy Strategies (TIPS) conducted a study on small and medium enterprise (SME) in South Africa's food processing complex looking at development prospects, constraints and opportunities (Mather, 2005). The focal point of the study was small processors to the exclusion of smallholder farmers as potential agro-processors.

Empirical research has focused on development constraints of agro-processing industries (Asokan and Singh, 2003; Watanabe *et al.*, 2009). In such research, agro-processing industries are de-linked and demarcated from farming activities implying agro-processing initiatives are conceived as distinct activities, separate from farming activities or not conducted within the farm-gate.

Empirical research conducted on smallholder farmer's focus on lack of access to markets (Freguin-Gresh, d'Haese and Anseeuw, 2012; Jagwe and Machethe, 2011; Jari and Fraser, 2009; Randela *et al*, 2008; Shiimi *et al*, 2012) to the exclusion of agro-processing as a possible channel and mechanism to enhance market access of smallholder farming entrepreneurs.

This study focused on smallholder farmer's agro-processing initiatives as a broader endeavour of vertically integrating the value chain of smallholder farming operational activities that are likely to increase sustainability and profitability of the farming enterprise (FAO, 1997; Louw *et al.,* 2008; Mather, 2005; Mhazo *et al.,* 2012; World Bank Report, 2013). Vertical integration of the value chain of smallholder farms has the potential to encourage supply of processed and value-added products that are ready for usage and consumption by consumers instead of relegating the processing function to other players within the value chain.

Improving and enhancing an understanding of smallholder farmer opportunity identification process may assist to ensure knowledge generated from this study is translated and transcends into innovative business solutions that are and can be implemented, potentially contributing to economic and social development.

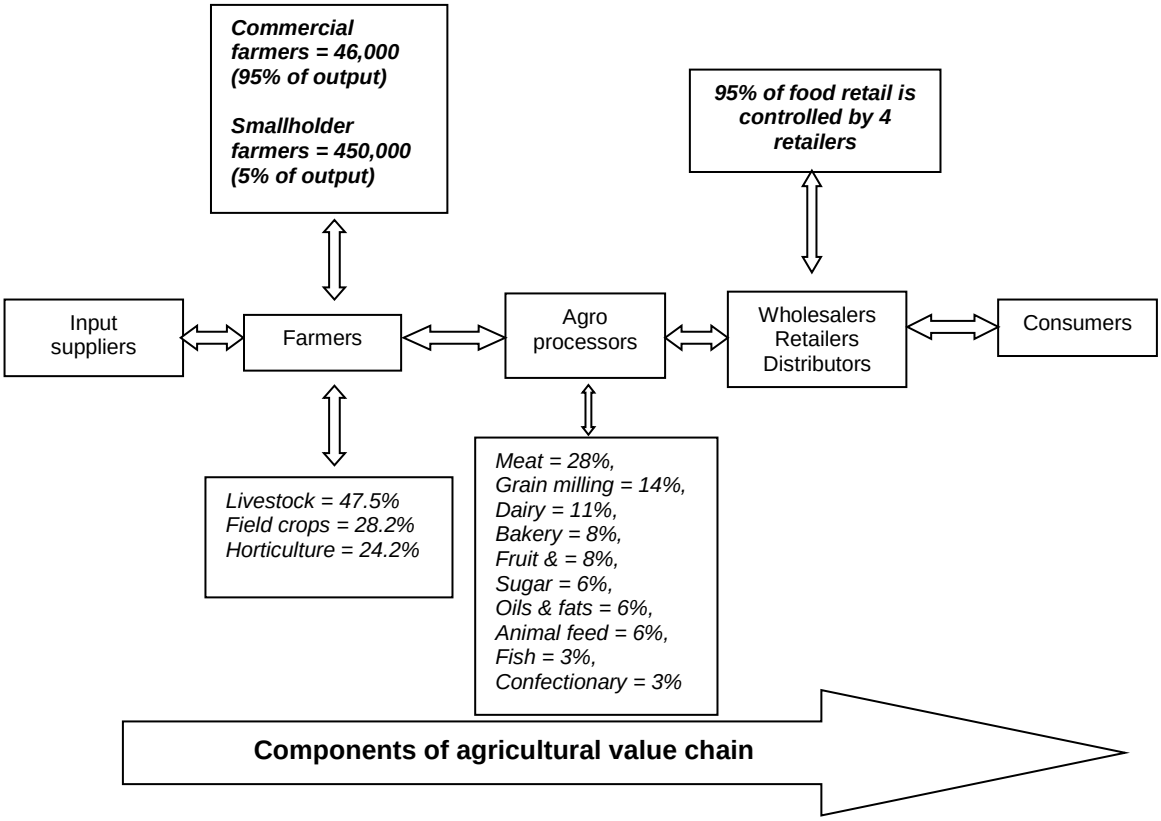


Figure 1: Integrated farming value chain

(NAMC, 2013)

The agro-processing value chain encompasses all subsequent activities after the harvest phase until the agricultural product ultimately reaches the consumer in its desired form, packaging, quantity, quality and price. The greatest potential growth of smallholder farming entrepreneurs in relation to agro-processing initiatives is in the fruit and vegetables sub-sector because of the acute challenge of accessing markets coupled with the perishability of the products (Mhazo *et al.*, 2012). This study focused on the food and beverage component of the agro-processing sector with emphasis on vegetables.

Participation of smallholder farming entrepreneurs in agro-processing activities has the potential to create niche markets that are currently confined to exploitation by large agro-processors who are distinct from actual farming operations (Louw *et al.*, 2008; World Bank Report, 2013). Exploitation of agro-processing by smallholder farming entrepreneurs is a potential solution to the challenge of lack of access to markets (Mhazo *et al.*, 2012)

Findings emanating from this study could assist smallholder farming entrepreneurs and those that counsel to facilitate and fast-track entrance and participation in the agro-processing activities.

The study could provide guidance regarding development intervention strategies to encourage smallholder farming entrepreneur's participation in the agro-processing initiatives. Knowledge gained from this study is likely to improve, facilitate and enable sustainable development utilising an entrepreneurial approach to smallholder farming in South Africa.

1.5 Delimitation of the study

This study focussed on smallholder farming entrepreneurs. Commercial farmers and established agribusinesses were excluded. Agro-processors and agribusinesses that were not actively involved in farming, whether SME or not were excluded.

Data was collected from smallholder farm owners and/or farm managers because they had reliable and credible information regarding markets and agro-processing industry.

Data was collected from smallholder farming entrepreneurs that employ 50 or less employees. Casual, part-time and full-time employees were considered employees of the farm.

The study required one response per smallholder farm. Farm workers were not interviewed to minimise risk of obtaining unreliable information. The sampling frame only included smallholder farming entrepreneurs.

Smallholder farming entrepreneurs not attending farmers meetings or not answering phones during data collection phase were excluded from the study.

The study only included food enterprises to the exclusion of non-food enterprises.

Smallholder farming entrepreneurs throughout South Africa were targeted to be interviewed, time and budget permitting.

1.6 Definition of terms

Good empirical research is based on good, clear and accepted definitions (Thompson, 2009). Constructs were defined where they first appear. The following are definitions utilised in this study:

1.6.1 Agro-processing industry and sector

The agro-processing industry is defined as a subset of the manufacturing sector that processes raw materials and intermediate products derived from the agricultural sector (FAO, 1997). Agro-processing industries relate to activities that change the form of agricultural products into various states not only to improve handling but also to increase shelf life, adding value to agricultural products (Mhazo *et al.*, 2012).

1.6.2 Alertness

Alertness is defined as capacity to recognise opportunities when they emerge. It refers to alertness to changed conditions or to overlooked possibilities (Baron, 2006).

1.6.3 Entrepreneurial cognition

Entrepreneurial cognition relates to the knowledge structures that people use to make assessments, judgments, or decisions involving opportunity, evaluation, venture creation and growth (Mitchell and Busineth, 2002). Entrepreneurial cognition allows for better understanding in terms of

- How entrepreneurs make decisions and think; and
- The process of decision-making.

1.6.4 Demographics

Demographics are defined as characteristics such as age, gender, origin, religion, level of studies and labour experience (Linan, Rodriguez-Cohard and Cantuche, 2011).

1.6.5 Small farming entrepreneur

The definition of entrepreneurs by Ahmad and Hoffman (2008) is adjusted for the purpose of this study to define smallholder farming entrepreneurs as those individuals with a potential to generate value, through the creation, expansion or innovation of economic activity by identification and exploitation of new agricultural products, agro-processes or markets. An entity was confined to an annual turnover of R10 million and less than 50 employees.

1.6.6 Smallholder farmers

The concept of smallholder farmers was approached from a variety of angles. For the purpose of this study, smallholder farmers were defined as those with a low asset base, limited resource endowments, poor resources, low farming technology, fragile market relationships, low access to services, finance and information relative to commercial farmers (Becx, Slingerland and Rabbinge, 2011; Dixon, Taniguchi and Wattenbach, 2003; World Bank, 2003).

The South African government specifically the AgriBEE sector codes defined SMME within agriculture according to several factors such as ownership, employment size and formality (Government Gazette, 2012). Informed by AgriBEE charter which is a sub-item of BBBEE Act 53 of 2003, smallholder farming entrepreneurs employ between zero and 50 people and have a maximum turnover of approximately R10 million per annum.

1.6.7 Value adding

It is critical to differentiate between two terms that are mostly used interchangeably namely, processing and value addition. Processing entails changing the form of a product, while value addition implies addition of value to

a product after which a buyer is willing to pay a price for the product that more than compensates for the cost of the inputs used in the process (Staatz, 2010). Value can be added to products without changing their physical form. Value adding activities range from washing/cleaning, sorting, packaging, branding and labelling (World Bank Report, 2013). To an extent that a product undergoes a process, for example grading, then value addition does involve processing, even though the physical form of the products does not change. For the purpose of this study value addition and agro-processing will be used synonymously.

1.6.8 New Growth Path (NGP)

NGP was adopted by cabinet in 2010 as a macroeconomic policy whose main thrust will be to prioritise employment creation (IPAP, 2013; Vietor and Comin, 2012). The thrust of NGP was a massive investment in infrastructure and people through skills development (NGP, 2010). NGP cited further weaknesses in the economy, the key being high unemployment rate and low skills capacity.

1.6.9 Industrial Policy Action Plan (IPAP)

IPAP (2013) is the implementation plan and instrument for NGP (Vietor and Comin, 2012). In the short-term, IPAP (2013) and NGP (2010) intend to accelerate employment through direct farmer support programmes but also encourage farmers to access financial assistance and agricultural support.

1.6.10 Accessibility

The ability of the smallholder farming entrepreneur to source and possess the resources required to advance the profitability of the smallholder farm. Accessibility of the smallholder farming entrepreneur to external resources is mainly determined by the extent of social ties and relations (Liao and Welsch, 2003).

1.7 Assumptions

There were various assumptions made in this study that may have had an impact on the outcome of the study. These assumptions are as follows:

- Respondents will allocate sufficient time to conduct telephonic and personal interviews, recognising that data collection will be carried out during peak production season;
- Uncertainty and instability in the agriculture sector related to the land reform process, including the farm worker minimum wage uprising, will not affect respondents' ability to be unbiased and truthful;
- Farm-workers will not be interviewed; only smallholder farm owner and/or smallholder farm managers will be interviewed;
- Agribusiness not involved in actual farming operations will be excluded whether SME or not. The intention of this study is to enhance vertical integration of farming activities of smallholder farmers;
- Smallholder farmers farming with various food-sector enterprises (livestock, horticulture, fruits, grain) will be considered for participation in the study;
- Respondents will understand and answer the questions to the best of their ability;
- Respondents will provide honest and genuine responses to questions asked;
- Respondents can choose not to disclose certain information or discontinue with the interview altogether;
- Number of respondents interviewed will be sufficient to obtain adequate data;
- Should respondents require feedback regarding the study, WBS and the supervisor will accede to such requests.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

This section examines definitions of topics, followed by a review of literature on agro-processing, human capital, social capital, market access and transaction cost. The hypotheses of the research are framed during the course of review and its conclusion.

Agro-processing activities by smallholder farmers has a potential to contribute significantly to sustainable livelihoods through food availability emanating from improved shelf-life, improved income from increased profitability, employment, social and cultural well-being from limited land (Mhazo *et al*, 2011; World Bank Report, 2013).

In South Africa, smallholder farmers are confined to economic participation within the informal sector, focusing on primary agriculture and excluding agro-processing activities. Commercial farmers are located in the formal economy with footprints along the value chain (DAFF, 2012).

This study is an endeavour towards understanding and appreciating factors that lead to constrained participation of smallholder farming entrepreneurs in agro-processing initiatives. The value of processed agricultural product fetches a higher price on the market floor as compared with basic and unprocessed agricultural products (Mhazo *et al.,* 2012; NAMC, 2013). This study has theoretical roots in the domains of human capital theory, social capital theory and transaction cost theory.

Entrepreneurship, in particular technology entrepreneurship, was identified as a possible solution to enhance innovation and grow the economy (Barreira, Botha, Oosthuizen, & Urban, 2011; Kuratko, 2009; Shane, 2000; Venter *et al.,* 2008) resulting in job creation and reduction in poverty (Kuckertz & Wagner, 2010). High technology agricultural initiatives were proven to be characterised

by not only potentially high future profits but also high uncertainty (World Bank Report, 2013). The ability to innovate continuously includes ensuring that the entrepreneurial process and action is at the heart of agribusiness models and has the potential to become a source of competitive advantage. Technology and agro-processing initiatives are intertwined (NAMC, 2013).

2.2 Agro-processing

UNIDO, IFAD and FAO (2008) define agro-processing as the processing, preservation and preparation of agricultural production for intermediate and final consumption. Another classification of agro-processing involves upstream and downstream industries, where the former are engaged in initial processing of agricultural activities, for example, grain storage, fruit packaging, grain flour milling, leather tanning, cotton ginning, oil pressing, saw milling and fish canning. The latter would involve further manufacturing of intermediate products made from agricultural products, for example, bread, biscuit and noodle making, textile spinning and weaving, paper production, clothing and footwear manufacturing, and rubber manufacturing (FAO, 1997). Smallholder farming entrepreneurs engaged and actively participating in up-stream or downstream activities were considered for participation in this study.

Agro-processing may also be defined as techno-economic activities performed on agricultural products with the purpose of making it usable as food, feed, fibre, fuel or industrial raw material (Mhazo *et al.*, 2012).

These techno-economic activities may be demarcated into three broad categories as seen in Figure 2.

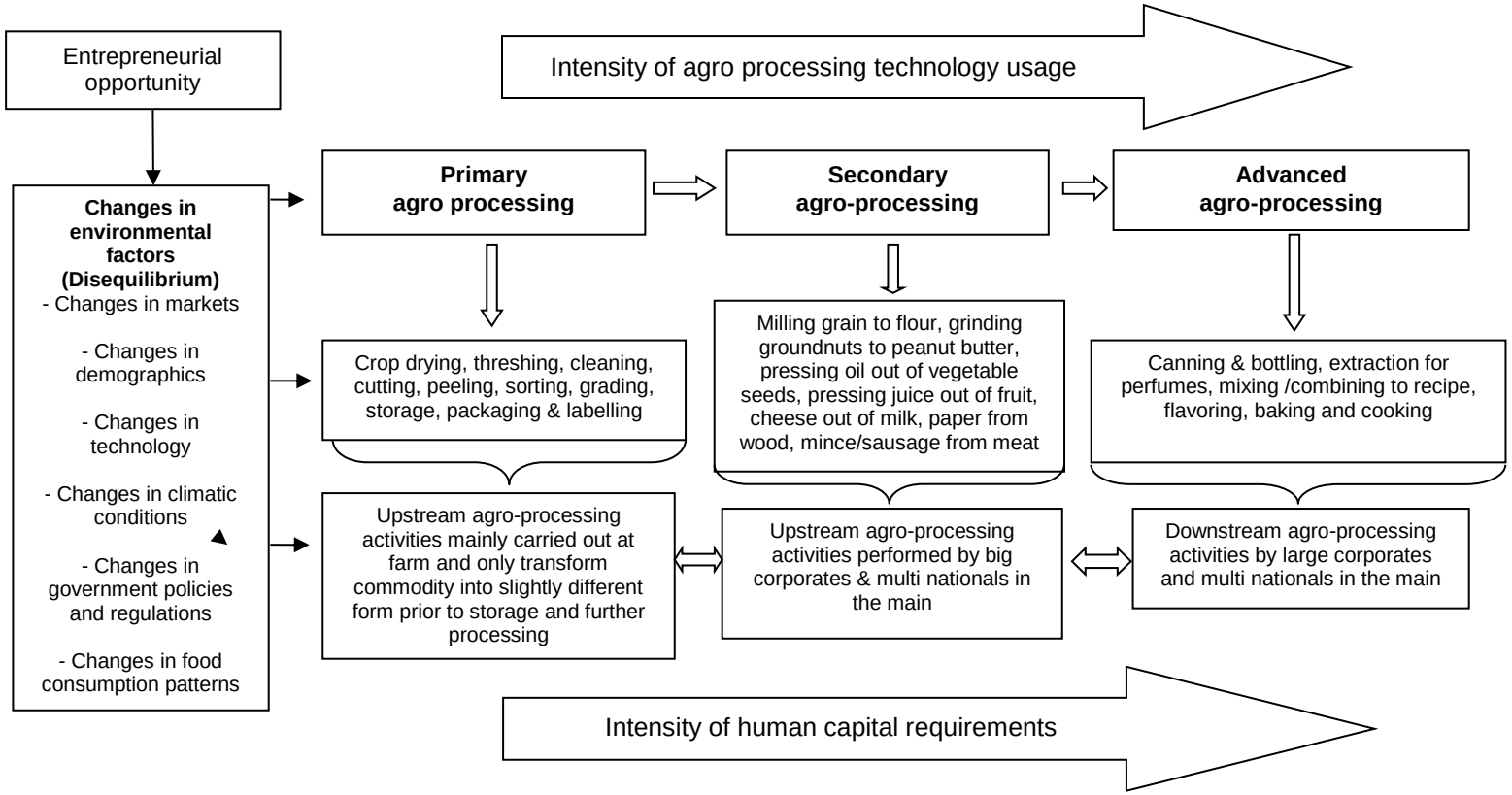


Figure 2: Different phases of agro-processing activities

(Thindisa, 2013)

For the purpose of this study, participating in agro-processing initiatives is not a matter of a yes or no question, but rather the extent to which smallholder farming entrepreneurs are engaged. This might range as low to high participation depending on agro-processing activities. For the purpose of this study, all three broad categories were considered and scaled from low participation to high with those requiring the use of technology rated at high.

Agro-processing is considered a sub-sector of the manufacturing sector. A common and traditional definition of agro-processing refers to the subset of manufacturing that processes raw material and intermediate products from the primary agricultural sector (FAO, 1997).

When comparing the formal and informal sectors, between primary agriculture and agro-processing, we find that primary agriculture, within the formal sector still creates the most employment opportunities. Employment in agro-processing has been remarkably steady (StatsSA, 2012).

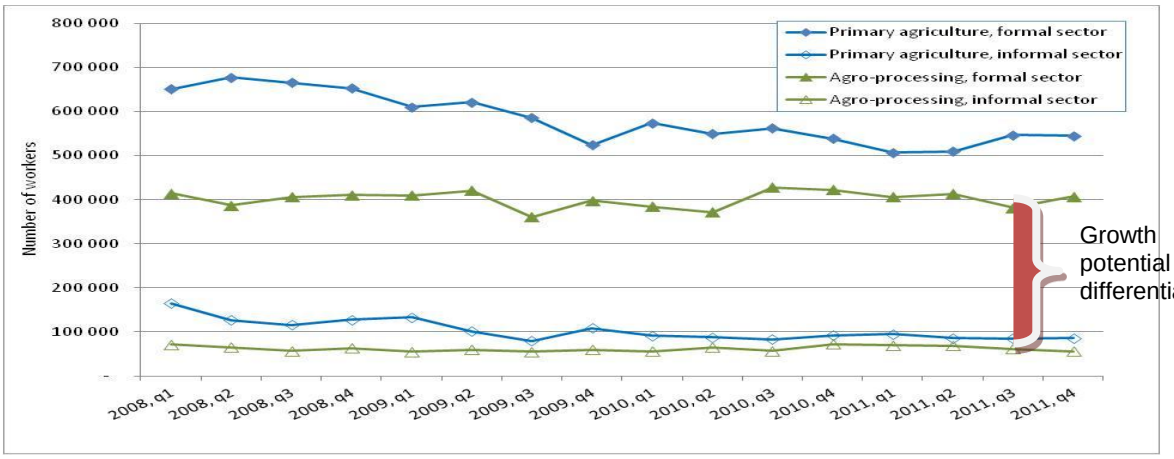


Figure 3: Employment trends in primary agriculture and agro-processing, formal versus informal, from Q1, 2008 through Q4, 2011

(StatsSA, 2012)

New Growth Path (NGP, 2010) and its implementation instrument called the Industrial Policy Action Plan (IPAP, 2013) identified the following constraints and barriers of entry related to participation by smallholder farming

entrepreneurs in the agro-processing sub-sector that formed the basis of this research study:

- Phyto-sanitary standards that many of smallholder famers do not appreciate;
- Regulatory barriers resulting in difficulty by many smallholder farming entrepreneurs to enter into and participate in the processing and value addition sector; and
- Under investment in agro-processing machinery and equipment.

Agro-processing has the potential to reduce poverty and unemployment significantly and increase financial and economic sustainability of smallholder farms (Alene *et al.*, 2007; Mhazo, Mvumi, Nyakudya and Nazare, 2012; Watanabe, Jinji and Kurihara, 2009; World Bank, 2007; World Bank Report, 2013). The value of processed product exceeds that of basic product (Louw *et al.,* 2008).

Encouraging and expanding agro-processing activities of smallholder farming entrepreneurs is not only propelled by developmental objectives but also by changing food consumption taste and preference patterns. These patterns emanate from population growth and increased urbanisation coupled with growth in the middle class whose food patterns are skewed towards quality processed food that is convenient, easy and quicker to cook (Louw *et al.*, 2008; World Bank Report, 2013).

Quality of processed food is linked to both the intrinsic and extrinsic factors. Intrinsic qualities refer to flavour, texture, appearance, shelf-life and nutritional value while extrinsic qualities refer to processing methods, packaging material and the type of production system utilised to produce a product (Asokan & Singh, 2003). Processed food quality should be geared towards meeting the expectation and market of the consumer.

The expansion of smallholder farming agro-processing initiatives is likely to trigger development in other sectors of the economy through the multiplier effect (Asokan & Singh, 2003; World Bank Report, 2013). Agro-processing is

associated with potential for generating demand among smallholder farmers and upgrading production through small-scale food processing including improving food price stability (FAO, 1997; Mather, 2005).

2.3 Entrepreneurship

Entrepreneurship is viewed as a catalyst for innovation and economic development (Kuckertz and Wagner, 2010). The ability to innovate continually has become a source of competitive advantage (Kuratko, 2009). Agro-processing has the potential to offer competitive advantage to smallholder farming entrepreneurs (World Bank Report, 2013).

Entrepreneurs have existed for many years. Individuals have, throughout history, spotted an opportunity and set-up a business to exploit this opportunity while bearing calculated and minimal risk (Venter *et al.*, 2008).

Entrepreneurs mobilise resources for exploitation of the opportunity recognised. Schumpeter (1942) describes entrepreneurs as bearers of risk, people that bring together factors of production or organisers of innovation. Entrepreneurs create value where there was none before by using resources in an innovative and unique way (Kuratko, Morris & Covin, 2011).

Although there is no universally accepted definition for entrepreneurship (Kuratko and Hodgetts, 1992; Kuratko *et al.*, 2011), various researchers have attempted to articulate definition of the concept. Entrepreneurship relates to the functional role of entrepreneurs that encompass functions like coordination, innovation, uncertainty bearing, capital supply, decision-making, ownership and resource allocation (Barreto, 1989).

Entrepreneurship can be defined as the ability and willingness of individuals to identify economic opportunities and capability to seize and exploit these opportunities into the market at a profit. Entrepreneurship involves efforts by individuals to recognise viable and profitable opportunities and subsequently access and manage the resources required to exploit opportunities identified

(Barreira *et al.*, 2011; Kuckertz and Wagner, 2010; Nwibo and Okarie 2013; Venter *et al.*, 2008).

The process of entrepreneurship is as critical as the individual entrepreneurs are (Shockley and Frank, 2011). Entrepreneurs agitate entrepreneurship. Entrepreneurship consists of two related processes that can be categorised as discovery of opportunity and exploitation of opportunity (Shane and Venkataraman, 2000).

Further, there are two paradigms to entrepreneurship, of which opportunity recognition is key and fundamental:

[1] *Discovery theory* stresses the importance of exogenous variables in opportunity recognition. Discovery theory posits that entrepreneurs are fundamental to search and sourcing opportunities in the environment. Through searching, entrepreneurs discover opportunities for supply of new products, new services, and new systems (Alvarez and Barney, 2007; Shane 2000).

[2] *Creation theory* states that opportunities are endogenously created by deeds and actions of entrepreneurs through exploration of channels geared for producing new products, new services and new systems. Creation theory assumes actions of entrepreneurs are fundamental to opportunity discovery and recognition (Baker and Nelson, 2005).

Baron (2006) identifies three factors critical to opportunity recognition.

[1] Active or passive search of opportunities by the entrepreneur, which is linked to discovery theory. Access to information is critical for the search for entrepreneurial opportunities (Shane, 2000).

[2] Alertness to opportunities (Kirzner, 1973) by the entrepreneur, which is also linked to discovery theory. Alertness emphasises the principle that an entrepreneur must recognise an opportunity not search for them. Alertness to entrepreneurial opportunities is influenced by cognitive abilities at the disposal of the entrepreneur (Shockley and Frank, 2011).

[3] Prior knowledge, which is a component of human capital, is one of the factors influencing opportunity recognition. Prior knowledge and experience was found to be positively related to entrepreneurial activity (Baron, 2006; Shane, 2000).

Entrepreneurial intent is known as self-acknowledged conviction by a person that they intend to set up a new business venture and consciously do so at some point in future (Kuckertz and Wagner, 2010; Thompson, 2009).

Entrepreneurship is about initiating and creating innovative entities that create wealth. Entrepreneurship involves starting or creating a new venture, innovating or putting together new combinations of resources, relentlessly pursuing opportunities, acquiring resources, taking calculated risks, ensuring profit seeking and crafting value (Kuratko, Morris and Covin, 2011). This study intended to investigate and determine factors affecting the transaction cost of smallholder farming entrepreneurs.

The ability to recognise novel opportunities in the volatile external environment, evaluate and prioritise these opportunities and then translate these opportunities into viable and profitable businesses lies at the heart of the entrepreneurial process (Kuratko *et al.*, 2011). Agro-processing initiatives provide a platform for new and novel opportunities for exploitation by smallholder farming entrepreneurs in the volatile agricultural sector.

Kirzner (1973) identifies entrepreneurial alertness or discovery of unnoticed opportunities as the life-blood of entrepreneurial theory. Entrepreneurial discovery represents being aware of what has been overlooked by others (Shockley & Frank, 2011). Entrepreneurship involves seeing through a misty situation created by the possibility of an uncertain future and identifying entrepreneurial opportunities for exploitation (Shane, 2000).

Entrepreneurial opportunity is defined as a situation that has potential for the discovery of new goods, services or raw material that can be brought to bear to produce economic value (Ardichvili, Cardazo and Ray, 2003; Davidsson and Honig, 2003).

People tend to define the concept of entrepreneurship according to individual parameters in terms of backgrounds, training and knowledge. For example, economists focus on classical economic models of behaviour, however similar and common factors of entrepreneurship emerge across disciplines such as creativity, innovation, opportunity recognition, achievement orientation, risk taking and resourcefulness (Venter *et al.,* 2008).

Schumpeter (1942) contends that entrepreneurs function not by instrumental rationality but by novel intuitions upon which novel and innovative business emanates from entrepreneurial opportunities. Entrepreneurship occurs everywhere and can be started by anyone.

Economic theory postulates that numerous exogenous factors affect entrepreneurship including demography, culture, politics, geography and economics (Nwibo and Okorie, 2013; Shane, 2003). These factors might affect smallholder farming entrepreneurs in various ways including:

- *Geography*: rural villages are located in areas with an acute lack of infrastructure resulting in a high transaction cost of doing business;
- *Economic*: low disposable income results in lack of opportunities in other sectors, local economies rely on agriculture for survival;
- *Culture*: land tenure agreements are still based on communal land use with little incentive for investment; and
- *Demography*: most rural areas are subject to patriarchy with women denied access to economic participation.

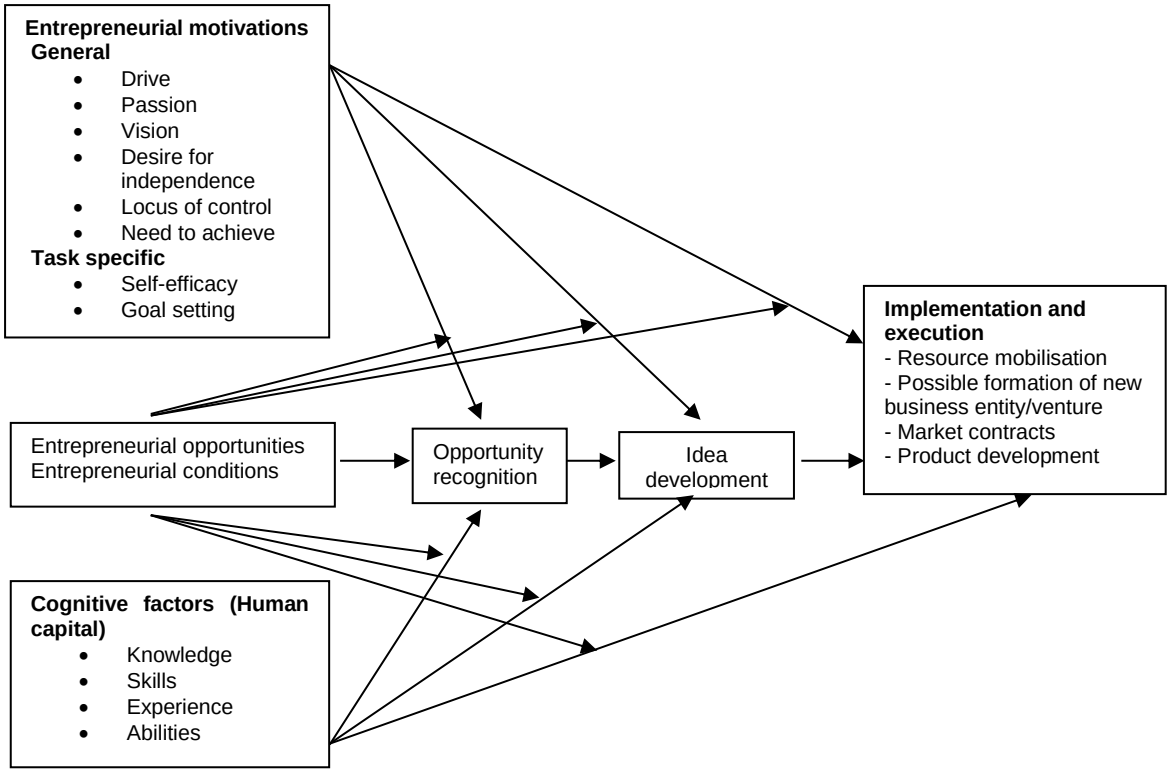


Figure 4: Entrepreneurship motivation and entrepreneurial process

(Shane, Locke & Collins, 2003, p. 269)

Entrepreneurship is a continuous process. The model in Figure 4 posits interaction between entrepreneurial motivations, entrepreneurial opportunities and external conditions. Cognitive factors are expected to be positively related to entrepreneurial opportunities (Shane, Locke and Collins, 2003, p. 274) and moderated by environmental or exogenous conditions (Kuckertz and Wagner, 2010)

Entrepreneurship has been gaining popularity and attention across the globe as an important source of economic growth and employment creation. Entrepreneurial initiatives have the potential to enhance competiveness and growth of the economy (GEM Report, 2011; Kuckertz and Wagner, 2010).

South Africa's levels of entrepreneurial activity, as measured by total entrepreneurial activity (TEA), remain among the lowest in developing nations

(GEM Report, 2011). The majority of entrepreneurial activity is located within the survival or necessity entrepreneurship as opposed to opportunity and high technology entrepreneurship. Technology entrepreneurship, directly linked to agro-processing, is seen as a possible solution to generate innovation, grow the economy and create jobs resulting in possible reduction in poverty.

The government of South Africa, through the New Growth Path (NGP, 2010) and the Industrial Policy Action Plan (IPAP, 2013) identified entrepreneurship as a possible solution and answer to mitigate high unemployment and poverty rates. The growth of high technology and opportunity-based entrepreneurship as indicated by TEA has been elusive notwithstanding the prioritisation of entrepreneurship by government (GEM Report, 2011) towards reducing unemployment and poverty. The poor education system and inadequate entrepreneurial training is the most frequently mentioned Achilles heel. Poor education means the knowledge of potential entrepreneurs is compromised.

Linking farming and entrepreneurship provides a catalyst for smallholder farmers to discover and exploit novel opportunities brought about by agro-processing (Whitefield, 2010). Agro-processing initiatives and technology are intertwined (NAMC, 2013).

2.4 Smallholder farming entrepreneurship

Smallholder farmers are defined as those with a low asset base, limited resource endowments, low farming technology, fragile and unstable market relationships and low access to services, finance and information relative to commercial farmers (Becx, Slingerland and Rabbinge, 2011; Dixon, Tarriguchi and Wattenbach, 2003; World Bank, 2003; World Bank Report, 2013).

Smallholder farmer entrepreneurship is defined as an innovative way of increasing planned production for a defined niche market propelled by a profit motive (Becx, Slingerland and Rabbinge, 2011). The major exclusion, by default, of entrepreneurship in smallholder farming is a result of many years of inadequate institutional support systems (Whitefield, 2010).

Using agriculture as the central thrust of local economic development in many rural areas requires a productivity revolution in smallholder farming (World Bank, 2007). About 38 percent of the population in South Africa reside in rural areas whose main economic mainstay is agriculture (StatsSA, 2012). Agriculture provides a vehicle to improve rural dwellers livelihoods including income generation. The labour absorption rate of agriculture is high compared with other sectors of the economy (World Bank Report, 2013).

The sheer size of the rural population and the lack of sufficient jobs for many unskilled labourers, coupled with huge areas of agricultural land that is fallow make agriculture the appropriate tool to offer sustainable employment and economic growth (Ashby *et al.*, 2009; Asokan and Singh, 2003; Shimi *et al.*, 2012; Uchezuba, Moshabele and Digopo, 2009).

Catalysing entrepreneurial behaviour of smallholder farmers is critical, essential and probably one of the few alternatives to enable smallholder farmers to benefit from inclusion in the formal markets and subsequently the agro-processing sector (Whitefield, 2010). Agro-processing has the potential to become a source of competitive advantage for smallholder farming entrepreneurs.

A study conducted in Ghana by Becx *et al*. (2010), identify constraints for entrepreneurship of smallholder farmers as follows:

- Mindset of farmers limits entrepreneurial activity, due to a perceived lack of credit facilities, lack of access to markets, inadequate and inefficient government support systems;
- Lack of incentives to invest in farming production technology as a result of unfavourable input and output prices and poor infrastructure; and
- Inordinate risks and uncertainties that smallholder farmers face due to unpredictable climate, hostile corporate institutions and unreliable markets.

Improving the level of skills and knowledge of smallholder farming entrepreneurship is critical towards increasing agricultural production (Ashby *et*

al., 2009). Skills improvement should be coupled with improvements in rural infrastructure including access to credit and markets (World Bank Report, 2013).

Dynamic and efficient smallholder farming sector encourages agricultural growth (Nwibo and Okorie, 2013). Smallholder farming entrepreneurship is posited as the thrust of competitiveness and economic growth (World Bank Report, 2013).

Technology based entrepreneurship is reliant on high levels of human and social capital (GEM Report, 2012). Farmers and individuals possessing high human and social capital are more likely to discover, identify and exploit agro-processing opportunities.

2.4.1 Human capital

Human capital theory postulates that knowledge enhances individuals with increases in their cognitive ability resulting in the likelihood of more productive entrepreneurial activity (Davidsson and Honig, 2003; Venter *et al.,* 2008). It assumes that individuals are bound to maximise economic benefits that accrue from their human capital. Individuals with broader pools of human capital may be associated with increased levels of productivity (Mosey, Noke and Binks, 2012). Taylor and Thorpe (2004) broadened the concept of human capital to include individuals' cognitive characteristics as well as accumulated work that has potential to impact on productivity. Knowledge and skills emanate from human capital investment, including education and work experience, which provides individuals with increases in cognitive abilities (Becker, 1964).

Human capital is defined as a set of skills and knowledge that an individual acquires through investment in schooling, on the job training, and other types of experience (Unger *et al*, 2011). Human capital is not only a result of formal education but also experience and knowledge.

Schema theory further explains how entrepreneurs identify opportunities. Schemas are defined as knowledge or cognitive ability structures representing

content and organisation of knowledge that develop as a result of cumulative experience, learning and meanings that an individual encounters within a specific domain (Gaglio and Katz, 2001; Ucbasaran, Westhead and Wright, 2009). Schemas determine how individuals respond to new set of information as a result of disequilibrium in the market, including alertness and ability to search for such information (Shane, 2000; Shockley and Frank, 2011). Schemas are prone to over-confidence and familiarity bias that has the potential to hinder creativity and innovation.

Similarly, considering prototype theory, Baron (2004) depicts the role of a prototype in explaining opportunity recognition. Experience provides the basis for individuals to acquire prototypes that inform opportunity recognition. A prototype may include features such as originality, market appeal, ease of accessing resources (Ucbasaran, Westhead and Wright, 2009).

Expert information processing theory further posits that experts process information differently to novices. Experts possess a more developed schema shaped by individual experience, which leads to more critical and sophisticated judgements (Ucbasaran, Westhead and Wright, 2009).

A distinction was made between specific human capital compared with general human capital. Specific human capital is defined as education, training or work experience within an area directly related to a field of interest (Dimov and Shepherd, 2005). Human capital is most important for success if it consists of current task-related knowledge and skills (Sherperd and DeTienne, 2005). Human capital increases an owner's capabilities of discovering and exploiting business opportunities (Unger et al, 2011; p.341). Specific human capital was found to be significantly related to higher productivity. Human capital factors such as education and work experience influence ability of entrepreneurs to identify and exploit new opportunities (Shepherd and De Tienne, 2005). Entrepreneurial intentions were shown to be significantly constrained by lack of knowledge, inspiration and resources (Mosey, Noke and Binks, 2012)

Education is a critical source of skills, problem solving abilities and knowledge (Ucbasaran, Westhead and Wright, 2009). Education provides the basis for analytical problem solving and competencies required to cope with the rigorous demands and requirements of entrepreneurship (Barreira *et al.*, 2011). Education was found to have a positive influence on the ability of entrepreneurs to identify new opportunities that are innovative (Davidsson and Honig, 2003; Shepherd and De Tienne, 2005). Education has the potential to assist individuals to escape poverty, subject to education system being accessible to appropriate smallholder farmers at the right time and with appropriate content. Traditionally women have been associated with lower level levels of education including human capital (World Bank Report, 2013). Levels of education provide an indication of the capacity and ability of smallholder farmers to process and interpret information, resulting in a better understanding and reduced transaction cost (Randela *et al.*, 2008).

A poor education system was identified as the primary inhibitor of high technology entrepreneurial activity (GEM Report, 2012). According to the Global Competitiveness Report (2011), South Africa's dysfunctional school system produces entrepreneurs that are ill-prepared for rigours of high technology entrepreneurial activities.

Human capital is not only a result of formal education but also experience and knowledge. There is a positive relationship between human capital and success. Knowledge can be described as either tacit or explicit (Venter *et al.*, 2008). Tacit-knowledge refers to know-how, which is taken as the non-codified components of activity while explicit knowledge refers to know-what describing information conveyed in procedures, processes, formal written documents and educational institutions (Davidsson and Honig, 2003). Solving complex agricultural problems and deciding on whether to participate or not participate in agro-processing activities requires both sets of tacit and explicit knowledge.

Explicit knowledge may be increased through accumulation of formal education such as attending and graduating at colleges or universities and also through work experience and non-formal education (Davidsson and Honig, 2003).

Entrepreneurs involved in multiple businesses may accumulate experience with potential to be leveraged to identify other business opportunities (Ucbasaran, Westhead and Wright, 2009). Prior skills and knowledge are likely to increase an individual's entrepreneurial alertness resulting in discovery of entrepreneurial opportunities that might otherwise not be visible to others (Baron, 2006; Shane, 2000; Shane and Venkataraman, 2000).

Shane (2000) recognises and identifies the critical imperative of explicit learning towards the establishment of business. Information and skills required for the exploitation of entrepreneurial opportunities can be learned through observation of others. Linkage of smallholder farming entrepreneurs with established commercial farmers is critical for learning and sharing information.

Three dimensions of prior knowledge are critical to the process of entrepreneurial opportunity discovery:

[1] Prior knowledge of markets;
[2] Prior knowledge of ways to serve markets; and
[3] Prior knowledge of customer problems.

Knowledge is not only about formal education. Human capital encompasses both innate and acquired skills through formal and non-formal education (Maman, 2000). Human capital is not only a consequence of formal education but also prior work experience including on-the-job, hands-on practical learning as well as non-formal education such as training courses that may not be part of the formal education process (Venter *et al.*, 2008). Entrepreneurial intentions including opportunity recognition was shown to be significantly constrained by lack of knowledge, inspiration and resources (Mosey, Noke and Binks, 2012).

Social set-up and systems within which an individual operates has the potential to influence over- or under-investment in education. Furthermore, the magnitude of investment in human capital may influence attitude towards entrepreneurial activity resulting in individuals that are highly certificated discouraged to take risks while under investment in human capital may encourage risk taking (Davidsson and Honig, 2003).

Opportunity recognition is likely to be heightened when several factors combine and come into effect. These factors may include prior knowledge, experience and education levels of the entrepreneur but also social networks considering both weak and strong ties (Shane and Venkataraman, 2000; Sherperd and DeTienne, 2005).

Factors that may influence the process of opportunity recognition and development leading to recognition and exploitation of opportunities include entrepreneurial alertness, prior knowledge and experience, social networks, personality traits and type of opportunity (Ardichvilli *et al.*, 2003). The ability by smallholder farming entrepreneurs to discover, recognise and exploit agro-processing opportunities are preceded by entrepreneurial alertness and prior relevant knowledge and experience.

Human and social capital are antecedents and fundamental to opportunity discovery, recognition and exploitation (Ardichvili, Cardazo and Ray, 2003; Davidsson and Honig, 2003; Shepherd and DeTienne, 2005; Venter, Urban and Rwigema, 2008). Human capital (Shane, 2000; Sherperd and De Tienne, 2005) and social capital (Hoang and Antoncic, 2003) were proven to significantly influence the entrepreneurial intent of individuals. Human and social capital are complementary.

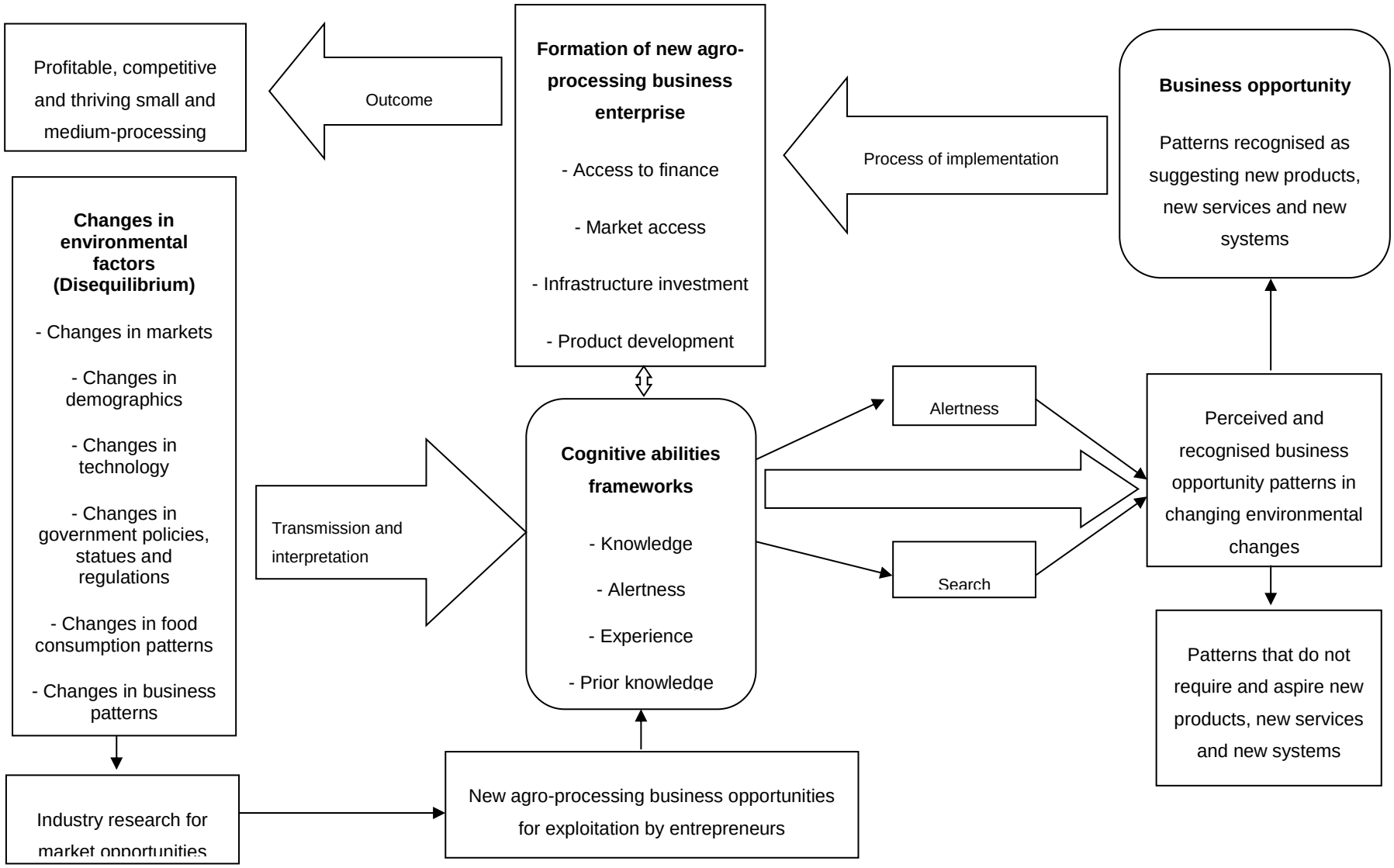


Figure 5: Pattern of opportunity recognition

Source: Adapted from Baron, 2006: p112)

Factors that are critical to opportunity recognition, such as alertness to opportunities, prior knowledge and external conditions are integrated in Figure 5. Extensive prior knowledge has the potential to result in the rigidity of routine, which leads to discarding of information indicating entrepreneurial opportunity (Baron, 2006).

Pattern recognition is the process through which an individual perceives complex and seemingly unrelated events as constituting identifiable patterns from which opportunity emerges (Baron, 2006).

Opportunities emerge from complex patterns of changing conditions such as technology, economic, political, social and demographic conditions. Technological transformation, political shifts, regulatory changes, social and demographic changes disrupt the competitive balance in the market resulting in the formation of opportunities for exploitation by entrepreneurs (Kuckertz and Wagner, 2010; Shane 2000).

Opportunity recognition begins with alertness (Kirzner, 1973) of individual farmers to the possibility of change in environmental factors but also implementing innovative ideas and solutions in which future potential financial and economic benefit or reward is clear and externally recognised (Therin, 2007). Changes in external factors such as rapid urbanisation, growth of the middle class and an increasing population provide entrepreneurial opportunities for smallholder farming entrepreneurs utilising agro-processing (Kuckertz and Wagner, 2010).

Individuals with higher human capital are likely to recognise and exploit the existence of opportunities, compared with individuals with lower human capital (Sherperd and DeTienne, 2005; Unger *et al.*, 2011). Opportunity recognition and its attachment to human capital represent a fundamental component of the entrepreneurial process. Recognising and exploiting an opportunity is a critical component of entrepreneurial behaviour (Shane and Venkataraman, 2000).

Opportunity recognition has three distinct processes (Ardichvili, Cardazo and Ray, 2003; Davidsson and Honig, 2003):

[1] Perceiving market needs between markets and unemployed resources;
[2] Recognising or discovering a fit between particular market needs and unemployed resources;
[3] Creating a new fit between separate needs and resources in the business concept.

Human capital has capacity to increase significantly the individual's information capacity, skills and entrepreneurial judgement that are critical in pursuit of entrepreneurial opportunities (Shane, 2000; Sherperd and De Tienne, 2005). It can amplify an individual's entrepreneurial alertness (Westhead, Ucbasaran, Wright, and Binks, 2005).

Clearer understanding of opportunity discovery and recognition may ensure new knowledge is translated into tangible business innovation and implementable solutions that can contribute to social and economic development (Ucbasaran, Westhead and Wright, 2009). Human capital is likely to be positively related to participation by smallholder farming entrepreneurs in the agro-processing initiatives.

2.4.2 Social capital

The fundamental thrust of social capital theory is that network ties provide access to resources and information that can be leveraged to identify, discover and exploit entrepreneurial opportunities (De Carolis and Saparito, 2006; Liao and Welsch, 2003; Sherperd and DeTienne, 2005). Social capital may be defined as all potential resources located within and accessed through a derived network of relationships available to individuals or social units (Randela, Alemu and Groenewald, 2008; Venter *et al*, 2008).

Social capital refers to opportunities enabled by a social structure including relationships and networks ties. Social capital refers to resources that can be converted and accessed from social relationships and networks ties (Coleman

1994; Burt, 1995; Johnson, Suarez, Lundy, 2003; Randela *et al.*, 2008; Yiu and Lau, 2008).

Networking refers to knowing the right individuals, making connections to achieve an endeavour and working together with people from within the system to reach a common goal and objective (Liao and Welsch, 2003; Venter *et al.*, 2008).

Networking may be categorised in terms of structuralist and connectionist streams where the structuralist stream focuses on the formation of network ties and patterns of interconnection while connectionist stream refers to network ties as a channel through which flow of information and resources may be accessed by members of the network (Yiu and Lau, 2008). For the purpose of this study the connectionist stream of social capital was considered. The connectionist stream is likely to enhance participation of smallholder farming entrepreneurs in agro-processing activities.

Social capital and human capital are complementary and reciprocal but also linked to outcomes such as entrepreneurism (Davidsson and Honig, 2003; Maman, 2000).

Three dimensions of an individual's social capital are posited as structural, relational and cognitive (Liao and Welsch, 2003):

[1] *Structural*: relates to the structure of the overall network of relations. It refers to the presence or absence of actors including the pattern and variety of connection of actors;
[2] *Relational*: refers to the quality and magnitude of actors' personal relations. It focuses on the type of relationship actors have with respect to trust, respect, and friendliness; and
[3] *Cognitive*: relates to the degree to which an individual shares a common system and way of doing things within the set-up.

Social capital may be demarcated into weak and strong ties (Davidsson and Honig, 2003; Venter *et al*., 2008). Weak ties refer to loose relationships

between individuals while strong ties are those located mainly among the nuclear family. Weak ties may reveal specific skills needed to realise entrepreneurial intentions while strong ties may be used to reinforce entrepreneurial intentions (Mosey, Noke and Binks, 2012). Both weak and strong ties are likely to enhance participation of smallholder farming entrepreneurs in agro-processing activities. Participation is also likely to be positively related to social capital.

Maintaining an extended network of weak ties is potentially critical for obtaining information and other resources (Venter *et al.,* 2008). Adler and Kwon (2002) distinguish between bridging and bonding social capital. Weak ties, also referred to as bridging social capital, are those with loose relationships between individuals while strong/close ties or bonding social capital are those usually located within the nuclear family (Davidsson and Honig, 2003).

Bridging social capital focuses on relations across rather than within groups. It generates opportunities for entrepreneurs by bridging contacts between different groups and networks. Weak ties may be useful for accessing information that might otherwise be costly to locate. Both weak and strong ties have the potential to build social capital leading to a positive contribution to entrepreneurial intentions (Adler and Kwon, 2002). Farmers might rely on farmer organisations or study groups to access relevant information. Strong ties are those involving family, which account for secure and extended access to resources. A farmer might rely on a family member to access funding. Both of these networks will be considered in this study.

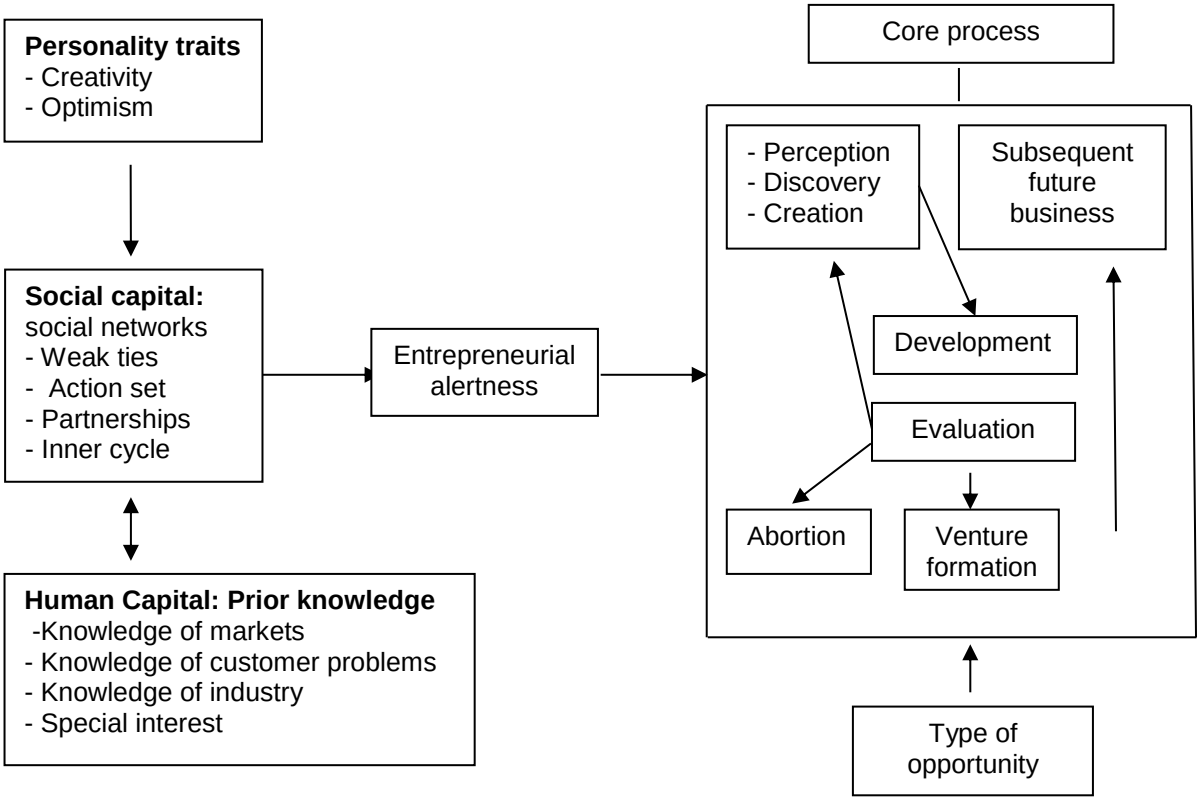


Figure 6: Model of opportunity identification and development theory

(Ardichvili et al., 2003:118)

The model in Figure 6 posits that entrepreneurial alertness is critical and central to the opportunity identification process. Entrepreneurial alertness is affected and influenced by personality traits, social networks and prior knowledge by the entrepreneur (Shane, 2000; Sherperd and DeTienne, 2005; Shockley and Frank, 2011). The entrepreneurial opportunity developed and evaluated is important in determining core process. Opportunity recognition is a multi-phase process wherein both the individual and the external process influences the core process.

While prior knowledge of industry is a critical component of the opportunity recognition process (Ardichvilli *et al.,* 2003; Shane, 2000), past experience may enhance rigidity to routine resulting in new opportunities being discarded because of extensive previous experience (Shepherd and Detienne, 2005). Past experience may therefore negatively affect opportunity recognition.

Farmers may be blinded by indigenous methods of production at the expense of newer technology based methods with the potential to create new markets, new customers and higher profits.

The notion of social capital encompasses human actions shaped by societal factors (Coleman, 1998; Putnam, 1993). Social capital is linked to outcomes such as entrepreneurism and successful development built around the existence of trust and a network that facilitates co-operative behaviour (Maman, 2000).

Social capital may be appropriable, convertible and substitutable (Liao and Welsch, 2003). It is appropriate because the actors' network may be used to access and obtain information required to advance a business initiative. Social capital may be used and converted to access other kinds of capital such as financial capital. Social capital may complement or be a substitute for other capital.

Individuals with high social capital are likely to be provided with enhanced access to information including trust from others. Entrepreneurs that possess high social capital based on networks, personal ties, and referrals are more likely to receive information and funding than entrepreneurs who are lower on social capital (Cable and Shane, 1999).

Where markets fail and transaction costs are high, social capital has the potential to provide a significant contribution to smallholder farmers' performance by providing access to information and reducing the costs of coordination and contracting (Johnson *et al.*, 2003; Randela *et al.*, 2008). Access to adequate, reliable and timely information is likely to significantly reduce transaction costs (Makhura, 2001; Jagwe and Machethe, 2011; Freguin-Gresh *et al*., 2012).

The effect of social capital on entrepreneurial performance can be highlighted in four aspects:

[1] Social network ties provide entrepreneurs with access to a variety of scarce resources (Maman, 2000);
[2] Social network ties provide entrepreneurs with access to intangible resources including credibility and competence (Bosma, Van Praag, Thurik, and De Wit, 2004);
[3] Given that entrepreneurs have a limited capacity to assemble and absorb information required in the decision-making process, network ties are critical to access such information. Information related to distributors, suppliers, competitors, and customer organisations is necessary during start-up (Johnson et al, 2003).
[4] Social networks have reputational and signalling effects: Positive perception and awareness of business networks that reduce monitoring and enforcement costs in contracting and transacting with trusted individuals and organisations (Johnson *et al*., 2003). Social networks have a potential for subsequent business exchanges that might be profitable.

In a study of smallholder farming entrepreneurs in Ghana, Barr (2000) found that social capital has the potential to contribute to technical information flows and reduction of transaction costs among enterprises.

Social capital has the capacity and ability to generate collective action among smallholder farming entrepreneurs. Collective action may contribute to the reduction of transaction costs of smallholder farmers in a variety of ways including collective provision of production inputs, collective production and processing, collective sourcing of finance, collective provision and sharing of infrastructure (Johnson *et al*., 2003; Randela *et al.*, 2008). Group action by smallholder farming entrepreneurs is likely to strengthen bargaining power, facilitate sourcing of institutional solutions to problems of coordination and public service provision but also compensate for missing markets resulting in reduced transaction cost (Ortmann and King, 2010).

By engaging in connections and network ties with like-minded individuals with whom an individual shares values and vision is likely to yield benefits compared with acting alone (Liao and Welsch, 2003). Development of smallholder farmers requires learning driven by creativity while individual commitment enhances business growth, economic development and financial sustainability (Kuratko, 2009).

2.4.3 Hypotheses

Based on the above discussions, the following hypotheses are derived and formed for testing:

H1: Participation by smallholder farming entrepreneurs in agro-processing activities is positively related to human capital. Smallholder farming entrepreneurs with greater human capital are likely to participate more in agro-processing activities than those with less human capital.

H2: Participation by smallholder farming entrepreneurs in agro-processing activities is positively related to social capital. Smallholder farming entrepreneurs with greater social capital are likely to participate more in agro-processing activities than those with less social capital.

2.5 The effect of transaction costs on access to market by smallholder farming entrepreneurs

Transaction costs are defined as costs of entering into exchange or agreement contracts, sourcing trading partners, screening potential partners, sourcing and verifying information, negotiating, product transfer, monitoring and enforcing transaction (Randela *et al.*, 2008). They are regarded as barriers to efficient and effective participation by smallholder farming entrepreneurs in various marketing channels resulting in a preference for a channel whose cost is minimal (Shiimi *et al*, 2012). They represent a critical factor of barriers to market participation by smallholder farmers (Arlene *et al*, 2007; Makhura, 2001; Ortmann and King, 2010).

Transaction cost theory postulates that firms, in the case of this study intermediaries, come into existence when markets are inefficient (Fiet, 2000). The existence of friction in a trade environment provides for the possibility of the intermediary role. Further, in an inefficient market place, the intermediary mediates between the potential seller of a product and the buyer; however, in situations wherein there are direct sales, the trade surplus is shared between the potential buyer of a product and the seller, to the exclusion of intermediary (Jagwe and Machethe, 2011).

Transactions are mainly accompanied by costs, these costs have the potential to generate a wedge among potential direct buyers and sellers of the product. The critical and important source of transaction costs affecting the smallholder farming entrepreneur is costs accompanied with sourcing information (Makhura, 2001). Farmers generally view intermediaries as exploiters that never offer them fair market prices. Transaction costs have a direct bearing on the marketing channel selected by smallholder farming entrepreneurs. Transaction costs are likely to be high because of poor logistics, poor infrastructure, ineffective bureaucratic freight procedures and non-tariff barriers encountered by smallholder farming entrepreneurs (World Bank Report, 2013).

Infrastructural obstacles such as the poor state of the roads, inadequate road networks, lack of storage facilities, lack of cold rooms to maintain the cold chain process, lack of grading and packaging equipment hinder market efficiency. This results in high transaction costs faced by smallholder farmers (Makhura, 2001; Mhazo *et al.*, 2012; Randela *et al.*, 2008; Shiimi *et al.*, 2012; Uchezuba *et al.*, 2009).

Infrastructure obstacles further reduces comparative and competitive advantage of smallholder farming entrepreneurs. Comparative advantage refers to the ability to produce and render a product more effectively and efficiently than the competition. Determinants of comparative advantage include hard infrastructure like roads and telecommunications, spatial location and the resource base. Competitive advantage refers to the possession of a unique set of productive

assets over competition such as human and social capital, advanced production machinery and equipment.

When smallholder farmers are faced with high transaction costs, they opt not to participate in formal market contracts and resort to spot-markets, which are not as rewarding (Makhura, 2001).



Figure 7: Typology of market contracts

(Freguin-Gresh et al., 2012: p27)

Contract farming may be demarcated into three categories according to objectives such as transfer of decision making and risk sharing (Freguin-Gresh *et al*., 2012).

[1] *Market specification contracts:* refer to pre-harvest contractual agreements that engage the buyer to provide a market outlet to a farmer under pre-agreed conditions mostly entailing price, volume, quality and time of expected delivery. Both farmer and buyer benefit from a price premium on quality and stability in the flow of supply of products specified at the market.

[2] *Management providing contracts:* are synonymous with marketing contracts. In this instance, the farmer delegates some of the production functions to the buyer, from farming practices to post harvest management practices. This method is closely linked to the leasing of smallholding.

[3] *Resource providing contracts:* are closest in arrangement to full vertical integration and require the buyer to provide a market outlet to the farmer but deliver input packages on credit with corresponding technical assistance where necessary.

Unblocking access to markets by smallholder farming entrepreneurs alone is not the panacea to challenges of sustainable and profitable smallholder farming enterprises. Comprehensive agricultural support programmes that include among others improving and enhancing human and social capital as well as reducing transaction costs that smallholder farmers encounter, are critical to success (Louw *et al.*, 2008; World Bank, 2007).

Using Porters five basic competitive forces illustrated in Figure 8, the Industrial Development Corporation (IDC, 2010) conducted a study that identified factors limiting and constraining development of agro-processing in the milling industry in South Africa. The basic competitive forces were listed as firm strategy, structure and rivalry, factor conditions, demand conditions and the role of government.

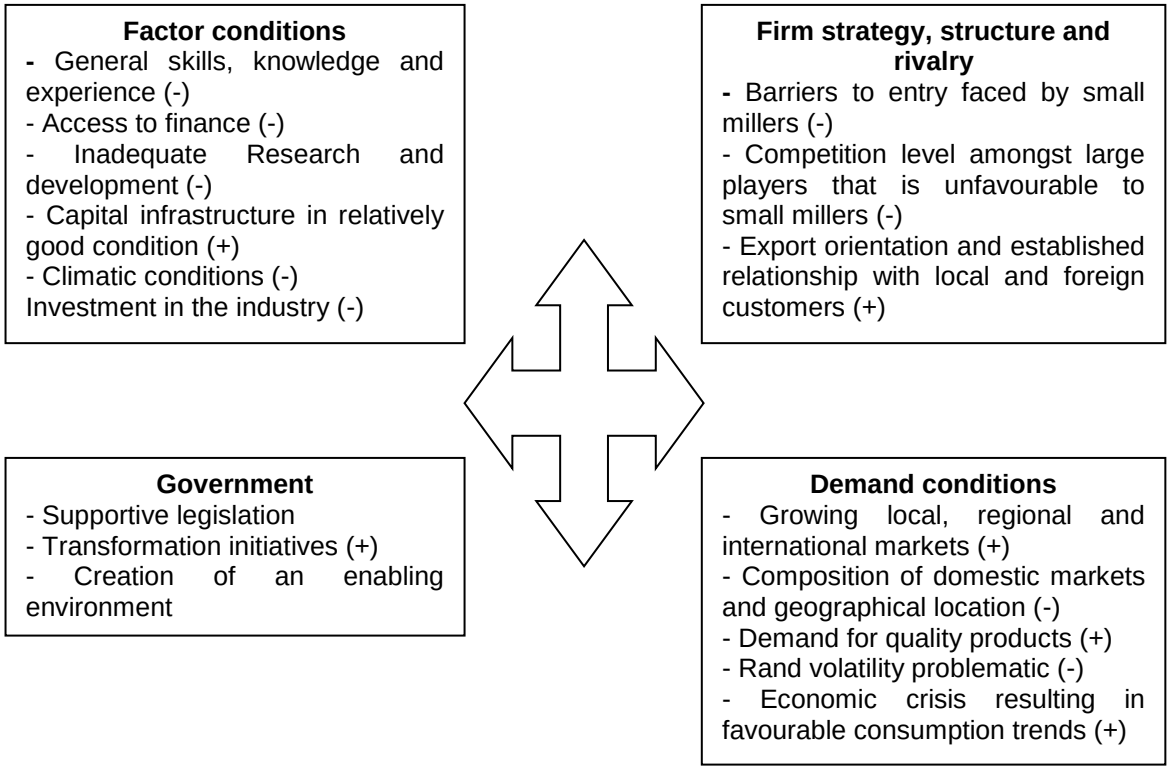


Figure 8: Porters five forces for milling industry

Source: IDC, 2010 (cited Louw et al., 2013: p106)

Access to technology, in terms of machinery and equipment to engage in agro-processing activities remains a major impediment to participation in agro-processing activities by smallholder farming entrepreneurs (Louw *et al.*, 2008; Mathers, 2005; Randela *et al.*, 2008). Participation in agro-processing activities requires investment in expensive machinery and equipment including vehicles for transport. It is possible at small-medium scale to source and receive automated and motorised processing equipment. Such equipment is capable of processing stock-feeds, groundnuts, sunflower, cotton, soybean, edible oil, fruits including vegetables into jams, spreads, pulps, juices, pastes, sauces, pickles and confectionary products (Mathers, 2005; Mhazo *et al.*, 2011). However, due to lack of access to finance (Louw *et al.,* 2008; Ortmann and King, 2010; Randela *et al.,* 2008; Shiimi *et al.,* 2012; Uchezuba *et al.,* 2009) smallholder farmers are unlikely to procure and obtain such advanced machinery and equipment. Furthermore, development of smallholder agro-processing machinery and equipment has not received the adequate support it deserves. Budget for research and development is not adequately propelled

because a shortage of qualified research personnel to carry-out the required tasks exists (Louw, Troskie and Geyser, 2013).

The benefits of access to appropriate and adequate technology, access to relevant information and market participation are massively constrained (Ortmann and King, 2010; World Bank Report, 2013). Vertical integration of smallholder farming enterprises utilising agro-processing may be an adequate response to high transaction costs because it allows farmers to capture a larger share of final consumer expenditure.

2.5.1 Lack of access to markets by smallholder farmers

The South African agricultural sector was deregulated with the enactment of the Marketing of the Agricultural Products Act (Act No. 47 of 1996). The passing of this legislation provided for a limited government intervention in the marketing of agricultural products. The use of control boards to intervene in the marketing of agricultural products was ceased in 1996 (Jari and Fraser, 2009; DAFF, 2013). The deregulation process entailed the removal of retail price controls, import and export control, and the removal of fixed price single channel marketing. The results of the deregulation process meant South African producers were suddenly exposed to global markets (Louw, Troskie and Geyser, 2013).

Markets are critical for sustainability and profitability of smallholder farmers because they act as a medium of exchange. Market participation by smallholder farming entrepreneurs is critical because they derive a livelihood, income and opportunities for exploitation (Makhura, 2001). Marketing activities such as cleaning, grading, storage, transportation and selling has the potential to increase profitability and sustainability of smallholder farmers (Jari and Fraser, 2009). At regional, provincial and national level, market participation by smallholder farming entrepreneurs is critical for sustainable agriculture and economic growth (World Bank Report, 2013).

Smallholder farming entrepreneurs have to decide where to sell their produce to maximise profit. When making a decision on where to sell, the smallholder farming entrepreneur is influenced by factors such as transport cost to the

market, volume and quality of products to be sold, anticipated price, certainty of clinching a deal, payments terms, storage capacity in case products are not sold and type of products (Jagwe and Machethe, 2011; Louw *et al.,* 2013; Makhura, 2001; Ortmann and King, 2010). All of which have a direct bearing on transaction costs smallholder farming entrepreneurs face.

Basic components of agricultural markets are:

- Supply side factors;
- Transaction costs; and
- Demand side factors.

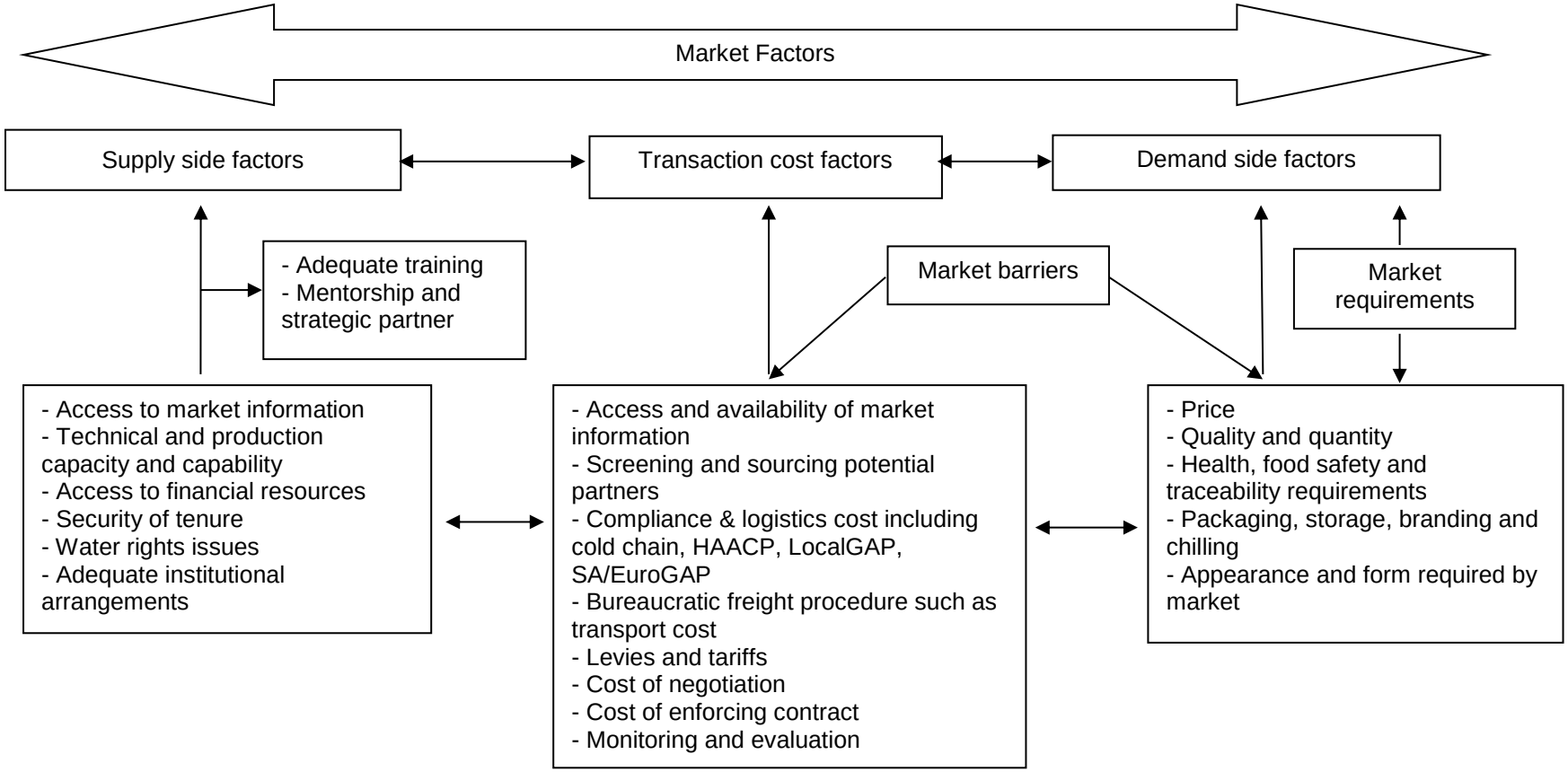


Figure 9: Conceptual model of market access and transaction cost

(Louw, 2012)

Retailers, wholesalers and agro-processors procure agricultural products from a limited number of large preferred commercial and established farmers/suppliers as a result of changed procurement practices and policies geared towards reduced transaction costs and increased supply chain efficiency (Louw *et al.*, 2008; Mathers, 2005).

The growing power of retailers and supermarkets means the food value chain may be described as buyer-driven, entailing the relationship between agents in the value chain through contractual agreements and seldom on an open market transaction (Louw *et al.,* 2008; Mather, 2005).

Smallholder farming entrepreneurs are faced with challenges and difficulties in accessing long-term commercial market contracts (FAO, 1997; Mathers, 2005; World Bank, 2007). Smallholder farmers are not able to participate in long-term commercial market contracts because of a wide variety of reasons including poor infrastructure, lack of market transport, low volumes of products, lack of market information, inadequate experience on grades and standards, insufficient and inadequate contractual agreements (Freguin-Gresh *et al.*, 2012; Jagwe and Machethe, 2011; Jari and Fraser, 2009; Louw *et al.*, 2008; Randela *et al.*, 2008; Shiimi *et al.*, 2012; World Bank Report, 2013). While urban-based consumers are likely to benefit from modernised and improved structures, smallholder farming entrepreneurs and food processors are unable to access long-term commercial market contracts. Accessing a supply contract is preceded by the audit of processing facilities to determine the capacity of a small processor to supply large volumes of processed food of high quality. Further challenges regarding access to retail markets include delayed payments (Mathers, 2005).

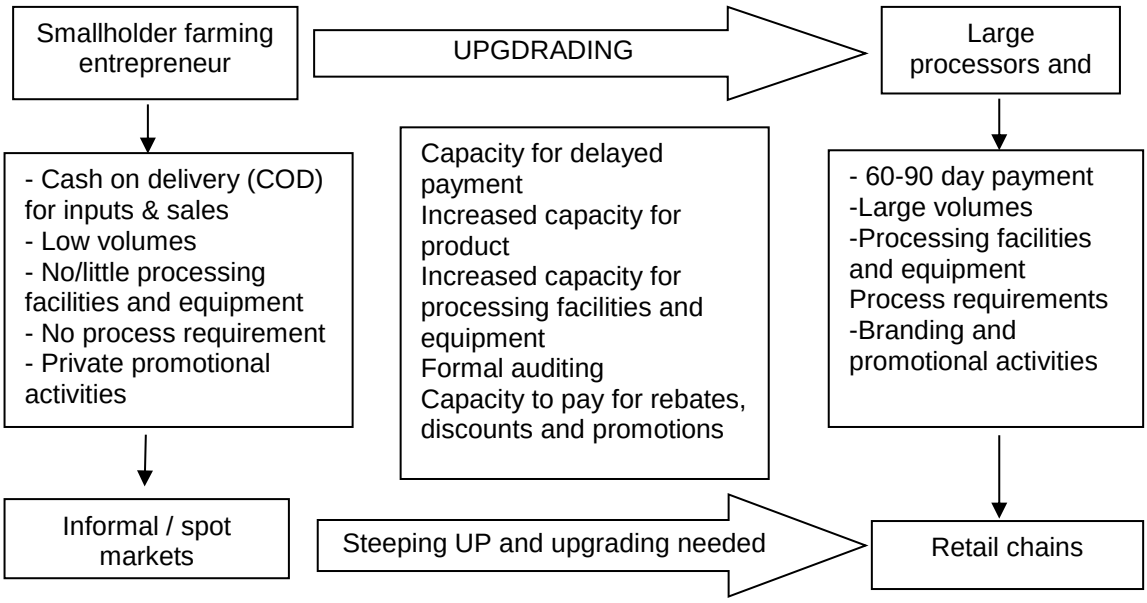


Figure 10: Upgrading required by smallholder farming entrepreneur to access retail markets

(Mather, 2005: p13)

Long-term market contracts with wholesalers and retailers are accompanied by strict requirements relating to volumes, quality, and food safety systems, meaning smallholder farming entrepreneurs entering the agricultural sector after many years of systematic exclusion are marginalised in favour of larger established farmers (Freguin-Gresh, d'Haese and Anseeuw, 2012; Mathers, 2005).

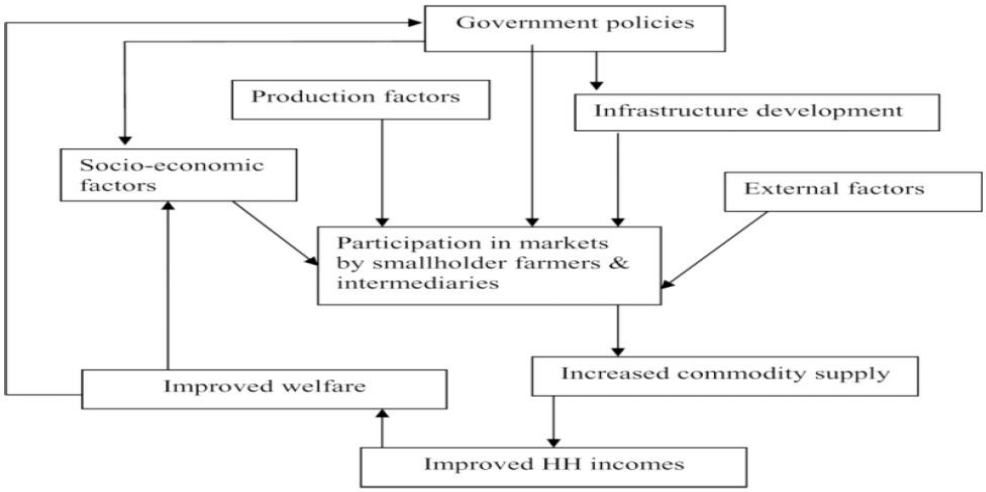


Figure 11: Factors affecting market participation by smallholder farmers

(Jagwe & Machethe, 2011: p112)

Contract farming has the potential to overcome some of the challenges impeding smallholder farming entrepreneurs from accessing the markets. Contract farming is a form of vertical coordination between farmers and buyers that directly shape production decisions through contractually specifying market obligations such as volume, quality, value and price, providing specific inputs and exercising some control at production level (Asokan and Singh, 2003). Contract farming is a potential vehicle to transfer technology and commercialise the smallholder farming sector. It is often critiqued as a tool to exploit smallholder farmers given the imbalance in power relations between farmers and buyers (Freguin-Gresh *et al*., 2012).

Successful contract farming arrangements should potentially be premised on long-term agreements. The advantage of contract farming is that smallholder farmers are protected against market volatility and guaranteed a stable price, which makes planning easier and the future price predictable (Jagwe and Machethe, 2012).

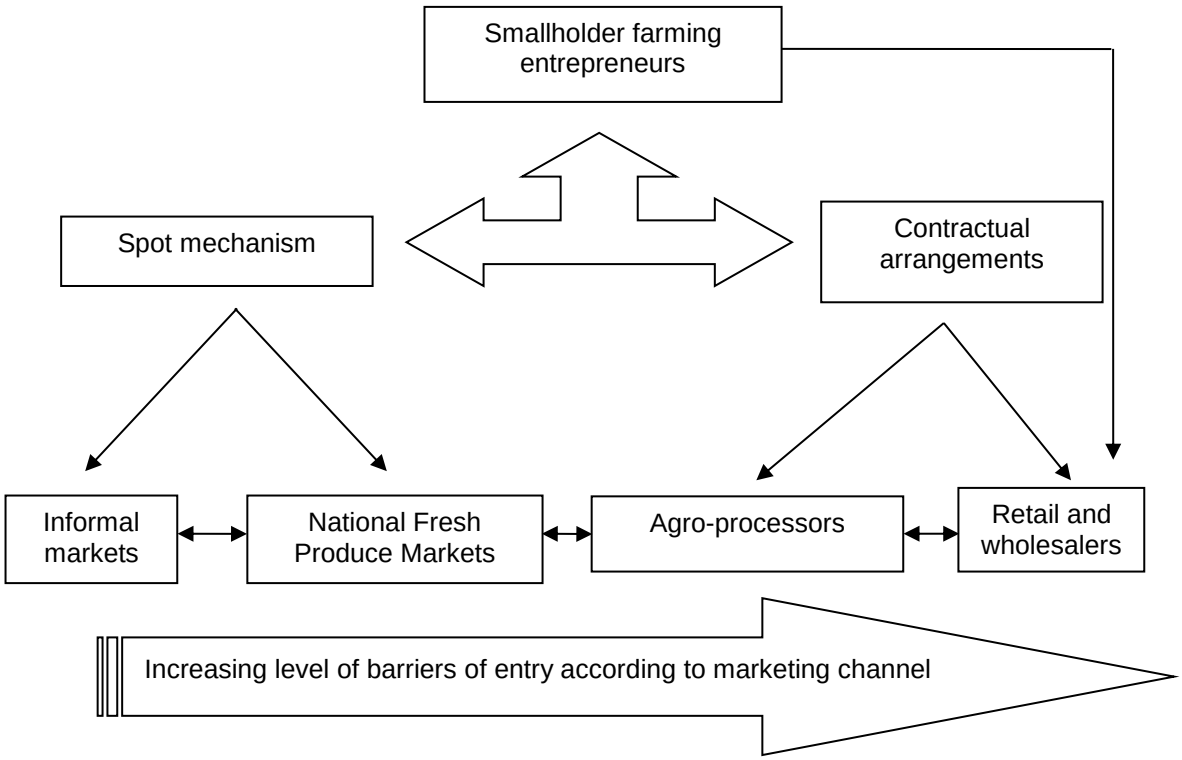


Figure 12: Marketing options for smallholder farming entrepreneurs

(Louw et al, 2008: p296)

Ease of market entry is somewhat of an explanation of reasons that smallholder farming entrepreneurs are confined to market participation in the informal sector. Lack of participation by smallholder farming entrepreneurs in agro-processing initiatives is likely to be positively related to transaction cost.

Agro-processing will provide a channel for market diversification of farming operations. New markets emanating from new products and potential new customers will provide potential for the growth of business including financial and economic growth (Kuratko, Morries, Covin, 2011).

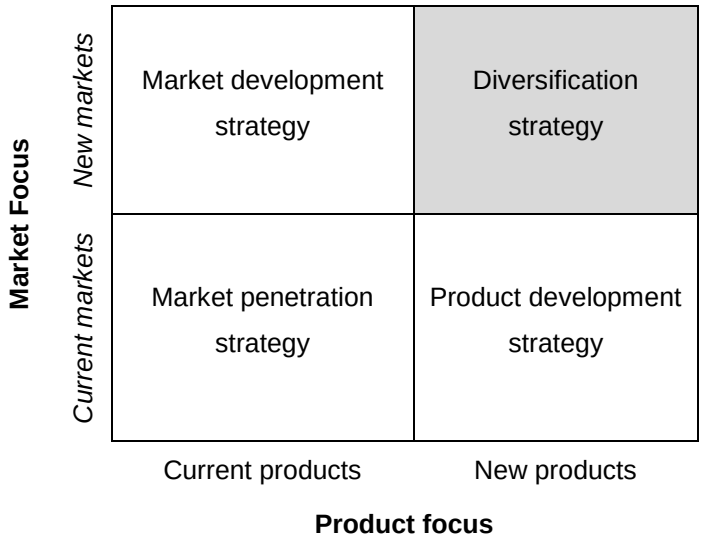


Figure 13: Growth Strategy Matrix

(Kuratko, Morries, Covin, 2011: p87)

Farmers that seek growth in current markets with current products are likely to be pursuing market penetration. Farmers seeking growth in new markets with current product are likely pursuing market development. Farmers pursuing growth in current market with new products are pursuing product development strategy while farmers seeking growth in new markets with new products are pursuing diversification strategy, which is where agro-processing is located. (See Figure 13.)

The intention and objective of this research study was to encourage smallholder farmers to pursue both diversification and product development strategies with agro-processing as the thrust of farming operations.

2.5.2 Hypotheses

H3: Participation by smallholder farming entrepreneurs in agro-processing activities is negatively related to transaction cost. Smallholder farming entrepreneurs with greater transaction costs participate less in agro-processing activities than those with lower transaction costs.

H4: Participation by smallholder farming entrepreneurs in agro-processing activities is positively related to access to markets. Smallholder farming entrepreneurs with greater access to markets participate more in agro-processing activities than those with less markets access.

2.5.3 Transaction cost as a moderator variable

A moderator is defined as a variable that affects the direction and/ or strength of a relation between an independent variable and a dependent variable (Baron and Kenny, 1986; Grant *et al*., 2006). Moderator variables are introduced when there is an unexpected inconsistent relationship between a predictor/ independent variable and a criterion/ dependent variable, meaning a relation holds in some settings but not others. Transaction cost is likely to influence participation of smallholder farming entrepreneurs in agro-processing activities.

Within the correlation analysis framework, a moderator variable is a third variable that affects the zero-order correlation between two other variables. The moderator effect is represented by the interaction between the focal independent variable (human social capital and market access) and the moderator variable (transaction cost) that specifies appropriate conditions for its operation (Frazier, Barron and Tix, 2004). The interaction of the moderator variables with the independent variable is important to determine the relations between the predictor and whether the independent variables and dependent variables are stronger for certain groups when compared to other groups.

The pattern of interaction between the predictor variable and the moderator variable is expected to be described as enhancing interaction in which both the predictor and moderator variables influence the outcome variable in the same direction and together have stronger additive effect (Frazier, Barron and Tix, 2004).

For the purpose of this study, based on the research by Baron and Kenny (1996); Cohen (1992); Frazier *et al.,* (2004) transaction costs are expected to moderate the relationship between:

- Human capital and participation of smallholder farming entrepreneurs in agro-processing initiatives;
- Social capital and participation by smallholder farming entrepreneurs in agro-processing initiatives; and
- Access to markets and participation by smallholder farming entrepreneurs in agro-processing activities.

The influence of the moderator interaction effect (HC*TC), (SC*TC) and (MA*TC) is likely to result in enhanced interaction in which both the predictor (HC) and moderator (TC) affect the outcome/ dependent variable (Participation by smallholder farming entrepreneurs in agro-processing activities) in the same direction and together have a stronger additive effect.

The moderator hypothesis is expected to be supported if the interaction effect (H5) is significant.

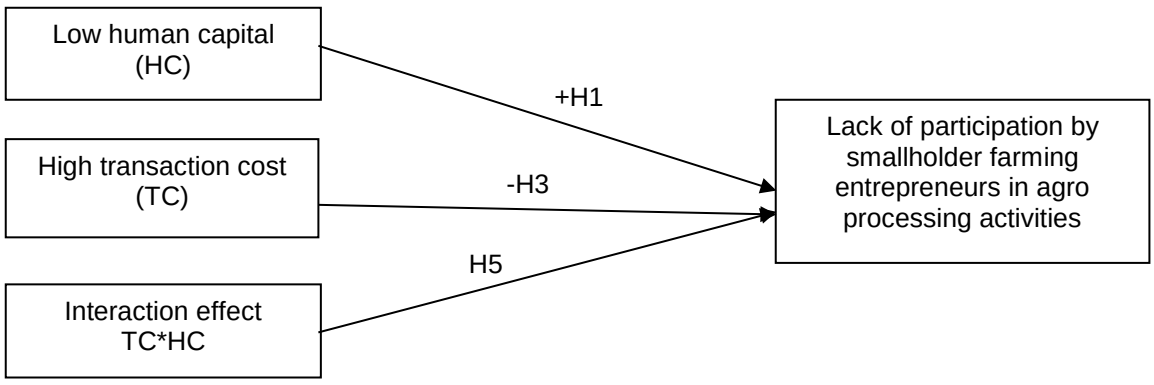


Figure 14: Transaction cost as moderator construct – Human capital

(Thindisa, 2013).

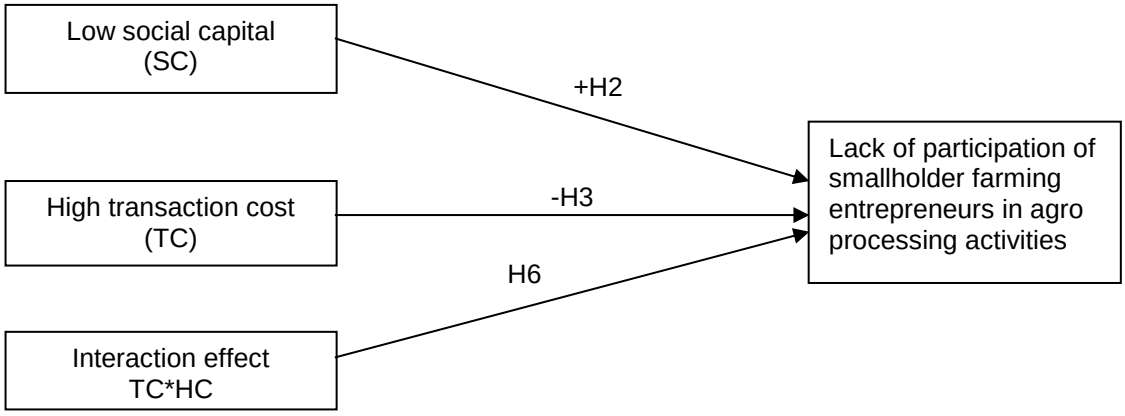


Figure 15: Transaction cost as moderator construct – social capital

(Thindisa, 2013)

The moderator hypothesis is expected to be supported if the interaction effect (H6) is significant.

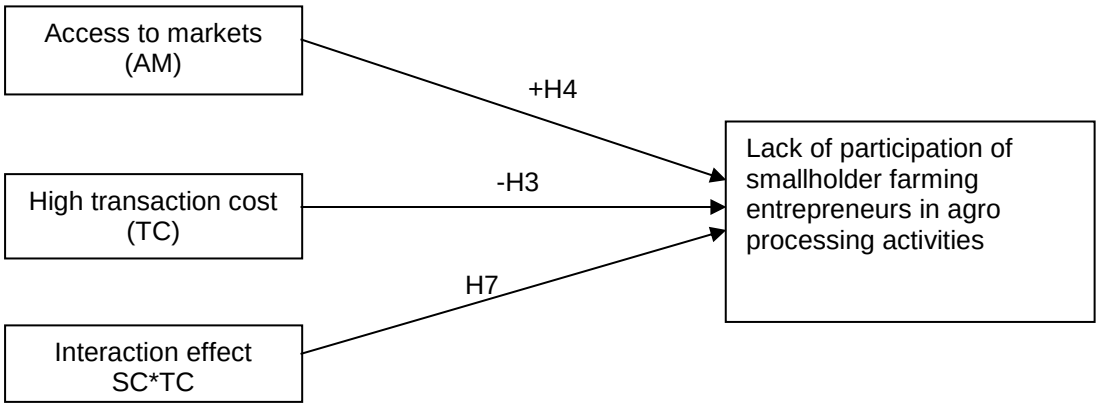


Figure 16: Transaction cost as moderator construct – access to markets

(Thindisa, 2013)

The moderator hypothesis is expected to be supported if the interaction effect (H7) is significant.

Based on discussions, the following moderator hypotheses are derived and formed for testing:

H5 The moderation effects of transaction costs on the relationship between human capital and participation by smallholder farming entrepreneurs in agro-processing activities. When transaction costs are high, it is anticipated that there will not be a relationship. When transaction costs are low the relationship is expected to be positive.

H6 The moderation effects of transaction costs on the relationship between social capital and participation by smallholder farming entrepreneurs in agro-processing activities. When transaction costs are high, it is anticipated that there will not be a relationship. When transaction costs are low the relationship is expected to be positive.

H7 The moderation effects of transaction costs on the relationship between market access and participation by smallholder farming entrepreneurs in agro-processing activities. When transaction costs are high, it is anticipated that there will not be a relationship. When transaction costs are low the relationship is expected to be positive.

Based on discussions, the following research question is derived and formed for testing:

Research question: To what extent can variation in participation in agro-processing activities by smallholder farming entrepreneurs be explained jointly by all independent variables human capital, social capital, market access while these variables are moderated by transaction cost?

2.6 Conclusion of literature review

The value of processed agricultural product exceeds that of basic commodity. The growth of the smallholder agro-processing initiative has a potential increase in profitability and sustainability of smallholder farms but also triggers development in other sectors of the economy through the multiplier effect (Asokan and Singh, 2003; IPAP, 2012).

Agro-processing activities have the potential to contribute to sustainable livelihoods through food availability and improved income resulting in increased profitability, employment, social and cultural well-being from limited land (Louw *et al.*, 2008; Mhazo *et al.*, 2011; Randela *et al.*, 2008).

Lack of appropriate marketing infrastructure such as road infrastructure, communication links, storage infrastructure and transportation facilities result in high transaction costs for smallholder farmers leading to confinement in informal markets, which are not as rewarding as formal marketing contracts (Makhura, 2001).

Breaking the cycle of non-sustainability of smallholder farmer's enterprises requires complementary interventions that focus on, among others, human capital to improve the skills and knowledge level of smallholder farming entrepreneurs while enhancing social capital and collective capacity of these farmers (Ashby *et al*., 2009).

Social capital is likely to assist smallholder farmers to improve capacity and capability to sell collectively thus eliminating challenges of lower volumes while improving access to services such as lack of access to finance, lack of technological innovation, low investment in marketing infrastructure and lack of access to formal markets (Makhura, 2001).

Long-term market contracts have the potential to overcome some of the challenges impeding smallholder farmers from accessing markets, and the low investment in agro-processing infrastructure (Asokan and Singh, 2003).

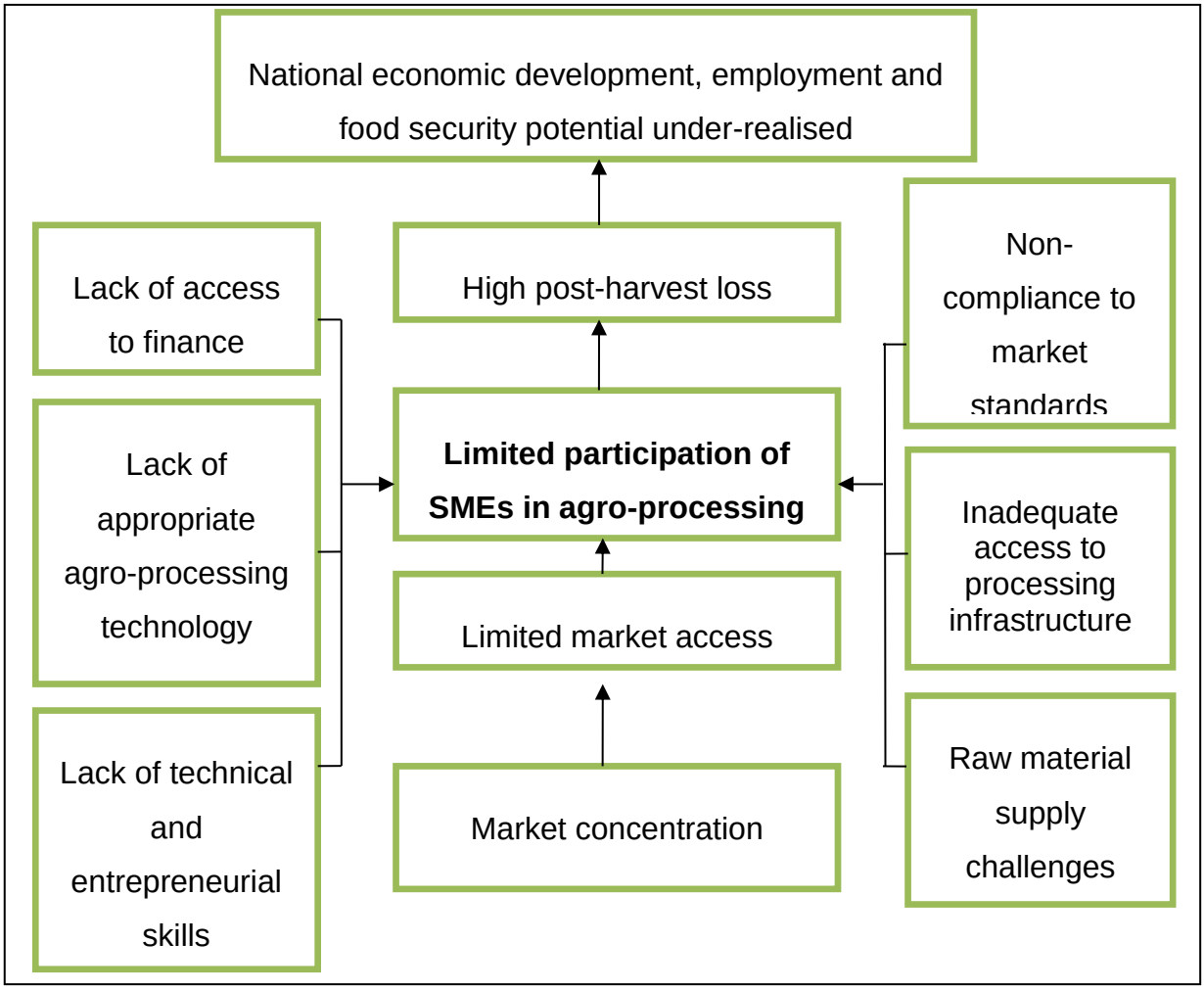


Figure 17: Factors constraining and limiting participation in agro-processing activities by smallholder farmers

Source: DAFF Agro-processing Strategy, 2013

2.6.1 Hypotheses

The following are hypotheses of this study:

H1: Participation by smallholder farming entrepreneurs in agro-processing activities is positively related to human capital.

H2: Participation by smallholder farming entrepreneurs in agro-processing activities is positively related to social capital.

H3: Participation by smallholder farming entrepreneurs in agro-processing activities is negatively related to transaction cost.

H4: Participation by smallholder farming entrepreneurs in agro-processing activities is positively related to access to markets.

H5 The moderation effects of transaction costs on the relationship between human capital and participation by smallholder farming entrepreneurs in agro-processing activities. When transaction costs. When transaction costs are high, it is anticipated that there will not be a relationship. When transaction costs are low the relationship is expected to be positive.

H6 The moderation effects of transaction costs on the relationship between social capital and participation by smallholder farming entrepreneurs in agro-processing activities. When transaction costs are high, it is anticipated that there will not be a relationship. When transaction costs are low, the relationship is expected to be positive.

H7 The moderation effects of transaction costs on the relationship between market access and participation by smallholder farming entrepreneurs in agro-processing activities. When transaction costs are high, it is anticipated that there will not be a relationship. When transaction costs are low the relationship is expected to be positive.

Research question - To what extent can a variation in participation in agro-processing activities by smallholder farming entrepreneurs be explained jointly by all independent variables: human capital, social capital and market access while these variables are moderated by transaction cost.

2.6.2 Conceptual model

Figure 18 details the theoretical conceptual model for this research project.

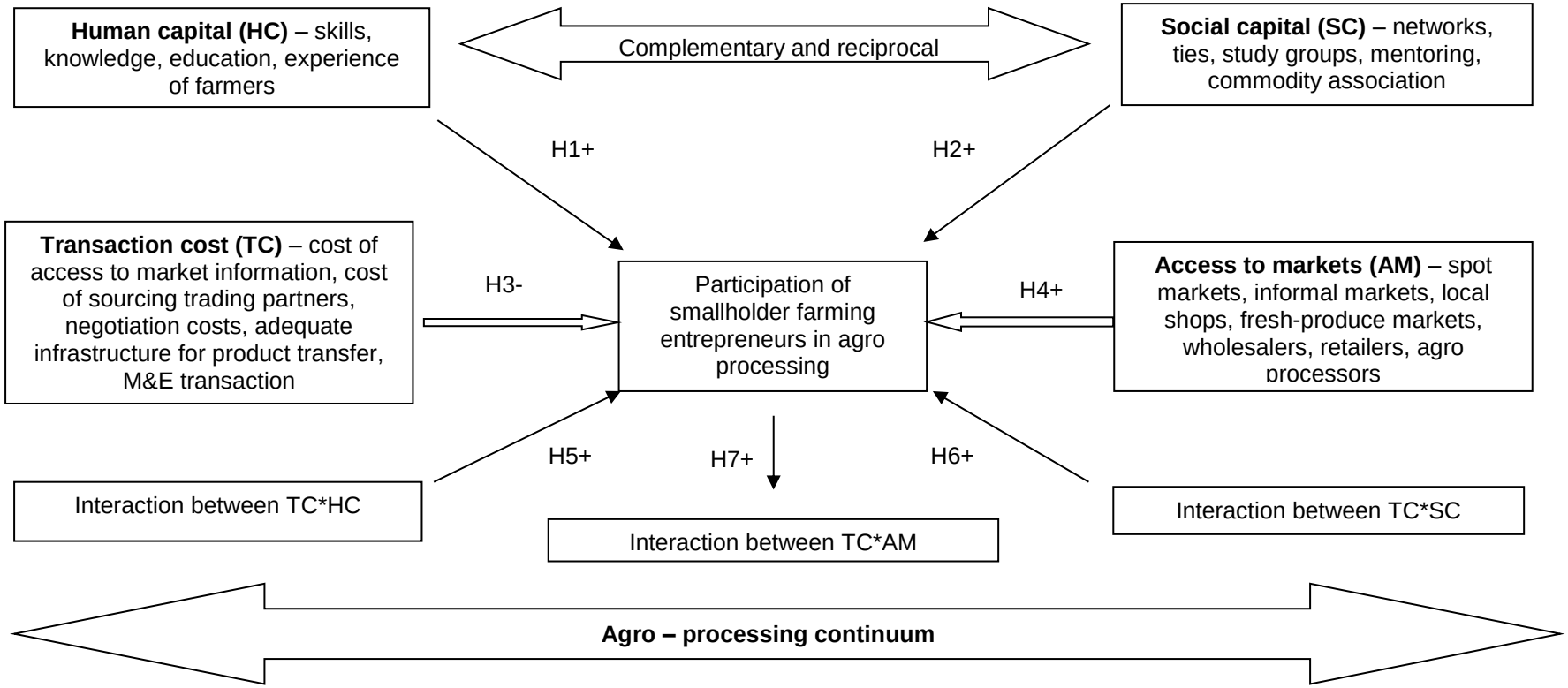


Figure 18: Conceptual theoretical model

(Thindisa, 2013)

CHAPTER 3: RESEARCH METHODOLOGY

3.1 Introduction

This section outlines the research methodology utilised to conduct this study. Research methodology refers to how research will be conducted, the method of gathering data including measurement and analysis of the data geared towards achieving the objectives of the study (Cooper and Schindler, 2008; p.130).

This study was conducted through quantitative research using a structured questionnaire. This method assisted with determining factors that influence the participation of smallholder farming entrepreneurs in the agro-processing activities. The study intended to determine the relationship between the level of participation by smallholder farming entrepreneurs in the agro-processing initiatives (dependent variable) and human capital, social capital, transaction costs and market access (independent variables).

Exploitation of agro-processing business opportunities is reliant on capability and ability of smallholder farming entrepreneurs to discover, recognise and exploit opportunities.

The inclusion of H1, H2 and H4 is premised on the importance of human capital, social capital and market access to entrepreneurial behaviour.

3.2 Research methodology / paradigm

This study used a quantitative research method of sourcing and obtaining usable statistical sets of data through completed questionnaires from smallholder farming entrepreneurs as respondents. This methodology was used to test theory and answer questions related to the relationship between participation by smallholder farming entrepreneurs in agro-processing activities as the dependent variable and human capital, social capital, and market access as independent variables with transaction cost as the moderating variable. This

study has its basis in the following theoretical paradigm: human capital theory, social capital theory and transaction cost theory.

The approach in this study was a survey using a predetermined structured questionnaire that yielded data for statistical analysis. A survey refers to a measurement process used to collect data using a structured questionnaire where respondents are asked questions (Field, 2009). Smallholder farming entrepreneurs were provided with structured questionnaires for responses related to perceived human and social capital, transaction cost, market access and participation in agro-processing activities.

Quantitative research involves sourcing and obtaining data from a large group of respondents; for the purpose of this study, responses were received from 166 smallholder farming entrepreneurs. Furthermore, quantitative research uses descriptive statistics to quantify data responses to generalise results from the sample of smallholder farming entrepreneurs to the population under review (Cooper and Schindler, 2008). Data was sourced using a structured questionnaire from smallholder farming entrepreneurs.

3.3 Research design

Research design is defined as the plan and structure of the investigation put together in such a manner as to obtain answers to research questions (Cooper and Schindler, 2011; p.138). The research strategy used was a survey-type through administering a structured questionnaire. A structured questionnaire was administered to smallholder farming entrepreneurs at farmer gatherings and/or meetings. Initially, the structured questionnaire was administered telephonically; however, due to the high telephone cost-factor, it was decided to abandon telephone interviews and focus on personal interview targeting farmer meetings and gatherings, which also limited travelling expenses. The main disadvantage of administering the structured questionnaire through telephone was that the interviewer had limited opportunity to probe for further answers as compared to personal interviews.

An on-line survey was not appropriate because empirical research has proven that smallholder farmers are characterised by lack of access to appropriate infrastructure and technology (Jari & Fraser, 2009), which has the potential to result in a poor response rate.

Advantages of collecting data through administering structured questionnaire at farmer gatherings and/or meetings are as follows:

- Mitigates telephone interview shortcomings of limited time and inability to pose follow-up questions;
- Smallholder farmers that might not be accessed through telephones might be captured during farmer gatherings;
- Targeting farmer gatherings is less costly compared with personal visits to individual farms;
- The method is quicker and more reliable.

This study intends to explain the relationship between participation of smallholder farming entrepreneurs in agro-processing activities and the perceived level of human capital, social capital and transaction cost of doing business.

3.4 Population and sample

3.4.1 Population

Population is defined as the total collection of elements about which inferences can be made (Cooper and Schindler, 2006; p.402). The population of this study was smallholder farming entrepreneurs located in South Africa. The targeted population only included farm owners and farm managers. Farm-workers were excluded from completion of the structured questionnaire because they might not be able to provide adequate, reliable and credible answers to questions posed thus compromising the validity of the research results. The target population is deemed necessary for the research because of the critical role agriculture plays in sustaining livelihoods of rural dwellers. Agriculture is the

mainstay of many rural local economies (Alene *et al.*, 2007; Mhazo *et al.*, 2012; Watanabe *et al.*, 2009; World Bank, 2007).

3.4.2 Sample and sampling method

Sampling involves selecting elements in the population upon which inferences will be made about the entire population (Cooper and Schindler, 2006; p.402). Compelling reasons for the sampling method in this study were not only keeping costs low and greater speed of data collation considering tight submission deadline for the research report but also challenges around the availability of the entire population of farmers.

Considering non-probability sampling method, used in this study, each member of the population has an unknown chance of being included in the sample (Cooper and Schindler, 2006; p.407). Non-probability sampling is appropriate considering the timing of the study. The availability of smallholder farming entrepreneurs was a limitation and constraint during data collation. This study was conducted during peak agricultural production season and furthermore, just a few months prior to the national election while land reform is a politically volatile subject particularly in the context of South African history.

Availability or convenience sample-type of non-probability was utilised in this study. Smallholder farmers available and present during farmer gatherings and meetings at the time of collating data were considered the sample (Cooper & Schindler, 2008). This indicated a bias because only smallholder farming entrepreneurs able to attend farmer gatherings participated in this study.

The sample was extracted from the population based on the AgriBEE charter. Informed by AgriBBBEE charter which is a sub-item of BBBEE Act 53 of 2003, smallholder farming entrepreneurs employ between one and 50 people and have a maximum turnover of approximately R10 million per annum. The Provincial Departments of Agriculture were approached to solicit dates for farmer gatherings and meetings that could be used for data collation. Farmer organisations were also approached for access to farmers during meetings and gatherings of the organisation. The sampling frame included smallholder

farmers that employ between one and 50 people and have a turn-over of less than R10 million per annum. Such smallholder farmers attended farmer gatherings and/or meetings. It was anticipated that farm owners and managers were capable to provide reliable and credible answers to the questions posed in the structured questionnaire.

The target was a response of at least 120 smallholder farming entrepreneurs fully cognisant of the principle that the bigger the sample, the lower the probability of small sample error. Sampling error may be a result of variance in the population and size of the sample (Field, 2009). The number of responses received from smallholder farming entrepreneurs was 166. The total spoiled questionnaires received were 18 translating to total questionnaires receives for both usable and spoiled equal to 184.

3.5 Research instrument

Data was collated using a structured questionnaire that was administered during farmer gatherings and/or meetings. A questionnaire is a form containing a set of predetermined questions (Cooper and Schindler, 2006; p.245); in this case, the questionnaire was closed-ended and took approximately 16 to 20 minutes for completion.

This study used adopted referenced measures of human capital, social capital, transaction cost, market access and agro-processing constructs. A referenced measure is a measure that was previously used in other studies by researchers while adopted measures are those that were referenced and slightly modified from the original form. Adopted referenced measures are therefore those that were referenced however slightly modified (Slavec and Drnovsek, 2012). Reliable and valid measures were critical for the legitimacy of the study.

The adopted referenced measures of human capital construct are years and level of education, years of industry specific experience, years of management experience and years of training sessions attended on industry specific tasks (Davidsson and Honig, 2003; Unger *et al.*, 2011). Items were measured using a

multiple-choice format for example when there are multiple-choice options for the interviewer but only one answer is sought, multiple-choice, single response scale was appropriate (Cooper and Schindler, 2006; p.337). Where multiple responses were required, the questionnaires clearly indicated this. Items representing the human capital construct were measured through a categorical scale using binary variables, for example: Have you attended seminars, workshop and conferences on agro-processing in the last quarter? Follow-up questions were measured by ordinal scale represented by numerical variables for example: If yes, indicate the number of times you attended workshops, seminars and conferences per quarter.

This study utilised adopted referenced measures of social capital from empirical research by Davidsson and Honig (2003); Liao and Welsch (2003); Randela *et al.* (2008) and Uchezuba *et al* (2009). In such empirical research, both weak and strong ties represent social capital. Weak tie items included questions on member of study group, member of farmer organisation, cooperate with neighbouring commercial farmer while strong tie items were represented by questions such as immediate family involved in agro-processing activities and family participated in agro-processing activities before. Items representing the social capital construct were measured through a categorical scale using binary variables, for example: Are you a member of farmer organisation? Follow-up questions were measured by ordinal scale represented by numerical variables for example: How many meetings did you attend per quarter?

Transaction cost constructs items were adopted from empirical research by Machethe and Jagwe (2011); Randela *et al.* (2008); Uchezuba *et al.* (2009) and Watanabe *et al.* (2009). Transaction cost items included access to market infrastructure items. The lower cost of logistics is thrust to transaction costs (Makhura, 2001). Infrastructure items were represented by smallholder farming entrepreneurs rating of community road infrastructure, rating of access to electricity in the community, rating of access to communication modes, rating of understanding agro-processing norms, standards and regulations and rating on

timeous access to market information. Items representing transaction cost construct were measured using a five-point Likert scale.

Market access construct items were adopted from empirical research by Randela *et al.,* (2008); Shiimi *et al.,* (2012). Market access items were included as barriers to accessing markets, involved in collective selling, preferred selling channel, and whether in contact with agricultural advisor. These items were measured using a categorical scale, specifically nominal variables that indicate where agricultural produce is sold. Items were measured using a multiple-choice format. When there are multiple-choice options for the interviewer but only one answer is sought, multiple-choice, single response scale is appropriate (Cooper and Schindler, 2006; p.337). Where multiple responses were required, the questionnaires indicated this.

Agro-processing construct items were adopted from empirical research by Randela *et al.* (2008); Uchezuba *et al.,* (2009) and Watanabe *et al.,* (2009). Participating in agro-processing initiatives is not a matter of either a yes or no question, but rather the extent to which smallholder farming entrepreneurs are engaged in activities. This might range from no participation to high participation depending on the type of agro-processing activities.

Agro-processing items included the following: participating in agro-processing activities, ability to add value and process agricultural products, access to agro-processing machinery and equipment, ability to operate agro-processing machinery and equipment, access to agro-processing markets, and access to funding to procure agro-processing equipment and machinery.

Items representing agro-processing construct were measured using a five-point Likert scale rated from one equalling poor and five equalling excellent (Vagias, 2006). Participants in the study were asked questions and their response rated and captured in the structured questionnaire. Each response was allocated a score to reflect the degree of attitudinal preference and scores were summed to measure the participants over all attitudes (Vagias, 2006). Advantages of the five-point Likert score is that it is quick and easy to construct (Cooper and

Schindler, 2006; p.339); however, it has been the subject of controversy regarding whether it is an ordinal or interval scale (Cooper and Schindler, 2006). Likert scales measuring the agro-processing constructs in this study were regarded as interval variables.

This study adopted referenced demographic measures by Nwibo and Okorie (2013); Randela *et al.* (2008) and Uchezuba *et al.* (2009), which were included in the structured questionnaire. Questions that were included in the demographic section include the province where the farm is located, gender and age of the smallholder farmer, how the farm was procured, the current farming activity on the farm, the main enterprises on the farm, the size of the farm, and the number of farm-workers employed. These items were measured using a multiple-choice format. When there are multiple-choice options for the interviewer but only one answer is sought, the multiple-choice, single response scale is appropriate (Cooper and Schindler, 2006; p.337).

The disadvantage of the research instrument was that due to time constraints, other relevant questions with potential influence of participation by smallholder farming activities in agro-processing activities may not be included. The timing of the study, noting the national elections on the horizon, dictated that sensitive matters related to land ownership be excluded.

Validity of the construct was enhanced through ensuring that items within the questionnaire reflect latent theoretical constructs of those they are supposed to measure (Field, 2005). Construct validity relates to the extent to which questions, which make up a construct, measure what they intend to measure. The consistency matrix in Table 17 was prepared and questions in questionnaire were related to the relevant research questions. Data was scaled before subjecting to statistical analysis. Multiple components of the validity (Slavec and Drnovsek, 2012) can be identified as follows:

- Discriminant validity refers to the extent to which a variable is distinct from other variables; this holds if the items expected to measure different constructs correlate with different factors. High discriminant validity

determines if a construct is distinctive and defines what others do not and whether its summated scale is correlated with similar but conceptually distinct measures (Field, 2005). Correlations of the two measures should be low to demonstrate that the two concepts are distinct. The researcher assessed correlations of the measures, which demonstrated distinction from each other. Utilisation of adopted valid and referenced measuring scales from empirical research contributed significantly to ensuring that questions making a construct measure what is intended. The human capital construct, social capital construct, market access construct and participation in agro-processing activities construct utilised, adopted and referenced measures.

- Convergent validity assists in determining if indicators of specific constructs share a high proportion of variance in common (Hair *et al.,* 2008). Convergent validity has the potential to identify if the instrument is measuring what it is supposed to measure, it should relate positively to other measures of the same construct, this holds if the items expected to measure the same constructs correlate with the same factor. The researcher assessed correlations among sub-contractors within the construct. Correlations were adequate and satisfactorily conformed to convergent validity.
- Face validity determines if every item content or definition on the questionnaire adequately represents the construct under review and study (Cooper and Schindler, 2008). The researcher's Supervisor coupled with the Statistician's evaluation and comments including piloting phase ensured questionnaire had face validity. Respondents were limited to farm managers, farm owners and elected leaders in instances of community property association to enhance collation of consistent and trustworthy information.

The detailed research instrument and introductory letter is included as Appendix B.

3.6 Procedure for data collection

Data was collected using a structured questionnaire that was administered through personal interviews at farmer gatherings and/or meetings. After explaining the importance of agro-processing to attainment of profitability and sustainability of farming enterprises, farmers were requested to complete the structured questionnaires. Instances where respondents did not understand questions posed, the interviewer was readily available to provide clarity.

Provincial Departments of Agriculture were approached to request a schedule of farmer gatherings and/or meetings to be held during the last quarter of 2013 and early 2014. In the Western Cape Province, Ms D Kepadisa, an agricultural advisor working with farmers, assisted to collate data. In Limpopo Province, Mr T Mamabolo, an agricultural economist for the Land Bank, assisted to collate data, while in Gauteng Province the researcher had an extensive network of farmers having worked for the Gauteng Department of Agriculture as an agricultural economist.

Table 2: List of farmer gatherings and meetings attended for data collation

Dates for data collation	Number of farmers interviewed	Location and Province	Farmer event
19 November 2013	14	Bronkhorstspruit - Gauteng	Training session on market access
27 November 2013	15	Gauteng Department of Agriculture Provincial Office - Gauteng	Women in Agriculture and Rural Development meeting
28 November 2013	16	De Deur – Gauteng	Sedibeng Agricultural Cluster Meeting
05 December 2013	64	Tarlton – Gauteng	Baby Vegetable Farmers Day
07 December 2013	14	Meyerton – Gauteng	Thiba – Tlala Agricultural Cluster
11 January 2014	8	Walkerville - Gauteng	Emfuleni Agricultural Cluster
29 January 2014	20	Tzaneen study group - Limpopo	Study group on financial record keeping
05 February 2014	15	Oodshorn farmers - Western Cape	Study group on marketing

Pictures were taken during data collation, attached in Appendix C. Prior to data collection the structured questionnaires were piloted during smallholder farming entrepreneurs training session at Bronkhorstspruit on the 19 November 2013 to detect, identify and mitigate challenges that might not have been anticipated during actual data collection. Minor amendments were made to the initial questionnaire after piloting. Amendments were mainly to rephrase questions that came across as unclear during piloting, after which the questionnaire was validated by the supervisor and statistician from the university involved in this research study. This endorsement by the university enhanced credibility of the study among respondents.

3.7 Data analysis

Data collected was captured on Excel software and analysed statistically using IBM Social Package for Social Scientist (SPSS) version 21 software. The software analysed the descriptive statistics, correlations and multiple regression of variables (Cooper and Schindler, 2006; Field, 2009). Findings of the study were analysed and presented using explanatory data analysis, a process of calculating descriptive statistics and frequencies to identify patterns and search for clues (Hair *et al.,* 2008). A minimum sample of 50 responses may be acceptable when using multiple regressions (Hair *et al.,* 2010). A sample size of 166 is therefore sufficient to conduct explanatory data analysis.

Descriptive statistics measured the centre, spread and shape of the distributions. Descriptive statistics depicted mean, mode, percentages, standard deviation and variance of numerical variables related to smallholder farmer's demographic variables such as age of farmers, gender of farmers, level of experience of farmers, type of enterprises mostly farmed with and size of farms. Mean refers to the common average while median splits the ordered data into two halves and finally mode refers to the value in data occurring most often (Cooper and Schindler, 2006; p.467).

Standard deviation indicated by how much a score deviated from the mean while variance indicates variance from the mean (Field, 2005; p.35). Frequencies were used to arrange data from the highest to lowest with counts and percentages. For example, black respondents had frequencies of 138 with a percentage of 83, while males numbered 61 translating to 36 percent and females numbered 105 translating to 64 percent.

Regression analysis assisted to determine the strength, direction and shape of the relationship between participation of the smallholder farming entrepreneur in agro-processing activities with a perceived level of human capital, social capital and market access, with these variables moderated by transaction cost.

In general, a regression model may be expressed as follows:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \text{-------} + \beta_n X_n + \varepsilon$$

Where:

Y = outcome / dependent variable;

β_0 = a constant which is the value of Y when X is zero;

β_n = regression co-efficient;

X_i = predictor / independent variable and

ε = error term

Multiple regressions were used as the main statistical tool to test the hypothesis. Multiple regressions have the ability to test, analyse and describe the relationship among two or more interval/ordinal scaled variables (Hair *et al.,* 2008). Multiple regression analysis is appropriate for analysing the degree and character of relationships of a single dependent variable (DV), in this case participation of farmers in agro-processing activities, and independent variables (IV) such as human capital, social capital, market access and interaction effect of transaction costs on independent variables. The thrust of multiple regressions is to utilise several independent variables to predict the dependent variable (Cooper and Schindler, 2008; Field, 2009). When utilising multiple regression, to measure predictive accuracy it is recommended to square each error and sum the results together. This process is known as the sum of squares that provides a measure of predictive accuracy that will vary depending on the amount of error (Hair, *et al.*, 2008).

Multiple regression analysis assumes the following factors:

- Normality of error term redistribution;
- Independence of error terms;
- Constant variance of error term; and
- Linearity of phenomenon measured.

Adoption of a multi-regression model to explain extent of variation in participation by smallholder farming entrepreneurs in agro-processing activities that can be explained jointly by all independent variables, human capital, social

capital and market access, while these variables are moderated by transaction cost dictated the following multi-regression model:

$$PIAI = (\beta_0 + \beta_1 HC + \beta_2 SC + \beta_3 TC + \beta_4 AM + \beta_5 TC*HC + \beta_6 TC*SC + \beta_6 TC*AM) + \varepsilon$$

Where:

PIAI = Participation by smallholder farming entrepreneur in agro-processing activities;

β_0 = constant which is the value of Y when X is zero;

βi = correlation co-efficient, Pearson correlation coefficient for purpose of this study;

HC = Human capital construct;

SC = Social capital construct;

TC = Transaction cost construct;

AM = Access to markets construct;

*TC*HC = Moderation or interaction effect by human capital and transaction cost on PIAI;*

*TC*SC = Moderation or interaction effect by social capital and transaction cost PIAI;*

*TC*AM = Moderation or interaction effect by access to markets and transaction cost on PIAI; and*

*ε = error term indicating proportion of PIAI that is not be explained by constructs HC, SC, TC, TC*HC, TC*SC and TC*AM.*

The coefficient of determination R^2 was used to explain the total proportion of variance in a dependent variable explained by independent variables. The R^2 removes the influence of the independent variable not accounted for in the constructs. It is a measure of the models good fit (Field, 2009; p.176).

The challenge with coefficient of determination R^2 is that it can substantially overestimate the strength of the relationship between outcome and predictor variable, when the number of predictors is not small relative to the number of observations. The coefficient of determination R^2 reaches its maximum of one for any saturated model even when predictors and outcomes are independent of each other. Consequently, the value of the coefficient of determination R^2 for a particular model tends to increase when sample size is reduced and the model gets closer to being saturated. Adjusted R^2 corrects this overestimation problem by accounting for the number of predictors in the model and is generally considered superior especially when comparing models with different

numbers of predictors (Field, 2009). Both the coefficient of determination R^2 and adjusted R^2 will be considered for this study.

Effect size (ES) are used to determine if results are statistically meaningful or not in practice or operation. The effect sizes are useful because they provide objective measure of the importance of an effect. The coefficient of determination R^2 will determine effect size. The coefficient of determination R^2 is a good intuitive measure (Field, 2009; p57). The following categories of effect size were considered for determination of significant tests being statistically practical (Cohen, 1992; Frazier, Tix and Barron, 2004):

- R^2 = .1 (low or weak) effect explains 10 percent of the total variance;
- R^2 = .3 (moderate or medium) effect accounts for 30 percent of the total variance;
- R^2 = .5 (high or strong) represents 50 percent of the total variance, an effect that is likely to be visible in operation and practice.

Hierarchical multiple regression was used to assess the effects of moderating variables.

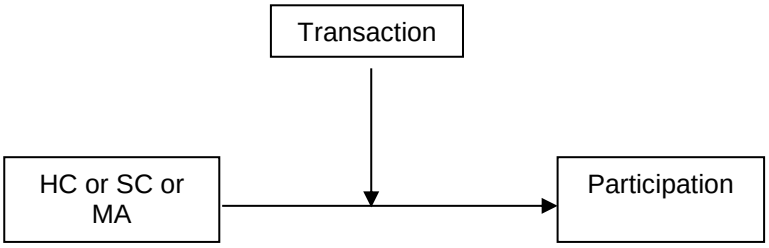


Figure 19: Interaction effect

To test for moderation the interaction effect between HC*TC; SC*TC and MA*TC was examined to test whether the moderation effect is enhancing, buffering or antagonistic. Enhancing moderation is when transaction cost as moderator increases the effect of the predictor such as HC, SC or MA on outcome/dependent variable, which is participation by smallholder farming entrepreneurs in agro-processing activities. Buffering moderation is when

transaction cost as moderator decreases the effect of the predictor/independent variable, while antagonistic moderation is when the transaction cost as moderator reverses the effect of the predictor/independent variable on outcome/dependent (Aiken and West, 1991).

To test for moderation, if R^2 from model 3 stated as:

$$PIAI = (\beta_0 + \beta_1 HC + \beta_2 TC + \beta_3 TC*HC) + \varepsilon$$

was greater than model 2 stated as:

$$PIAI = (\beta_0 + \beta_1 HC + \beta_2 TC) + \varepsilon$$

and greater than model 1 stated as:

$$PIAI = (\beta_0 + \beta_1 HC) + \varepsilon$$

and model 3 being positive and statistically significant, it was concluded that enhancing moderation was successful. The same would apply to the measure of construct social capital and market access.

The Pearson correlation coefficient was used to examine bi-variate relations and ranges between +1 to -1. Correlation coefficients reveal the magnitude and direction of the relationships in the model. Magnitude refers to the degree to which variables move in unison or opposition while the sign identifies the direction of the relationship (Cooper and Schindler, 2006; p.537). A correlation coefficient of any magnitude, sign or significance levels does not determine causation.

Multivariate analysis requires that assumptions underlying statistical techniques be tested for separate variables and for a multivariate model. Each of the measures of construct were tested if it met normality. Normality is a fundamental assumption to multivariate analyses because extreme departures from normality have the potential to render results statistically invalid. However, Central Limit Theorem states that regardless of shape of the population, the sampling distribution will tend to be normally distributed but parameter

estimates will tend to be accurate with increasing sample size (Cooper and Schindler, 2006). The sample size of the study was 166, which was considered relatively large.

The hypothesis (H1) of this study is stated as participation by smallholder farming entrepreneurs in agro-processing activities is positively related to human capital. Hypothesis (H2) is stated as participation by smallholder farming entrepreneurs in agro-processing activities is positively related to social capital while hypothesis (H4) is stated as participation by smallholder farming entrepreneurs in agro-processing activities is positively related to access to markets. This was interpreted as meaning that the outcome variable (participation of smallholder farming entrepreneur) and predictor variables (human capital, social capital and access to markets) move in the same direction. Further, the transaction cost variable is positively related to non-participation of the smallholder farming entrepreneur in agro-processing activities.

The interaction effect of human capital (HC) and transaction cost (TC) determines the moderation effect of transaction cost to independent variable (H5). The same applies to social capital (SC). Transaction cost is anticipated to moderate the effect of the independent variable to dependent variables (H6) similarly with access to markets (H7).

Hypothesis testing for significance levels was done using the α-values or significance levels. ρ-value indicated the probability a variable is likely explained by relationship with others (Cohen, 1992; Field, 2009). Significant variables were those ρ-values less than .01 or .005 meaning that variation between variables is bigger than the sample error (Cooper and Schindler, 2006 p.552).

3.7.1 Criteria to distinguish low, medium and high human capital

Human capital is defined as a set of skills and knowledge that an individual acquires through investment in schooling, on the job training, and other type of experience (Unger *et al*, 2011). Human capital is not only a result of formal education but also experience and knowledge.

A distinction was made between specific human capital compared with general human capital. Specific human capital is defined as education, training or work experience within the area directly related to the field of interest (Dimov and Shepherd, 2005). Human capital is most important for success if it consists of current task-related knowledge and skills (Sherperd and DeTienne, 2005). Human capital increases the owner's capabilities of discovering and exploiting business opportunities (Unger et al, 2011; p.341). Specific human capital was found to be significantly related to higher productivity.

For the purpose of this study, human capital levels of smallholder farming entrepreneurs were demarcated into three categories. First, farmers with matric or less but with certificate or diploma not related to the agriculture sector were classified as low human capital; second, farmers with bachelor's degree including those with a certificate or diploma in agriculture sector are classified as medium human capital. Third, farmers with post graduate qualification irrespective of in agriculture or not are classified as high human capital. Further, farmers with 11 years' experience are classified as high human capital. Those with less than three years' experience, their qualification takes precedence over experience.

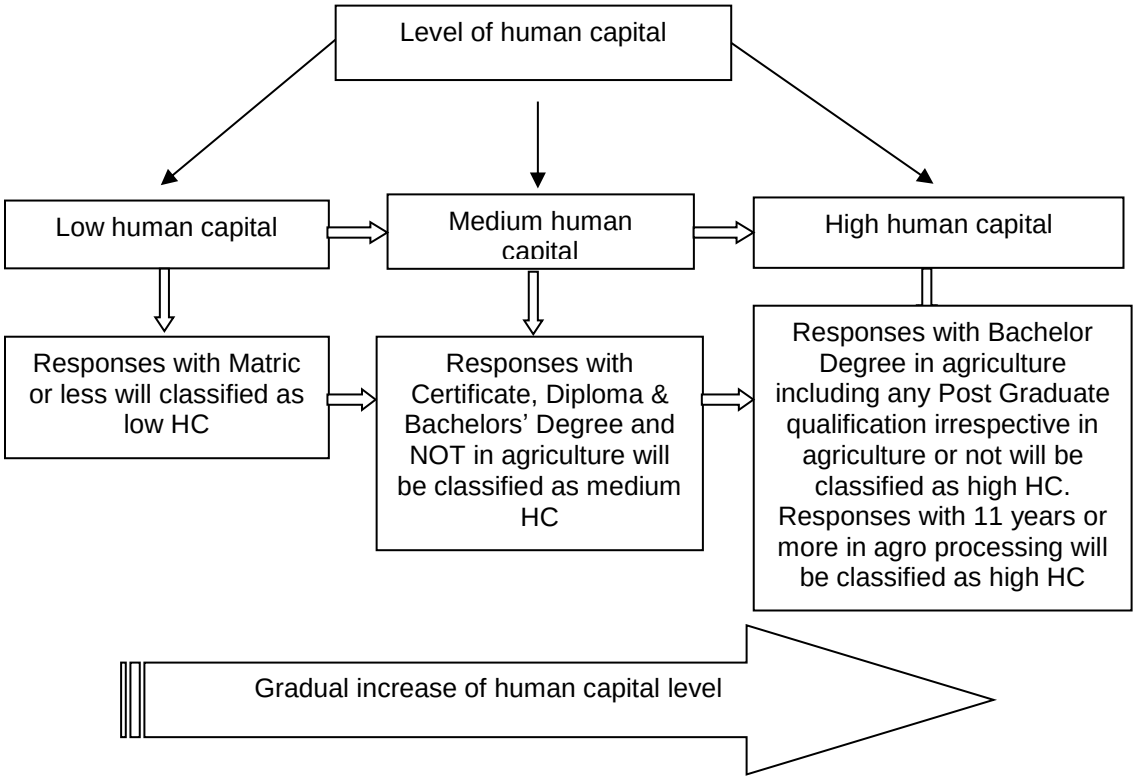


Figure 20: Criteria to distinguish low, medium and high human capital

3.7.2 Criteria to distinguish low from high social capital

Social capital refers to opportunities enabled by social structure including relationships and networks ties. Social capital refers to resources that can be converted and accessed from social relationships and networks ties (Coleman 1994; Burt, 1995; Johnson, Suarez, Lundy, 2003; Randela *et al.*, 2008; Yiu and Lau, 2008).

Networking refers to knowing the right individuals, making connections to achieve an endeavour and working together with people from within system to reach a common goal and objective (Liao and Welsch, 2003; Venter *et al.*, 2008). Networking may be categorised in terms of structuralist and connectionist streams, where the structuralist stream focuses on the formation of network ties and patterns of interconnection while the connectionist stream refers to network ties as a channel through which a flow of information and

resources may be accessed by members of the network (Yiu and Lau, 2008). For the purpose of this study connectionist streams of social capital were considered. The connectionist stream is likely to enhance participation of smallholder farming entrepreneurs in agro-processing activities.

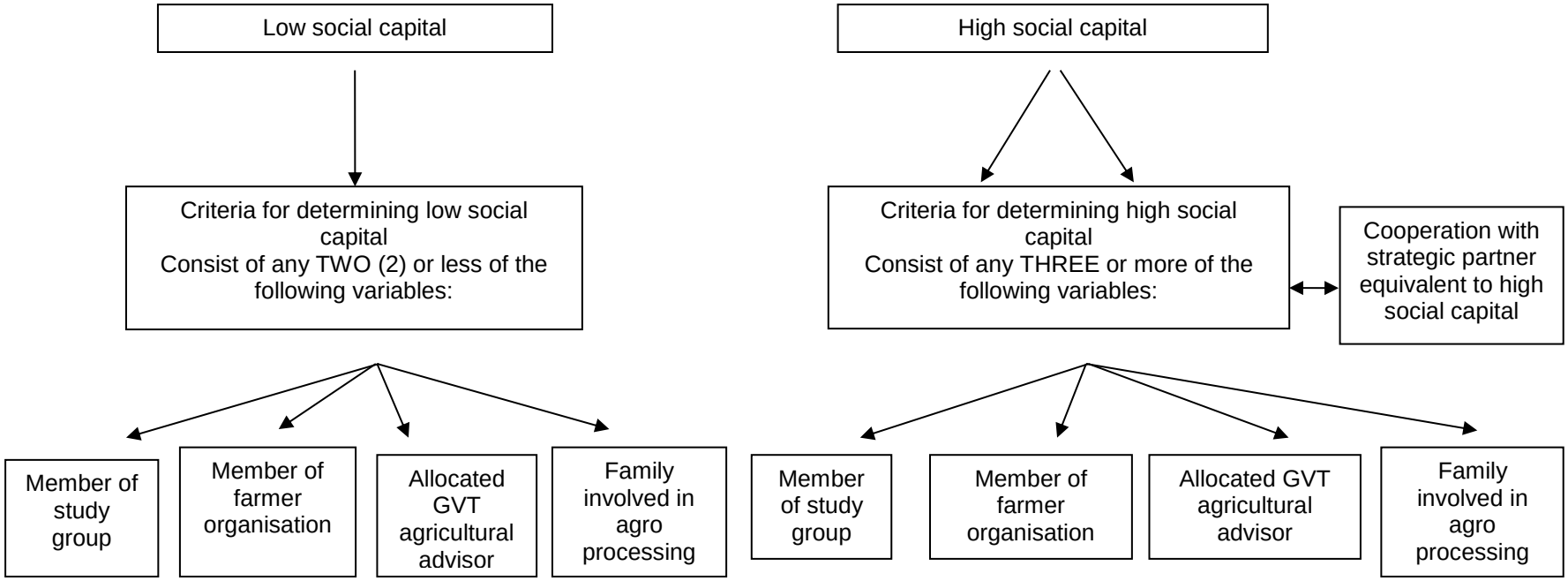


Figure 21: Criteria to distinguish low from high social capital

3.7.3 Criteria to distinguish low from high transaction cost

Smallholder farming entrepreneurs are faced with challenges and difficulties in accessing long-term commercial market contracts (FAO, 1997; Mathers, 2005; World Bank, 2007). Smallholder farmers are not able to participate in long-term commercial market contracts because of a wide variety of reasons including: poor infrastructure, lack of market transport, low volumes of products, lack of market information, inadequate experience on grades and standards and insufficient and inadequate contractual agreements (Freguin-Gresh *et al.*, 2012; Jagwe and Machethe, 2011; Jari and Fraser, 2009; Louw *et al.*, 2008; Randela *et al.*, 2008; Shiimi *et al.*, 2012; World Bank Report, 2013). All of these factors have a direct bearing on transaction costs that smallholder farming entrepreneurs face.

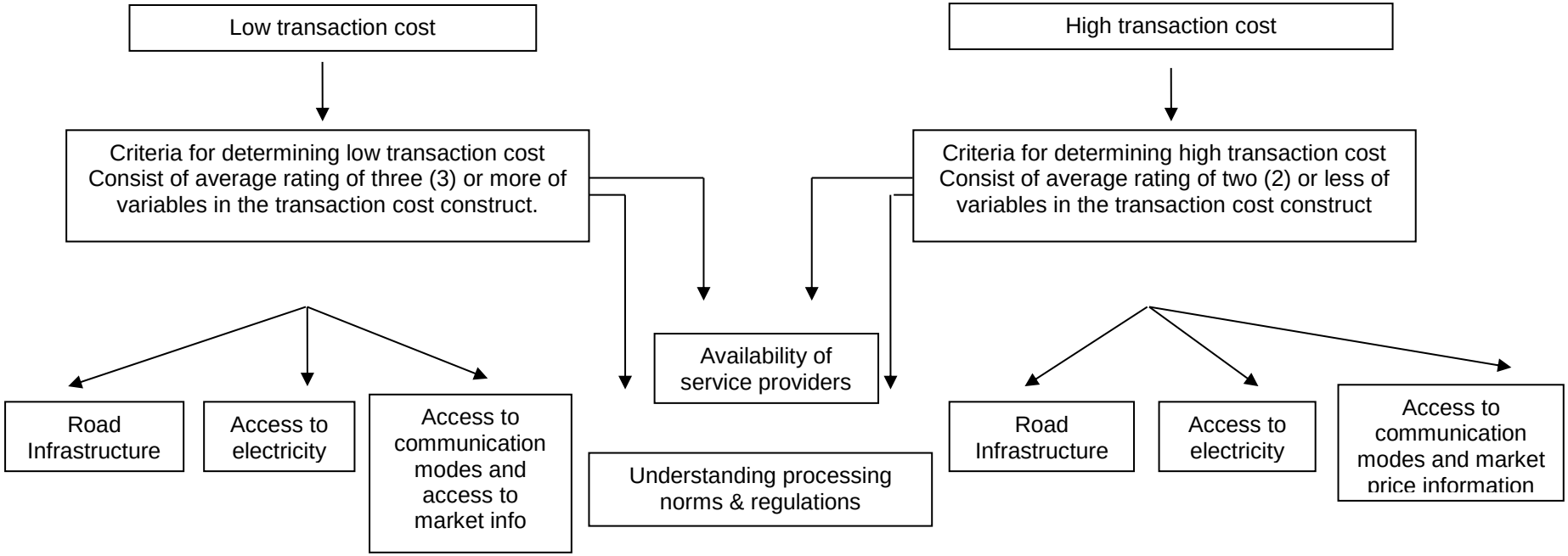


Figure 22: Criteria to distinguish low from high transaction cost

3.8 Validity and reliability of the research

Internal validity is the extent to which findings and results of the research study can be attributed to measure of constructs considered for this study (Cooper and Schindler, 2006). Validity of the entire research study refers to the quality of research process and accuracy of results.

3.8.1 External validity

External validity is intended to determine whether results of the study would hold true for other places and settings, should it be generalised (Field, 2009; p.11). The ability and extent to which these research findings could be generalised across populations is limited due to the sample size (166) resulting from the convenience sample method utilised. However, valid measures were used in this study for predicting the perceived human and social capital, market access and transaction costs constructs leading to enhanced legitimacy of the study (Slavec and Drnovsek, 2012).

3.8.2 Internal validity

The internal validity is the extent to which the measuring instrument provides adequate and sufficient coverage of the topic being researched (Cooper and Schindler, 2006). Validity of the measurement procedure refers to whether the procedure measures the variable it purports to measure. The validity of measurement procedure relates to whether the procedure measures the variable it claims to measure (Field, 2009). However, validity of the entire research study examines the quality of the research process and the accuracy of results (Slavec and Drnovsek, 2012). Adoption of valid and referenced measures for human capital, social capital, transaction cost and market access enhance the validity of research study.

3.8.3 Reliability

Reliability is the extent to which measurement procedure yields the same outcomes on repeated trials (Slavec and Drnovsek, 2012), and relates to the

focused accuracy and precision of the measurement procedure (Field, 2009). Reliability tests using Cronbach's Alpha indicates whether an instrument may be interpreted consistently across different situations (Cooper and Schindler, 2008).

For the purpose of this study, the reliability test for scale was not conducted mainly because variables are not one-dimensional. A single item scale has the challenge of reliability. Variables are therefore not expected to correlate.

3.9 Limitation of the study

Research generally has its own limitations. This research study is no exception.

- Participation was voluntary and some smallholder farming entrepreneurs might consider it unnecessary to be part of the survey;
- Participation on the study was limited to farm owners or managers; farm workers were excluded.
- Data was collected a few months prior to national elections. Land reform is often used as an electioneering tool. it was hoped that farmers participated notwithstanding the rhetoric from politicians caused by electioneering;
- There are other variables not included in the study that might impact and influence participation of small holder farming entrepreneurs in the agro-processing sector;
- Response fatigue emanating from other critical research studies;
- Data was collected during the festive season, which is peak agricultural production season however some farmers might have been away on holidays;
- The sample was selected using the convenience type method, by implication the sample might not be representative of the population;
- Reliability could be compromised because the construct variable items were not one dimensional, therefore Cronbach's Alpha test for reliability could not be used

CHAPTER 4: PRESENTATION OF RESULTS

4.1 Introduction

This section presents the results of the study. Data was collected through a structured questionnaire that was administered to smallholder farming entrepreneurs during farmer's gatherings and meetings. The questionnaire had five sections, demographics, human capital construct, social capital construct, transaction costs construct, farmers market access construct and participation in agro-processing construct.

In total, 166 responses were received from smallholder farming entrepreneurs. Farmers interviewed included farm owners, farm managers and elected leaders in cases where the legal entity was a community property association. Farm workers were excluded from the survey. Eighteen responses were classified as spoiled because they were incomplete or double answered. Data was coded for computer handling and captured on an Excel spreadsheet before being transferred to SPSS version 21 for analysis.

Findings of the study were analysed and presented using explanatory data analysis, which calculates descriptive statistics and frequencies to identify patterns. This method provided flexibility to respond to patterns revealed by the preliminary data analysis, which involved initiating various statistical procedures and tests on the raw data. These statistical procedures included descriptive statistics, correlation coefficients and regression analysis.

4.2 Descriptive statistics

Descriptive statistics is defined as condensing huge volumes of data into summary measures, depicting mean, mode, percentages, standard deviation and variance of numerical variables related to smallholder farmer's demographic variables such as age of farmers, gender of farmers, level of experience of farmers, type of enterprises mostly farmed with and size of farms.

Mean refers to the common average while median splits the ordered data into two halves. Standard deviation indicated by how much a score deviated from the mean while variance indicated variance from the mean.

4.2.1 Descriptive statistics of demographics

Descriptive statistics depicted frequencies and percentages of numerical variables related to smallholder farmer's demographic variables such as age of farmers, gender of farmers, level of experience of farmers, type of enterprises mostly farmed with and size of farms.

Table 3: Descriptive statistics of demographic characteristics

Description	Frequencies	Percentage*
Farmers per province		
Gauteng	130	78%
Limpopo	21	13%
Western Cape	15	9%
Racial group		
Black	138	83%
White	3	2%
Coloured	25	15%
Gender		
Male	61	37%
Female	105	63%
Age in years		
Below 21	1	1%
21 – 25	10	6%
26 – 29	3	2%
30 – 35	16	9%
36 – 40	24	15%
41 – 45	21	12%

Description	Frequencies	Percentage*
46 – 50	43	26%
51 – 55	18	11%
55+	30	18%
Position occupied on the farm		
Farm owner	123	74%
Farm manager	24	15%
Elected leader	19	11%
Farming enterprise		
Vegetables	92	56%
Grains	7	4%
Livestock	20	12%
Poultry	35	21%
Fruits	12	7%
Understanding of agro-processing norms, standards & regulations		
Understanding	80	48%
Lack of understanding	86	52%
Highest level of education		
Below matric	32	19%
Matric or grade 12	35	21%
Certificate or Diploma	53	32%
Bachelor's Degree	36	22%
Post graduate Degree	10	6%
Where does the farmer sell produce		
No market	2	1%
Informal or spot market	53	34%
Local shops and in town	31	20%
Fresh produce market	20	13%
Government tender contract	10	7%

Description	Frequencies	Percentage*
Retail or wholesale	39	25%
Are you selling as collective or group		
Selling as a group	29	18%
Not selling as a group	93	56%
Selling as a group and individually	44	26%
Access to finance to procure agro-processing machinery and equipment		
Able to access finance	53	32%
Unable to access finance	113	68%
Participation in agro-processing activities		
Washing, cleaning & storage	21	24%
Sorting, slicing, grinding, labelling	38	42%
Abattoir, milling, fermentation, canning	30	34%

**Percentages rounded off, no decimal places*

Most farmers interviewed were black (83 percent) and females constituted 63 percent. Respondents indicated that 55 percent were farming with vegetables while 21 percent indicated poultry. Seventy-four percent of respondents were farm owners. The majority of respondents indicated the highest qualifications as Certificate or Diploma (32 percent) followed by Bachelor's Degree (22 percent). Farmers that participated in secondary agro-processing activities constituted 42 percent while those that participated in tertiary and primary agro-processing activities were 24 percent and 34 percent respectively.

4.2.2 Descriptive statistics of constructs

The study measured the following constructs: human capital, social capital, market access and transaction cost. Descriptive statistics of the constructs are included in Table 4.

Table 4: Descriptive statistics of scales measuring constructs

Construct	Std Deviation	Scale mean	Scale median	Valid N	Min	Max
Participation	.50	1.46	1.00	166	1	2
Human capital (HC)	.84	2.09	2.00	166	1	3
Social capital (SC)	.49	1.39	1.00	166	1	2
Market access (MA)	.27	1.08	1.00	166	1	2
Transaction cost (TC)	.50	1.60	2.00	166	1	2

Human capital had the highest scale mean (*M*=2.09) and the highest standard deviation (*SD*=.84) while market access had the lowest scale mean *(M=1.08)* and lowest standard deviation *(SD=1.08)*. Standard deviation assists to calculate where the sample means lies at 95 percent confidence interval.

4.3 Correlation matrix analysis

The correlation matrix is computed to determine and assess the relationship between variables prior to the multiple regression analysis. Correlation should not be interpreted as causation, there might be other variables not included in research study that might affect relationships between variables.

Correlation matrix examination may be conducted to determine potential multicollinearity among independent variables. Multicollinearity is used to denote the presence of linear relationships among explanatory variables. Low correlation coefficients between independent variables indicates multicollinearity is not a factor.

According to Table 5 the correlation coefficient range between -.05 and .43 while there were some significant correlations. Participation of smallholder farming entrepreneurs in agro-processing activities was significant and positively correlated to human capital r (166) = .38; p < .01). Participation of smallholder farming entrepreneurs in agro-processing activities was significant and positively correlated to social capital r (166) = .19; p < .05). Participation of

smallholder farming entrepreneurs in agro-processing activities was positively correlated to market access r (166) = .18; p < .05). Participation of smallholder farming entrepreneurs in agro-processing activities is significant and negatively correlated to transaction cost r (166) = -.43; p < .01).

Table 5: Pearson correlation matrix

	Participation	HC	SC	TC	MA
Participation	1.00	.38**	.19**	-.43**	.18*
HC	.38**	1.00	.14	-.36**	.102
SC	.19**	.14*	1.00	-.30**	-.05
TC	-.43**	-.39**	-.30**	1.00	-.32**
MA	.18*	.10	-.05	-.32**	1.00

*** Correlation is significant at .01 level (1-tailed)*
** Correlation is significant at .05 level (1-tailed)*

Pearson correlation of the measures of constructs are low to moderate demonstrating that two constructs are generally distinct conforming discriminate validity. Further, correlation coefficients between independent variables suggest lack of multicollinearity.

4.4 Testing hypotheses using hierarchical multiple regression

The aim of regression analyses is to predict a single dependent variable from one or more independent variables. In the regression model, the intercept and the coefficient are estimated by minimising the sum of squares. Prediction accuracy were assessed based on the coefficient of determination (R^2). The coefficient of determination R^2 was used to explain the total proportion of variance in the dependent variable explained by the independent variable. The R^2 removes the influence of the independent variable not accounted for in the constructs. It is a measure of the models good fit.

Hypothesis H1 predicted a positive relationship between the dependent variable (DV) participation of smallholder farming entrepreneurs in agro-processing activities and independent variable (IV) human capital (HC). H5 extended these

hypotheses by predicting the relationship between human capital and participation in agro-processing activities while these variables were moderated by transaction costs, such that when transaction costs are high there is no relationship, but when transaction costs are low the relationship is positive. H5 is tested using hierarchical multiple regression.

Both H1 and H5 hypotheses relate to respective sub-problems 1 and 5 that were stated as to determine whether the relationship between participation in agro-processing activities by smallholder farming entrepreneurs and human capital depends on transaction cost. When transaction costs are high, it was anticipated that there will not be a relationship however, when transaction costs are low the relationship is positive.

4.4.1 Testing hypothesis H1

Hypothesis H1 was stated as:

H1 Participation by smallholder farming entrepreneurs in agro-processing activities is positively related to human capital.

Table 6: Regression summary for participation and human capital (model 1)

Model	R	R^2	Adjusted R^2	Std error	Change statistics				
					R^2change	F change	df1	df2	Sig. f change
1	.38	.14	.14	.47	.14	26.90	1	164	.00

a. Predictors: Human capital.
b. Dependent variable: Participating in agro-processing activities

Regression results in Table 6 indicated that R^2 is 14 percent suggesting 14 percent variance in participation by smallholder farming entrepreneurs was explained by human capital. The R^2 was significant $F(1,164=26.90, p=.00)$. The effect size was classified as moderate.

Verdict: There was no evidence to support null hypothesis. Alternate hypothesis H1 was supported and retained.

4.4.2 Testing hypothesis H5

Hypothesis was stated as:

H5 The moderation effects of transaction costs on the relationship between human capital and participation by smallholder farming entrepreneurs in agro-processing activities. When transaction costs. When transaction costs are high, it is anticipated that there will not be a relationship. When transaction costs are low the relationship is expected to be positive.

Table 7: Regression summary for participation and human capital + transaction cost (Model 2)

Model	R	R^2	Adjusted R^2	Std error	Change statistics				
					R^2change	F change	df1	df2	Sig. f change
2	.49	.24	.23	.44	.24	24.13	2	163	.00

a. Predictors: Human capital + Transaction cost
b. Dependent variable: Participating in agro-processing activities by smallholder farming entrepreneurs

Regression results from Table 7 indicated that R^2 is 24 percent suggesting 24 percent variance in participation by smallholder farming entrepreneurs was explained by human capital + transaction cost. R^2 is significant $F(2,163=25.13, p=.00)$. The effect size was classified as moderate.

Table 8: Regression summary for moderation effect - HC*TC (Model 3)

Model	R	R^2	Adjusted R^2	Std error	Change statistics				
					R^2change	F change	df1	df2	Sig. f change
3	.49	.24	.22	.44	.24	17.16	3	162	.00

*a. Predictors: Human capital + Transaction cost + HC*TC*
b. Dependent variable: Participating in agro-processing activities by smallholder farming entrepreneurs

Regression results from Table 8 indicated that R^2 is 24 percent suggesting 24 percent variance in participation by smallholder farming entrepreneurs was explained by human capital + transaction cost + HC*TC. R^2 was significant $F(3,162=17.16, p=.00)$. The effect size was classified as moderate.

4.4.3 Assessment of moderation effect (H5)

Table 9: Analysis of the moderation effects between human capital + TC + HC*TC

	Model 2 (HC+TC)			Model 3 (HC+TC+HC*TC)				
	B	**SE**	***β***	**B**	**SE**	***β***	**ΔR^2**	**ΔF**
Intercept	1.79**	.18		2.08**	.40			
Human capital (HC)	.15**	.04	.25	-.02	.16	-.03		
Transaction cost (TC)	-.34**	.08	-.33	-.56**	.22	-.55		
HC*TC				.09	.09	.29		
R^2	.24**			.24**			.00	
F	25.13**			17.16**				9.97

B = unstandardised coefficients, SE = standard error, β = standardised coefficients, N = 166
****p<.1; **p<.01; *p,<.05*

Table 9 indicates R^2 for model 2 and 3 was constant at .24 to .24 indicating differential of .00 implying interaction effect was not successful.

Verdict: Considering analysis depicted in Table 9, there was no evidence to support alternate hypothesis (H5). Null hypothesis was supported and retained.

Regression equation may be stated as:

Participation in agro-processing activities = 2.08 + (-.02HC) + (-.56)TC + .09HC*TC

4.5 Testing hypotheses H2 and H6 using hierarchical multiple regression

Hypothesis H2 predicted a positive relationship between dependent variable (DV) participation in agro-processing activities by smallholder farming entrepreneurs and independent variable (IV) social capital (SC). H6 extended these hypotheses by predicting the relationship between social capital and participation in agro-processing activities while these variables were moderated by transaction costs such that when transaction costs are high then there is no

relationship but when transaction costs are low the relationship is positive. H6 was tested using hierarchical multiple regression.

Both H2 and H6 hypotheses related to respective sub-problems 2 and 6 that were stated as to determine whether the relationship between participation in agro-processing activities by smallholder farming entrepreneurs and social capital depends on transaction cost. When transaction costs are high, it was anticipated that there will not be a relationship however, when transaction costs are low relationship is positive.

4.5.1 Testing hypothesis H2

Hypothesis H2 was stated as:

H2 Participation by smallholder farming entrepreneurs in agro-processing activities is positively related to social capital.

Table 10: Regression summary for participation and social capital (model 1)

Model	R	R^2	Adjusted R^2	Std error	Change statistics				
					R^2change	F change	df1	df2	Sig. f change
1	.19	.04	.03	.50	.04	6.23	1	164	.01

a. Predictors: Social capital
b. Dependent variable: Participating in agro-processing activities

Regression results from Table 10 indicated R^2 is four percent suggesting four percent variance in participation by smallholder farming entrepreneurs is explained by social capital. R^2 was significant $F(1,164=6.23, p=.01)$. The effect size was classified as low.

Verdict: There was no evidence to support null hypothesis. Alternate hypothesis H2 was supported and retained.

4.5.2 Testing hypothesis H6

Hypothesis H6 was stated as:

H6 The moderation effects of transaction costs on the relationship between social capital and participation by smallholder farming entrepreneurs in agro-processing activities. When transaction costs are high, it is anticipated that there will not be a relationship. When transaction costs are low the relationship is expected to be positive.

Table 11: Regression summary for participation and social capital + transaction cost (Model 2)

Model	R	R^2	Adjusted R^2	Std error	Change statistics				
					R^2change	F change	df1	df2	Sig. f change
2	.43	.19	.18	.45	.19	18.87	2	163	.00

a. Predictors: Social capital + Transaction cost
b. Dependent variable: Participating in agro-processing activities by smallholder farming entrepreneurs

Regression results from Table 11 indicated R^2 is 19 percent suggesting 19 percent of variance in participation by smallholder farming entrepreneurs was explained by social capital + transaction cost. R^2 was significant $F(2,163=18.87, p=.00)$. The effect size was classified as moderate.

Table 12: Regression summary for moderation effect - SC*TC (Model 3)

Model	R	R^2	Adjusted R^2	Std error	Change statistics				
					R^2change	F change	df1	df2	Sig. f change
3	.44	.19	.18	.45	.19	12.90	3	162	.00

*a. Predictors: Social capital + Transaction cost + SC*TC*
b. Dependent variable: Participating in agro-processing activities by smallholder farming entrepreneurs

Regression results from Table 12 indicated R^2 is 19 percent suggesting 19 percent variance in participation by smallholder farming entrepreneurs was explained by social capital + transaction cost + SC*TC. R^2 was significant $F(3,162=12.90, p=.00)$. The effect size was classified as moderate.

4.5.3 Assessment of moderation effect (H6)

Table 13: Analysis of the moderation effects between social capital + TC + SC*TC

	Model 2 (SC+TC)			Model 3 (SC+TC+SC*TC)				
	B	**SE**	***β***	**B**	**SE**	***β***	**ΔR^2**	***F***
Intercept	2.02**	.18		2.35**	.39			
Social capital (SC)	.07	.08	.07	-.16	.24	-.15		
Transaction cost (TC)	-.41**	.07	-.41	-.62**	.23	-.62		
SC*TC				.15	.15	.26		
R^2	.19**			.19**			.00	
F	18.80**			12.90**				5.9

B = unstandardised coefficients, SE = standard error, β = standardised coefficients, N = 166
****p<.1; **p<.01; *p,<.05*

Table 13 indicates R^2 for model 2 and 3 was constant at .19 to .19 indicating differential of .00 implying interaction effect was not successful.

Verdict: Considering analysis depicted in Table 13, there was no evidence to support alternate hypothesis (H6). Null hypothesis was supported and retained.

Regression equation may be stated as:

Participation in agro-processing activities = 2.35 + (-.16SC) + (-.62)TC + .15SC*TC)

4.6 Testing hypotheses H4 and H7 using hierarchical multiple regression

Hypothesis H4 predicts a positive relationship between the dependent variable (DV) participation in agro-processing activities by smallholder farming entrepreneurs and the independent variable (IV) market access (MA). H7 extends these hypotheses by predicting the relationship between market access and participation in agro-processing activities while these variables are moderated by transaction costs such that when transaction costs are high then

there is no relationship but when transaction costs are low the relationship is positive. H7 was tested using hierarchical multiple regression.

Each of H4 and H7 hypotheses relates to respective sub-problems 4 and 7 that were stated as to determine whether the relationship between participation in agro-processing activities by smallholder farming entrepreneurs and market access depends on transaction cost. When transaction costs are high, it was anticipated there will not be a relationship however, when transaction costs are low the relationship is positive.

4.6.1 Testing hypothesis H4

Hypothesis H4 was stated as:

H4 Participation by smallholder farming entrepreneurs in agro-processing activities is positively related to market access.

Table 14: Regression summary for participation and market access (Model 1)

Model	R	R^2	Adjusted R^2	Std error	Change statistics				
					R^2change	F change	df1	df2	Sig. f change
1	.14	.02	.01	.50	.2	3.15	1	164	.04

a. Predictors: Market access
b. Dependent variable: Participating in agro-processing activities

Regression results from Table 14 indicated R^2 is two percent suggesting two percent variance in participation by smallholder farming entrepreneurs was explained by market access. The effect size was classified as very low. R^2 was significant $F(1,164=3.15, p=.04)$.

Verdict: There was no evidence to support null hypothesis. Alternate hypothesis (H4) was supported and retained.

4.6.2 Testing hypothesis H7

Hypothesis H7 was stated as:

H7 The moderation effects of transaction costs on the relationship between market access and participation by smallholder farming entrepreneurs in agro-processing activities. When transaction costs are high, it is anticipated that there will not be a relationship. When transaction costs are low the relationship is expected to be positive.

Table 15: Regression summary for participation and market access + transaction cost (Model 2)

Model	R	R^2	Adjusted R^2	Std error	Change statistics				
					R^2change	F change	df1	df2	Sig. f change
2	.43	.18	.17	.45	.18	18.35	2	163	.00

a. Predictors: Market access + Transaction cost
b. Dependent variable: Participating in agro-processing activities by smallholder farming entrepreneurs

Regression results from Table 15 indicated R^2 was at 18 percent suggesting 18 percent variance in participation by smallholder farming entrepreneurs was explained by market access + transaction cost. R^2 was significant $F(2,163=18.35, p=.00)$. The effect size was classified as moderate.

Table 16: Regression summary for moderation effect - MA*TC (Model 3)

Model	R	R^2	Adjusted R^2	Std error	Change statistics				
					R^2change	F change	df1	df2	Sig. f change
3	.43	.19	.17	.46	.19	12.36	3	162	.00

*a. Predictors: Market access + Transaction cost + MA*TC*
b. Dependent variable: Participating in agro-processing activities by smallholder farming entrepreneurs

Regression results from Table 16 indicated R^2 was 19 percent suggesting 19 percent variance in participation by smallholder farming entrepreneurs was explained by market access + transaction cost + MA*TC. R^2 was significant $F(3,162=12.36, p=.00)$. The effect size is classified as moderate.

4.6.3 Assessment of moderation effect (H7)

Table 17: Analysis of the moderation effect between market access + TC + MA*TC

	Model 2 (MA+TC)			Model 3 (MA+TC+MA*TC)				
	B	**SE**	***β***	**B**	**SE**	***β***	**ΔR^2**	***F***
Intercept	2.15**	.22		1.80**	.55			
Market access (MA)	-.001	.14	.00	.34	.50	.18		
Transaction cost (TC)	-.43**	.08	-.43	-.11	.46	-.11		
MA*TC				.31	.45	-.32		
R^2	.18**			.19**			.01	
F	18.35**			12.36**				.599

B = unstandardised coefficients, SE = standard error, β = standardised coefficients, N = 166

****p<.1; **p<.01; *p,<.05*

Results in Table 17 indicated R^2 for model 3 at .18 and significant while R^2 for model 2 at .19 and significant. Change in R^2 from .18 to .19 indicated differential of .01 implying interaction effect was successful with enhancing moderation effect on the outcome variable. Enhancing moderation is when increasing the moderator variable would increase the effect of the predictor on the outcome variable. Regression equation may be stated as:

Participation in agro-processing activities = 1.80 + (.34MA) + (-.11)TC + .31MA*TC

Verdict: Considering analysis depicted in Table 17, there was no evidence to support null hypothesis. Alternate hypothesis H7 was supported and retained.

4.7 Testing hypothesis H3

Hypothesis H3 predict an inverse relationship between dependent variable (DV) participation of smallholder farming entrepreneurs in agro-processing activities and independent variable (IV) transaction cost (TA).

Table 18: Regression summary for participation and transaction cost

Model	R	R^2	Adjusted R^2	Std error	Change statistics				
					R^2change	F change	df1	df2	Sig. f change
1	.43	.18	.17	.45	.18	36.93	1	124	.00

a. Predictors: Transaction cost
b. Dependent variable: Participating in agro-processing activities

Regression results from Table 18 indicated R^2 is 18 percent suggesting 18 percent variance in participation by smallholder farming entrepreneurs was explained by transaction cost. R^2 is significant $F(1,164=36.93, p=.00)$. The effect size was classified as moderate.

Verdict: There was no evidence to support null hypothesis. Alternate hypothesis (H3) was supported and retained.

4.8 Testing research question

The research question hypotheses is as follows:

Research question: To what extent can variation in participation in agro-processing activities by smallholder farming entrepreneurs be explained jointly by all independent variables human capital, social capital, market access while these variables are moderated by transaction cost.

Table 19: Regression model summary

Model	R	R^2	Adjusted R^2	Std error	Change statistics				
					R^2change	F change	df1	df2	Sig. f change
1	.51	.26	.23	.44	.26	7.97	7	158	.00

*a. Predictors: (Constant), Interaction effect MA*TC, Interaction effect HC*TC, Interaction effect SC*TC, social capital, human capital, market access, transaction cost.*
b. Dependent variable: Participating in agro-processing activities

Regression results from Table 19 indicated R^2 is 26 percent (.26, $p<.00$) suggesting 26 percent variance in participation by smallholder farming

entrepreneurs was explained by all the independent/predictor variables. R^2 was significant $F(7,158=7.97$, $p=.00)$. The effect size was classified as moderate.

Verdict: There was no evidence to support null hypothesis. Alternate hypothesis in the form of the research question was supported and retained.

Table 20: Analysis of independent variables jointly

	Joint model = HC + (HC*TC) + SC + (SC*TC) + MA + (MA+TC) + TC			***p*-value**
	B	**SE**	***β***	
Intercept	1.73	.81		
Human capital (HC)	.01	.17	.01	.97
HC*TC	.09	.09	.27	.34
Social capital (SC)	-.21	.25	-.20	.40
SC*TC	.19	.15	.33	.22
Market access (MA)	.53	.49	.28	.28
MA*TC	-.51	.44	-.51	.25
Transaction cost (TC)	-.25	.57	-.25	.66
R^2	.26**			
F	7.97**			

B = unstandardised coefficients, SE = standard error, β = standardised coefficients, N = 166
****p<.1; **p<.01; *p,<.05*

Multiple regression equation is depicted as:

$$\textit{Participation in agro-processing} = 1.73 + .01HC + (-.21)SC + (-.25)TC + .53MA + .09TC*HC + .19TC*SC + (-.51TC*AM)$$

Figure 22 depicts a scatterplot for testing normality of residuals. Values fall on the diagonal of the plot, indicating error scores were normally distributed confirming homogeneity of variance.

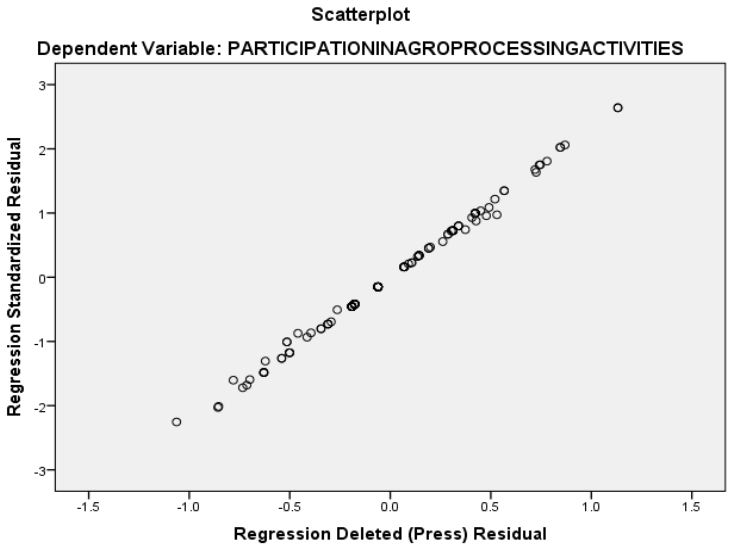


Figure 23: Scatterplot

CHAPTER 5: DISCUSSION OF FINDINGS

5.1 Introduction

This chapter presents a discussion of the findings of the study. Results from the quantitative study are integrated with the literature review. First, the demographic profile of respondents is discussed, followed by a review of the results of hypotheses and finally implications of the findings are discussed. This chapter concludes with a summary of key findings.

5.2 Demographic profile of respondents

As indicated in Chapter 4, the total number of smallholder farming entrepreneurs interviewed were 166, of which 78 percent were based in Gauteng Province, 13 percent from Limpopo Province and nine percent from Western Cape.

Most farmers interviewed were black at 83 percent, while coloureds were 15 percent followed by whites at two percent, supporting assertions by Strategic Plan of Department of Agriculture, Forestry and Fisheries (2012) that the majority of smallholder farmers are Africans but black in particular. Proportion of female farmer's respondents was 63 percent while males were 37 percent supporting FAO (1997); World Bank Report (2013) and NDP (2012) indicating women farmers are the backbone of many rural farming areas.

Respondents indicated 55 percent were farming with vegetables while 21 percent and 12 percent indicated poultry and livestock respectively, confirming the study limitations of bias towards the food and beverage sub-component of agro-processing sector. Further, its confirmation that smallholder farming entrepreneurs are farming with vegetables and poultry to mitigate impact of poverty.

The study targeted farm owners, farm managers and elected leaders as source of information to enhance validity of information. Of the 166 farmers

interviewed, 74 percent of respondents were farm owners while 15 percent were farm managers and elected leaders constituted 11 percent.

5.3 Discussion of hypotheses

5.3.1 Discussion of hypothesis H1

As indicated in Chapter 2, Hypothesis H1 predicted that participation by smallholder farming entrepreneurs in agro-processing activities is positively related to human capital. Results in Chapter 4 supported the alternate hypothesis. The R^2 was significant at 14 percent (.14; p<.00) suggesting 14 percent of variance in participation by smallholder farming entrepreneurs is explained by human capital. Participation of smallholder farming entrepreneurs in agro-processing activities was significant and positively correlated with human capital $r(166) = .38$; p<.01

It was argued in Chapter 2 that individuals with higher human capital are likely to recognise and exploit entrepreneurial opportunities, compared with those with lower human capital (Sherperd and DeTienne, 2005). Knowledge, skills and experience are fundamental and antecedent to human capital. Human capital enhances individuals with increases in their cognitive ability resulting in the likelihood of a productive entrepreneurial activity (Davidsson and Honig, 2003; Venter *et al*., 2008). Schema theory indicated how individuals respond to a new set of information emanating from disequilibrium in the environment towards discovery and exploitation of entrepreneurial opportunity (Gaglio and Katz, 2001). Entrepreneurial opportunities emerge from complex patterns of changing conditions such as political, social, economic, demographic and technological. (Ucbasaran *et al.,* 2009). The discovery theory further posits the centrality of entrepreneurs to discover entrepreneurial opportunities through searching and sourcing changing environment (Alvarez and Barney, 2007).

Education was found to influence positively the ability of entrepreneur to identify and discover new business opportunities for exploitation (Ucbasaran *et al.,* 2009). Results of this study supported the notion that education is a critical

source of skills, knowledge and problem solving. Smallholder farmers interviewed indicated 32 percent had Diplomas while 22 percent had Bachelor's Degrees and only six percent had post-graduate degrees. Equally, smallholder farming entrepreneurs participating in agro-processing activities were 24 percent for primary agro-processing, 42 percent for secondary agro-processing and 34 percent for tertiary agro-processing. The level of education explains the high level of participation by smallholder farming entrepreneurs in agro-processing activities. Cumulatively, 66 percent of respondents were participating in both primary and secondary agro-processing activities, which might be explained by the level of education, which was commutatively at 54 percent for both Diploma and Bachelor's Degree.

Human capital is not only a consequence of formal education but also prior experience particularly on-the-job and hands-on practical learning (Venter *et al.,* 2008). Information and skills required to discover and exploit entrepreneurial opportunities may be learned through observation from others. Expert processing theory alluded expert's process information differently from novices. An expert poses a developed schema shaped by individual experience (Ucbasaran *et al.,* 2009). Prototype theory further indicated experience provides basis for individuals to recognise entrepreneurial opportunity. Results indicated 16 percent of respondents were in strategic partnership with neighbouring commercial farmers. Partnerships were meant to mentor smallholder farming entrepreneurs to enhance knowledge through skills transfer and on-the-job learning.

Results of the study supported the fundamental role that human capital plays in enhancing and encouraging participation by smallholder farming entrepreneurs in agro-processing activities. The alternate hypothesis (H1) was supported and retained (.14; $p<.00$). This study further supported the discovery theory, schema theory, prototype theory and expert processing theory.

5.3.2 Discussion of hypothesis H2

As indicated in Chapter 2, Hypothesis H2 predicted participation by smallholder farming entrepreneurs in agro-processing activities is positively related to social capital. Results supported the alternate hypothesis (H2). Regression results in Table 10 indicate R^2 was significant at four percent (.04, p<.01) suggesting four percent variance in participation by smallholder farming entrepreneurs is explained by social capital. Participation in agro-processing activities by smallholder farming entrepreneurs was significant and positively correlated to social capital r (166) = .19; p<.05.

Chapter 2 argued that social capital provides a network and ties to smallholder farmers to access information and resources that may be leveraged to exploit an entrepreneurial opportunity (De Carolis and Saparito, 2006; Sherperd and DeTienne, 2005). Connections and networks provide smallholder farmers with benefits that might not be available if a farmer was acting alone. Distinction was made between weak and strong ties (Davidsson and Honig, 2003; Venter *et al.,* 2008). Weak ties referred to loose relationships between farmers such as belonging to farmer organisation, belonging to study group and collective marketing. Weak ties may be useful for accessing information that might be otherwise costly to locate. Strong ties were those located among the nuclear family. Strong ties were those involving family that accounted for secure and extended access to resources (Adler and Kwon, 2002).

The results in Chapter 4 supported social capital theory. Further results supported assertions by Davidsson and Honig (2003) and Adler and Kwon (2002). The results indicated that weak ties encouraged smallholder farmers into collective action. Collective action of smallholder farmers was through collective procurement of production inputs, collective sourcing of finance, collective marketing, collective sharing and provision of infrastructure. About 84 percent of the respondents indicated were participating in farmer organisations or collectively marketing and selling produce. Through linkage with agricultural advisors, respondents were able to source and access technical and market

information. Only eight percent of respondents indicated strong ties. The alternate hypothesis was supported and retained.

5.3.3 Discussion of hypothesis H3

As indicated in Chapter 2, Hypothesis H3 predicted the participation by smallholder farming entrepreneurs in agro-processing activities as negatively related to transaction cost. Results supported the alternate hypothesis (H3). Regression results in Table 18 indicate R^2 was significant at 18 percent (.18, p<.00) suggesting 18 percent of variance in participation by smallholder farming entrepreneurs was explained by transaction costs. Participation by smallholder farming entrepreneurs in agro-processing activities was negatively correlated to transaction costs r (166) = -.43; p<.01 supporting studies and assertions that high transaction costs are barriers to market participation by smallholder farmers (Shiimi *et al.,* 2012; Randela *et al.,* 2008; and Arlene *et al.,* 2007).

In Chapter 2, high transaction costs are regarded as barriers to efficient and effective participation by smallholder farming entrepreneurs in various marketing channels with preference to those channels whose costs are minimal such as spot markets (Shiimi *et al.,* 2012; Randela *et al.,* 2008; and Arlene *et al.,* 2007). High transaction costs are likely a result of poor logistics, poor infrastructure, poor telecommunication mode and ineffective bureaucratic procedures.

Results of the study confirmed assertions by the World Bank Report (2013) that most farming areas are located in rural areas characterised by poor infrastructure, which precipitates high transaction costs forcing smallholder farmers to choose a marketing channel whose costs are minimal such as spot markets. Spot markets are informal by nature. About 34 percent of respondents indicated spot markets as preferred marketing channel while 20 percent were selling at local shops. Ease of entry might be a reasonable explanation for smallholder farmers being confined to market participation in the informal sector. The results support transaction cost theory.

5.3.4 Discussion of moderator hypothesis H4

As indicated in Chapter 2, Hypothesis H4 predicted participation by smallholder farming entrepreneurs in agro-processing activities as positively related to market access. Results supported the alternate hypothesis (H4). Regression results from Table 14 indicate R^2 is at one percent (.01, p=.04) suggesting one percent of variance in participation by smallholder farming entrepreneurs is explained by market access. Participation by smallholder farming entrepreneurs in agro-processing activities was positively correlated to market access r (166) = .18; p<.05

Markets are critical for profitability of enterprises because they act as a medium of exchange. Market participation by smallholder farming entrepreneurs is critical because they derive livelihood and entrepreneurial opportunities for exploitation. Smallholder farming entrepreneurs are faced with a plethora of challenges such as low volumes, lack of market information, lack of experience regarding grades and standards and poor infrastructure resulting in lack of access to long term market contracts (Arlene *et al.,* 2007; FAO, 1997; Shiimi *et al.,* 2012; Randela *et al.,* 2008; World Bank, 2007). Results of this study indicates that cumulatively, 54 percent of respondents were selling at both spot market and local shops respectively, indicating the inability of smallholder farmer's to penetrate retail and wholesale marketing channels characterised by long term contracts. Results supported the assertion that smallholder farmers find it difficult to access formal retail and wholesale contracts due to challenges of volume and poor infrastructure.

Furthermore, when deciding where to sell products, smallholder farmers are influenced by factors such as anticipated price, payment terms, storage capacity in case products are not sold and transport to market (Louw *et al.,* 2013; Ortmann and King, 2010). All of these factors have a bearing on the level of transaction costs faced by smallholder farmers resulting in a channel whose costs are limited. Results of the study indicated 34 percent of respondents utilised spot markets as their marketing channel because of minimal transaction costs faced by smallholder farmers.

Results supported studies and assertions by FAO (1997) and World Bank (2007) that high transaction costs are barriers to market participation by smallholder farmers.

5.3.5 Discussion of moderator hypothesis H5

As indicated in chapter 2, hypothesis H5 was stated as the moderation effects of transaction costs on the relationship between human capital and participation by smallholder farming entrepreneurs in agro-processing activities. When transaction costs. When transaction costs are high, it is anticipated that there will not be a relationship. When transaction costs are low the relationship is expected to be positive.

Table 9 indicated R^2 for model 2 at .24 and significant $F(2,163=25.13, p=.00)$ while model 3 indicated R^2 at .24 and significant $F(3,162=17.16, p=.00)$. The R^2 for model 2 and 3 were constant at .24 to .24 indicating differential of .00 implying that interaction-effect was not successful. There was no evidence to support the alternate hypothesis (H5). Results indicated that the null hypothesis was supported and retained.

The moderator is a variable that affects direction and strength of a relation between independent and dependent variables (Baron and Kenny, 1986; Grant *et al.,* 2006). The pattern of interaction between predictor variable and moderator variable is expected to enhance interaction. However, results indicated that moderation (HC*TC) was not successful, implying that transaction costs as a moderating variable did not have an influence on the relationship between human capital and participation of smallholder farming entrepreneurs in agro-processing activities.

These results were interpreted with caution because, there might be other variables, not included in the study, with significant influence on transaction cost. Institutional support (Jagwe and Machethe, 2011) and implementation of capital infrastructure projects by government may change levels of transaction cost faced by rural farmers. Further, global economic downturn might cause

reduction in spending by consumers implying economic slowdown. Business would generally be curtailed irrespective of the level of transaction cost.

5.3.6 Discussion of moderator hypothesis H6

As indicated in Chapter 2, hypothesis H6 was stated as the moderation effects of transaction costs on the relationship between social capital and participation by smallholder farming entrepreneurs in agro-processing activities. When transaction costs are high, it is anticipated that there will not be a relationship. When transaction costs are low, the relationship is expected to be positive.

As indicated in Table 13, regression results indicated R^2 for model 2 was .19 and significant $F(2,163=18.80, p=.00)$ while model 3 indicated R^2 at .19 and significant $F(3,162=12.90, p=.00)$. The R^2 for model 2 and 3 was constant at .19 to .19 indicating differential of .00 implying interaction-effect was not successful. There was no evidence to support the alternate hypothesis. The null hypothesis is supported and retained.

The moderator effect (SC*TC) is likely to result in enhanced interaction effect. By implication, results indicated that transaction costs did not influence the relationship between participation of smallholder farmers in agro-processing activities and social capital. Again, these results should be interpreted with caution as other significant variables such as institutional support were not included in this research instrument. Further, farmer membership and participation in industry organisation is not entirely limited by transaction cost. Historically, farmers organise themselves along commodity groups that are formed within farming communities. Meetings and farmer gatherings are therefore organised and held within the farming community with no requirement for long distance travelling or a town hall.

Results further indicated that smallholder farmers were members of various industry organisations, 84 percent indicated membership of farmer organisations or belonging to a study group.

5.3.7 Discussion of hypothesis H7

As indicated in Chapter 2, hypothesis H7 was stated as the moderation effects of transaction costs on the relationship between market access and participation by smallholder farming entrepreneurs in agro-processing activities. When transaction costs are high, it is anticipated that there will not be a relationship. When transaction costs are low, the relationship is expected to be positive.

Table 17 indicated R^2 for model 2 was .18 and significant $F(2,163=18.35; p=.00)$ while model 3 indicated R^2 at .19 and significant $F(3,162=12.36; p=.00)$. Change in R^2 from .18 to .19 indicated differential of .01 implying that the interaction-effect was successful with enhancing moderation effect on the outcome variable. There was no evidence to support the null hypothesis. The alternate hypothesis was supported and retained.

Transaction cost theory posits intermediaries come into existence when markets are unable to be efficient (Fiet, 2000). In an inefficient market place, an intermediary performs the mediation between the potential seller of a product and the buyer. In situations where the market is efficient, direct sales take place, implying the potential buyer and seller share any trade surplus that would have otherwise been pocketed by the intermediary. Transaction costs have the potential to drive a wedge between potential buyers and sellers (Jagwe and Machethe, 2011). Results of the study supported the transaction cost theory that when the market place is inefficient, farmers are likely to prefer informal markets to avoid intermediary charges, but also to avoid tedious formal market regulations and requirements. Almost 54 percent of respondents indicated that informal markets and local shops were preferred markets for selling of produce.

It was further indicated that transaction costs have a direct bearing on the marketing channel selected by smallholder farming entrepreneurs. Preference will be given to the channel whose transaction costs such as transport cost, storage cost, commission rate, and payment terms are minimal (Louw *et al* ., 2008; Mhazo *et al.,* 2008; World Bank Report, 2013). Results of the study

support assertions that farmers would prefer a marketing channel, such as spot and informal markets whose transaction cost is low.

5.4 Conclusion

Results in Chapter 4 indicate hypothesis H1, H2, H3 and H4 were supported. Furthermore, human capital theory, social capital theory and transaction cost theory were supported. The only moderation hypothesis supported was H7. The research question of the study intended to determine the cumulative influence of all the independent variables on participation in agro-processing activities by smallholder farming entrepreneurs, while these variables are moderated by transaction cost.

Regression results in Table 19 indicated R^2 is significant at 26 percent (.26, p> .00) suggesting 26 percent variance in participation by smallholder farming entrepreneurs was explained by all the independent/predictor variables while these variables are moderated by transaction costs. The R^2 is significant F(7,158=7.97, p=.00). There was no evidence to support the null hypothesis. The alternate hypothesis, in the form of the research question, was supported and retained.

Results confirm the assertions by the GEM Report (2011) and World Bank Report (2013) that no singular panacea would resolve developmental and profitability challenges faced by smallholder farmers, a multi-faceted and comprehensive approach would be required. Entrepreneurship remains the thrust of improving farmer's livelihoods. Improvement of human capital for smallholder farmers is a critical prerequisite to sustainable development.

CHAPTER 6: CONCLUSIONS AND RECCOMENDATIONS

6.1 Introduction

In this chapter the conclusions of the study are expanded upon, recommendations and limitations of the study are articulated, and finally suggestions for further research explained.

6.2 Conclusion of the study

This thesis investigated the relationship between participation in agro-processing activities, by smallholder farming entrepreneurs, and human capital, social capital and market access, while these independent variables were moderated by transaction costs. In Chapter 1, the importance of agriculture in rural economies was discussed. Furthermore, improving sustainability and profitability of smallholder farmers will require significant improvement of human capital among smallholder farmers. Human capital is central to entrepreneurial advances by smallholder farmers (GEM Report, 2011; NDP, 2012; World Bank Report, 2013).

The purpose of the study was to investigate factors that restrict and limit participation in agro-processing activities by smallholder farming entrepreneurs. The objective of the study was to fill the research gap identified by NGP (2010); NDP (2012); IPAP (2013) and World Bank Report (2013) indicating that agro-processing has the potential to improve the livelihoods of smallholder farmers however it remains under-developed.

The study also addressed research gaps by Mather (2005); Mehta (2012); Watanabe *et al.,* (2009) and Rocha (2008) in terms of broadening the scope and space of the smallholder farmers value chain and not confine it to considering the agro-processing sector as distinct from primary agriculture.

A study by IDC (2010) identified factors that restrict and limit participation of SME agro-processors in the wheat industry to the exclusion of other grain segments. Additionally, TIPS (2005) conducted a study to identify food processing complexities, constraints and opportunities. The focal point of the study was SME agro-processors to the exclusion of smallholder farming entrepreneurs.

In brief, the important findings of this study are that human capital is fundamental to sustainable farmer development (GEM Report, 2011). Human capital is critical to entrepreneurship (Ardichvili *et al.,* 2003; Davidsson and Honig, 2003; Sherpherd and DeTienne; Venter *et al.,* 2008). Results of the study supported the research hypothesis that there is a positive and significant relationship between human capital and participation in agro-processing activities by smallholder farming entrepreneurs. Further, results supported human capital theory, prototype theory, schema theory, expert information processing theory and discovery theory.

Findings of the study indicated a significant contribution of social capital to smallholder farming enterprises. Social capital was demarcated into weak and strong ties (Davidsson and Honig, 2003; Venter *et al.,* 2008). Results indicated that the majority (84 percent) of smallholder farmers had weak ties. In summary, the findings indicated a positive and significant relationship between social capital and participation in agro-processing activities by smallholder farming entrepreneurs supporting social capital theory.

Additionally, findings of the study indicated that transaction costs were negatively and significantly related to participation, by smallholder farmers, in agro-processing activities. Transaction costs were proven to be a barrier to access markets by smallholder farmers (Arlene et al., 2007; Ortmann and King, 2010; Shiimi et al., 2012). Results of the study confirmed these assertions. Findings of the study supported transaction cost theory.

Findings of the study indicated that transaction costs had significant and enhancing moderation effects on the relationship between market access and

participation by smallholder farming entrepreneurs in agro-processing activities. When farmers are faced with high transaction costs they opt not to participate in formal markets and resorted to spot or informal markets, which were less rewarding (Jagwe and Machethe, 2011; Louw, *et al.,* 2013; Makhura, 2001; Ortmann and King, 2010).

Finally, findings of the study depicted a cumulative influence of all independent variables on the dependent variables as significant and positive. The World Bank Report (2013) on reaching the rural poor, a renewed strategy for rural development, indicates the importance of a multi-faceted and comprehensive development approach to farmer development. No single factor will resolve all the challenges facing smallholder farmers. However, enhancing human capital is fundamental to sustainable farmer development initiatives.

6.3 Recommendations

The following recommendations are informed by findings of this study. These recommendations are directed at role players in the agro-processing industry.

- Policy makers should consider prioritising entrepreneurship as a vehicle to improve sustainability and profitability of farming and agro-processing enterprises. Human capital is critical and fundamental to entrepreneurship (GEM Report, 2011). Agro-processing was identified as a potential entrepreneurial opportunity for smallholder farmers (NGP, 2010; NDP, 2012; World Bank Report, 2013). Skills requirements impede progress.
- Smallholder farming entrepreneurs should consider entering into business partnerships with neighbouring commercial farmers and agro-processors to enhance both human and social capital through on-the-job-training and learning.
- Funding mechanisms towards promotion and support of SME processing initiatives are scattered and thinly spread. Development financial institutions, including government funding, should consider value chain

finance. It will encourage linkage and integration of both the primary agricultural sector and secondary sector of the economy.

- Through preferential procurement legislative framework, government should consider allocating and ring-fencing percentage procurement of processed food to SME processors and smallholder farming entrepreneurs in line with Broad Based Black Economic Empowerment (BBBEE) Act of 2003. Transformation of the agro-processing sector will encourage development.
- Government should craft and allocate resources, and implement strategy for localisation of agro-processing products. This strategy will coordinate and integrate intervention approaches among various stakeholders but also encourage development of the SME processing industry.
- Agro-processing companies and corporates should consider increasing enterprise development spend for the benefit of SME processors and smallholder farming entrepreneurs. Enterprise development spend should be channelled towards access to market access, access to finance or incubation to improve the human capital and social capital of SME agro-processors.
- Presidential Infrastructure Coordinating Commission (PICC), focusing on improving rural infrastructure development, should consider the findings of this study to broaden and fast-track the implementation of capital infrastructure in rural areas.
- The competition commission should broaden its investigation into uncompetitive practices by agro-processing corporates. Such behaviour restricts and limits development of the SME agro-processing industry.

6.4 Suggestion for further research

The agro-processing sector is in its infancy, taking into consideration transformation and equitable participation by smallholder farming entrepreneurs in the mainstream economy, the suggestions for further research are limited to those that are closely related and linked to this thesis.

Studies should consider investigating the moderation effect of entrepreneurship on the relationship between participation by SME agro-processors and market access, access to finance, institutional support and the level of farmer development. As indicated in Chapter 2, entrepreneurship, particularly technology entrepreneurship is critical and fundamental to sustainable farmer development (GEM Report, 2011).

Furthermore, studies should consider investigating agro-processing complexities, constraints and opportunities in the non-food sector whose dynamics and characteristics of the processing activities and value chain are different to the food and beverage sector.

Finally, studies should investigate the contribution of enterprise development spend of big processing companies and corporates in South Africa towards promotion, support and development of the agro-processing SME industry. Support of SME agro-processing industry is the responsibility of all stakeholders. Government alone has limitations to advance SMME development.

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ANNEXURE 1: CONSISTENCY MATRIX

Sub-problem	Literature review	Hypothesis	Source	Type of data	Analysis
To measure, evaluate and determine the relationship between participation of smallholder farming entrepreneurs in agro-processing initiatives with the perceived level of human capital and social capital	Unger, M., Rauch, A., Frese, M., & Rosenbusch, N. (2011). Human capital and entrepreneurial success: A meta-analytical view. *Journal of Business Venturing, 26, 341-358* Randela, R., Alemu, Z.G., & Groenewald, J.A. (2008). Factors enhancing market participation by small-scale cotton farmers, *Agrekon: Agricultural Economics Research, Policy and Practice in Southern Africa,* 47:4, 451-469 Davidsson, P., & Honig, B. (2003). The role of social and human capital among nascent entrepreneurs. *Journal of Business Venturing 18* (2003), 301-331 Liao, J., & Welsch, H. (2003). Social capital and entrepreneurial growth aspirations: a comparison of technology and non-technology based nascent entrepreneurs. *Journal of High Technology Management Research*, Vol 14, 149-170 Baron, R.A. (2006). Opportunity recognition as pattern recognition. How entrepreneurs "connects the dots" to identify new business opportunities. *Academy of Management Perspectives 104-118*	Human capital is positively related to participation of smallholder farming entrepreneur in agro-processing initiatives Social capital is positively related to participation of smallholder farming entrepreneur in agro-processing initiatives	Self-administered questionnaire using Google Drive Software	Nominal data will be used in the analysis	Data will be cleaned on Excel software and analysed statistically using IBM SPSS version 21 software to obtain descriptive statistics and regression results

Sub-problem	Literature review	Hypothesis	Source	Type of data	Analysis
To measure, evaluate and determine the relationship between participation of smallholder farming entrepreneurs in agro-processing initiatives with perceived level of transaction cost	Shiimi, T., Taljaard, P.R., & Jordaan, H. (2012). Transaction costs and cattle farmers' choice of marketing channel in North-Central Namibia, *Agrekon: Agricultural Economics Research, Policy and Practice in Southern Africa,* 51:1, 42-58 Mhazo, N., Mvumi, B., Nyakudya, E., & Nazare, M. (2012). The status of the agro-processing industry in Zimbabwe with particular reference to small- and medium-scale enterprises. *African Journal of Agricultural Research* Vol. 7(11), p. 1607-1622, Jagwe, J.N., & Machethe, C. (2011). Effects of Transaction Costs on Choice of Selling Point: A Case of Smallholder Banana Growers in the Great Lakes Region of Central Africa*, Agrekon: Agricultural Economics Research, Policy and Practice in Southern Africa,* 50:3, 109-123 Jari, B., & Fraser, G.C.G. (2009). An analysis of institutional and technical factors influencing agricultural marketing among smallholder farmers in the Kat River Valley, Eastern Cape Province, South Africa. *African Journal of Agricultural Research* Vol. 4 (11), pp. 1129-1137 Louw A., Jordaan, D., Ndanga, L., & Kirsten, J.F. (2008). Alternative marketing options for small-scale farmers in the wake of changing agri-food supply chains in South Africa, *Agrekon: Agricultural Economics Research, Policy and Practice in Southern Africa,* 47:3, 287-308	Transaction costs are positively related to non-participation by smallholder farming entrepreneur in agro-processing initiatives	Self-administered questionnaire using Google Drive Software	Nominal data will be used in the analysis	Data will be cleaned on Excel software and analysed statistically using IBM SPSS version 21 software to obtain descriptive statistics and regression results

ANNEXURE B: LETTER AND STRUCTURED QUESTIONNAIRE

Letter

My name is Victor Mahlogedi Thindisa, a Master of Management in Entrepreneurship and New Venture Creation (MM ENVC) student at Wits Business School (WBS), University of Witwatersrand, Johannesburg. The following questionnaire is part of extensive research undertaken to investigate factors affecting participation by smallholder farming entrepreneur's in agro-processing activities in South Africa. Your invaluable input is vital to the outcome of this research study. This research is in partial fulfillment of my Masters' degree.

This survey is voluntary and will take about 15 minutes to complete. Participants may decide to withdraw at any stage of the process. All information is confidential as the ethics of the university ensure that your identity and responses are confidential and will strictly be used for research purposes only. Please indicate if you wish not to participate in this study.

If you wish to receive the processed results of the survey, please send me an e-mail at mahlogedi@blackiq.co.za.

Thanking you in anticipation for participating in the survey.

Regards,
Mahlogedi Victor Thindisa

Masters' candidate: Master of Management in Entrepreneurship and New Venture Creation (MM ENVC)

Wits Business School (WBS)

University of Witwatersrand

Questionnaire

DEMOGRAPHICS

Select an answer by marking with X in the space that reflects your answer most accurately. Indicate one answer ONLY unless otherwise indicated.

Indicate the province your farm is located?

Gauteng	Limpopo	Mpumalanga	Free-State	KwaZulu-Natal	Free-State	North-West	Eastern Cape	Western Cape

Indicate your racial group?

Black	White	Coloured	Asian	Indian	Others, please specify.....

Indicate your age in years?

Below 21	21-25	26-29	30-35	36-40	41-45	46-50	51-55	56+

Indicate your gender or sex?

Male	Female

What is your current position on the farm?

Farm owner	Farm manager	Elected leader	Farm worker	Others, please specify.....

How did you acquire or obtain your farm?

LRAD	PLAS	SLAG	Lease or rented from GVT	Communal	Bought privately	Others, please indicate……

*LRAD = Land Redistribution for Agricultural Development Grant; PLAS = Proactive Land Acquisition Strategy; SLAG = State Land Acquisition Grant

What enterprise are you farming with? Choose main enterprises, not more than 2

Vegetables	Grains	Livestock	Poultry	Fruits	Medicinal plants	Others, please indicate……..

What is the size of your farm in Hectares (Ha)?

Less than 5	6-35	36-65	66-95	96-125	126-155	156-185	186-215	216+

How much land in your farm available for farming activities is currently utilised or cultivated?

No production	¼ utilisation	½ Utilisation	¾ Utilisation	Full production

How many years have you been actively farming?

Never farmed before	Less than 3 years	4-10 years	11-17 years	18-24 years	25+ years

How many permanent workers are you currently employing on the farm?

Less than 5 farm workers	6-50 farm workers	51-200 farm workers	200+ farm workers

How many seasonal workers are you currently employing on the farm?

Less than 5 farm workers	6-50 farm workers	51-200 farm workers	200+ farm workers

HUMAN CAPITAL CONSTRUCT

Select an answer by marking with X in the space that reflects your answer most accurately. Indicate one answer ONLY unless otherwise indicated.

Indicate your highest qualification?

Below Matric	Matric or grade 12	Certificate or Diploma	Bachelors Degree	Post graduate Degree	Others, please indicate…… ……..

Is your highest qualification in agriculture?

Yes	No

Are you currently adding value or processing agricultural produce?

Yes	No

If YES, indicate type of value addition or agro-processing activities currently taking place on your farm? Indicate main ones, not more than 2

Washing, cleaning, drying, storage	Sorting, cutting, slicing, grinding, grading, labelling, chilling	Abattoir, milling, fermentation, canning, bottling	Fortification, extraction, and compression	Others, please indicate…… ……

Indicate how many years have you been involved in value addition and agro-processing?

Never before	Less than 3 years	4-10 years	11-17 years	18-24 years	25+ years

Have you attended training workshops, seminars or conferences related to value addition and agro-processing?

Yes	No

If YES, indicate number of workshops, seminars or conferences attended per QUARTER?

1-2	3-4	5-6	7-8	9-10	11+

Have you attended practical hands-on-training sessions related to value addition and agro-processing?

Yes	No

If YES, indicate number of hands-on-training sessions attended related to value addition and agro-processing attended per QUARTER?

1-2	3-4	5-6	7-8	9-10	11+

SOCIAL CAPITAL CONSTRUCT

Select an answer by marking with X in the space that reflects your answer most accurately. Indicate one answer ONLY unless otherwise indicated.

Are you a member of farmer study group?

Yes	No

If YES, indicate number of study groups sessions attended per QUARTER?

1-2	3-4	5-6	7-8	9-10	11+

Are you a member of farmer organisation or association?

Yes	No

If YES, indicate number of farmer organisation meetings you attended per QUARTER?

1-2	3-4	5-6	7-8	9-10	11+

Are you in contact or allocated government agricultural advisor?

Yes	No

If YES, how many meeting or sessions you attend with agricultural advisor per QUARTER?

1-2	3-4	5-6	7-8	9-10	11+

Do you have or cooperate with mentor or strategic partner regarding value addition or agro-processing activities?

Yes	No

If YES, how many sessions you attend with mentor or strategic partner per QUARTER?

1-2	3-4	5-6	7-8	9-10	11+

Is a family member actively participating in value addition or agro-processing activities?

Yes	No

If YES, how many years has the family member been actively participating in value addition and agro-processing activities?

Never before	Less than 3 years	4-10 years	11-17 years	18-24 years	25+ years

TRANSACTION COST CONSTRUCT

Select an answer by marking with X in the space that reflects your answer most accurately. Indicate one answer ONLY unless otherwise indicated.

How would you rate road infrastructure in your community?

Poor	Fair	Good	Very good	Excellent

How would you rate access to electricity in your farming community?

Poor	Fair	Good	Very good	Excellent

How would you rate access to communications modes such as telephones, cell phones, Post Office, radio reception, TV reception?

Poor	Fair	Good	Very good	Excellent

Do you have access to market price information?

Yes	No

If YES, how do you source and access market price information?

No access	Buy price information	Farmer study group	Farmer organisation	GVT agricultural advisor	Others, please indicate……

MARKET ACCESS CONSTRUCT

Select an answer by marking with X in the space that reflects your answer most accurately. Indicate one answer ONLY unless otherwise indicated.

Do you have access to markets for agricultural produce?

Yes	No

If YES, where do you sell your agricultural produce?

No market	Informal or spot market	Local shops and town	Fresh Produce Markets	GVT contract	Retail or wholesale	Others, please indicate……

Is transport a barrier for accessing markets?

Yes	No

Are quantities and volumes required by buyers constituting barrier to market access?

Yes	No

Are prices offered by buyers constituting barriers to market access?

Yes	No

Do buyers require value added and processed agricultural produce?

Yes	No

How many years have you been selling agricultural produce?

Never before	Less than 3 years	4-10 years	11-17 years	18-24 years	25+ years

Are you selling agricultural produce as a group/collective?

Yes	No	Both

If YES, how many marketing groups are you participating in?

1-2	3-4	5-6	7-8	9-10	11+

PARTICIPATION IN AGRO-PROCESSING ACTIVITIES CONSTRUCT

Select an answer by marking with X in the space that reflects your answer most accurately. Indicate one answer ONLY unless otherwise indicated.

Do you have access to value addition and agro-processing machinery, equipment and facilities such as washing bays, cutting, slicing, grading and labelling machines, cold rooms, abattoir, milling equipments etc?

Yes	No

If YES, how would you rate your access to value addition and agro-processing machinery, equipment and facilities such as washing bays, cutting, slicing, grading and labelling machines, cold rooms, abattoir, milling equipment?

Poor	Fair	Good	Very good	Excellent

How would you rate your ability to operate and utilise value addition and agro-processing machinery?

Poor	Fair	Good	Very good	Excellent

Do you understand value addition and agro-processing norms and standards such as cold chain process, HAACP, LocalGAP, SAGAP, EuroGAP?

Yes	No

If YES, how would you rate your ability and understanding of value addition and agro-processing norms and standards (HAACP, SAGAP, LocalGAP, EuroGAP, cold chain process)?

Poor	Fair	Good	Very good	Excellent

Do you have access to finance to procure value addition and agro-processing machinery and equipment?

Yes	No

If YES, how would you rate your ability to source funding to procure value addition and agro-processing machinery and equipment?

Poor	Fair	Good	Very good	Excellent

How would you rate availability and access of service providers in your area selling agro-processing machinery and equipment?

Poor	Fair	Good	Very good	Excellent

Thanks for participating in this study. Your responses will be kept strictly confidential and only be used for the purpose of this study.

ANNEXURE C: PICTURES CAPTURED DURING DATA COLLATION