ENTREPRENEURIAL CHARACTERISTICS AND FINANCIAL PERFORMANCE

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In the

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DECLARATION

I, Simone Nieuwoudt, hereby declare that this dissertation submitted by me for the degree of Master of Science (M.Sc. Agric) Agricultural Economics, at the University of the Free State, is my own independent work and has not previously been submitted by me to any other university.

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LIST OF ACRONYMS AND ABBREVIATIONS

DEA	Data Envelopment Analysis
DMU	Decision Making Unit
EBITDA	Earnings Before Interest, Taxes, Depreciation and Amortisation
FFSC	Farm Financial Standards Council
GDP	Gross Domestic Product
KMO	Kaiser-Meyer-Olkin
NFI	Net Farm Income
PCA	Principal Component Analysis
PCR	Principal Component Regression
ROA	Rate of Return on Assets
ROE	Rate of Return on Equity
SME	Small and Medium Enterprises

ABSTRACT

The main objective of the study is to explore the relationship between entrepreneurial competencies of a farmer and the financial performance of said farm to determine whether initiatives focussed on improving entrepreneurial competencies of farmers will contribute towards improving their financial performance.

The study was conducted in South Africa, and the data used within the study was gathered through a formal agreement with a commercial financial organisation. The financial performance of the farmers was calculated by means of farm financial ratios and then used to determine a single measurement namely the operating efficiency. The operating efficiency was calculated using a mathematical linear programming technique, this technique is a financial based Data Envelopment Analysis (DEA). It was hypothesised that entrepreneurial competencies of farmers will have an effect on the financial performance of the farm.

The entrepreneurial competencies instrument used by Man (2001), was identified and used to measure the entrepreneurial competencies of the farmers. Entrepreneurial competencies were identified in terms of the statements that displayed high-factor loadings for each of the competencies. Farmers displayed an average of 70% or above for all the individual entrepreneurial competencies, indicating entrepreneurial behaviour among the farmers. . To determine the relationship between entrepreneurial competencies and financial performance the operating efficiency scores were regressed against the competencies scores. An Ordinary Least Squares (OLS) model was used within the Principal Component Regression (PCR) to regress the dependent and independent variables due to the nature of the dependent variables.

The results from the financial based DEA showed that there were inefficient farms within the sample, however more than half of the farms had an efficiency score above 0.855, indicating high levels of operating efficiency. Therefore, the majority of farms were operating close to efficiency compared to one another, however not all were efficient. The entrepreneurial competencies scores indicated that all the farmers displayed entrepreneurial competencies. In determining the relationship between the operating efficiency and all of the entrepreneurial competencies as a combined index there was a positive significant relationship, for a single entrepreneurial competencies index. On further investigation a t-test was used to determine if there was a statistical difference between each individual competencies and the financial

performance. It was found that individual competencies have a larger positive relationship on the operating efficiency of the farm.

The results show that each of the individual entrepreneurial competencies have a positive relationship with the operating efficiency of the farm. Operating inefficiencies can be improved by increasing the individual entrepreneurial competencies where a farmer is lacking.

Keywords: Operating Efficiency, Financial Performance; Financial ratios; Entrepreneurial Competencies, Data Envelopment Analysis, Ordinary Least Squares Regression.

TABLE OF CONTENTS

PAGE

DECLARATION ii

ACKNOWLEDGEMENT iii

LIST OF ACRONYMS AND ABBREVIATIONS iv

ABSTRACT v

TABLE OF CONTENTS vii

LIST OF FIGURES x

LIST OF TABLES xi

CHAPTER 1 INTRODUCTION 1

1.1 BACKGROUND AND MOTIVATION 1

1.2 PROBLEM STATEMENT 2

1.3 OBJECTIVE 3

1.4 OUTLINE OF THE STUDY 4

CHAPTER 2 LITERATURE REVIEW 5

2.1 INTRODUCTION 5

2.2 FIRM PERFORMANCE 5

2.2.1 FINANCIAL PERFORMANCE 5

2.2.2 LIQUIDITY 9

2.2.3 DATA ENVELOPMENT ANALYSIS (DEA) TO ASSESS FINANCIAL PERFORMANCE 16

2.2.4 DISCUSSION 17

2.3 ENTREPRENEUR 18

2.3.1 FARMER AS ENTREPRENEUR 19

2.3.2 APPROACHES TO ASSESSING ENTREPRENEURS 21

2.3.3 ENTREPRENEURIAL COMPETENCIES FRAMEWORK 31

2.4 EXPLORING THE RELATIONSHIP BETWEEN ENTREPRENEURIAL COMPETENCIES AND FINANCIAL PERFORMANCE 33
2.5 CONCLUSION 35

CHAPTER 3 METHODOLOGY 37

3.1 DATA 37
3.1.1 MEASURING FINANCIAL PERFORMANCE OF RESPONDENTS 38
3.2 METHODS 41
3.2.1 MEASURING FINANCIAL PERFORMANCE 41
3.2.2 MEASURING ENTREPRENEURIAL COMPETENCIES 43
3.2.3 EXPLORING THE INFLUENCE OF ENTREPRENEURIAL COMPETENCIES ON FINANCIAL PERFORMANCE 57

CHAPTER 4 RESULTS AND DISCUSSION 62

4.1 FINANCIAL PERFORMANCE 62
4.1.1 OPERATING EFFICIENCY 62
4.2 ENTREPRENEURIAL COMPETENCIES 67
4.2.1 ENTREPRENEURIAL COMPETENCIES SCORING 67
4.3 ENTREPRENEURIAL COMPETENCIES INFLUENCE ON FINANCIAL PERFORMANCE 70
4.3.1 DETERMINING THE PRINCIPAL COMPONENTS 71
4.4 CONCLUSION 75

CHAPTER 5 SUMMARY, CONCLUSIONS AND RECOMMENDATIONS ..77

5.1 INTRODUCTION 77
5.1.1 BACKGROUND AND MOTIVATION 77
5.1.2 PROBLEM STATEMENT AND OBJECTIVES 77
5.2 LITERATURE REVIEW 79
5.2.1 FIRM PERFORMANCE 79
5.2.2 ENTREPRENEURSHIP 79
5.3 METHODOLOGY 81

5.3.1 DATA 81
5.3.2 METHODS 81
5.4 RESULTS AND CONCLUSIONS 82
5.4.1 OPERATING EFFICIENCY OF FARMERS 82
5.4.2 ENTREPRENEURIAL COMPETENCIES OF FARMERS 83
5.4.3 ENTREPRENEURIAL COMPETENCIES INFLUENCING FINANCIAL PERFORMANCE 83
5.5 RECOMMENDATIONS 84
REFERENCES 86

LIST OF FIGURES

Figure 4.1: Cumulative probability distribution of operating efficiencies for the farmers. 63

Figure 4.2: Distribution of scores for entrepreneurial competencies among the farmers 68

LIST OF TABLES

Table 2.1: Measurement for determining the farm performance according to FFSC, namely the farm financial ratios ("Legal 21") 7

Table 2.2: Conceptual competency clusters and underlying competencies 28

Table 2.3: Distribution of competencies within the questionnaire used by Man (2001) 32

Table 3.1: Measures of financial performance according to ratios used in the study 38

Table 3.2: Financial performance distribution of the respondents' farming business 40

Table 3.3: Statements used to determine the entrepreneurial competencies of farmers. 44

Table 3.4: Kaiser-Meyer-Olkin Measure of Sampling Adequacy and Bartlett's Test of Sphericity for the statements Q01 to Q17 50

Table 3.5: Rotated component matrix for statements Q01 to Q1.7 51

Table 3.6: Kaiser-Meyer-Olkin Measure of Sampling Adequacy and Bartlett's Test of Sphericity for statements Q18 to Q40. 53

Table 3.7: Rotated component matrix for statements Q18-Q40. 53

Table 3.8: Kaiser-Meyer-Olkin Measure of Sampling Adequacy and Bartlett's Test of Sphericity for statements Q41 to Q53. 55

Table 3.9: Component matrix for variables Q41-Q53. 56

Table 4.1: Summary statistics for financial efficiency of farmers 62

Table 4.2: Financial ratio score distribution for the efficient farms and inefficient farms 64

Table 4.3: Eigen values for entrepreneurial competencies efficiency regression model 71

Table 4.4: Significant PC for the operating efficiency 72

Table 4.5: Level of significance and correlation of entrepreneurial competencies compared with operating efficiency. 73

CHAPTER 1

INTRODUCTION

1.1 BACKGROUND AND MOTIVATION

Agriculture is one of the most important sectors within the South African economy, as it contributes to various levels within the economy. In 2015, the direct contribution of primary agriculture to the South African GDP (Gross Domestic Product) was 2.3 % (GDP Fact Sheet 2nd Quarter, 2015). Agriculture also provides employment, especially within rural areas, creating job opportunities for the educated and uneducated populations of the South African labour force. The agricultural sector also creates opportunities for domestic growth, employment expansion, and foreign exchange income. Taking these opportunities into consideration, a focus on expanding the agricultural sector (i.e. growth, business integration and employment) is thus expected to contribute significantly towards growing the economy of South Africa.

Increasing costs, for example production costs or operating costs, within the South African agricultural sector has been limiting growth opportunities. Increasing input prices within the agricultural sector, together with decreasing commodity prices, has created a cost price squeeze in agriculture (ABSA Agricultural Outlook, 2015). The cost price squeeze puts the profitability of farmers under increased pressure. In addition to shrinking profit margins, farmers also now have increased pressure to produce more in order to survive within a volatile market. The price volatility and underfunding from financial institutions have placed more pressure on farmers to become innovative within their farming business to increase performance (Asfaha & Jooste, 2007). Therefore, farmers need to be innovative to ensure that their farming enterprises remain profitable and competitive within the dynamic environment.

A farm's performance is measured by how successful it is within the market. The farm's performance is determined by financial and non-financial measurements. Non-financial measurements include employee growth, job satisfaction, self-sufficiency and so forth. However, financial performance is focused on minimising costs, increasing business growth,

and sustainability to increase profitability. There is a link between a farm's financial performance and the skills of the manager/owner, thereby creating a need for improved decision-making skills (Man, Lau & Chan, 2002). The decision-making ability of an entrepreneur has been identified as being an important skill for gaining profitability and increasing business success.

An entrepreneur, as a farmer, is a person who takes more risks, provides capital within the business, is innovative and has the ability to seek opportunities in order to increase profits (Bergevoet, 2005). However, to achieve business success, a farmer needs to make strategic, as well as innovative, decisions concerning all levels of the business. Therefore, farmers rely on entrepreneurial competencies and characteristics to enable them to become more successful. The topic of entrepreneurial competencies has increased in popularity, as a way for determining entrepreneurial behaviour among individuals. Man *et al*. (2002) identified competencies that line up with the literature on which characteristics an entrepreneur needs to have in order to exhibit entrepreneurial behaviour. The entrepreneurial competencies, linked with behaviour and decision-making skills, have been proven to positively influence the financial performance of a business.

1.2 PROBLEM STATEMENT

The topic of entrepreneurial competence has received little attention in the context of financial performance, despite the fact that profit margins are under pressure in the agricultural sector and the view that entrepreneurial skills are expected to have a positive influence of on decision-making. However, the importance of entrepreneurial skills for sound business decision-making is evident from literature. The link between entrepreneurship and financial performance is reflected in the decision-making abilities of the farmer, and this topic has received little attention from researchers in the context of decision-making in agriculture.

The topic of financial performance in agriculture, however, has received ample attention over the last few decades. Swenson (2003) explains that financial records are set in a structured format that allows producers to summarise their financial information so that it eases the decision-making process. Researchers have focused on increasing profit (production) by decreasing costs (input costs). This means that a farming business needs to pursue liquidity and profitability to improve its financial performance (Sebe-Yeboah & Mensah, 2014). Therefore, recommendations centralise around improving the financial performance through increasing both liquidity and profitability. This is, however, done by making appropriate decisions, which forms part of entrepreneurial skills.

Researchers have explored the relationship between entrepreneurial skills and technical efficiency of farms in South Africa (Jordaan, 2012; Jordaan & Grové, 2012). A positive relationship was found and recommendations were made to place more emphasis on extending the entrepreneurial skills of smallholder farmers to improve their performance. However, to this researcher's knowledge, no research has been done proving the relationship between entrepreneurial competencies of farmers and their financial performance in a South African context. Thus, there is no scientific evidence available that proves that entrepreneurial competencies may contribute to improve the financial performance of farmers.

1.3 OBJECTIVE

The main objective of this study is to explore the relationship between the entrepreneurial competencies of farmers and the financial performance of their farms to determine whether initiatives focused on improving the entrepreneurial competencies of the farmers will contribute towards improving their financial performance.

The main objective will be reached through the completion of the following sub-objectives:

Sub-objective 1: To explore the financial performance of these farmers to establish whether they are financially maintainable and profitable. Financial ratios will be used to determine ratios in each of the liquidity, solvency, profitability and financial efficiency categories of the farms. A financial ratio-based DEA model will be used to determine a single variable, operating efficiency, which can be used to compare against the entrepreneurial competencies.

Sub-objective 2: To measure the entrepreneurial competencies of farmers in order to determine if the farmers exhibit entrepreneurial competencies through their observed behaviour. Entrepreneurial competencies were measured using the entrepreneurial competence instrument, developed by Man (2001).

Sub-objective 3: To explore the relationship between entrepreneurial competencies and financial performance of the farmers to determine whether or not the entrepreneurial competencies of farmers can contribute towards predicting the variation in financial performance.

1.4 OUTLINE OF THE STUDY

The remaining part of this dissertation is distinctly organised into 4 remaining chapters. **Chapter 2** consists of a literature review which will provide an overview of the relevant literature on entrepreneurial characteristics of farmers, as well as the literature on financial performance of farmers. In Chapter 2, there will be a discussion on the methods of measuring/determining these two aspects. **Chapter 3** describes the methodological framework of the dissertation. In **Chapter 4,** the focus will be on the research results and a discussion on the findings. The concluding chapter, **Chapter 5**, is the summary of the dissertation, setting out the conclusions, as well as recommendations.

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

Chapter 2 provides an overview of the relevant literature on farm financial performance and entrepreneurship (specifically, farmers as entrepreneurs). This chapter consists of three main sections. Firstly, the firm performance of a farm, focusing on financial performance is discussed. Secondly, the theory of entrepreneurship will be discussed with specific reference to entrepreneurial theories and approaches. Lastly, methods for determining the influence of entrepreneurial competencies on the financial performance of a farm are examined.

2.2 FIRM PERFORMANCE

A firm's performance is an indicator of whether the firm is considered to be successful within a market, taking into consideration a variety of different outcomes (Walker & Brown, 2004). Firm performance is thus a significant indicator to determine whether a firm is viable and successful in its current activities. Because different measurements are used in determining performance, there is no consensus on the appropriate measures of performance (Wiklund, 2006).

A common distinction for performance measurements is between financial and non-financial measures (Rauch, Wiklund, Lumpkin & Frese, 2009). Non-financial measures include self-sufficiency, customer satisfaction, employment increase with employee growth, and job satisfaction, as well as the ability to balance work and family (Walker & Brown, 2004). For the purpose of this study, the focus will be on the financial performance measure. There are specific measurements available to measure financial performance.

2.2.1 FINANCIAL PERFORMANCE

The objective for any business is to use inputs in order to create an output that can be sold for a profit, and the same can be said for a farm. A farm makes use of inputs, such as feed, seed, and fertiliser, to produce crops or livestock, therefore pursuing the same objective of

any other business (producing an output in order to make a profit). As a farm is considered a business, and the main objective, in the past, was to maximise profit (Carter & Rosa, 1998). Today, however, there are additional factors involved, i.e. minimising cost, increasing business growth, increasing family time, avoiding debt, and achieving sustainability to be successful; hence, the focus is more on the sustainability of the farming business for future generations (Olson, 2010). Financial performance is an important part of any business, including a farming business. For a farmer to be successful, he or she needs to be able to determine the financial structure to assess whether the farm's financial performance is viable. Effective record-keeping can help with determining the long-term performance, and provide an overall picture of the farm's financial performance (Henning, 2011). Thus, the financial performance of a farm is important in agriculture, as it provides the measures needed to evaluate the financial statements of a farming business to determine the success of the businesses performance.

Farmers need financial statements to compare the actual performance of the business against the planned performance (Pena, Klinefelter & Warmann, 1999) and past performance. Efficient production of farming operations has been shown to be an important factor in financial performance (Gloy, Hyde & LaDue, 2002). However, most farmers prefer not to concentrate on their planning, record-keeping and marketing, but rather on production (Pena *et al.*, 1999). Pena *et al.* (1999) further explain that effective managers must be able to determine the financial performance of the farming business at any given time. The reason for this being that a farmer can learn from past performances.

Contentment with past performance may elevate future business aspirations, leading to an increase in the ambitions of the businesses' future financial goals (Lant & Shapira, 2008). To fully understand the financial performance of any business, historical data is important. Historical data can be used to determine what factors might have negatively influenced the performance of the farm. Therefore, constant evaluation and re-evaluation of the financial performance of the farm is considered important.

Performance evaluation of any business is an important process where the owners receive feedback on the actions taken within the business to stay competitive and increase profitability (Burja & Burja, 2013). If farmers want to be successful in a volatile economic environment, they need to manage their resources better and be more effective business managers (Lewis, 1998). According to the Farm Financial Standards Council (FFSC, 2011), the five measurements that can be used by farmers to determine their financial performance are: Solvency, Liquidity, Profitability, Repayment Capacity and Financial Efficiency. To calculate these five measurements, the farmer needs to have a complete balance sheet and

income sheet (Feng & Wang, 2000). If all the financial statements and the financial ratios are analysed, more insight will be gained into the financial position and performance of the business (Pena *et al.*, 1999). Shown in Table 2.1 below are the formulas of the five measurement categories that are measured by the "Legal 21" used by the FFSC (2011).

Table 2.1: Measurement for determining the farm performance according to FFSC, namely the farm financial ratios ("Legal 21")

LIQUIDITY	
1. Current ratio	= Total current farm assets / Total current farm liabilities
2. Working capital	= Total current farm assets / Total current farm liabilities
3. Working capital to gross revenues	= Working capital / Gross farm income
SOLVENCY	
4. Farm debt-to-asset ratio	= Total farm liabilities / Total farm assets
5. Farm equity-to-asset ratio	= Farm net worth / Total farm assets
6. Farm debt-to-equity ratio	= Total farm liabilities / Farm net worth
PROFITABILITY	
7. Net farm income	= Gross cash farm income – Total cash farm expenses (excluding compensation of management team, capital interest and rent) +/- Inventory changes – Depreciation
8. Rate of return on farm assets (ROA)	= Return on farm assets / Average farm assets (Return on farm assets = Net farm income – Value of operator labour and management)
9. Rate of return on farm equity (ROE)	= Return on farm equity / Average farm net worth (Return on farm equity = Net farm income – Value of operator labour and management)
10. Operating profit margin	= Return on farm assets / Value of farm production (Value of farm production = Gross cash farm income +/-

	Inventory change of crops, livestock & other income items – Feeder livestock purchases – purchased feed)
11. Earnings Before Interest Taxes Depreciation and Amortisation (EBITDA)	= Net farm income + interest expenses + Depreciation and amortisation expenses
REPAYMENT CAPACITY	
12. Capital debt repayment capacity	= Net farm income + Depreciation + Net non-farm income – Family living & income taxes + Interest expenses on term loans
13. Capital debt repayment margin	= Capital debt repayment capacity – Scheduled principal and interest on term loans (includes payments on capital leases)
14. Replacement margin	= Capital debt repayment capacity – Unfunded (cash) capital replacement allowance
15. Term debt coverage ratio	= Capital debt repayment capacity / Scheduled principal and interest on term loans (includes payments on capital leases)
16. Replacement margin coverage ratio	= Capital debt repayment capacity / [Scheduled principal and interest on term loans (includes payments on capital leases)+ Unfunded capital replacement allowance]
FINANCIAL EFFICIENCY	
17. Asset-turnover ratio	= Value of farm production / Average farm assets
18. Operating expense ratio	= (Total farm operating expenses excluding interest – Depreciation) / Gross farm income
19. Depreciation-expense ratio	= Depreciation / Gross farm income
20. Interest-expense ratio	= Farm interest / Gross farm income
21. Net farm income ratio	= Net farm income / Gross farm income

Source: Becker, Kauppila, Rogers, Parsons, Nordquist & Craven (2009).

2.2.2 LIQUIDITY

Table 2.1 above shows that liquidity is measured with the use of the current ratio; the working capital; and the working capital against gross revenue ratio. Liquidity is a measure of the ability of a farm to pay its short-term debt and other expenses within one year (Blocker, Ibendahl & Anderson, 2003; Olson, 2010). Liquidity consists of components that include the level of investment in current assets, as well as the amount of financing (credit) in the short term (Henning, 2011). In the following section, the current ratio, working capital and the working capital against gross revenue will be discussed.

- Current ratio

Current ratio gives an indication of whether or not the current liabilities would be paid if the current assets were to be liquidated. Liquidity (ability to pay obligations) increases as the current ratio increases (Blocker *et al*., 2003). The ratio is calculated by dividing the current assets of the farm by the current liabilities. A ratio of two to one or higher is generally considered to be good, while a ratio of one to one is the minimum (Blocker *et al.*, 2003). If the ratio is too high, it is not an indication of "good" financial performance. However, a high ratio can also mean that the farm has leeway in meeting the short-term financial commitments, without affecting the normal day-to-day business of the farm (Swenson, 2003).

- Working capital

Working capital is a theoretical measure of the amount of funds available to buy inputs and inventory items, after current liabilities have been paid by selling current assets (FFSC, 2011). Working capital is the amount of current assets that remain after the current liabilities have been paid (Henning, 2011). The measurement is calculated by subtracting the current liabilities from the current assets. Working capital is at its most accurate when it is benchmarked historically for the same farm (Blocker *et al.,* 2003). The working capital measurement exercise needs a better understanding of how the farm works, the risks associated with the farm, and the future plans of the farm (Olson, 2010). A too-high working capital value may indicate that the current assets are not being used to their fullest capacity to increase the profitability of the farm. Because this measurement is in currency value and is not a ratio, it is difficult to use it to accurately compare it with other farms (Blocker *et al.*, 2003).

- Working capital against gross revenue

Working capital against gross revenue is a better measure of liquidity than that of just working capital, as it takes into consideration the size of the farm, e.g. the amount of livestock, hectares planted, and the differentiation between crops (Craven, Nordquist & Klair, 2011). Again, the higher the ratio is, the better, as it is an indication of higher liquidity of the farm. Working capital against gross revenue ratio is considered to be a better measurement than working capital due to it being a ratio, rather than a currency value.

2.2.3 SOLVENCY

Solvency is a measure of how well a farming business is able to repay its debt, if all the farming assets were to be liquidated and used to pay the debt at a specific point in time (Blocker *et al.*, 2003). Solvency is considered to be a good indicator, both of the percentage of the farm that is owned by the farmer, and of the percentage of the farm that is owned by creditors, such as banks. Table 2.1 above shows that there are three measures to assess solvency, namely Debt to Asset ratio; Equity to Asset ratio; and Debt to Equity ratio.

- Debt to Asset ratio

The debt to asset ratio compares the farms debt obligations owed by a farmer to the value of the farm assets (FFSC, 2011). Debt to asset ratio is used to determine the financial position of the farm and is also referred to as the leverage of the business (Boehlje, Dobbins, Miller, Miller & Barnard, 1999). The debt to asset ratio is difficult to interpret because the lifecycle of the business influences the ratio. An emerging farmer will/can have higher ratios than those of existing or more established farmers, the reason being that more of the farm's assets are leveraged (Blocker *et al.*, 2003; Henning, 2011).

As shown in Table 2.1 above, the debt to asset ratio is calculated by dividing total farm liabilities by total farm assets (measured as a percentage). The higher the debt to asset ratio is, the larger the risk exposure of the farming business will be (FFSC, 2011). Debt to asset ratio for a specific farm is dependent on the age of the business and the farming industry in which the farm operates. Smaller ratios are preferred, because a smaller ratio indicates that the farming business has a better chance of maintaining the solvency of the farm (Kay, Edwards & Duffy, 2004). However, if a farm is experiencing a large growth phase, the amount of credit the farm has will be bigger (Mehrotra, 2010). The solvency of a farm is very important for farmers to remember (i.e. if there are periods of drought, floods, and drastic

price changes etc.) which can result in unfavourable economic conditions, and which is when the farm will need to be solvent to survive.

- Equity to Asset ratio

The equity to asset ratio is used to measure the percentage of the total farm assets that are financed by the farmer's own equity, or the owner's claims against the assets of the business (Henning, 2011; FFSC, 2011). The equity to asset ratio is calculated by dividing the total farm equity by the total farm assets (Table 2.1 above). A higher equity to asset ratio is preferred, as the higher ratio implies that a larger portion of the assets of the farm is owned by the farmer, thus decreasing the creditor's risk (Olson, 2010).

- Debt to Equity ratio (leverage)

Leverage, or the debt to equity ratio, is defined as the relationship between the farm's debt and the equity (capital) used to finance the farming business (Henning, 2011). Total farm liabilities are divided by total farm equity (Table 2.1 above). Leverage can be favourable for farming operations, but it depends on how debt is used within the business (Boehlje *et al.*, 1999). However, according to Boehlje *et al.* (1999), a farm with a small amount of debt can be limited in its operations (i.e. efficiency, farm operations growth and earning capacity).

The balance between profitability and the amount off assets owned by the firm is important. Funds generated by assets are not only needed to repay debt, but also help in contributing to the profitability of the farm. The indicators of profitability as a measure of financial performance are discussed next.

2.2.4 PROFITABILITY

Profitability is a measure of the profit that the farm generates through its day-to-day operations (Blocker *et al.,* 2003). Profitability gives an indication of how well the farm uses the available resources, assets and equity to increase its revenues. A higher value is preferred for all five of these measures (Olson, 2010). As shown is Table 2.1 above, there are five measurements used to measure profitability, namely Net Farm Income (NFI); Rate of Return on Farm Assets (ROA); Rate of Return on Farm Equity (ROE); Operating Profit Margin; and Earnings Before Interest, Taxes, Depreciation and Amortisation (EBITDA).

- Net Farm Income (NFI)

The NFI is reported in the income statement and is a currency value, and not a percentage or ratio (Blocker *et al.*, 2003; Henning, 2011). According Kantrovich (2011), Net Farm Income represents the return on three aspects, namely labour, management and equity that has been invested in the farming business. As with the working capital, the currency value determined is used as a benchmark against historical data of the farm to measure the farms past performance.

- Rate of Return on Farm Assets (ROA)

ROA is the ratio determined by the income earned by a business, compared with the assets used within the operation of the business (Sebe-Yeboah & Mensah, 2014). The ROA ratio is one of the most important ratios used to compare farms with each other, as it can be used to compare farms' operations over an extended period of time (FFSC, 2011). Burja and Burja (2013) confirm that the ROA ratio is important in determining the profitability of the farm. The higher the value of this ratio, the more profitable the farming business will be. A lower ratio, on the other hand, means that there is room for improvement to increase profit.

- Rate of Return on Farm Equity (ROE)

ROE relates to the profit, as well as the resources, contributed by the farmer; thus, the ROE ratio is dependent on the ROA ratio and the use of leverage (Sebe-Yeboah & Mensah, 2014). ROE will be greater than ROA if the debt capital is used resourcefully (Olson, 2010). Blocker *et al.* (2003) state that the ROE ratio more completely reflects the return available from investment outside of the farming business. The ROE ratio gives information on the performance of debt in the capital structure of the farm and is a valuable measure of the performance of the owner's equity (Henning, 2011). A higher ROE is preferred and the ROE should be compared with the opportunity cost of capital, for example the rate of returns of other investments (Olson, 2010).

- Operating Profit Margin

The operating profit margin measures the profitability of the farm in terms of the return per monetary unit of gross revenue (FFSC, 2011). Thus, the operating profit margin ratio focuses on the per unit production that generates profit. The operating profit margin is calculated by dividing the ROA by the value of the farm production (Table 2.1 above). This ratio is calculated after all the operating costs (value of the farm production) have been paid, thereby giving an indication of the overall profit after all the expenses linked to farming a

crop or producing livestock have been covered. However, "*if expenses are held in line relative to the value of output produced, the farm will have a healthy profit margin*" (Olson, 2010).

- Earnings Before Interest Taxes Depreciation and Amortisation (EBITDA)

EBITDA measures the earnings available to be used for debt repayment. EBITDA is determined based on information derived from the farm's Income Statement. This measurement takes into consideration all the contributing factors in regard to earnings, specifically showing the amount available for the repayment of any of the farm's debt. Amortisation represents the projected expenses of an intangible asset, over the lifetime that it will be used. Depreciation is the calculation of the decrease in the value of an asset, although there are several measurements for calculating depreciation. EBITDA is measured as a currency value.

2.2.5 REPAYMENT CAPACITY

Repayment capacity is a function for measuring a farmer's ability to repay term debt by means of using farm and non-farm income (Blocker *et al.,* 2003). This measurement is determined by four ratios: Term Debt Capital Lease Coverage; Capital Replacement Margin; Term Debt Repayment Margin; and Replacement Margin Coverage Ratio.

- Term Debt Capital Lease Coverage Ratio

The term debt capital lease coverage ratio provides a measure of the capability of a farmer to cover all term debt and capital lease coverage payments before the acquirement of unfunded assets (FFSC, 2011). The ratio is considered to be better, the higher the ratio is. Thus, if the ratio is higher (1.75 and higher), then the ability to pay debt repayments is higher.

- Capital Replacement Margin

The capital replacement margin allows farmers and financial institutions to evaluate the ability of a farmer to generate the funds necessary to repay debts that are considered long-term, namely longer than one year (FFSC, 2011). As with term debt, the higher the ratio is, the better will be the ability to repay the debt (credit) used to finance the year's operating expenses within one year.

- Term Debt Repayment Margin

The term debt repayment margin is the same as capital replacement margin, as it is also used to determine the ability of the farmer to generate funds to repay debts that are due within one year and to replace assets used to pay these debts. This measurement assumes that the credit obtained to pay operating expenses of the farm will be paid off within one year of acquiring the funds (FFSC, 2011).

The term debt repayment measurement is presented as a currency value, which makes the measurement difficult to compare with other farms. However, it is possible to compare the historical data from the same farm through the years.

- Replacement Margin Coverage Ratio

Replacement margin coverage ratio is the last ratio that forms part of the repayment capacity measurement. As shown in Table 2.1 above, to measure this ratio, capital debt repayment is divided by the sum of the scheduled principal and interest on term loans which is then added to the unfunded capital replacement allowance. The ratio simply measures whether the farm has the ability to pay all of its term debts on time, and purchase capital assets only from income. A ratio lower than one to one indicates that the farmer had not generated sufficient income and therefore is unable to pay term debt payments (Olson, 2010).

2.2.6 FINANCIAL EFFICIENCY

Financial efficiency measures how well a farmer uses assets to generate revenues and how efficient the farmer is with cost control (Blocker *et al.*, 2003). Shown in Table 2.1 above are the five ratios that are used to determine financial efficiency, namely Asset Turnover Ratio; Operating Expense Ratio; Depreciation Expense Ratio; Interest Expense Ratio; and Net Farm Income from Operations. If the last four ratios are calculated correctly, they should sum to one (Olson, 2010).

- Asset Turnover Ratio

The asset turnover ratio is a measurement of how resourcefully the assets on the farm are used to generate revenues from farming operations. By increasing farm revenues, one can improve the asset turnover of the farm (Blocker *et al.*, 2003). The ratio is calculated by dividing the gross revenues by the average total farm assets, thus all of the income generated from selling the product of the farmer is divided by the assets used to produce the

products. A higher ratio suggests that the assets are used more effectively to generate revenues (FFSC, 2011).

- Operating Expense Ratio

The operating expense ratio indicates the relationship between all of the operating expenses and the gross revenue. As seen in Table 2.1 above, the operating expenses are divided by gross revenue to indicate the percentage of revenue that is used to fund operating expenses. A lower expense ratio is better, but it is dependent on how old the equipment is: farms with older equipment will have higher ratios (Blocker *et al.*, 2003) due to older equipment needing more maintenance. A lower ratio indicates that a smaller percentage of the revenue is used to fund the operating of the farm.

- Depreciation Expense Ratio

The depreciation expense ratio is calculated by dividing depreciation by gross farm income, and is thus an indication of the depreciation of farm resources. The depreciation expense ratio is difficult to calculate owing to the variety of methods used to calculate depreciation (Blocker *et al.*, 2003). The ratio can also vary according to the farm type (FFSC, 2011). A low depreciation ratio indicates the use of older equipment and this may indicate that operating expenses are higher. However, the problem with depreciation is that there are different means of calculating depreciation and there is no specific reference as where to use what method.

- Interest Expense Ratio

Interest expense ratio indicates the relationship between interest expenses to the gross revenue (FFSC, 2011). The interest expense ratio shows the amount of interest that is being paid by the farmer and this should be decreasing over time. A percentage lower than 10 % would be acceptable for the interest expense ratio. This measure indicates whether or not the farm has too much debt (Blocker *et al.,* 2003) attributable to interest being paid on outstanding debt.

- Net Farm Income from Operations Ratio

Net farm income from operations is a ratio that shows the relationship between the net farm income from operations to the gross revenues (FFSC, 2011). The ratio measures the gross revenue after expenses have been paid. If the ratio is higher than 20 %, it is considered to be good.

From the 21 measurements in Table 2.1 above, Olson (2010) highlighted the point that only nine of these measurements are needed to evaluate the financial performance and financial position of a farm. According to Olson (2010), these nine measurements are Current ratio; Working capital to Gross revenues; Net worth/Equity; Debt to Asset ratio; Net farm income; ROA; ROE; Operating profit margin; Replacement margin and Replacement margin coverage ratio.

All of the measurements discussed are used to determine the "legal 21" and, ultimately, the financial performance of a farm. Measures are all individually indicated and do not indicate one overall indicator for use to rank farms according to financial performance efficiency. However, to be able to determine how farms can be ranked according to one another, a measurement is needed. A possible measurement that can be used to assess financial performance is the financial-based DEA model that will be discussed next.

2.3 DATA ENVELOPMENT ANALYSIS (DEA) TO ASSESS FINANCIAL PERFORMANCE

The financial-based DEA model was developed by Fernandez-Castro and Salimi (1998) and then further developed by Al-Shammari and Salimi (1998) who used this model to determine the performance of banks situated in Jordan. The adapted DEA model was also used by Ablanedo-Rosas, Gao, Zheng, Alidaee and Wang (2010) to determine the relative efficiency of Chinese ports. Most of the DEA studies have focused more on operational performance. However, the financial performance directly influences the survival of a business (Ablanedo-Rosas *et al.*, 2010)

The DEA model is a non-parametric mathematical programming model which was developed by Charnes, Cooper and Rhodes (1978) and is based on the relative efficiency concept developed by Farrell (1957). The concept is based on the fact that it is difficult to compare groups with each other. Therefore, with this model, the efficiency of a decision-making unit (DMU) can be evaluated by comparing it with other DMUs in the group.

To explain DEA, the best approach is to first explain the index numbers (Sarafidis, 2002). Sarafidis (2002) explains that to calculate the efficiency with non-parametric mathematics, across several firms, a simple index of relative performance can be used.

$$efficiency\ score = (\beta_1\gamma_1 + \beta_2\gamma_2 \dots\dots\dots \beta_i\gamma_i)/cost$$

Where γ indicates different levels of output and β are the weights of each of these outputs. Certain problems do, however, arise with simple indexes. There is an assumption of

constant returns to scale, which means that the weights attached to the outputs take equal value for all firms (Sarafidis, 2002). This can lead to a disadvantage owing to the assumptions not always being true. To help eliminate this disadvantage, DEA makes use of weights.

Sarafidis (2002) explains that the objective of the DEA is to make use of linear programming in order to find weights that will maximise the efficiency score for firms. There is, however, the constraint that no farm can have an efficiency score greater than 100 % (Henning, 2011). The DEA model uses the efficiency index of the equation and can allow the weights of the index to vary for each firm. The reason is that the individual firm's performance can be compared so that all firms are at their best level of efficiency within the group (Henning, 2011).

One of the model's characteristics is that it would reject a solution for a particular firm if the set of weights that maximises the relative performance scores is larger than 100 % (Sarafidis, 2002). This is where the enveloped part of the DEA model finds its basis, by enveloping the observations that are most efficient for each set. This can then be used to determine whether a firm is efficient, compared with another firm, with regard to the weights used to measure the maximum efficiency of the group of firms. In the case of an inefficient firm, there would be one or more firms that are measured to be more efficient, and these firms are considered to be the peer group for an inefficient firm (Sarafidis, 2002).

Al-Shammari and Salimi (1998) modelled the operating efficiency of banks by making use of the DEA model which was adopted from the DEA approach used by Fernandez-Castro and Smith (1994). The model used by Al-Shammari and Salimi (1998) was used by Ablanedo-Rosas *et al.* (2010) to study the relative efficiency of Chinese ports. This model was adapted to an output-orientated version of DEA, based on financial performance (Ablanedo-Rosas *et al.*, 2010). Henning (2011) and Henning, Strydom and Willemse (2013), used the model adapted by Ablanedo-Rosas *et al.* (2010) to carry out financial benchmarking analysis of farmers in the Northern Cape province of South Africa. This study will make use of that model to determine financial performance and thereby create a single measurement variable to be compared against the entrepreneurial competencies of said farmers.

2.3.1 DISCUSSION

All the measures discussed can be used to gain an understanding of a farming business' financial performance. The primary objective of a financial analysis is to assist in making informed decisions, so that a farmer is able to identify the strengths and weaknesses of the

farming business (Martikainen, Perttunen, Yli-Olli & Gunasekaran, 1995; Henning, 2011). A farmer makes decisions that directly influence the financial performance of the farming business.

Record-keeping and knowledge of the financial performance of the farm is thus of the utmost importance to ensure the success of the business. The growing link between farm performance and employee skills has created a need to improve decision-making in order to sustain performance (Man *et al.*, 2002). According to Ketelaar-de Lauwere, Enting, Vermeulen and Verhaar (2002), studies into the managerial tasks of entrepreneurs will help provide an understanding into the way entrepreneurs divide their management into strategic-planning (long-term decision-making in terms of the farm's future), tactical-planning (short-term decision-making in terms of the development of the production procedures) and operational-planning aspects (the physical performance of farming tasks).

There exists a strong relationship between a farmer's characteristics and farm decisions, owing to a farm being (mainly) run as a family business in which the farmer (with the help of his[1] family) is at the same time the entrepreneur, manager and the labour force (Ondersteijn, Giesen & Huirne, 2003). The decision-making process of an entrepreneur is essential in securing profitability and business success. The farmer has to have the skills of an operator, manager and entrepreneur, all at the same time, to ensure the financial success of the farm (Olsson, 1988; Bergevoet, 2005). In the next section, the focus shifts to the entrepreneurial competencies, characteristics and behaviour of individuals.

2.4 ENTREPRENEUR

Entrepreneurship is conceived of as "*a characteristic, behaviour, an activity and a social role*" that an individual exhibits (Misra & Kumar, 2000). Therefore, it is relevant that there exist individual personal characteristics and competencies needed by an individual who is considered to be an entrepreneur (Markman & Baron, 2003). Being entrepreneurial is an expression used to describe people who are innovative, creative and open to change. They are also able to recognise opportunities and use the resources available to them to achieve their approaches and goals (O'Connor & Fiol, 2002).

Ahmad and Seymour (2008) state that there is a lack of agreement on a specific definition for entrepreneurs. The problem is that the term 'entrepreneur' (someone who tends to show

[1] In this dissertation a farmer will only be referred to in the male form, but a farmer can be male or female.

entrepreneurial behaviour) is used synonymously with owner; manager; trader; and owner–manager, which creates confusion in terms of arriving at one specific definition (McClelland, 1967). There is diversity among the different definitions of an entrepreneur within literature. However, there is consensus about certain terms linked to an entrepreneur and entrepreneurship, namely innovativeness, locus of control, opportunity seeking and risk-taking attitude.

The terms that link the definitions of an entrepreneur are "*innovation, opportunity recognition, profit, promoting economic growth and venture creation and change*" (Misra & Kumar, 2000). Knudson, Wysocki, Champagne and Peterson (2004) describe entrepreneurs as people who have a need for achievement. They strive to make a difference in their lives, as well as in the lives of others. Gray (2002) defines entrepreneurs as individuals who manage a business with the intention of expanding/using the leadership and managerial capabilities they have to achieve this. While the concept of an entrepreneur is defined in a number of different ways, the basis of the definitions is that entrepreneurs are individuals who make different decisions, based on advancing himself and his business. Personal characteristics and decision-making skills have been linked to the management capacity of farmers, thereby indicating the importance of entrepreneurship in agriculture (Nuthall, 2001)

According to McElwee (2008), there are two types of farmers, namely the "*farmer as a farmer*" and the "*farmer as an entrepreneur*". He notes that a "*farmer as a farmer*" limits himself in business opportunities. This type of farmer focuses on strategic orientation, based on cost–price decreases, without considering new market opportunities (McElwee, 2008). The "*farmer as an entrepreneur*" is more innovative and searches for new opportunities. According to McElwee (2008), this type of farmer identifies non-farming agricultural prospects/opportunities and uses the farm's resources to create extra revenue for the farm. The "*farmer as an entrepreneur*" is thus more committed to seeing the business being successful in a variety of agricultural aspects. In the next section, the focus will be on a farmer as an entrepreneur.

2.4.1 FARMER AS ENTREPRENEUR

"Farm" or "farmer" is defined as an agricultural enterprise or an agricultural entrepreneur working in animal husbandry, horticulture and arable farming practices (de Lauwere, 2005). According to Carter and Rosa (1998), farmers are primarily owner–managers and therefore a farm is characterised as a business. Historically, the motivation for farmers has not always been financial, but rather the health, which includes growth expansion and succession, of their business (McElwee & Bosworth, 2010).

In recent years, however, there has been a shift in the motivation to personal survival and the survival of the business (McElwee & Bosworth, 2010). The reason being, that there have been major changes taking place in agriculture in the last number of years. New emerging markets, together with shifts in production, have created pressure but also opportunities for farmers (Vik & McElwee, 2011). These changes gave way to finding new ways to adapt and survive within the market. Vik and McElwee (2011) state that adaption strategies, innovation, entrepreneurship and the identification of new opportunities are essential requirements for farmers.

According to McElwee (2006), entrepreneurship is becoming more and more important in modern farming. In South Africa, the topic of agricultural entrepreneurship is still relatively new, although in Europe this topic is receiving ample attention (Nieuwoudt, Henning & Jordaan, 2015). Carter (1998), as well as Carter and Rosa (1998), state that farmers have traditionally been behaving as entrepreneurs. The changing market structures and globalisation of agriculture has increased the need for farmers to be more innovative in their decision-making. Agricultural organisations see entrepreneurship as a form of relief for farmers to be able to cope with the challenges they face in a changing market (Bergevoet, 2005). Kroppd and Lindsay (2001) state that the identification of entrepreneurs in developing countries can help with the acceleration of creating new jobs, which will help stimulate the economic growth of that country.

Bergevoet (2005), however, defines an entrepreneur in terms of agriculture, as a person who is a risk-taker, provider of finances (own capital, but has the ability to gain necessary financial resources), an innovative person and an opportunity seeker with the goal to increase profit. As an entrepreneur, the farmer is responsible for making strategic and innovative decisions to be used as an advantage for the farming business. A farmer that is in charge of a family farm needs to have the skills of a craftsman, manager and an entrepreneur, all at the same time (Olsson, 1988). Bergevoet (2005) explains that a farmer, as an entrepreneur, is responsible for making strategic choices and providing the necessary capital, as a manager, he is responsible for the execution and control of the plans, and lastly as a craftsman, he is responsible for carrying out the tasks on the farm.

Knudson *et al.* (2004) differentiate between possessing entrepreneurial characteristics and acting on them. Entrepreneurs can become comfortable in their careers and may never strive to achieve higher levels of success, while others may seek new opportunities to attain higher job satisfaction. To be successful as an entrepreneur, certain competencies and characteristics are required. According to Onubuogu and Esiobu (2014), for the sustainable development of agricultural businesses, the development of entrepreneurial competencies of

a farmer is important. Entrepreneurs have certain competencies and characteristics which distinguish them from other individuals, and these characteristics and competencies will be discussed under the approaches to assessing entrepreneurship.

2.4.2 APPROACHES TO ASSESSING ENTREPRENEURS

There are three main approaches that have been linked to the study of entrepreneurship, namely the traits approach, the behavioural approach and the opportunity identification approach. According to Kobia and Sikalieh (2010), these three approaches have been used in attempts to understand entrepreneurs and entrepreneurship. These approaches have been discussed by Phelan (2014) and Henning (2016) and will be used as a basis of discussion. Human capital and entrepreneurial skills and competencies will also be discussed.

2.4.2.1 THE TRAITS APPROACH

The traits approach is based on the psychology of an entrepreneur and draws from theories based on personality, focusing on the individual as a promoter of entrepreneurship (Phelan, 2014). The basis of the approach is that entrepreneurial individuals have different personality traits from the rest of the world's population. According to Kobia and Sikalieh (2010), a person with entrepreneurial skills can be distinguished from others through the identification of specific personality traits. There are three main traits that are foremost in this approach, namely need for achievement, locus of control, and risk-taking propensity.

- Locus of Control

The theory of locus of control originates from the work of Rotter (1966), who described locus of control as the way a person expects that an outcome (due to their behaviour) can be influenced by their characteristics and how they react to a situation. Locus of control includes the expectations of an outcome due to fate or luck (Rotter, 1966). Therefore, internal locus of control is a person's belief of how they can exert control over their fortunes. External locus of control, on the other hand, is the belief that one does not have an influence on an outcome.

Rotter (1966) stated that people with an internal locus of control would be more likely to display entrepreneurial behaviour, due to their need to determine (have control over) their own path. According to Schiebel (2002), the locus of control of a successful entrepreneur is his ability to control situations, as well as their outcomes. The literature accordingly suggests

that individuals with a higher internal locus of control will be more entrepreneurial (Bonnet & Furnham, 1991; Mueller & Thomas, 2011).

- Risk-taking Attitude

According to Vesala, Peura and McElwee (2007), it is assumed that an entrepreneur takes calculated economic risks, but with the goal of maximising profit. In agriculture, risk attitudes are usually categorised as risk-taking, risk-neutral and risk adverse. Entrepreneurship, however, creates an additional category of calculated risk-taking. For a manager to manage his risk does not necessarily mean avoiding risk, but rather managing the risk to one's own benefit. An entrepreneur may rationally take on a risk if there is a possibility for a reward. This, however, is something to be measured among entrepreneurs and is not necessarily an integral character trait (Phelan, 2014).

The risk-taking attitude of an individual will determine the type of decisions they will make, either in regard to the farming business, or in general. Entrepreneurs are people who are considered to be optimistic, as well as having a certain level of self-confidence, which are traits of risk takers (Wärneryd, 1988; Chell, Haworth & Brearley, 1991; Brandstätter, 1997; Elfring, 1999). An entrepreneur who is confident will be more likely to see an opportunity as less risky than someone who is less confident. A possible reason for the involvement of entrepreneurs in riskier events is that entrepreneurs evaluate opportunities in a more optimistic way than others do (Palich & Bagby, 1995). Therefore, this leads to the assumption of calculated risk taking.

- Innovativeness

The seeking, creating, developing and implementing of new products or methods are seen as a description of innovativeness (Vesala *et al.,* 2007). An entrepreneur is involved with "*active, dynamic and competitive economic striving*" to seek out new opportunities (Stanworth & Curran, 1991; Stevenson & Jarillo, 1991). An entrepreneur is thus actively looking for new ways to do things, create things, or improve things. This constant search for "new ways" distinguishes entrepreneurs from other individuals, by them being innovative.

- Need for Achievement (nAch)

According to Hansemark (2003), the need for achievement is founded on the expectancy that one can do something better and faster than anyone else can, or better than before. Entrepreneurs have a need for achievement, and strive to make a difference in their own lives and those of others (Knudson *et al.*, 2004). Need for achievement is an internal drive to

succeed and achieve greater and better things. The theory of need for achievement was developed by McClelland (1967). According to McClelland (1967), the need for achievement is higher for entrepreneurs than it is for other individuals. However, Low and MacMillan (1988) found that the need for achievement that McClelland (1967) describes as being higher in entrepreneurs could also be high in a manager, a sales-person or other business-related individuals.

The uncertainty between the relationship for need for achievement and an entrepreneur in the literature contributes to the criticism of the traits approach in determining entrepreneurship. The behavioural approach is suggested as an alternative to the traits approach, where there is a focus on cognitive psychology, rather than on psychological traits (Phelan, 2014).

2.4.2.2 THE BEHAVIOURAL APPROACH

The behavioural approach is more concerned with "what" the entrepreneur does, rather than who he is (Phelan, 2014). According to Phelan (2014), the behavioural approach emphasises the activities associated with the creating of a new venture. Gartner (1989) was one of the first to shed light on the importance of new venture creation with regard to entrepreneurship. There are two concepts within the behavioural approach, namely venture creation and cognitive process/bias and self-efficacy, will be discussed in the following section.

- Venture creation

Venture creation is the basis of the entrepreneurial process and is linked to the world-wide perception that people have of an entrepreneur. Knudson *et al.* (2004) explain that entrepreneurs are highly motivated, and due to the motivation, they start new ventures, which can be in new products or businesses. Thus, the creating of a new venture is a crucial part of the behavioural approach to entrepreneurship.

The behavioural approach is concerned with venture creation, but also considers the individual behaviour as a necessity of the entrepreneur (Phelan, 2014). The entrepreneur needs the willingness and motivation to act upon his ideas in order to implement the venture. The entrepreneur's ideas and intentions form the strategic template of new ventures, products and the processes to ease manufacturing, marketing and distribution (Knudson *et al.,* 2004).

- Cognitive process/bias and self-efficacy

Entrepreneurial activity is planned behaviour and reflects cognitive behaviour (Krueger, Reilly & Carsrud, 2000). Cognitive behaviour explains the mental process followed by an individual in any situation. According to Mitchell, Busenitz, Lant, McDougall, Morse and Smith (2002), cognition/cognitive psychology helps people to interact with other people and their environment, therefore this is the process whereby their sensory input is understood and explained. Thus, it is evident that the cognitive process is how the entrepreneur gathers, interprets and uses the information to create a new venture.

Skuras, Meccheri, Moreira, Rosell, and Stathopoulou (2005) describe the cognitive approach as comprehensive human capital that is acquired through knowledge and experience, accumulated through running businesses. Therefore, the entrepreneur is actively learning how to better his knowledge and apply it within the business, creating a feeling of success. Therefore, knowledge links with self-efficacy, which is one's belief in oneself. The belief is that one is able to apply knowledge to attain success within a business.

Self-efficacy is a person's self-belief or self-confidence (Lans, 2009). It can be described as a person's belief in his ability to achieve goals with confidence and a certain level of motivation. Feelings of self-efficacy and achieving individual goals have been associated with entrepreneurial intentions (Bird, 1995). Efficacy is thus needed in venture creation as a source of belief and motivation that the "entrepreneur" will be able to succeed in creating the new venture.

One of the biggest criticisms of the behavioural approach is that a person is only considered to be an entrepreneur if they create a new venture, but after the creation, the entrepreneurial behaviour ceases to exist. According to Gartner (1989), the behavioural approach can come to an end when the "creation" part of the business is complete. Entrepreneurship is an ongoing process whereby entrepreneurial individuals consistently search for new ways in bettering himself and his businesses, thus the entrepreneurial behaviour never ends.

Another approach that can be used to measure entrepreneurship is the opportunity identification approach, which will be discussed in more detail in the next section.

2.4.2.3 OPPORTUNITY IDENTIFICATION APPROACH

Opportunity, as well as opportunity identification, has been regularly identified as a component of entrepreneurship, one of the most-mentioned traits of an entrepreneur (Chandler & Jansen, 1992; Shane & Venkataraman, 2000; O'Connor & Fiol, 2002; Man *et*

al., 2002; Elfring & Hulsink, 2003; Vesala, & Peura, 2003; Alsos, Ljunggren & Pettersen, 2003; Bergevoet, 2005; Ulhøi, 2005; Dutta & Crossan, 2005; McElwee, 2008; Lans, Hulsink, Baert, & Mulder, 2008; Lans *et al.* 2008; Jack, Moult, Anderson & Dodd, 2010; Ndubisi & Iftikhar, 2012; Webb, Ireland & Ketchen, 2014). Entrepreneurs are those who take advantage of opportunities by using the technological changes and their innovations (Dutta & Crossan, 2005).

Lans *et al.* (2006) states that the identification and the pursuit of opportunities create new ways to study entrepreneurship in terms of learning and development, instead of limiting entrepreneurship to simply venture creation. Opportunity identification is therefore considered as being a very important part of the entrepreneurial process. Bergevoet (2005) has stated that the identification and selection of opportunities, especially the right opportunity for the business, comprise one of the most important abilities of a successful entrepreneur. Entrepreneurial opportunities was first identified and developed by Kirzner (1978; 1983; 1985) and Schumpeter (1928; 1934; 1954), who each had differing theories on how opportunities are identified (Phelan, 2014).

- Schumpeter versus Kirzner

The Schumpeter (1934) theory suggests that opportunities arise through combining already existing resources in new ways, while the Kirzner (1983) theory states that an opportunity is identified within the gaps in the market with the help of using market information that is already available (Phelan, 2014). The difference between the two theories is whether there is access to new information. The Schumpeter (1934) theory needs access to new information, whereas the Kirzner (1983) theory does not require access new information.

Phelan (2014) states that the behavioural approach and the traits approach combined can be seen as the opportunity identification approach, and accordingly it may seem that there is no one approach that is sufficient. Due to the criticisms of the above approaches to entrepreneurship, there has been room for new theories and approaches to be developed. One such approach is the human capital theory, which can be used to determine entrepreneurship among individuals (Lans, Hulsink, & Mulder, 2006). According to Phelan (2014), the human capital theory originates from economics, with a particular focus on the relationship between human resources and financial success.

2.4.2.4 HUMAN CAPITAL APPROACH

According to Skuras *et al.* (2005), entrepreneurial human capital comprises skills and knowledge learned/developed by the entrepreneur. Human capital regulates the capability of the owner of a business to identify an opportunity and to use that opportunity to their advantage. Human capital; Skills; and Knowledge include the number of years' experience; education; training experience; managerial experience; family influences and age (Skuras *et al*. , 2005; Lans *et al.*, 2006).

According to Becker (1964), studies which have traditionally focused on the relationship between human resources and financial success which stems from the human capital theory (Cited in Lans, Van Galen, Verstegen, Biemans & Mulder, 2014). If a profitable opportunity exists, people who tend to have higher levels human capital will identify this opportunity easier (Davidson & Honig, 2003). These human capital factors contribute to giving entrepreneurs an advantage.

According to Skuras *et al.* (2005), human capital comprises the processes that contribute to advanced stages of knowledge which give an entrepreneur a competitive advantage in beginning a thriving and successful venture. A large part of the human capital theory is thus the formal process of gaining a competitive advantage through education and training. Skuras *et al.* (2005) describe this process as a cognitive process, whereby human capital is increased by gaining knowledge through work experience.

There are formal and informal processes for increasing one's human capital, these processes will help the entrepreneur to attain higher standards of abilities in a wide range of entrepreneurial areas, for example "*finance, management and marketing*" (Skuras *et al.,* 2005). It is therefore important to remember that these are not the only significant factors that need to be taken into consideration. According to Davidsson and Honig (2003), human capital is not only gained by formal education, but it also derives from experience and real-world learning that is gained through different experiences, as well as informal education (training courses that are not part of formal education).

Lans *et al.* (2014) propose that the concept of competencies is a useful way to determine and study human capital of entrepreneurs in Small and Medium Enterprises (SMEs). The concept of competencies is to apply skills and knowledge, rather than having skills and knowledge, which enhances the human capital theory to become more practical. In the next section, skills and competencies are discussed.

2.4.2.5 ENTREPRENEURIAL SKILLS AND COMPETENCIES

The entrepreneurial competency approach is becoming increasingly popular as a way of studying entrepreneurial characteristics (Man *et al.*, 2002). Lans, Bergevoet, Mulder and van Woerkum (2005) have stated that, the issue of competency development has been a focal point for literature on entrepreneurship. The competency approach is thus proven to be an appropriate approach for measuring entrepreneurship. According to Phelan (2014), it is accepted within entrepreneurial literature that an entrepreneur needs certain attributes to be able to start a business. These attributes have been defined as "*knowledge, skills, abilities, expertise, acumen and competency*". Before discussing entrepreneurial competencies, the theory of skills and the difference between competencies and skills need to be highlighted. Chell (2013) defines skills as "*multi-dimensional constructs, that comprise of cognitive (knowledge), affective (emotional), behavioural (occupational, job and tasks as well as inherent responsibilities)*" that an entrepreneur has in their skill set. Skills are thus attributes that entrepreneurs use to their benefit in creating or establishing a venture.

Mischel (1973) argues that skills and abilities can be categorised under the same term, namely competencies. Kanungo and Misra (1992) brings to light the point that skills and competencies vary in terms of transferability; skills are standard and linked to an exact situation/task, whereas competencies are transferable to a broader range of situations/tasks. Kanungo and Misra (1992) also suggest that an entrepreneur may have several of these task-specific skills, but the appropriate and suitable use of these skills is expected to be reliant on cognitive competencies.

The competencies approach focuses on the fact that possessing competencies does not make one entrepreneurial, but rather, an individual's behaviour and decisions can help the individual to perform more competitively in areas that actually matter (Man *et al.*, 2002). Man (2001) categorised entrepreneurs according to ten competencies, although of these ten competencies, six are consistently named in literature as being important. The six competencies are opportunity, organising, strategic, relationship, commitment and conceptual competencies. The competencies framework is considered to be useful in assessing the ability of entrepreneurs to perform their role/job successfully. Therefore, entrepreneurial competencies are the underlying characteristics that enable entrepreneurs to gain improved performance by successfully completing tasks, more than others do.

Competencies are observable and measurable in terms of the psychological process of an entrepreneur (Bird, 1995). The six entrepreneurial competencies were identified and defined as a 'competency cluster' by Man and Lau (2005) and were further tested and developed by

Man (2001) and Man *et al*. (2002). Man *et al.* (2002) explain that these competencies are changeable and learnable, allowing for entrepreneurship to be developed further within individuals. In Table 2.2 below, the competencies, as outlined by Man *et al.* (2002), are named, described and their underlying competencies are highlighted. A more detailed description of each of these competencies and their underlying competencies follows.

Table 2.2: Conceptual competency clusters and underlying competencies

COMPETENCIES[a]	**BEHAVIOURAL FOCUS**[a]	**UNDERLYING COMPETENCIES**[b]
Opportunity competencies	Competencies relates to recognising, developing and creating of opportunities through numerous means.	General Awareness International orientation Market orientation
Relationship competencies	Competencies related to person to person (one on one) or person to group based interactions.	Communication Negotiation Networking Persuasiveness Teamwork
Conceptual competencies	Competencies relate to different conceptual abilities, reflected in the behaviour of the entrepreneur.	Conceptual thinking Problem analysis
Organising competencies	Competencies relate to the organisation of various internal and external human, physical, financial and technological resources.	Human Resource Management/Human Resource Development Leadership Planning and organisation
Strategic competencies	Competencies related to the setting, evaluating and implementing of firm strategies.	Learning orientation Management control Result orientation Strategic orientation

Commitment competencies	Competencies that serve as the driving force for the entrepreneur to go ahead with the business.	Self-management Value clarification Vision

Source: [a]Man *et al*. (2002) and [b]Lans *et al*. (2005)

- Opportunity competencies

Opportunity is defined as the possibility for meeting a need created within the market through a creative mixture of resources for delivering superior value (Schumpeter, 1954). An entrepreneur is often described as an individual who seeks and sees new opportunities within the market. For an entrepreneur to be considered successful, he or she needs to be able to recognise opportunities that are in line with his or her business strategies. Identifying and selecting opportunities for a new business comprise one of the most important abilities of a successful entrepreneur (Bergevoet, 2005). According to Chandler and Jansen (1992), an individual's ability to search and assess opportunity strategies are not the only means for identifying opportunities, as entrepreneurial alertness is another form of identification. Gaglio and Katz (2001) explain entrepreneurial alertness as being the individual's ability to notice without searching. Table 2.2 above shows that several aspects can be placed at the core of opportunity competence. The underlying competencies are placed at the core of the behavioural focus, identifying opportunities at different levels. According to Lans, Verstegen and Mulder (2011), opportunity competency is linked to an individual being able to be aware of opportunities, and seeing opportunities within the local market, as well as for broadening the horizon of the enterprise.

- Relationship competencies

Relationship competencies are based on interactions between the farmer and other people, either as individuals or as groups. According to Gielen, Hoeve and Nieuwenhuis (2003), it is important for a farmer to possess social skills in order to be able to gain access to knowledge sources. Therefore, a farmer needs to be able to gain access to the relevant knowledge, either through his own resources or by making use of agricultural expertise and networks. It is important for a farmer to be competent enough to make a decision regarding what level of expertise he needs on the farm, or to be able to communicate to the individual the needs of the farming business (Weinand & Conlin, 2003). The underlying competencies are all interlinked with building relationships, whether through networking, teamwork, negotiations, etc., to help place the individual in a better market position. Cooney (2005)

confirms this by stating the importance of working in a team in order to become successful in business.

- Conceptual competencies

Conceptual competencies are correlated with the conceptual abilities of entrepreneurs, for example decision-making skills and understanding complicated information (Bergevoet, 2005). Thus, the problem-solving behaviour associated with seeking and implementing new opportunities forms part of these competencies. According to De Wolf, McElwee and Schoorlemmer (2007), innovation skills, risk management, reflection and awareness of threats all need to be possessed by an individual with conceptual thinking ability. The underlying competencies comprising this behavioural focus are closely related to the way an entrepreneur is able to analyse a problem and find a solution by using conceptual thinking.

- Organising competencies

An individual with organising competencies can effectively delegate, organise and coordinate; and efficiently use resources as well as manage employees. These are the competencies that are closely related to managerial capabilities of a farmer. According to De Wolf *et al*. (2007), managerial capabilities (e.g. human resource management, financial management, planning, and leadership) all form part of organisation within the farming business. All of these factors are closely related to the underlying competencies which form part of human resource management and planning.

- Strategic competencies

Strategic competencies are related to the setting, evaluating, and implementing of strategies within a farming business (Man *et al.*, 2002). Strategic planning is associated with the long-term decision-making of a farm's activities. Goal setting, strategic planning, and evaluation, as well as business plan that includes the vision and mission, are important parts of the success of the business and form part of these entrepreneurial competencies (Chell, 2008; Lans *et al.*, 2005; De Wolf *et al.*, 2007; Lans *et al*., 2011). All of these factors that are mentioned correspond with the underlying competencies shown in Table 2.2 above.

- Commitment competencies

Commitment competencies are considered to be the factors that encourage the entrepreneur to take the final leap and start/grow/expand his or her business venture. According to Lans *et al.* (2005), an entrepreneur's internal drive for success in the form of

self-management, as guided by value clarification, is an important factor. Gray (2002) explains that people who are managers of a business, with an intention of growing that business, need to have leadership, managerial and commitment for achieving their goals. According to Baum and Locke (2004), there are important connections between overcoming adversity and the belief in your own competence (self-efficacy).

The specific entrepreneurial psychological characteristics, such as locus of control, risk taking and innovativeness, can be considered to comprise "*the motor of entrepreneurship*" (Bergevoet, 2005). The six important entrepreneurial competencies function as the 'fuel' that is transformed into the energy that drives the 'motor' of entrepreneurial behaviour (Bergevoet, 2005). There is a large focus in the literature on the entrepreneurial competencies of entrepreneurs. The entrepreneurial competencies framework was developed by Man (2001), and will be discussed in the next section.

2.4.3 ENTREPRENEURIAL COMPETENCIES FRAMEWORK

Man (2001) developed the framework and it has been used to test for entrepreneurial competencies among the SMEs of the service sector in Hong Kong. The framework was tested to be accurate in terms of seven of the competencies, including the six competencies which are considered in the literature to be most prominent (Li, 2009). Li (2009) verified the fact that the framework is able to distinguish between entrepreneurs and non-entrepreneurs. The framework can therefore be used to distinguish entrepreneurial individuals in the agricultural sector.

According to Man (2001), the existing measures of entrepreneurial competencies seemed to be limited, and he states that the "most useful" measure is that of Chandler and Jansen (1992). Man (2001) explains that their measure does not cover all of the competencies, so there is a need to look at the different measurement tools available, to "*develop a unifying set of instruments for measuring competencies from a behavioural aspect*". To develop this instrument, Man (2001) compared existing instruments with the components of competency. Man (2001) determined the following competencies to be represented in the questions asked within the questionnaire, and each of these competencies was found to have had a Cronbach's alpha above 0.7, indicating a high level of reliability.

Table 2.3: Distribution of competencies within the questionnaire used by Man (2001)

Competencies	Question	Cronbach's Alpha
Opportunity competencies	1-4	0.78
Relationship competencies	5-10	0.90
Analytical competencies	11-14	0.85
Innovative competencies	15-17	0.87
Operational competencies	18-22	0.90
Human competencies	23-27	0.94
Strategic competencies	28-36	0.94
Commitment competencies	37-40	0.85
Learning competencies	41-45	0.93
Personal Strength competencies	46-53	0.92

This framework consists of 53 statements that are aimed at measuring the 10 competencies. These statements are answered using a 7-point Likert scale. The respondents have to indicate the degree to which they agree with the different statements, where a score of 1 suggests that the individual does not agree with the statement, and a score of 7 indicates that the individual completely agrees with the statement.

In the study done by Man (2001) on the owner/managers of SMEs in Hong Kong, Man (2001) identified four competencies, namely opportunity-, relationship-, strategic- and commitment competencies, that form part of the conceptual competency cluster that has been discussed. The other competencies that Man identified are analytical, innovative, operational, human, learning, and personal strength competencies.

In the factor analysis done by Man (2001), a number of factors within each competency were identified. The factor model suggested that the conceptual competencies would be better if it was divided into two new competencies. These competencies would be analytical and innovative. According to Man (2001), entrepreneurs with conceptual competencies behaviour tend to be more intuitive, although an underlying competency of conceptual

competencies is in problem analysis, where analytical thinking is needed. Innovativeness is commonly associated with entrepreneurial behaviour, as is evident from literature. Accordingly, Man (2001) found that entrepreneurs who are innovative in their behaviour have links toward the conceptual competencies of entrepreneurial behaviour.

The factor analysis also indicated that the organising competencies of the entrepreneurs were better suited if they were separated into operational and human competencies. Operational competencies better reflect the organising of business operations and human competencies required in people management. Human competencies are closely linked with human resource management, which is an underlying competency of organising competencies (Table 2.1 above). The last two competencies identified and used by Man (2001) were learning and personal strength competencies. According to Man (2001), these are support competencies, which are personally focused on the entrepreneur, and are based on how entrepreneurs see their own strength and ability to adapt and learn.

The same factor analysis approach will be used to determine the competencies present among respondents from the agricultural sector. The method used to determine the competencies (Principal Component Analysis) is discussed in Chapter 3 and the competencies identified will be discussed in the results chapter, namely Chapter 4. The next section will focus on an exploration of the influence that entrepreneurial competencies have on the financial performance of an individual.

2.5 EXPLORING THE RELATIONSHIP BETWEEN ENTREPRENEURIAL COMPETENCIES AND FINANCIAL PERFORMANCE

The relationship between entrepreneurial competencies and financial performance is considered to be very important. However, the influence of entrepreneurial competencies on firm performance is underexplored (Gerli, Gubitta & Tognazzo, 2011). There are frameworks that have been suggested for determining the relationship between entrepreneurial competencies (Man, 2001) and firm performance. Firstly, Man (2002) suggests three financial performance measures that can be compared with the individual entrepreneurial competencies. The second framework, conceptualised by Ahmad, Halim and Zainal (2010), suggests that the focus should also be on the individual entrepreneur in order to demine business success. The third framework by Gerli *et al.* (2011) suggests that the focus should not be on the individual, but rather on the whole firm.

To be able to determine the relationship between entrepreneurial competencies and financial performance of a farm, the competencies and financial measurements that will be used need

to be determined. As seen from literature, it is evident that the entrepreneurial competencies framework developed by Man (2001) is used. In the study done by Man *et al.* (2002), it was suggested that the six competencies mentioned in Table 2.2 above could be compared with three factors linked to financial performance. The three factors included efficiency and profitability; growth; and relative performance. Man, Lau and Snape (2008) recommended that the relationship between entrepreneurial competencies and firm performance should be tested in different industries. This indicates that the entrepreneurial framework can be used in the agricultural industry.

The second framework developed by Ahmad *et al.* (2010) used the framework of Man (2001) to determine the entrepreneurial competencies. Their analysis of the entrepreneurial competencies generated eight significant competencies, which they used in their conceptual framework. The study suggests that for a firm to be successful, specific entrepreneurial competencies are needed, i.e. strategic competencies, opportunity competencies, conceptual competencies, commitment competencies, organising competencies, relationship competencies, technical competencies, and personal competencies. All of these competencies are suggested to be positively related to performance (Ahmad *et al.*, 2010). It is, therefore, important that entrepreneurs should school themselves in the relevant competencies to increase their firms' performance, including financial and non-financial performance (Ahmad *et al.*, 2010).

Lastly, Gerli *et al.* (2011) suggested that the trend in profitability and growth over a three-year period needs to be modelled into a competency model to determine the effect of entrepreneurial competencies on financial performance. The financial performance of the firms were categorised into three sections, namely best, average, and poor performance. To determine the effect of the competencies on profitability and growth, a standard non-parametric statistical analysis was conducted using the Mann-Whitney U test. This analysis assisted Gerli *et al.* (2011) to identify which of the competencies led to best, average and poor performances. They used this criteria to group the entrepreneurial competencies. After this, they performed a regression analysis to determine the relationship between financial performance and entrepreneurial competencies. Their conclusion was that competencies have a positive effect on financial performance.

To be able to determine the relationship between the competencies and the financial performance of the farmers in this study, the Principal Component Regression (PCR) method was decided upon. The study done by Gerli *et al*. (2011) concluded positive relationship between one financial performance measure and entrepreneurial competencies, while making use of a regression analysis. Jordaan (2012) and Khaile (2012) used the PCR

method to ascertain the determinants of technical efficiency of small-scale farmers in South Africa. The method uses efficiency scores as the dependent variable and the financial performance of this study will be determined using an output-orientated DEA model to determine the single financial variable (efficiency score).This efficiency score is used as the dependent variable in order to determine whether the independent variables (entrepreneurial competencies) have an influence on it.

The reason for using the PCR as the regression model is to eliminate the multi-collinearity that can occur between a large number of independent variables in a small sample size. Khaile (2012) stated that in a typical regression analysis, problems in the estimation can occur due to correlated variables (multi-collinearity). The reason for multi-collinearity is due to high degree of correlation between a large number independent variables, if these independent variables measure the same variable (Khaile, 2012). The PCR analysis is used to reduce the number of variables that are interrelated variables, whilst still maintaining the necessary variation. Therefore, making this a efficient method for determining the relationship between entrepreneurial competencies and financial perfromance.

2.6 CONCLUSION

In the literature, it has become evident that farmers are under pressure in regard to the market they produce in. The cost price squeeze has created the need for farmers to be innovative in how they can reduce costs and maximise outputs in order to survive in the volatile market.

The financial performance analysis is a well-established concept, with several methods being available for determining the financial standings of a farm. The financial analysis makes use of the “legal 21” measurements to determine the financial standings of a farm. However, this accounts for five different financial concepts within financial performance. Therefore, these measurements give a detailed description of a farm’s finances. In order to have one single variable that can be used to determine the financial performance of a farm, a method of calculation is needed.

A method used by Henning (2011) and Henning *et al.* (2013) was identified as being a sufficient method for calculating a single variable. Henning (2011) and Henning *et al.* (2013) used an output-orientated DEA model to calculate a single variable of financial efficiency, in order to benchmark farmers’ finances against one another. This method is best suited to be used in this study, as it will achieve the objective of determining a single variable that is

needed for determining the influence of a farmer's entrepreneurial competencies on the finances of the farm.

In South Africa, there is no reported evidence of the influence of entrepreneurial competencies on the financial performance of a farm. However, Bergevoet (2005) determined that farmers can be classified as entrepreneurs, thus the decisions made by a farmer will impact on the finances of the farm. This indicates a gap in the knowledge within South Africa for determining the relationship between entrepreneurial competencies and financial performance.

Entrepreneurial competencies have been the focus of determining whether or not an individual may possess entrepreneurial behaviour or not. The method used by Man (2001) is a sufficient way of determining what entrepreneurial competencies can be identified among South African farmers. To determine the relationship between the competencies and the financial performance of the farmers, the Principal Component Regression (PCR) method will be used as it is best suited for achieving the objective of the dissertation. The PCR has the ability to determine if one set of data has an influence on a different set of data, while eliminating multi-collinearity between the independent variables. Thus, this approach will be appropriate to use in determining the influences that entrepreneurial competencies have on financial performance.

CHAPTER 3

METHODOLOGY

The aim of this chapter is to describe the procedures used in this study. The chapter consists of two main sections. The first section is concerned with the data used to determine the financial performance of the farm businesses. The second section sets out a description of the methods used to interpret and quantify the data. The methods are described in three sub-sections. The sections cover financial performance, entrepreneurial competencies and the Principal Component Regression (PCR) model. The financial performance section provides information on the financial ratio measures and support for the financial ratio-based DEA model that will be used to measure the financial performance of the farmers. The next sub-section discusses the survey instrument used to determine the entrepreneurial competencies of the farmers. The last section provides background on the model chosen to determine the influence of the competencies against the financial performance of a farmer.

3.1 DATA

The data used for the research was collected through a formal agreement with a commercial financial organisation in South Africa. The organisation provided access to financial data of their clients (commercial farmers) and also to their personnel during the research. The financial organisation provided data from all nine provinces in South Africa. Therefore, the data was not limited/specific to one region or type of farming.

The financial data was provided first, after which the executive representatives of the clients were requested to rate their clients' behaviour or abilities to perform certain tasks in their farming businesses. The executive representatives work hand-in-hand with the farmers and assist the farmers in their credit applications. Representatives that felt they did not know the farmers well enough withdrew from the data collection procedure. The anonymity of the farmers was ensured for privacy reasons.

The survey was conducted between July and November 2015. However, not all of the surveys were completed, because some of the farmers were no longer clients of the

commercial bank. From a possible 160 respondents[2] available for the research, 99 questionnaires were completed and sent back. Out of the 99 questionnaires received back, only 94 of the respondents provided sufficient financial data for measuring their financial performance according to identified financial ratios. Self-rating was not included in the research to prevent over-stating of own abilities, and research has made use of expert or peer rating to determine entrepreneurial competencies (Lans *et al.*, 2011).

3.1.1 MEASURING FINANCIAL PERFORMANCE OF RESPONDENTS

3.1.1.1 FINANCIAL PERFORMANCE MEASURES

The financial measures used to determine the financial performance for the farmers in this study only include the ratio measures. Ratio measures eliminate the economies of size (currency values), which means that a more realistic comparison of the farms' performance against one another can be seen. The financial measures used to measure the financial performance of the farms are shown in Table 3.1 below. These measures were used to calculate the ratios in this study.

Table 3.1: Measures of financial performance according to ratios used in the study

Financial ratio	Formula	Rating		
		Strong	Stable	Vulnerable
Current ratio	Current assets / Current liabilities	>2		<1
Working capital to gross revenues	Working capital* / Gross farm income	>30 %		<10 %
Debt to asset ratio	Total liabilities / Total assets	<30 %		>60 %
Debt to equity ratio	Total liabilities / Total equity**	<43 %		>150 %
Rate of return on assets	(Net farm income + interest paid) / Total assets	>8 %		<4 %
Rate of return on equity	Net farm income / Total assets	>10 %		<3 %
Operating profit margin	(Net farm income + interest paid) / Gross farm income	>25 %		<15 %
Asset turnover ratio	Farming profit / Total assets	>45 %		<30 %

[2] Although the information concerning the farmers was obtained from representatives of the financial organisation, the farmers will be referred to as 'respondents' for ease of reference, where appropriate.

Operating expense ratio	(Production cost – Depreciation) / Gross farm income	<60 %	>80 %
Net farm income ratio	Net farm income / Gross farm income	>20 %	<10 %

*Working capital = Current assets-Current liabilities; **Total equity = Total assets – Total liabilities

Source: CFFM (2014)

To determine a farm's financial performance, Table 3.1 can be used as a guideline. Table 3.1 illustrates which financial indicators were used and their industry benchmarks (the cut-off values). In order for a farm to be performing "strong", with respect to a certain financial aspect according to the industry benchmark, the farm needs to fall in the green category. If a farm is performing so as to be "vulnerable", it will be in the red category. This indicates what a farmer needs to focus on in order to increase his or her financial performance. However, these are for each specific ratio, and are mere guidelines.

These ratios do not provide a single indication of a farm's performance against other farms. The single variable is needed for the measuring of the relationship between entrepreneurial competencies and financial performance. The financial-based DEA model in the next section is used to determine operating efficiency and can be used to provide a single operating efficiency score for each farm.

3.1.1.2 FINANCIAL PERFORMANCE OF RESPONDENTS' FARMING BUSINESSES

The data characteristics of the financial performance of the respondents' farming businesses are indicated in Table 3.2 below. The performance of the farming businesses are discussed by making use of performance indications suggested by the CCFM (2014), where each measurement can be divided into three performance categories: "strong", "stable" and "vulnerable". Each of the ratios used and the distribution of the percentage of farms according to the categories are shown in Table 3.2.

Table 3.2: Financial performance distribution of the respondents' farming business

Financial ratio	Distribution of ratings		
	Strong	Stable	Vulnerable
Current ratio	36 %	10 %	48 %
Working capital to gross revenues	56 %	21 %	14 %
Debt to asset ratio	4 %	5 %	81 %
Debt to equity ratio	39 %	49 %	6 %
Rate of return on assets	78 %	13 %	3 %
Rate of return on equity	69 %	18 %	7 %
Operating profit margin	88 %	2 %	3 %
Asset turnover ratio	3 %	4 %	87 %
Operating expense ratio	75 %	10 %	9 %
Net farm income ratio	74 %	11 %	9 %

Table 3.2 indicates that most of the ratios indicate "strong" performance for a large percentage of the farms. Liquidity represents the farm's ability to meet financial obligations and was measured by the current ratio and the working capital to gross revenues. The current ratio is concerned with the amount of current assets available to be sold to cover short-term debt. The farms had higher percentage of farms within the vulnerable category, thus the majority of farms will not be able to cover short-term debt with assets. Current ratio is influenced by the fact that farmers make use of production loans. Production loans are expected to be repaid within 12 months, which can influence the liquidity of the farm. However, working capital to gross revenue indicates that the majority of the farms were in the strong category. This shows that even though the farms are not able to pay their short-term debt through selling their current assets, the farms have sufficient capital to pay off short-term debt.

Debt to asset ratio and debt to equity ratio are parts of the solvency measure. Solvency determines whether the farm has the ability to cover all liabilities if everything, including the land, is sold off. The farm's debt to asset ratio provides an indication of how much of the farm is owned by the credit provider, and the higher the ratio is, the more "vulnerable" the farm is, because the credit provider then owns the majority of assets. In terms of the farms in this study, 81 % of the farms are considered "vulnerable", and the farmers need to pay off more of their liabilities to be reclassified into the "strong" category. The farms are highly leveraged. On the other hand, the debt to equity ratio indicates the percentage of the farming business which is owned by the owner. The majority of the farmers are within the "stable"

category, indicating that the majority of the farmers will be able to move into the “strong” category, if they were to decrease the debt owed to the bank.

Profitability of the farm was measured by rate of return on assets, rate of return on equity, and operating profit margin. Overall, the majority of the farms were categorised in the “strong” category for all of the profitability financial measures, indicating that the farms are able to produce products while simultaneously being able to pay their production costs with the income earned. The ROA is the return on investments, more than 78 % of the farms are in the “strong” category, and therefore the return is worth the investment. The ROE indicates the return of investment from the owner’s investment. The majority of the farms are within the “strong” category. The last profitability measure is operating profit margin, which is an indication of how efficiently the farm is operating to generate profit. The ratios of the farms indicate that 88 % of farmers are producing at either a lower production cost or a higher turnover rate, creating a higher profit margin.

The last financial measure is financial efficiency and in order to determine this, the asset turnover ratio, operating expense ratio, and net farm income ratio were calculated. The asset turnover ratio specifies how the farm’s capital is used to generate profit. The majority of the farms are considered to be “vulnerable” because they have too high production costs, compared with production yields. In order for the farms to better their position, an in-depth look at decreasing expenses is needed.

However, the operating expense ratios and net farm income ratios indicate that the majority of the farms are considered “strong”. The operating expense ratios of the “strong” farms have low ratio, indicating that the amount of income used to cover operating expenses is low, and thus the farm is less vulnerable to the volatile market. The net farm income ratio is linked to the operating expense ratio, as this ratio indicates the amount of income left after all expenses have been covered. The majority of farmers are “strong” due to the percentage of the ratio being higher. These two ratios indicate that the farmers in the study need to assess their asset turnover ratio, as there is sufficient income to cover expenses but production costs are too high.

3.2 METHODS

3.2.1 MEASURING FINANCIAL PERFORMANCE

The first sub-objective of this study is to determine the financial performance of the farmers. Therefore, financial performance measures are needed and have been discussed in the

financial performance of respondents' farming businesses section. These measures do not provide a single indication of the financial performance, as a farm can have ratios in different categories. In order to determine the influence of entrepreneurial competencies against financial performance, one single variable of financial performance is needed. The financial ratio-based DEA approach adapted and used by Henning (2011) was applied to obtain a single variable for financial performance.

3.2.1.1 SPECIFICATION OF THE DEA MODEL TO QUANTIFY FINANCIAL PERFORMANCE INTO OPERATING EFFICIENCY

The adapted financial ratio-based DEA model provides an indication of the efficiency of the farms by considering multiple financial ratios simultaneously and providing a single measurement of operating efficiency. According to Henning *et al.* (2013), every farm is seen as a decision-making unit (DMU). The DMU is a term for the assortment of firms or departments that have the same goals and objectives, using the same inputs and outputs to reach their goals (Al-Shammari & Salimi, 1998). The financial-ratio based DEA model combines multiple financial measurements into a single operating efficiency (Henning *et al*., 2013).

The output-orientated financial ratio-based DEA model, with variable returns to scale, is defined as:

Maximise: Z_0

Subject to: $\sum_{n=1}^{N} \lambda_n r_{in} \geq z_0 r_{i0} \qquad i = 1, \ldots\ldots, m$

$\sum_{n=1}^{N} \lambda_n = 1$

$z_0 \geq 0;\ \lambda_n \geq 0\ (n = 1, \ldots\ldots\ldots, \mathcal{N})$

where Z_0 specifies the ratio expansion rate for DMU_0 and λ_n represents the multiplier weights used to determine the efficiency frontier (Henning *et al*., 2013). The total number of DMUs is represented by $\mathcal{N}$ and is judged on m which represents the financial measurements (Al-Shammari & Salimi, 1998). The r_{i0} represents the total number of observed measurements for DMU_0. The mathematical model is calculated and solved for every individual farm, thereby calculating the relative operating efficiency for every DMU (Ablanedo-Rosas *et al.,* 2010). The interpretation of the Z_0 value can be confusing, therefore, to ease the interpretation, an interpretable efficiency score (α) was estimated (Henning, 2010; Henning *et al*., 2013). The higher the Z_0 value (estimated ratio expansion

rate) is, the lower the efficiency level will be. The efficiency score (α) allows for the ranking of DMU_0 or the current DMU. The efficiency score of 1 is considered to be efficient and a score smaller than 1 is inefficient (Ablanedo-Rosas *et al.,* 2010).

Efficiency score (α): $\alpha = \frac{1}{z_0}$ $1 \geq \alpha \geq 0$

The efficiency score determined with the financial-ratio based DEA model will be used in determining the relationship between the entrepreneurial competencies of farmers and their financial performance.

3.2.2 MEASURING ENTREPRENEURIAL COMPETENCIES

The second sub-objective of this study is to determine the entrepreneurial competencies of farmers. The competencies instrument developed by Man (2001) is used to determine the entrepreneurial competencies of farmers. The competencies of the farmers will determined by using a Principal Component Analysis (PCA).

3.2.2.1 INSTRUMENT USED TO EXPLORE ENTREPRENEURIAL COMPETENCIES

The instrument used to measure the entrepreneurial competencies was developed by Man (2001). Man (2001) developed the instrument by considering existing measuring instruments of entrepreneurial and managerial competencies and found that his instrument provides a higher level of reliability for measuring the entrepreneurial competencies, when considered from a behavioural viewpoint. The instrument consists of 53 statements related to the abilities of an individual (as an owner or manager of a business) that are used to measure 10 competencies as determined by Man (2001). The statements are answered with a 7-point anchored Likert scale, where 1 is ‘strongly disagreeing’ and 7 is ‘strongly agreeing’ with the respective statement. Table 3.3 below lists the statements used to determine the entrepreneurial competencies of the respondents. The statements were adapted from the original instrument to ensure that the statements relate to the agricultural sector.

Table 3.3: Statements used to determine the entrepreneurial competencies of farmers.

	Statement
Q01	Identify goods or services the agricultural market needs
Q02	Perceive unmet consumer needs
Q03	Actively look for products or services that provide real benefit to customers and the agricultural market
Q04	Seize high-quality business opportunities
Q05	Develop long-term trusting relationships with others
Q06	Negotiate with others
Q07	Interact with others
Q08	Maintain a personal network of work contacts
Q09	Understand what others mean by their words and actions
Q10	Communicate with others effectively
Q11	Apply ideas, issues, and observations to alternative contexts
Q12	Integrate ideas, issues, and observations into more general contexts
Q13	Take reasonable job-related risks
Q14	Monitor progress toward objectives in risky actions
Q15	Look at old problems in new ways
Q16	Explore new ideas
Q17	Treat new problems as opportunities
Q18	Plan the operations of the business
Q19	Plan the organisation of different resources

Q20	Keep the farming organisation running smoothly
Q21	Organise resources
Q22	Coordinate tasks
Q23	Supervise lower ranking employees
Q24	Lead employees
Q25	Organise people
Q26	Motivate people
Q27	Delegate effectively
Q28	Determine long-term issues, problems, or opportunities
Q29	Aware of the projected directions of the industry and how changes might impact the firm
Q30	Prioritise work in alignment with business goals
Q31	Redesign the department and/or organisation to better meet long-term objectives and changes
Q32	Align current actions with strategic goals
Q33	Assess and link short-term, day-to-day tasks in the context of long-term direction
Q34	Monitor progress toward strategic goals
Q35	Evaluate results against strategic goals
Q36	Determine strategic actions by weighing costs and benefits
Q37	Dedicated to make the venture work whenever possible
Q38	Refuse to let the venture fail whenever appropriate
Q39	Possess an extremely strong internal drive

Q40	Commit to long-term business goals
Q41	Learn from a variety of means
Q42	Learn proactively
Q43	Learn as much as I can in my field
Q44	Keep up to date in my field
Q45	Apply learned skills and knowledge into actual practices
Q46	Maintain a high energy level
Q47	Motivate self to function at optimum level of performance
Q48	Respond to constructive criticism
Q49	Maintain a positive attitude
Q50	Prioritise tasks to manage my time
Q51	Identify my own strengths and weaknesses and match them with opportunities and threats
Q52	Manage my own career development
Q53	Recognise and work on my own shortcomings

The statements in Table 3.3 above are used to measure 10 entrepreneurial competencies identified by Man (2001), which competencies comprise of: Opportunity competencies; Relationship competencies; Conceptual competencies (Analytical competencies and Innovative competencies); Organising competencies (Operational competencies and Human competencies); Strategic competencies; Commitment competencies; Learning competencies; and Personal strength competencies. A brief discussion on each of these competencies follows.

- Opportunity competencies

The identification and development of market opportunities is a very important aspect in relation to entrepreneurial behaviour. Farmers are considered to be in positions where

opportunities may present themselves or are identifiable and the farmers need to make use of these opportunities to their advantage. Therefore, a farmer's behaviour needs to illustrate where he is actively seeking opportunities in the product and consumer market. To measure the ability of a farmer, the following items were used to measure opportunity competencies (Man, 2001): "Identify goods or services the agricultural market needs"; "Perceive unmet consumer needs"; "Actively look for products or services that provide a real benefit to customers and the agricultural market"; and "Seize high quality business opportunities".

- Relationship competencies

Interacting with people, either on an individual or group-based level, is part of being entrepreneurial. Social skills will assist an entrepreneur in communicating and developing the necessary relationships needed to ensure the success of his business. A farmer needs to have the same behavioural social skills in order to communicate instructions to employees, build business networks, obtain knowledge, and to network and negotiate in terms of business activities. The following items were used to measure relationship competencies (Man, 2001): "Develop long-term trusting relationships with others"; "Negotiate with others", "Interact with others"; "Maintain a personal network of work contacts and communications skills"; "Understand what others mean by their words and actions"; and "Communicate with others effectively".

- Conceptual competencies

In order to measure conceptual competencies (Man, 2001), the following statements are used: "Apply ideas, issues and observations to alternative contexts"; "Integrate ideas, issues and observations into a more general context"; "Take reasonable job-related risks"; "Monitor progress toward objectives in risky actions"; "Look at old problems in new ways"; "Explore new ideas"; "Treat new problems as opportunities"., Conceptual abilities comprise an important behaviour quality for an entrepreneur to have. These abilities relate to decision-making skills and problem-solving. Farmers need the same skills and abilities in order to be innovative in managing risk and accessing threats. This is important for farmers because of the volatile agricultural market.

- Organising competencies

The organisation of internal and external resources within a business is an important capability of any manager or entrepreneur. This closely relates to the need for farmers to have managerial capabilities (resource organisation) to determine the required input use to achieve a certain amount of output and to plan with the resources available. The following

statements were used to determine the organising competencies (Man, 2001): “Plan the operations of the business”; “Plan the organisation of different resources”; “Keep the farming organisation running smoothly”; “Organise resources”; “Coordinate tasks”; Supervise lower ranking employees”; “Lead employees”; “Organise people”; “Motivate people”; and “Delegate effectively”.

- Strategic competencies

Strategic competencies relates to entrepreneurs setting and implementing the strategies of their business. For any business to be successful, a clear goal is needed to ensure that long-term goals are reached. Due to the market that farmers form part of, strategic planning is essential in ensuring that the production of the farm will be successful. To determine the strategic competencies needed, the following statements will be used (Man, 2001): “Determine long-term issues, problems, or opportunities”; “Aware of the projected directions of the industry and how changes might impact the firm”; “Prioritise work in alignment with business goals”; “Redesign the department and/or organisation to better meet long-term objectives and changes”; “Align current actions with strategic goals”; “Assess and link short-term, day-to-day tasks in the context of long-term direction”; “Monitor progress toward strategic goals”; “Evaluate results against strategic goals”; and “Determine strategic actions by weighing costs and benefits”.

- Commitment competencies

Seeing any venture through to becoming successful is the commitment factor that encourages an entrepreneur to start or take on a new opportunity. For a farmer, this is an important set of competencies, as farmers are considered to be owner/managers and they need commitment in order to reach goals. To determine the commitment competencies, the statements that follow were used (Man, 2001): “Dedicate to make the venture work whenever possible”; “Refuse to let the venture fail whenever appropriate”; “Possess an extremely strong internal drive”; and lastly, “Commit to long-term business goals”.

- Learning competencies

Acquiring knowledge is a very important behavioural aspect for any person who wants to grow and be able to grow a business. For farmers to rise above in their sector, they need to stay up-to-date with the newest technology available or methods that can be used for production. Thus, learning competencies are an important behavioural ability and are measured by the following statements (Man, 2001): “Learn from a variety of means”; “Learn

proactively"; "Learn as much as I can in my field; "Keep up to date in my field"; and "Apply learned skills and knowledge into actual practices"

- Personal strength competencies

For any entrepreneur to be successful, he or she needs to have certain personal qualities that ensure a personal drive to succeed. This can be said for any owner trying to make a business successful. For farmers, this strength is very important as there are several factors outside their control that can affect their production yield. To measure the personal strength competencies (Man, 2001), the following statements are used: "Maintain a high energy level"; "Motivate self to function at optimum level of performance"; "Respond to constructive criticism"; "Maintain a positive attitude"; "Prioritise tasks to manage my time"; "Identify my own strengths and weaknesses and match them with opportunities and threats"; "Manage my own career development"; and "Recognise and work on my own shortcomings"

3.2.2.2 PROCEDURE FOLLOWED TO EXPLORE ENTREPRENEURIAL COMPETENCIES

The procedure followed by Man (2001) was used to explore the entrepreneurial competencies of the farmers. IBM SPSS Statistics 23 was used to determine the loading patterns for the factor analysis. Byrant, Yarnold and Michelson (1999) summarised the point that factor analysis is a multivariate statistical procedure that is used to decrease a large number of variables into a smaller set of variables (factors). This establishes underlying dimensions between measured variables and latent constructs and it provides construct validity evidence of reporting scales (Byrant *et al.*, 1999).

Factor analysis for determining the entrepreneurial competencies was performed by considering the following assumptions in the procedure. The analysis was performed with a varimax rotation, Kaiser normalisation, and Principal Component Analysis (PCA). Statements included in the determined components had to fulfil the following criteria. The first step is to determine the communalities. The communality value for each statement should be 0.50 or higher, and if not, the statement should be removed. After the communalities have been removed, the component analysis determines the factors included in each component. Costello and Osborne (2005) suggest that a factor loading of 0.50 is enough to be considered "strong". However, if there are cross-loadings between components, the statement should be removed. Lastly, components with an eigenvalue greater than one are included in accordance with the "Kaiser-Guttman" rule (Fekedulegn, Colbert, Hicks & Schuckers, 2002; Williams, Brown & Onsman., 2012).

The Kaiser-Meyer-Olkin Test of Sampling Adequacy (KMO) indicates the degree of variance and the KMO value needs to be above 0.49. The Bartlett test of sphericity is statistically significant if the value is less than 0.001. A Cronbach's alpha of 0.7 or higher will confirm that there is an existing strong internal consistency between the items measuring each of the related competencies.

All of the criteria above were applied to the factor analysis of the three parts of the entrepreneurial competencies instrument. The results are discussed in the section below. The results from the PCA are used to determine the specific competencies, as well as the statements that are significant in determining these competencies.

- Factor analysis for Q01 to Q17

The factor analysis for statements Q01 to Q17 consists of three components. Statements Q04, Q05 and Q09 had communality below 0.50, and they were therefore removed, while Q10, Q12 and Q14 were removed due to cross-loadings. The level of significance for the Bartlett's test of sphericity is less 0.001, thereby indicating the factor analysis to be significant. The KMO value is greater than 0.49, thus the factors are significant as shown in Table 3.4 below.

Table 3.4: Kaiser-Meyer-Olkin Measure of Sampling Adequacy and Bartlett's Test of Sphericity for the statements Q01 to Q17

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.847
Bartlett's Test of Sphericity	Approx. Chi-Square	520.228
	df	55
	Sig.	.000

In Table 3.5 below, the rotated component matrix indicates the statement with high factor loading in three components. The components have eigenvalues greater than one, and the overall cumulative percentage of variance for all three components explains 70.11 %.

Table 3.5: Rotated component matrix for statements Q01 to Q1.7

	Component		
	Conceptual	Relationship	Opportunity
Q15:Look at old problems in new ways	**.796**	.162	.298
Q17: Treat new problems as opportunities	**.795**	.337	.113
Q11: Apply ideas, issues, and observations to alternative contexts	**.719**	.224	.150
Q16: Explore new ideas	**.698**	.417	.254
Q08: Maintain a personal network of work contacts	.370	**.752**	.047
Q07: Interact with others	.396	**.749**	.020
Q06: Negotiate with others	.268	**.719**	.240
Q13: Take reasonable job-related risks	.004	**.690**	.404
Q02: Perceive unmet consumer needs	.228	.204	**.853**
Q01: Identify goods or services the agricultural market needs	.115	.410	**.735**
Q03: Actively look for products or services that provide real benefit to consumers and the agricultural market	.471	-.099	**.637**
Eigen values	5.377	1.213	1.122
Cumulative percentage	48.880	59.912	70.110
Cronbach's Alpha	0.758	0.867	0.813

The first component with high factor loadings is for statements Q15, Q17, Q11 and Q16. The statements relate to the abilities of farmers to form ideas that can be implemented in their farming business. Q11 relates to the farmers' ability to apply innovative ideas, knowledge and issues in new ways. Because agricultural markets are volatile and agricultural products are dependent on weather conditions, farmers need to think and apply new ideas to ensure success. Q15, Q16 and Q17 deal with looking at old problems in new ways, finding new ideas, and treating problems as opportunities. This is essential in the unpredictable sector of agriculture. As the component relates to the conceptualising abilities of the farmers, the component was named conceptual competencies. The Cronbach's alpha for these competencies is above 0.7, thus the reliability of the statements is confirmed.

The statements with high factor loadings in component two are Q06, Q07, Q08 and Q13. For each individual statement, the average score was six. Q06 and Q07 are related to negotiating and interacting. For a farmer it is important to be able to negotiate the best price for his crop or livestock (even though the farmer is a price taker, benefits or extras can be negotiated), while still being able to maintain good business relationships with processors. Thus, this links with Q08, which is related to maintaining a personal network of work contacts. However, in order for farmers to grow their business, they need to take reasonable risks in terms of their crop production, deliveries, which producers they sell to and the companies that they buy inputs from. This relates to Q13 (job-related risks) having a high average score, where farmers access and take risks to increase business size and profitability. Therefore, this cluster of competencies relates to communicating abilities and relationships, and accordingly it will be called relationship competencies. Strong internal consistency was measured between the statements and is confirmed with a Cronbach's alpha of 0.867.

The last component consisted of high factor loadings for Q01, Q02 and Q03. Q01 is related to identifying goods specifically needed in the agricultural market, while Q02 and Q03 are more related to consumer needs. The focus of these statements is on seeking or identifying gaps and needs within the market. These needs and gaps represent possible business opportunities for farmers. Therefore, the last component is called Opportunity competencies. The Cronbach's alpha confirms the reliability of the statements to the component.

- Factor analysis for Q18 to Q40

Table 3.6 below indicates that the Bartlett's test was less than 0.001 and the KMO was greater than 0.49. In the test for communalities, none of the statements needed to be removed. In order to determine the components, the component structure was used and cross-loadings for Q20, Q21, Q26, Q29, Q30, Q33, Q37, Q38 and Q39 were identified. These statements were removed in order to determine the final statements that have high factor loadings and are needed to determine each of the components. The statements with high factor loadings are listed in Table 3.6 below, with their corresponding component.

Table 3.6: Kaiser-Meyer-Olkin Measure of Sampling Adequacy and Bartlett's Test of Sphericity for statements Q18 to Q40.

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.873
Bartlett's Test of Sphericity	Approx. Chi-Square	849.249
	df	120
	Sig.	.000

Three components were also extracted for statements Q18 to Q40. As Shown in table 3.7 below, the eigenvalues for each component is greater than one and the cumulative percentage of variance for all three components explains 65.43 % of the total variance.

Table 3.7: Rotated component matrix for statements Q18-Q40.

	Component		
	Strategic	Operational	Commitment
Q36: Determine strategic actions by weighing costs and benefits	**.825**	.203	.047
Q32: Align current actions with strategic goals	**.791**	.172	.227
Q40: Commit to long-term business goals	**.731**	.069	.194
Q31: Redesign the department and/or organisation to better meet long-term objectives and changes	**.706**	.326	.276
Q35: Evaluate results against strategic goals	**.700**	.353	.171
Q28: Determine long-term issues, problems or opportunities	**.686**	.424	-.137
Q34: Monitor progress toward strategic goals	**.685**	.441	-.010
Q26: Motivate people	**.637**	.167	.281
Q18: Plan the operations of the business	.234	**.785**	.087
Q20: Keep the farming organisation running smoothly	.047	**.743**	.388
Q22: Coordinate tasks	.333	**.702**	.098

Q19: Plan the organisation of different resources	.411	**.661**	.198
Q21: Organise resources	.449	**.635**	.106
Q23: Supervise lower ranking employees	.145	**.565**	.440
Q37: Dedicate to make the venture work whenever possible	.236	.138	**.827**
Q38: Refuse to let the venture fail whenever appropriate	.132	.242	**.815**
Eigen values	7.606	1.671	1.192
Cumulative percentage	47.540	57.980	65.427
Cronbach's Alpha	0.907	0.861	0.760

The first component consists of eight statements with high factor loadings. These statements comprise Q26, Q28, Q31, Q32, Q34, Q35, Q36 and Q40, identified by high factor loadings determined with the PCA. The Cronbach's alpha confirms the reliability of this component with a very high value of 0.907, indicating internal consistency between the statements. In terms of setting, aligning and determining the costs and benefits of strategic goals, Q32, Q35 and Q36 are needed. For farmers, strategic goals are needed to ensure that they achieve the long-term goals determined for their farming businesses. Farmers need to plan further ahead into the future, due to factors outside their control affecting their production, crop rotation, field rotation etc., which are all factors for long-term planning. Q28 relates to the long-term planning required to avoid problems by identifying them beforehand, as well as identifying opportunities. In order to achieve these opportunities, commitment is needed, which is measured by Q40. The last statement that plays a role is Q26, which relates to motivating people, in the sense that the only way to achieve long-term goals is to motivate the people who will help the farmer achieve the goals. This component relates to the strategic planning of business activities and is therefore called strategic competencies.

Q18, Q19, Q20, Q21, Q22 and Q23 are the statements with high factor loadings in the second component, with a Cronbach's alpha confirming reliability. Q18 and Q19 are concerned with the planning of the operations, and the organisation of the business and the resources. This is an important part of agricultural production as farmers need to determine what they are going to produce, what resources they need to have available, how they will utilise the resources, what tasks need to be completed, and how they will ensure that the tasks run as smoothly as possible. This all relates to Q20, Q21 and Q 23. However, in order to ensure the smooth running of tasks, a farmer needs to supervise employees to make sure

tasks are completed in a correct and timely manner. As the statements are related to the daily operations of the farming business, the component was named operational competencies.

High factor loadings for statements Q37 and Q38 were determined in component three. Q37 is related to how dedicated the farmer is to see the venture work, and Q38 to the refusal of seeing the venture fail. This indicates that farmers are very committed in seeing their ventures succeed and this component was therefore called commitment competencies. The Cronbach's alpha confirms that these two statements are reliable in measuring the commitment competencies.

- Factor analysis for statements Q41 to Q53

According to the factor analysis for Q41 to Q53, all the contributing factors for the appropriateness of factor analysis were sufficient for the Bartlett's test and latent root test. The test for communalities indicated no communalities with values below 0.5. In the component structure test, statements Q48, Q50 and Q52 were removed due to cross-loadings. Table 3.8 below indicates the results for the satisfied factor analysis, showing the variables significant for these components.

Table 3.8: Kaiser-Meyer-Olkin Measure of Sampling Adequacy and Bartlett's Test of Sphericity for statements Q41 to Q53.

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.913
Bartlett's Test of Sphericity	Approx. Chi-Square	538.053
	df	45
	Sig.	.000

In Table 3.9 below, the component with factor loadings above 0.5 for each statement, the eigenvalues, and percentage variance for the component are shown. The component has an eigenvalue greater than one, and the cumulative percentage of variance for the component explains 58.66 % of the total variance. The Cronbach's alpha indicates that there is internal consistency between the statements.

Table 3.9: Component matrix for variables Q41-Q53.

	Component
	Support
Q42: Learn proactively	**.815**
Q44: Keep up to date in my field	**.809**
Q43: Learn as much as I can in my field	**.800**
Q41: Learn from a variety of means	**.797**
Q47:Motivate self to function at optimum level of performance	**.745**
Q53: Recognise and work on my own shortcomings	**.745**
Q45: Apply learned skills and knowledge into actual practices	**.741**
Q51: Identify my own strengths and weaknesses and match them with opportunities and threats	**.737**
Q49: Maintain a positive attitude	**.733**
Q46: Maintain a high energy level	**.728**
Eigen values	5.866
Cumulative percentage	58.664
Cronbach's Alpha	0.920

All the statements, after removal, had high factor loadings for only one component. The component (eigenvalue 5.87) consist of the following statements, Q41, Q42, Q43, Q44, Q45, Q46, Q47, Q49, Q51 and Q53. Q41, Q42, Q43, Q44 and Q45, which relate to farmers keeping up-to-date in their field of business by making proactive decisions to learn and apply the relevant skills and knowledge. Due to the rapid expansion in agricultural technologies, this is a critical part of farming. Changing weather and climate patterns, together with increasing input costs, force farmers to apply new skills so as to enable them to continue producing. Q51 states that a farmer should be able to identify his or her strengths and weaknesses to match them with opportunities and threats, which also relates to Q53 in recognising shortcomings and finding ways to work on them. Farmers need to employ knowledgeable advisers where they have shortcomings, should they are not able to learn the skills needed. Maintaining a positive attitude and high energy level will help with learning and adapting a new skill into day-to-day living, so that the skill can be mastered. This is essential

in the expanding market. Q46, Q47 and Q49 all measure the level of optimal performance required to be successful. The factors included in the component relate to the capabilities of the farmers to encourage confidence and deal with difficulties, thus this component is called support competencies.

3.2.3 EXPLORING THE INFLUENCE OF ENTREPRENEURIAL COMPETENCIES ON FINANCIAL PERFORMANCE

Regression analysis was used to explore the relationship between entrepreneurial competencies and financial performance of the respondents. The dependent variable in the regression analysis is a vector of efficiency scores estimated to represent the level of financial performance of the respondents, making use of the Ordinary Least Squares (OLS) regression approach within the Principal Component Regression (PCR). McDonald (2009) argues that the properties of OLS, given that the data is generated by equation (5), parallel those of Ordinary Least Squares (OLS) in the linear probability binary discrete choice model. OLS estimates of β are consistent and asymptotically normal under general conditions. This is the Ordinary Least Squares (OLS) model that is used instead of the Tobit regression model, which is usually used in PCR. This method was used by Jordaan (2012) to calculate the determinants that influenced the cost efficiency for Eksteenskuil farmers. The reason for this being that the dependent variable y_i, is the logarithm of the estimated financial efficiency scores estimated by equation (5). Following the recommendation of McDonald (2009), the dependent variables are the logarithm of the financial efficiency scores calculated in the DEA model, and therefore this approach is suitable.

Table 3.10: Correlation matrix for Entrepreneurial competencies.

	Opportunity competencies	Relationship competencies	Conceptual competencies	Operational competencies	Strategic competencies	Commitment competencies	Support competencies
Opportunity competencies	1	0.50	0.55	0.38	0.39	0.34	0.49
Relationship competencies		1	0.63	0.65	0.55	0.41	0.54
Conceptual competencies			1	0.68	0.74	0.49	0.74
Operational competencies				1	0.67	0.50	0.58
Strategic competencies					1	0.40	0.78
Commitment competencies						1	0.46
Support competencies							1

A correlation matrix was calculated for all the independent variables, namely the entrepreneurial competencies. If there are more than two independent variables, multi-collinearity can exist if the correlation coefficient is less than 0.9 (Bagheri and Midi, 2009). From the results, multi-collinearity was acknowledged, indicating that the variables are interrelated. The multicollinearity supports the use of the PCR model for determining the relationship between the entrepreneurial competencies and operating efficiency.

The PCR is a data analysis tool that is used to reduce the dimensionality (number of variables) of a large number of interrelated variables, while retaining variation. PCR offers the chance to discover the most significant directions among data and to eliminate 'noise' directions. PCR offers new filtered information on an orthogonal or even orthonormal basis (Pfisterer, 2006). This new set of information is known as eigenvectors and eigenvalues. Therefore, because of orthogonality, the eigenvectors are uncorrelated and the basic vectors corresponding to the maximum variance can be extracted without distracting the analysis in other directions (Pfisterer, 2006).

3.2.3.1 PRINCIPAL COMPONENT REGRESSION (PCR)

The application of the PCR here is based on the studies of Magingxa (2006) and Khaile (2012).

- Estimating Principal Components

In order to calculate the PCR, the eigenvectors of the variables need to be calculated, the vectors can be used to construct the principal components (PC). The decisive factor for determining which factor needed to be included in the model (components) is based on it having eigenvalues greater than one. This method is known as the "Kaiser-Guttman Rule" (Fekedulegn *et al.*, 2002; *Williams et* al., 2012). Very small eigenvalues indicate that there is severe multi-collinearity; therefore, small eigenvalues are removed from the analysis (Liu *et al*., 2003). NCSS program is used to determine the eigenvectors and eigenvalues from the original independent variables. A correlation matrix is used to determine eigenvalues $\varphi_1, \varphi_2, \ldots\ldots\ldots,$ and equivalent eigenvectors $v_j,$ making use of standardised and un-standardised variables. The following equations (1) and (2) are used to determine the eigenvalues and eigenvectors:

$$|C - \varphi I| = 0, \left|C - \varphi_j\right| v_j = 0 \qquad (1)$$

Eigenvectors are organised to create the matrix shown in Equation (3). *V* is acknowledged to be orthonormal, because *V* columns act in agreement with the conditions $v_i' v_i = 1$ and $v_i' v_i = 1$ for $\neq j$:

$$V = \begin{bmatrix} v_{11} & v_{12} & . & . & v_{1k} \\ v_{21} & v_{22} & . & . & v_{2k} \\ . & . & . & . & . \\ . & . & . & . & . \\ v_{k1} & v_{k2} & . & . & v_{kk} \end{bmatrix} \quad (2)$$

The important step in this section is the extraction of components. The common rule for selecting principal components is to select those with eigenvalues greater than one.

- Regression with Principal Components

The principal components scores denoted by Σ are calculated by matrix multiplication of eigenvalues. These eigenvalues were obtained from equation (3) above. Therefore, the next equation describes the principal components' scores Σ as follows:

$$\Sigma = A^s V \quad (4)$$

where A^s is the $n \times k$ matrix of the variables. *V* is eigenvector matrix as determined in equation (2) above. The component scores Σ are calculated in a matrix multiplication product form, with a dimension of *k* components equal to *k* variables. The evaluation of the components is regressed against the original dependent variable α. This is where equation (5), the linear unit model is presented as:

$$y_i = \beta_0^s + A^s V B^s + \varepsilon \quad (5)$$

where the $A^s V$ and ε are independently distributed with zero means, $0 \leq y_i \leq 1$, with the limit point $y_i = 1$ possessing positive probability. Also, Where β_0^s and B^s are estimated by the OLS Model, and are standardised coefficients for the constant and the independent variables respectively. Since the eigenvectors are orthogonal to one another, as defined by the eigenvector matrix V where $VV' = I$, equation (5) can be reformulated in the form:

$$y_i = \beta_0^s + A^s V V' B^s + \varepsilon \quad (6)$$

or

$$y_i = \beta_0^s + \Sigma \rho + \varepsilon \quad (7)$$

where $\Sigma = A^s V$ and $\rho = V' B^s$. Σ is the $n \times l$ matrix of the retained components, V is a $k \times l$ matrix of eigenvectors equivalent to the l retained components, and A^s is the standardised dependent variables (Magingxa, 2006). Where ρ is $l \times l$ vector of new coefficients associated with l components. Describe standard errors of the estimated coefficient ρ as symbolised by a $l \times 1$ vector calculated in the form of (Fekedulegn *et al*., 2002; Magingxa, 2006):

$$Var(\hat{\rho}) = \widehat{\delta^2}(\Sigma' \Sigma)^{-1} = \hat{\delta} diag(\varphi_1^{-1}, \varphi_2^{-1}, \ldots\ldots\ldots, \varphi_l^{-1} \quad (8)$$

where $\widehat{\delta^2}$ is the variance of the residuals that were calculated in equation (6). The elimination of some principal components does not change the magnitude of the variance (Fekedulegn *et al*., 2002). However, the elimination of one or more components will ultimately reduce the total variance, resulting in a better model. The elimination of the component(s) can be done based on its significance from the regression results (Magingxa, 2006). Presume that r principal components are eliminated due to the insignificance, then equation (7) can be reformulated to use $k - r$ components.

$$\varphi = \beta_0^s + \Sigma_{k-r} \rho_{k-r} + \varepsilon^0 \quad (9)$$

The 0 symbol on ε^0 is used to differentiate it from ε determined in equation (7). The residuals differ because the vectors of coefficients have been reduced to $k - r$ components.

- <u>Identifying the significance of individual explanatory variables within the Principal Components</u>

The advantage of a PCR exercise is that all hypothesised independent variables can be manually calculated. The recollected components are transformed back into the original independent variables:

$$b_{pc}^s = V_{k-r}\, \hat{\rho}_{k-r} \quad (10)$$

$$\begin{vmatrix} b_{1,pc}^s \\ b_{1,pc}^s \\ \cdot \\ \cdot \\ b_{1,pc}^s \end{vmatrix} = \begin{vmatrix} v_{11} & v_{11} & \cdot & \cdot & v_{1l} \\ v_{21} & v_{22} & \cdot & \cdot & v_{2l} \\ \cdot & \cdot & \cdot & \cdot & \cdot \\ \cdot & \cdot & \cdot & \cdot & \cdot \\ v_{k1} & v_{k1} & \cdot & \cdot & v_{kl} \end{vmatrix} * \begin{vmatrix} \widehat{\rho_1} \\ \widehat{\rho_2} \\ \cdot \\ \cdot \\ \widehat{\rho_l} \end{vmatrix} \quad (11)$$

where V_{k-r} is the matrix of eigenvectors for the retained principal components, $\widehat{\rho}_{k-r}$ is a vector of coefficients (except for the intercept) estimated in equation (9), and b_{pc}^s is a vector of coefficients (except for the intercept) of the parameters in vector β^s estimated in equation

(6). Variance of the principal component estimators in the form of standardised variables is calculated by:

$$Var\left(b_{pc}^{s}\right) = v_{l}^{s} K^{s} \tag{12}$$

where v_l^s indicates the squares of the eigenvector elements of v_l^s in equation (3), and K^s indicates the squares of the elements of the matrix of standard errors of the coefficient matrix ρ in equation (9). The equivalent standard errors for the estimators of principal components of standardised variables are specified by:

$$s.e.\left(b_{pc}^{s}\right) = Var(b_{pc}^{s})^{\frac{1}{2}} \tag{13}$$

In same context as Fekedulegn *et al*. (2002) and Magingxa (2006), standardised variables b_{pc}^{s} are transformed back to natural un-standardised variables $b_{j.pc}$, of A_i. The results are given by:

$$b_{i.pc} = \frac{b_{i.pc}^{s}}{1/S_{ai}}\ , \qquad i = 1,2, \dots\dots\dots, k \tag{14}$$

and

$$b_{i.pc} = b_{o.pc}^{s} - \frac{b_{1.pc}^{s}\,\overline{a_1}}{1/S_{a1}} - \frac{b_{2.pc}^{s}\,\overline{a_2}}{1/S_{a2}} - \ \dots\dots\dots - \frac{b_{i.pc}^{s}\overline{a_k}}{1/S_{ai}} \tag{15}$$

where s_{ai} is the standard deviation of the i^{th} original variable A_i and $b_{o.pc}^{s}, b_{1.pc}^{s}, b_{2.pc}^{s}, \dots\dots\dots, b_{k.pc}^{s}$ are coefficients of the standardised variables. The original un-standardised dependent variable (efficiency score) is used in the OLS model when estimating principal components significance. It therefore follows that the natural un-standardised variables $b_{i.pc}$, can be correctly calculated when the standard deviation s_{ai} is calculated by $1/S_{ai}$ as shown in Equation 14.

The data collected from the survey and the financial statements provided by the bank is needed to achieve the sub-objectives of this study. In the next chapter, the results from the methods used to analyse the data will be discussed.

CHAPTER 4

RESULTS AND DISCUSSION

This chapter presents the results of the research. The chapter is divided into three sections, the first of which discusses the operating efficiency scores for each farm. The second section explores and discusses the entrepreneurial competencies of the farmers, which is followed by a discussion of the relationship between the financial performance of a farm and the entrepreneurial competencies of the farmer.

4.1 FINANCIAL PERFORMANCE

The aim of this section is to present and discuss the operating efficiency scores, determined from the financial ratios, of the farmers. The financial ratios used to determine the efficiency scores are shown in Table 3.1 above (Chapter 3). Only the measures that provide ratios were used in the analysis. The use of currency values in an analysis can be misinterpreted, as the sizes of the farming businesses are not considered. The size of a farm affects the values calculated in monetary measurements, and therefore currency values need to be excluded from the model.

4.1.1 OPERATING EFFICIENCY

The efficiency scores are restricted to an interval of between zero and one, where a farm with a score of one is considered to be efficient, and a score below one is considered inefficient. An important aspect to remember is that the operating efficiency scores are determined in comparison with the other farms in the sample. The efficiency of the farms is calculated relative to one another and an inefficient score does indicate that a farm has room for improvement relative to the efficient farms. Summary statistics displaying the overall distribution of the operating efficiencies of the farms are presented in Table 4.1 below.

Table 4.1: Summary statistics for financial efficiency of farmers

Mean	0.877
Standard deviation	0.074
Minimum	0.749
Maximum	1.000

Table 4.1 indicates that the farmers exhibit a range between 0.749 and 1. The average efficiency for the farmers is 0.877, which indicates that the distribution is skew to the right, meaning that in this sample the farmers that are compared to each other are more towards the efficient side of operating efficiency. An inefficient score is only an indication that the farm is less efficient, when compared with the efficient farms in the study (Henning *et al.*, 2013). There are several reasons why these farms might have inefficient scores, for example different types of farm production, size of production, and climate change.

The farms with an operating efficiency score of one are thus found to be operating efficiently, compared with the other farms in the sample which have a score below one, making the farms with an efficiency score of one the peer group. The peer group consist of 13 farms, which are: farms number 1, 4, 8, 16, 32, 35, 46, 55, 58, 85, 86, 88 and 89.

The cumulative distribution of the operating efficiencies indicated the spread of the efficiency scores between zero and one, as shown in Figure 4.1 below. From Figure 4.1, it is evident that 50 % of the farmers have efficiency scores of below 0.855, which is below the average. Therefore, in this sample, most of the farmers are ranked closer to one, which is the efficient level, but there is room for improvement. All the farmers had an efficiency score above 0.5, but only 39.36 % were above average.

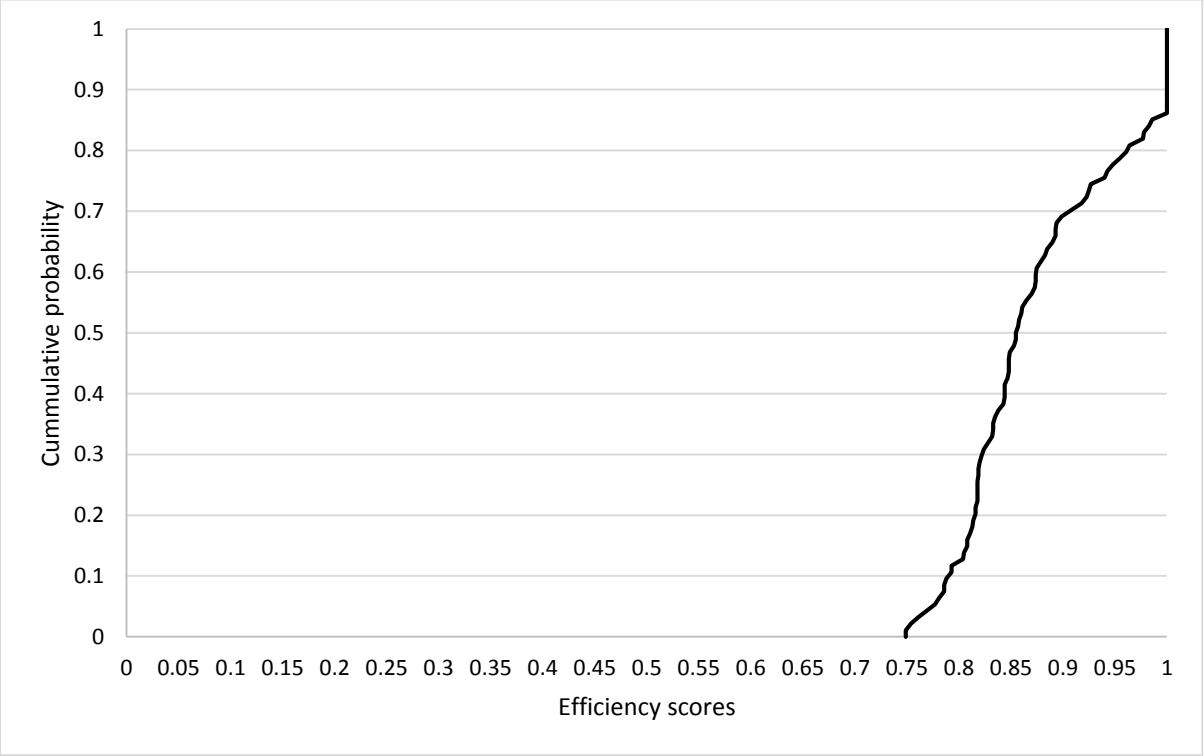

Figure 4.1: Cumulative probability distribution of operating efficiencies for the farmers.

In order to gain a better understanding on why certain farms are determined as being efficient, the financial ratios used to determine the operating efficiency scores were explored. Table 4.2 below indicates the distribution of the ratios among the efficient farms and the inefficient farms, respectively.

Table 4.2: Financial ratio score distribution for the efficient farms and inefficient farms

Financial Ratio	Efficient farms			Inefficient farms		
	Strong	Stable	Vulnerable	Strong	Stable	Vulnerable
Current ratio	57 %	7 %	36 %	35 %	11 %	54 %
Working capital to gross revenues	44 %	31 %	25 %	64 %	23 %	14 %
Debt to asset ratio	22 %	21 %	57 %	1 %	3 %	96 %
Debt to equity ratio	29 %	36 %	35 %	44 %	55 %	1 %
Rate of return on assets	93 %	7 %	0 %	81 %	15 %	4 %
Rate of return on equity	71 %	7 %	22 %	74 %	21 %	5 %
Operating profit margin	79 %	7 %	14 %	98 %	1 %	1 %
Asset turnover ratio	22 %	14 %	64 %	0 %	2 %	98 %
Operating expense ratio	21 %	29 %	50 %	90 %	8 %	2 %
Net farm income ratio	79 %	14 %	7 %	79 %	11 %	10 %

It is important to note that some of the farms may have “vulnerable” ratios, but they are nevertheless considered to be operating at optimal efficiency. The reason is that the financial-based DEA model takes all of the farms’ ratios into consideration, and as a whole, the operating efficiency of these farms is optimal.

In terms of current ratio, a ratio of 2:1 or more is generally accepted as indicating a strong ratio. The current ratio measures the extent to which the farm is able to pay the current liabilities by selling the available current assets. More than 50 % of the efficient farms had

ratios that are considered “strong”. However, only 44 % of the efficient farms had a “strong” rating for the ratio of working capital against gross revenue, indicating that the working capital of the efficient farms has a larger value than the gross revenue. Accordingly, the current assets of these farms are larger in amount than the current liabilities. Both these ratios measure a farm’s performance in terms of liquidity, indicating that in the short term, 57 % of the efficient farms are able to sell current assets to cover the current liabilities, but that only 44 % of these farms have the capital needed to cover outstanding debt. The liquidity for the inefficient farms indicates that 64 % of the farms are rated “strong” in terms of the cash they have available, but only 35 % of the farms have enough current assets to sell off to cover debt. This indicates that, in general, the efficient farms have higher current assets than the inefficient farms.

The solvency ratio (debt to assets) of the efficient farms has a higher percentage of farms in the “strong” category than the inefficient farms. Only 1 % of the inefficient farms are able to cover their total liabilities should all their assets be sold, indicating that the majority of the farms are “vulnerable”. However, the leverage ratio (debt to equity) indicates that 44 % of the inefficient farms will be able to cover their total liabilities with owner’s equity, whereas only 21 % of the efficient farms have sufficient leverage. Overall, the efficient farms have more assets to cover their debts, and the inefficient farms have more cash and owner’s equity to cover their debt.

For the profitability measures, the efficient farms had 93 % “strong” measures for ROA. This indicates that the efficient farms are using assets appropriately to generate income, which links with the efficient farms having, on average, more “strong” ratings in terms off debt to assets and current ratio. None of the efficient farms had a “strong” rating for ROA. The inefficient farms have an average of 81 % for farms with “strong” ROA. This shows that income is being generated effectively with the assets available to the farm. However, the debt to assets ratio indicates that the majority of the inefficient farms have high amounts of debt that need to be paid. The ROE needs to be higher to be better, and an acceptable percentage is 10 % or higher for a strong ratio. The efficient and inefficient farms had more than 70 % ratings in the “strong” category. However, in terms of debt to equity, the inefficient farms had more owners’ equity than the efficient farms, contributing to the ROE for inefficient farms being higher. The lower equity contributes to the expanding of farms, because debt can be used to increase farm activities. This can possibly be a reason for the higher debt to asset and debt to equity ratios.

Thus, efficient farms are seen to be performing better when considering the ROA ratio, and inefficient farms have more farms with “strong” ratios for ROE. Efficient farms are therefore

producing more net farm income in terms of the total capital employed by the farm, and inefficient farms are producing more using own equity. Operating profit margin is the last ratio used to determine the profitability of a farm. A high operating profit margin is preferred as it indicates the profit that is earned from sales (assets and equity used to produce commodities that are sold). The majority of the efficient and inefficient farms had a high percentage of operating profit margin in the “strong” category. However, the “stable” and “vulnerable” categories indicate that the farms are vulnerable to increased input costs and negative markets.

Operating expense ratio is generally preferred where the ratio is lower, indicating that the revenue from the production process is sufficient to cover the production costs. The operating expense ratio links with the operating profit margin, as the ratio provides an indication of how the profit (income) is used to fund the operating expenses (mostly inputs used for production activities). A “vulnerable” score indicates that the operating profit margin will also be lower, owing to higher production costs. Thus, the high percentage of inefficient farms with “strong” operating expense ratios contribute to the high percentage of farms with “strong” operating profit margins. On average, a higher percentage of the inefficient farms have “strong” operating expense ratios, indicating that the efficient farms with “vulnerable” ratios need to decrease their production cost.

Asset turnover ratio measures how effectively a farm’s capital is used. A higher ratio is considered to be better. The inefficient farms had a 98 % “vulnerable” average score for this ratio, indicating that the inefficient farms have higher input costs, and thus they are not producing at an optimal level. These farms, therefore, need to consider methods of decreasing expenses or increasing production. The efficient farms have a 64 % “vulnerable” average score and a 22 % “strong” average score. This indicates that there are farmers using inputs effectively to produce greater outputs. However, both efficient and inefficient farms need to consider more productive methods to use in their production.

For the net farm income ratio, a higher percentage is preferred as this ratio indicates the income left after all payments are made. Both the efficient and inefficient farms had an average “strong” score of 79 %. The efficient farms, however, had a lower average “vulnerable” score than that of the inefficient farms. A “vulnerable” score indicates that the farm is spending a large amount of the gross income on expenses. This can also indicate that production is not sufficient in obtaining income. Thus, this ratio indicates that there is still room for more optimal production methods to be used by both efficient and inefficient farms.

The results from determining the operating efficiency of the farms indicate that there are differences in the operating efficiencies of the farms. As the agricultural sector is very dynamic, different factors have an influence on a farming business, including the economy, weather, resources, environment and the decisions made by an owner concerning farm. The DEA model takes the overall situation of the farms into consideration when determining the efficiency score, explaining why the inefficient farms are performing “stronger” in certain ratios. The entrepreneurial competencies of farmers are explored to determine the different competencies that are observed by the executives when making representations of their clients’ farming activities.

In the next section, the entrepreneurial competencies of the farmers are explored. An entrepreneurial competencies score is calculated for each farmer, which is then used to determine the influence of each of the competencies on the financial performance (operating efficiency) of the farmers.

4.2 ENTREPRENEURIAL COMPETENCIES

The aim of this section is to present and discuss the entrepreneurial competencies of the farmers. The entrepreneurial competencies are determined by using a PCA to indicate which of the statements in the entrepreneurial framework make up relevant components and to finally determine the competencies. Once the competencies are determined, entrepreneurial scores for each competency is calculated in order to determine the influence of each of the competencies on the financial performance of the farmers.

4.2.1 ENTREPRENEURIAL COMPETENCIES SCORING

In the previous section, the competencies displayed by the farmers were identified. For each of the competencies, there are statements that are linked to the competencies, as shown in Table 3.3 above. In order to determine a measure that can be used to determine the relationship between the competencies and the financial performance of the farm, a score is calculated. The measuring instrument is anchored on a 7-point Likert scale to determine how the representatives rate the farmers in terms of the statements.

The score that a representative rated for the farmer in question within the framework is used to determine a score for the competencies by adding the score out of 7 for each statement together. In terms of opportunity competencies, the points for Q01 to Q03 are added to arrive at a score for these competencies. Therefore, each farmer has a score given for each

of the competencies. Only the factors (statements) identified in the PCA needed for the competencies are included in the calculation.

Figure 4.2 below shows the distribution of the entrepreneurial competencies of the farmers between the lower, mean and upper values. The lower and upper values are indicated by the lines to show the spread, while the histogram indicates the mean values of the competencies. In order to make the figures easier to interpret, the average scores were converted into percentages in order to compare the different competencies with each other.

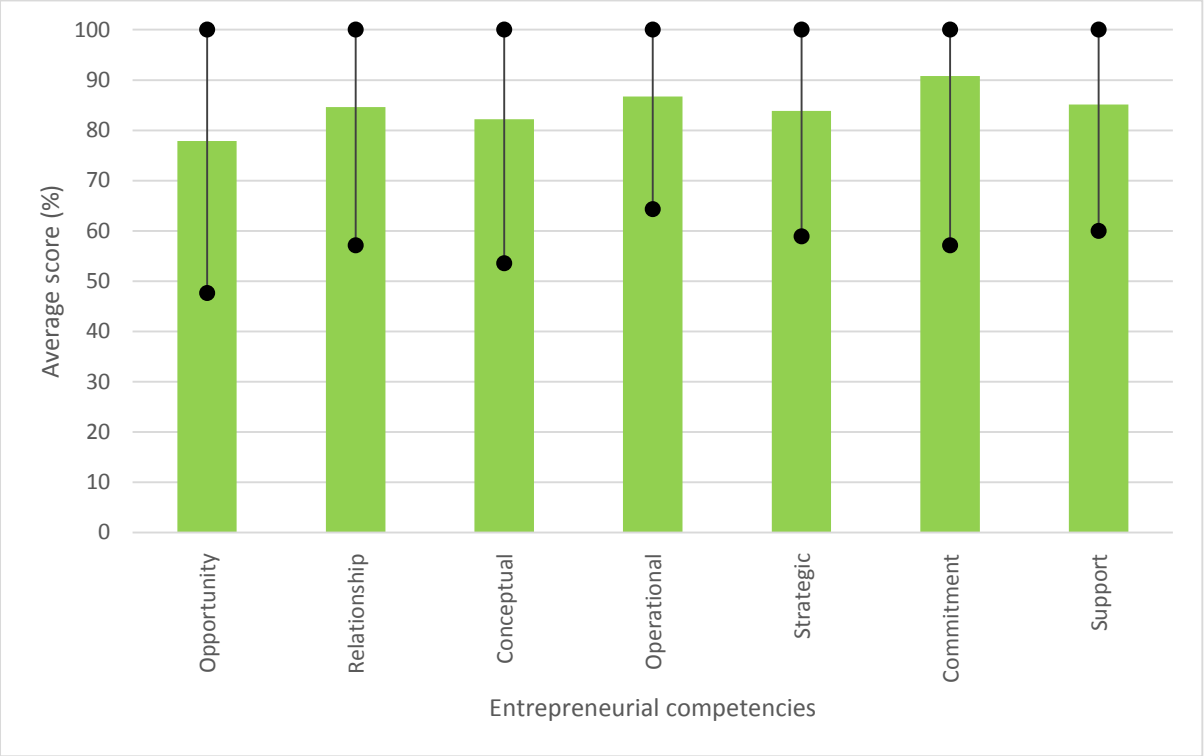

Figure 4.2: Distribution of scores for entrepreneurial competencies among the farmers

In Figure 4.2, it is shown that all of the competencies identified for the farmers are toward the upper bound (higher end of the distribution), with all of the average scores being above 70 %. The weakest average score identified is with opportunity competencies, indicating the greatest room for improvement lies there. Commitment competencies (91 %) represent the strongest competencies identified, followed by operational competencies (87 %). Both of these competencies have average scores above 85 %, which still leaves room for improvement.

As the opportunity scores are higher, this is an indication that the farmers' behaviour does indeed illustrate that they are actively seeking new opportunities. These new opportunities can be used as strategies to increase their market, production, efficiency or to decrease production costs, thus positively benefiting their financial performance. The results

correspond with the literature, where Vik and McElwee (2011) state that in the changing agricultural markets, the identification of new opportunities is an essential requirement for farmers. However, compared with the other entrepreneurial competencies, this section of competencies has the lowest average score, indicating room for improvement through identifying new opportunities, such as vertical or horizontal integration in the market, or decreasing input costs by searching for new vendors.

In terms of the relationship competencies, the average scores for the farmers were above 80 %, illustrating that the farmers' behaviour is tending towards negotiating, interactions and personal networks with others, as well as showing their ability to take reasonable job risks. The use of these relationship behaviours in their day-to-day business may open doors to new opportunities in terms of the reasonable risks, as well as improving the farmers' abilities to negotiate. Farmers are considered to be price-takers, although they are still able to negotiate the terms of delivery or transport cost to ensure that they receive the most out of their product. This links with interacting with others and creating a personal network.

The higher scores for the conceptual competencies highlight the fact that the farmers think conceptually about how they analyse problems. This indicates that a farmer's behaviour reflects the focus on his decision-making ability. The results indicate that farmers do indeed have the ability to analyse, assess and react to situations. Problems can occur at different stages in the dynamic agricultural sector and farmers need to take their time in thinking about what they need to achieve and what decisions need to be made in order to achieve their goals. Thus, the farmers conceptualise the way they think and analyse problems. This relates to the literature where conceptual thinking is concerned with decision-making in regard to innovation, risk, problems and seeking possible solutions.

Operational competencies relate to the way a farmer organises his business operations. These competencies form part of the underlying competencies of organising competencies, which are directly aimed at the operational part of organising. The high average score of above 85 % indicates that the farmer's behaviour is focused on the operations of the business. Most farmers are 'hands-on' with the day-to-day running of the business, which links to why these competencies have a high score. Farmers need to be present in coordinating tasks and making sure that the appropriate resources are used in order for the tasks to be completed correctly. Therefore, this behaviour indicates that the strategy of the farmer is to "run" the farm.

Strategic competencies have an average score above 75 %, thereby illustrating that farmers are actively setting, evaluating and implementing strategies on their farms that relate to

organising and operational competencies. Because strategic competencies relate to the implementing of strategies, it would be expected that farmers would have higher scores, as this determines whether or not they reach goals and increase sales, thereby increasing profitability.

Commitment competencies scored the highest average score of all the competencies. This illustrates that the farmer's behaviour is mostly oriented towards seeing that any venture he takes on is successful. As the agricultural market is very volatile, this behavioural aspect is a necessity in order to guarantee success. Commitment competencies are the factors that encourage entrepreneurs to start/grow/expand their business. For farmers, this is an important aspect due to farmers mostly being owners as well as managers, meaning that the farmers are responsible for a wide variety of tasks, as the tasks are spread over a wide area.

Support competencies rated an average score above 75 %, meaning that the farmers' behaviour suggests that they do use these competencies, but there is still room for improvement. This grouping of competencies is based on how farmers, as entrepreneurs, see their own strength and ability to adapt and learn. The average score is closer to the upper score, indicating that the majority of farmers are rated high in their ability to learn and adapt. This links with the unpredictability and volatile market of the agricultural sector, where due to factors outside a farmer's control, crops and livestock may be lost through drought or disease, for example. Farmers accordingly need to be able to adapt in order to survive.

The following section evaluates the influence of each of the entrepreneurial competencies on the efficiency scores of the farmers.

4.3 ENTREPRENEURIAL COMPETENCIES INFLUENCE ON FINANCIAL PERFORMANCE

The literature review indicated that an individual's entrepreneurial competencies have a positive influence on their financial performance. In this section, the aim is to determine the level of influence which the entrepreneurial competencies have on the farms' business performance. Because of the correlations between the competencies, a Principal Component Regression (PCR) analysis was used to determine whether certain of the entrepreneurial competencies determined in the previous section needed to be grouped together.

4.3.1 DETERMINING THE PRINCIPAL COMPONENTS

The unstandardized data was imported into the NCSS to obtain eigenvalues and eigenvectors. The eigenvectors calculated are needed to compute the principal components (PCs). An un-rotated procedure of components was selected to compute the eigenvalues and eigenvectors. This method was chosen because the components were not the primary objective.

The principal components were calculated through a matrix multiplication between the variables and the eigenvectors. Thus, uncorrelated PCs were manually calculated using Equation 5, following the method recommended by McDonald (2009). A correlation matrix was used to determine whether any correlation exists. Table 4.3 below shows the eigenvalues of the components selected for the regression at the production stage. Two of the variables were removed in the determining of the PC's due to commonalties below 0.50.

Table 4.3: Eigen values for entrepreneurial competencies efficiency regression model

Principal components	Eigen value	Percentage of variation
PC_1	3.634	72.685
PC_2	0.567	11.338
PC_3	0.353	7.052
PC_4	0.252	5.032
PC_5	0.195	3.893
Total	5.001	100

The variability in the regression model is only due to PC_1, because of the "Kaiser-Guttman Rule" which states that only PCs with eigenvalues equal or above one are to be included in a regression model (Fekedulegn *et al.*,2002; Williams *et al.*, 2012). However, the PC's indicated that all the variables can be included in one component, namely ZPC_1. In determining the significance of the ZPC_1, an OLS model was estimated. The results of the regression analysis of the operating efficiencies are shown in Table 4.4 below.

Table 4.4: Significant PC for the operating efficiency

Variable	Coefficient ßs	Std. Error	T-ratio	Sig. (2-tailed)*
Constant	-0.059	0.004	-16.039	0.000
ZPC_1	0.008	0.004	2.12	0.022
F-statistic				4.341
Prob (F-statistic)				0.005
Adjusted R-square				0.035

*5 %

The result shown in Table 4.4 indicates that entrepreneurial competencies index (ZPC_1) is significant with a very small positive significant value. A positive value indicates that if entrepreneurial competencies increase, operating efficiency will also increase, this result is as was expected. Evidence from literature indicates that an increase in entrepreneurial competencies will increase the financial performance (operating efficiency). The relationship between the operating efficiency and entrepreneurial competencies is, however, very small, indicating that the entrepreneurial competencies as a whole (all the competencies combined into one index) have a very small positive effect. A possible reason might be that a farmer is trying to over-commit in all aspects measured in terms of competencies, thereby neglecting the focus on individual competencies. Therefore, a more in-depth look into the individual competencies is needed to determine the effect of the individual entrepreneurial competencies on operating efficiency.

However, if farmers concentrate on their individual competencies, they will be able to identify where they are lacking and then make use of necessary measures to counter this. Accordingly, the management of a farm requires that the farmer should be competent in all of the competencies. This increases the need to concentrate on the competencies which need to be focused on individually in order to ensure that the competition for a farmer's time and effort is directed towards increasing the competencies where he is lacking. This is, however, difficult if all the competencies are grouped together, creating a small positive relationship between competencies and operating efficiency.

In order to determine the significance of each individual competency identified in section 4.2.1, a t-test was used to determine whether any of the entrepreneurial competencies scores and operating efficiency scores are statistically different from one another. The significant probability values are shown in Table 4.5 below, as well as the correlations

between each of the competencies and the operating efficiency. Here the two competencies that was omitted in the entrepreneurial competencies index, was included.

Table 4.5: Level of significance and correlation of entrepreneurial competencies compared with operating efficiency.

Competencies	Probability (p-values)	Correlation(r)
Opportunity competencies	0.068	0.19
Relationship competencies	0.285	0.11
Conceptual competencies	0.045	0.21
Operational competencies	0.125	0.16
Strategic competencies	0.051	0.20
Commitment competencies	0.037	0.22
Support competencies	0.026	0.23

The correlation values of each of the competencies in relation to the operating efficiency score indicates that there is a positive correlation between them. Thus, each of the competencies has an individual positive effect on the operating efficiency, even though when combined in the group of entrepreneurial competencies there is a very low score. Therefore, the focus should be on individual competencies and not on entrepreneurial competencies as a whole. In the next section, each of the competencies will be discussed in relation to operating efficiency.

The opportunity competencies indicate that those farmers who are actively seeking new opportunities in order to increase farm business, ways to integrate other sectors in the market, new gaps within the market, or even opportunities to decrease production costs, will be able to increase their operating efficiency by 19 %. The farmers' average score for these competencies showed the lowest score for all of the competencies, indicating the largest room for improvement. Thus, if farmers were to expand their businesses horizontally or vertically within the value chain, they would increase the size of their businesses, thereby creating more revenue opportunities within the businesses. The increase in income could improve the profitability of the farming business. Thus, actively seeking opportunities can benefit the operating efficiency of a farm.

The relationship competencies group has the smallest relations on the operating efficiency. However, there is still a positive increase in the operating efficiency where the farmer increases his abilities to communicate, network and negotiate. If a farmer builds a network within the processing industry, for example, he or she will be able to negotiate the terms of

crop delivery. Farmers are price-takers, therefore there is small room for negotiating, but if farmers have a higher quality or grade of a product, they can negotiate for no-cost or lower transport costs. This would help decrease production costs on the farm, thereby increasing farm income and profitability. Accordingly, it is important for farmers to communicate and negotiate their concerns in order to ensure securing the best prices, transport conditions, grades and inputs for their businesses. All of these factors have an effect on production and sales, thus directly affecting operating efficiency.

The conceptual competencies of farmers are also expected to have a positive influence on their operating their farms efficiently. These competencies are closely related to opportunity, which presents the innovative ideas or knowledge needed to think of problems in new ways. However, this group of competencies achieved the second-lowest average score, indicating more room for improvement. Usually, the need to seek an opportunity arises owing to problems or lack of a solution. Thus, if farmers become innovative with their problem-solving efforts, this might create opportunities for new products or services within the market. For example, if a farmer decides to plant maize instead of farming with livestock, he will need a combine harvester, and although this is an expensive implement, the farmer could make the combine available for hire to other farmers facing the same need, thereby helping with the payments for the implement. This could increase the farmer's income and help decrease the debt used to acquire the implement, while being innovative and seeking a new opportunity.

The operational competencies relate to the operations of the business. If the farmer focuses on organising and planning the operations of the farm, creating a clear strategy or end goal and ensuring that the operations runs smoothly, the operating efficiency of the farm could increase by 16 %. Literature suggests that planning on how resources will be used may decrease production costs, thereby increasing income and profit of the farm. Farmers therefore need to have a clear plan for their production year, to help increase the overall well-being of their farms' finances.

Strategic competencies can increase the operating efficiency of the farm by 20 %, where there is a focus on increasing the farmer's strategic competencies behaviours. The competencies focus on setting and determining the cost–benefits for reaching strategies or goals. Thus, if a farmer has a well-planned business strategy with a clear vision and mission, he or she will be able to determine the short-term, reachable goals that will determine the success of the business plan. If a farmer, for example, endeavours to increase the production area of crops in each planting season, while maintaining the same input costs, he will be able to grow the business and increase the income at the same time. This will, however, require commitment to the goal in order to achieve success.

The average score for commitment competencies was the highest among all the competencies. If there is an increase in how committed the farmer is in ensuring that a venture is successful, the operating efficiency will increase with 22 %. The positive relation between commitment and operating efficiency is similar to that described in literature, which suggests that being committed to the business will ensure business growth. If there is an increase in the business size or opportunities, there will be an increase in income. For any goal or strategy to be achieved, is important that there be a commitment toward the strategy, with the belief in own capabilities to achieve strategy. This links with the support competencies of a farmer.

The support competencies are the competencies with the largest relation on the operating efficiency, when there is an increase in this group of competencies behaviour. These competencies are closely related to the personal strengths and learning capabilities of the farmer. Self-efficacy is important in order for farmers to believe in their own capabilities to learn and apply new knowledge and to be successful in their operations. If a farmer has a higher belief in himself, he will be willing to work harder and be more committed in seeing a venture through. If a farmer does not believe in his own capabilities in terms of crop knowledge, he will doubt himself and not commit to ensuring the success of the crop. This might decrease the production yield, thereby negatively effecting operating efficiency. In the literature review, it is suggested that to ensure an increase in business growth, farmers should constantly increase their knowledge, thereby increasing their self-efficacy and self-belief.

4.4 CONCLUSION

For the original problem identified, there was no evidence available in South Africa that proved that entrepreneurial competencies may contribute to the improvement of the financial performance of farmers. The literature suggests that a positive relationship exists between financial performance and higher levels of entrepreneurial competencies.

In the PCR, the positive relationship was proven between operating efficiency and the entrepreneurial competencies for the farmers included in the research. A positive relationship is, however, very small for the entrepreneurial competencies index. In order to determine the reason for the small relationship, the influence of each of the individual entrepreneurial competencies on operating efficiency was determined.

The overall conclusion is that the individual entrepreneurial competencies of a farmer will have a positive influence on the financial performance of a farm, given that farmers who

actively try to increase their individual entrepreneurial competencies will ultimately increase their income from their farm. The increase of farm income will mean that the farm grows as a business, creating a wealthier farming business. This will lead to an overall successful business and successful farmer, in turn leading to an increased contribution within the particular agricultural sector that the farm produces in. Therefore, a greater investment in the training and educating of farmers concerning their entrepreneurial competencies will lead to greater business success for farmers.

CHAPTER 5

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 INTRODUCTION

5.1.1 BACKGROUND AND MOTIVATION

Within South Africa, a focus should be placed on expanding the agricultural sector, where there are a variety of opportunities for the employment of foreign income and for economic growth. However, the challenge of the price–cost squeeze in recent years has limited the performance of some farmers. This has created a need for farmers to be innovative and to increase profitability and business performance (Asfaha & Jooste, 2007). In order to increase profitability, farmers need to make informed decisions regarding finances, opportunities and integration.

A farm's performance can be increased by considering certain financial performance measures and the factors that influence these measures. In order to increase performance, the focus should be to minimise cost, and increase business growth and sustainability within the volatile market. Thus, the abilities needed to improve profitability and increase business growth include decision-making skills, networking skills, opportunity seeking behaviour and problem solving abilities.

The decision-making ability of a manager/owner is considered to be part of the skills of an entrepreneur. However, for farmers to be successful in their farming operations, innovative decisions-making abilities are needed, linking with entrepreneurial characteristics and competencies in order to guarantee success. For this reason, it is expected that a farmer with enhanced entrepreneurial competencies would enjoy improved financial performance.

5.1.2 PROBLEM STATEMENT AND OBJECTIVES

Entrepreneurial competencies, linked with entrepreneurial behaviour and decision-making skills, influence the financial performance of a farm. In South Africa, however, there is no reported research (to the knowledge of the researcher) on the influence of farmer's entrepreneurial competencies on their financial performance.

Ample research has focused on the measurement of financial performance. In most of the research studies, the focus has been on increasing profitability by decreasing costs. Therefore, the recommendations centralise around improving the financial performance through increasing both liquidity and profitability. This is done by making appropriate decisions, which form part of entrepreneurial skills. Abroad, there have been studies that link entrepreneurial behaviour with agriculture. However, according to the researcher, there is a dearth of knowledge on this in South Africa.

Researchers have explored the relationship between entrepreneurial skills and technical efficiency of farms in South Africa (Jordaan, 2012; Jordaan & Grové, 2012). A positive relationship was found and recommendations were made to place more emphasis on extending entrepreneurial skills of smallholder farmers to improve their performance. Thus, there is no scientific evidence available to establish that improved entrepreneurial competencies might contribute to improved financial performance of farmers.

The main objective of the study was to explore the effect of the relationship between entrepreneurial competencies of a farmer and the financial performance of the farm. The main objective was achieved through the completion of three sub-objectives:

Sub-objective 1: To explore the financial performance of these farmers to establish whether they are financially maintainable and profitable. Financial ratios were used to determine ratios in each of the liquidity, solvency, profitability and financial efficiency categories of the farms. A financial ratio-based DEA model was used to determine a single variable, operating efficiency that can be used to compare against the entrepreneurial competencies.

Sub-objective 2: To measure the entrepreneurial competencies of farmers in order to determine if the farmers exhibit entrepreneurial competencies through their observed behaviour. Entrepreneurial competencies were measured using the entrepreneurial competence instrument, developed by Man (2001).

Sub-objective 3: To explore the relationship between entrepreneurial competencies and financial performance of the farmers to determine whether or not the entrepreneurial competencies of farmers can contribute towards predicting the variation in financial performance.

5.2 LITERATURE REVIEW

5.2.1 FIRM PERFORMANCE

The firm performance of any business is concerned with determining whether or not the business is performing successfully within the market. It is a measurement used to determine whether or not a business is achieving its objectives (Mutonyi & Gyau, 2014). However, firm performance is measured in two categories, namely financial and non-financial performance. There is no specific metric measurement for non-financial performance, thus it will not be included in this study.

In order to measure financial performance, accurate financial record-keeping is important. Financial statements are needed to measure and monitor the firm's (financial) performance (Pena *et al.*, 1999). Financial performance is concerned with how financially viable a business is. In any business, it is important to know what the financial position of the business is, as well as how the financial performance of the business measures up, and in farming it is no different.

Farm finance guidelines provide mechanisms to measure a farm's financial performance. A number of studies have been done on measuring farm financial performance. There are five measurements used to determine financial performance, Liquidity; Solvency; Profitability; Repayment Capacity; and Financial Efficiency (FFSC, 2011). In this study, however, the ratios for Liquidity, Solvency, Profitability and Financial efficiency were used. Currency values were left out of the measurement because larger farms are likely to have higher currency values than smaller farms (Hoppe, 2015).

The ratios of these four measures are calculated individually in order to determine the financial performance for specific measures. However, in order to compare farms against each other in terms of financial performance, an overall measurement is needed. The financial-based Data Envelopment Analysis (DEA) model is an output-orientated model which is focused on maximising a given objective with some constraints. This model was used to calculate efficiency scores in order to rank the operating efficiency of different farms against one another.

5.2.2 ENTREPRENEURSHIP

There is a lack of agreement on a specific definition for entrepreneurs (Ahmad & Seymour, 2007). The problem is that the term entrepreneur is used, rather than owner; manager;

trader; and owner-manager, which creates confusion in terms of one specific definition (McClelland, 1967). There is diversity among the different definitions of an entrepreneur within literature, but there is consensus about certain terms linked to an entrepreneur and entrepreneurship. These terms are innovativeness, locus of control, opportunity seeking and risk-taking attitude. The basis of the entrepreneurial definitions is that entrepreneurs are individuals who make different decisions based on advancing themselves and their businesses. Personal characteristics and decision-making skills have been linked to the management capacity of farmers, thus indicating the importance of entrepreneurship in agriculture (Nuthall, 2001). This is confirmed by Bergevoet (2005) who states that agricultural entrepreneurship is receiving heightened attention to counter changes in the agricultural market.

Carter (1998) and Carter and Rosa (1998) state that farmers have traditionally behaved as entrepreneurs. The changing market structures and globalisation of agriculture has increased the need for farmers to be more innovative in their decision-making. Agricultural organisations see entrepreneurship as a form of relief for farmers by becoming able to cope with the challenges they face in a changing market (Bergevoet, 2005).The "*farmer as an entrepreneur*" is more innovative and searches for new opportunities. According to McElwee (2008), this type of farmer identifies non-farming agricultural prospects/opportunities and uses the farm's resources to create extra revenue for the farm. Thus, these entrepreneurial farmers are more committed to seeing the business become successful.

Different approaches exist to measure the entrepreneurial characteristics of individuals. In recent years, the entrepreneurial competencies approach has become increasingly popular. The reason for the increased interest is that the competencies approach includes traits, characteristics, abilities and skills as underlying dimensions. Entrepreneurial competencies take into consideration the fact that an individual's behaviour and decisions tends to make him or her more entrepreneurial in activities (Man *et al.*, 2002).

The instrument developed by Man (2001) has been used to measure entrepreneurial competencies. This instrument was applied by Man (2001) in small and medium enterprises in Hong Kong, but the same instrument can be applied in any industry. From literature, it is evident that there are certain behavioural aspects that are commonly associated with entrepreneurial behaviour. These aspects are also identified within the entrepreneurial competencies instrument.

5.3 METHODOLOGY

5.3.1 DATA

The data used for this research was collected through a formal agreement with a commercial financial organisation in South Africa. The survey was conducted between July and November, 2015. Although 160 respondents were identified for the research, only 99 questionnaires were completed and sent back. Out of the 99 questionnaires received back, only 94 of the respondents provided sufficient financial data for measuring their financial performance according to identified financial ratios. Self-rating was not included in the research to prevent over-stating of own abilities. The research has made use of expert ratings, consisting of experts that work hand in hand with the farmers.

Analysis was mainly based on the primary data which was obtained from a commercial financial institution within South Africa. The data was collected from all nine provinces, therefore representing the whole country. An instrument developed by Man (2001) was used to measure the entrepreneurial competencies of the farmers. The instrument consists of 53 statements, and a 7-point anchored Likert scale was used to rate each statement, where 1 represented strongly disagree, and 7 represented strongly agree, with each statement. The statements were rephrased to make them more relatable to agriculture.

5.3.2 METHODS

Operating efficiency was used to determine the degree of financial performance in the study. The operating efficiency was measured (sub-objective 1) by making use of an adapted financial-based Data Envelopment Analysis (DEA) model. This model has been used by Henning (2011) and Henning et al. (2013) to determine the operating efficiency of farmers in the Northern Cape. The financial ratios of the farms were calculated and used to determine an efficiency score for each farm. The operating efficiency score was used to indicate within the group of farmers which farms were performing efficiently, compared with one another.

After the operating efficiency had been calculated, the next step was to determine the entrepreneurial competencies demonstrated in the farmers' behaviour (sub-objective 2). The instrument developed by Man (2001) was used to gauge answers to statements relating to entrepreneurial competencies. To determine the specific entrepreneurial competencies displayed by the farmers in the study, an explanatory factor analysis was used to ascertain what statements related to which of the competencies. The competencies were identified in terms of the statements that displayed high factor loadings for each of the competencies. To

determine a score for each of the competencies, the ratings for the statements used to determine the entrepreneurial competencies were added together.

The entrepreneurial competencies scores were then used to determine the relationships between the entrepreneurial competencies and the operating efficiency scores for each farm (sub-objective 3). The operating efficiency scores were used as the dependant variable. The dependent variable in the regression analysis is a vector of efficiency scores estimated to represent the level of financial performance of the respondents. Due to the nature of the dependant variable, the recommendations of McDonald (2009) were followed and an Ordinary Least Squares (OLS) model was used within the Principal Component Regression (PCR).

5.4 RESULTS AND CONCLUSIONS

5.4.1 OPERATING EFFICIENCY OF FARMERS

The results from the financial-based DEA model indicated that the distribution of the efficiency scores ranged from 0.749 to 1. The distribution indicates that the farms in the sample all have an operating efficiency score above 0.70. Therefore, the farms in the sample are all operating near the optimal efficiency level, compared with one another. About 50 % of the farms had an efficiency score above 0.855. This indicates that the distribution skews to the right, with a very high level of operating efficiency for the sample. The reason for this may be that the model assigns weights to rank all the farms at their most efficient level.

The percentage of farms within the strong category for net farm income ratio for both efficient and inefficient farms indicates the same percentage for both of these groups, who are efficiently generating income that can cover their expenses and still have income left. However, there are farms who can work on decreasing their high production costs and increasing their gross incomes. This will increase the overall financial well-being of a farm, thereby increasing the operating efficiency.

In conclusion, farms need to increase the amount of their ratios that can be categorised as strong in order to increase their operating efficiency. The increase in operating efficiency will mean that the farms will be producing at a more optimal level of production, thereby increasing their financial performance.

5.4.2 ENTREPRENEURIAL COMPETENCIES OF FARMERS

On average, all of the farmers had a score above 70 % for each of the individual entrepreneurial competencies. This indicates that the majority of the farmers in the sample do display entrepreneurial behaviour. The farmers had the highest average score in regard to commitment competencies. This establishes that the need to see a venture succeed is very important to these farmers.

The lowest average score was identified for opportunity competencies. The distribution for this group of competencies is also wider, indicating larger room for improvement. Farmers need to increase their focus on actively seeking new opportunities within the agricultural market. Opportunity competencies, in identifying new gaps could benefit the farming business of a farmer, are most lacking within this group of farmers.

In conclusion, farmers within South Africa do display entrepreneurial behaviour. Entrepreneurial competencies, such as commitment and operation competencies, are higher within this sample of farmers, but all of the competencies identified had high average scores.

5.4.3 ENTREPRENEURIAL COMPETENCIES INFLUENCING FINANCIAL PERFORMANCE

The entrepreneurial competencies of the farmers were measured against the operating efficiencies of their farms by making use of a PCR model. However, the entrepreneurial competencies of the sample farmers were found to have a small positive significance, when measured as a single entrepreneurial competencies index variable. However, further investigation was done to determine the individual relationship between each of the entrepreneurial competencies and the operating efficiency.

It was found that each of their individual entrepreneurial competencies will have a positive relationship with the operating efficiency. Therefore, an increase in a specific entrepreneurial competencies behaviour will mean an increase in the operating efficiency of the farm. The support competencies were found to have the largest significant influence on the operating efficiency, thereby indicating that a farmer will need to expand his knowledge and self-efficacy in order to gain the largest increase effect in operating efficiency.

A possible reason for the difference between the individual entrepreneurial competencies and entrepreneurial competencies, as a whole, is the focus given to the competencies. Entrepreneurial competencies, as a whole, indicate that a farmer needs to focus on several

competencies at the same time, in consequence of which certain competencies will be neglected. Farmers need to be owners, managers and workers, at the same time, which creates an increased demand on the farmer to perform well on several levels within the business.

However, if farmers concentrate on individual competencies, they will be able to identify where they are lacking and make use of necessary measures to counter this. Therefore, the management of a farm means that a farmer needs to be competent in all of the competencies. This increases the need to concentrate on the competencies to be focused on individually in order to ensure that the competition between the competencies for the farmer's time and effort is focused on increasing the competencies where he is lacking. This is, however, difficult where all the competencies are grouped together, creating a small positive relationship between entrepreneurial competencies and operating efficiency.

The overall conclusion is thus that the entrepreneurial competencies of a farmer have an influence on the financial performance of a farm. Given that farmers who actively try to increase their individual entrepreneurial competencies will ultimately increase their income from their farm, the increase of the farm income will mean that the farm grows as a business, creating a wealthier farming business. This will lead to an overall successful business and a successful farmer, contributing to an increased contribution within the particular agricultural sector that the farm produces in. Therefore, a greater investment in the training and educating of farmers about their entrepreneurial competencies will lead to greater business successes for farmers.

5.5 RECOMMENDATIONS

It is important to note that the focus of this study is based on a specific group of farmers, with a small sample. The farmers in this study have diverse farming practices and they produce differing products. Therefore, the variability in efficiency scores can be influenced by these factors.

The following conclusions can be drawn from the study:

- Despite the different farming sectors used in the financial performance measures, all of the farmers displayed a high level of operating efficiency in their performance.

- Entrepreneurial competencies do affect the financial performance of farmers, thus the entrepreneurial ability of a farmer is important for business success.

– Training farmers on an individual entrepreneurial competencies level is important to ensure that the competencies are managed correctly to achieve optimal benefits in terms of the contribution to operating efficiency.

In light of the results from this study, the following recommendations for further research can be made:

– A new model for measuring financial performance using a single variable that takes into consideration all the factors of financial performance should be researched further.

– Very little research has been done on farmers' entrepreneurial literacy in South Africa, and therefore research on the entrepreneurial behaviour of farmers should be expanded to address this knowledge gap.

– Methods for measuring entrepreneurial competencies are largely based on self-rating questionnaires. Research should be done on different methods for measuring and determining entrepreneurial competencies.

– Research on the effect of entrepreneurial competencies of farmers and how their behaviour affects operating efficiency should be done to determine the access to credit available to farmers.

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