Critical success factors of emerging pig producers: Case study of selected areas in the Gauteng and Mpumalanga Provinces

by

XOLILE S. DLAMINI

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DECLARATION

I Xolile S. Dlamini declare that this thesis/dissertation, which I hereby submit for the degree Master of Science (Agricultural Economics) at the University of Pretoria, is my work and has not been submitted by me for any other degree at this or any other tertiary institution.

Given and family name: Xolile S. Dlamini

Signature: .....

Date: .....

Dedication

To Amanda, Mandisa and Wakhile.

Let God’s love shine in you, as my love for you shines in my heart.

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First, I would like to thank the National Department of Agriculture for partly funding my tuition when I was on the point of dropping my studies owing to lack of funds. Special thanks must go to Mr Mathebula, the Deputy Director of Education and Training, who understood my desperation to finish my studies. I would like to express my gratitude to the South African Pork Producers' Organisation (SAPPO) for granting me a bursary that facilitated the research survey for this study and funded part of my tuition.

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ABSTRACT

Critical success factors of emerging pig producers. Case study of selected areas in the Gauteng and Mpumalanga Provinces

By

Xolile S. Dlamini

Degree: M.Sc. (Agric) Agricultural Economics
Department: Agricultural Economics, Extension and Rural Development
Study Leader: Professor Andre Louw

This study investigated the critical success factors for emerging pig producers in the Gauteng and Mpumalanga provinces in South Africa. The study was undertaken to determine operational management practices and key performance indicators of emerging pig producers, and compare them against South African commercial pig industry norms. The expectation was that emerging pig producers' operational management practices and key performance indicators are similar to South African commercial pig industry norms.

Research findings show that critical success factors for emerging pig producers include average income per sow per litter, piglets born per sow per litter, average income per adult pig, and provision of feeders and drinkers for pigs. Challenges faced by emerging pig producers include low participation of youth, small scale of operations, poor market participation and poor management leading to high mortality rates, long farrowing intervals, small litter sizes, and poor weaning practices, as well as poorly equipped housing.

The research concluded that there are no significant differences between successful pig production and education levels, as well as between the previous work experiences of successful and unsuccessful emerging pig producers.

The expectation was that emerging pig producers with more years of previous experience in pig production would be more successful than those with only a few years of previous experience. However, there was a positive but not strong relationship between success, operational management and perceived success factors. Both successful and unsuccessful emerging pork producers considered the success factors as equally critical. The study achieved its objectives, although the findings are not strong enough to explain the relationships between overall success scores of successful and unsuccessful emerging pig producers.

The study suggests that SAPPO can facilitate the transition of emerging pork producers to commercial production through capacity building, providing support and improving participation of emerging pig producers in the pork chain. This can be achieved by designing support strategies that will enable an emerging pig producer to develop as a person (entrepreneur) which should translate into business development, increase net worth and expand into commercial production. The ultimate success and impact of this support service rests on the shoulders of PPPs and producers as recipients of support in terms of their commitment, the level to which they will access and make use of the support available at their disposal and their willingness to implement the given advice and information. SAPPO could redesign its support strategies to include mentorship, capacity building, cost reduction strategies and market access through contracting.

This study recommends that a similar study be conducted in other provinces to back up these findings, as well as to provide representation of emerging pig producers in the whole country. A database that contains a list of active emerging pork producers with contactable phone numbers in Mpumalanga and Gauteng provinces was not available. There is a need for a study that will compile a comprehensive database and profile of emerging pig producers, to use in developing some business models. Emerging pig producers are still in transition, not yet operating at a commercial scale. A study that will develop standards or norms specifically for emerging pork producers to use as a benchmark for performance evaluation is necessary.

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LIST OF ACRONYMS & ABBREVIATIONS

Abbreviation	Meaning
AGRIBEE	Agricultural Black Economic Empowerment
ARC	Agricultural Research Council
CASP	Comprehensive Agricultural Support Programme
CSF	Critical Success Factors
DOA	Department of Agriculture
ECPP	Emerging Commercial Pork Producers
EPP	Emerging Pork Producers
EU	European Union
FAO	Food and Agricultural Organisation
GP	Gauteng Province
KZN	KwaZulu-Natal
LRAD	Land Redistribution for Agricultural Development
MAFISA	Micro Agricultural Finance Institution for South Africa
MP	Mpumalanga Province
NDA	National Department of Agriculture
NS	Not Significant
PPP	Public Private Partnership
PLAS	Proactive Land Acquisition Strategy
SAPPO	South African Pork Producers' Organisation
SME	Small and Medium Sized Enterprises
USA	United States of America

DEFINITION OF TERMS

Litter	all piglets produced at a single birth
Sow	female that has farrowed at least once
Boar	uncastrated male pig used for breeding
Creep area	area accessible to small pigs but not their mother, in which a high protein supplement is provided
Culling	removal of unproductive breeding stock for slaughter
Farrowing	to give birth to pigs
Gilt	young female that has not yet produced a litter
Weaning	removing young piglets from their mother

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CHAPTER 1

INTRODUCTION

1.1 BACKGROUND

The significant role of smallholder agriculture in creating job opportunities, poverty reduction and contribution to food security is widely recognised by research (HLPE, 2013; IFAD, 2014; Altman, Hart & Jacobs, 2009). The South African Government, in its National Skills Development Strategy, pledged to develop and support small, micro and medium enterprises, including smallholder farmers (Department of Higher Education and Training, 2010). The most common argument in favour of smallholder farmers is that they contribute to food security, contribute to economic growth and create employment for the rural poor (Temtime & Pansiri, 2004).

The survival rate of small farming businesses in South Africa is very low. Over 80% of small farming businesses fail (Mmbengwa, Ramukumba, Groenewald, Van Schalkwyk, Gundidza & Maiwashe, 2011). This rate can be attributed to a variety of problems related to production issues, inadequate managerial skills, financial management, and limited access to markets. Smallholder pig producers in South Africa face similar problems. A small number of commercial pig producers practising highly intensive pig production and a large number of subsistence pig farmers, practising mainly extensive pig production, characterise the South African pig industry. Although there are a large number of subsistence pig producers, their contribution to the pig industry is negligible (Aliber & Hart, 2009). There are more than 4 000 subsistence farmers breeding 20 000 sows, compared with 400 commercial pig producers breeding 103 000 sows (Eskort, 2011). According to Qeda Nyoka, SAPPO head of emerging farmer development, South Africa has about 1200 emerging pig farmers countrywide who own about 15 000 sows in total which is about 15% of the 105 000 sows in commercial units (Nyoka, 2012).

In South Africa, the demand for pork ranks third after chicken and beef. South Africa consumes approximately 2 million pigs and slaughters about 1.8 million pigs annually, of which 65% is processed (Eskort, 2011). This indicates that South African pork producers need about 200 000 pigs to meet domestic demand. Figure 1.1 shows pork production and consumption patterns in South Africa.

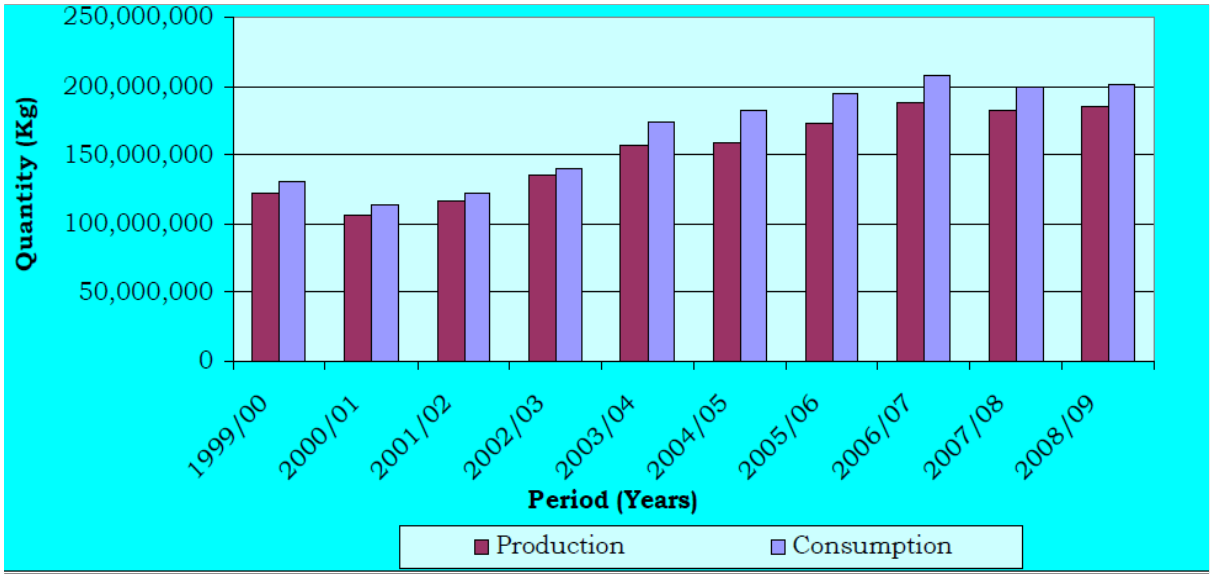

Figure 1.1: Pork Production and Consumption in South Africa during 1999/00 to 2008/09

Source: Department of Agriculture, Forestry and Fisheries, 2011:11

It is clear from Figure 1.1 that pork consumption exceeded production throughout the 1999–2000 to 2008–09 periods, with the highest consumption in 2006–07. This implies that South Africa is a net importer of pork. From January to September 2012, South Africa imported 24 550 metric tons. Imports were mainly from Germany (37%), Canada (27.25%) and Spain (15.16%). The imports were mainly ribs (57.38%), other cuts (35.33%), hams or shoulders (7.08%) and carcasses (0.21%), respectively (South African Pork Producers' Association, 2012).

Given the small number of commercial pig producers and their high contribution to the pig industry, as well as the net importer status of the South African pig industry, there is a need to encourage and support subsistence pig producers to engage in commercial production.

However, the transition of emerging farmers from subsistence farming to commercial production is constrained by their small scale of production, lack of knowledge of commercial farming practices and inadequate financial management skills.

South African emerging farmers face problems such as lack of secure title to land, lack of investment and operating capital, limited access to credit, insufficient farm size, poor housing infrastructure, poor access to extension officers and a highly competitive industry context (Macleod, 2008; (Ortmann, 2005).

Management problems faced by emerging pig producers include inbreeding, high mortality rates, long farrowing intervals, small litter sizes, poor weaning practices, poor housing infrastructure and high levies charged at auctions (Manchidi, 2009). Other problems include lack of access to high value markets, high transaction costs such as transportation, and high feed costs, all leading to poor feeding practices

The limited access for emerging pig producers to high value markets can be attributed to their inability to produce in large quantities, as well as their inability to meet strict requirements on quality and food safety in the supply chain (Vermeulen, Kirsten & Sartorious, 2008:199). In addition to these challenges, emerging pig producers cannot afford the costs involved in meeting these requirements (Kirsten & Sartorius, 2002:504). An increasing possibility of further exclusion of small-scale farmers (especially emerging black farmers) who are currently entering general commercial agriculture is anticipated (Louw, Ndanga, Chikazunga & Jagwe, 2008:288; Bienabe & Sautier, 2005; Vermeulen *et al*., 2008).

1.2 PROBLEM STATEMENT

Given the large number of subsistence pig producers and the unchanging net importer status of the industry, it is important to investigate the transition of emerging pork producers (EPPs) to commercial production. Efforts to encourage and support EPPs could lead to increased pig production and thus a significant contribution to the pig industry. This requires knowledge of the problems they face and the identification of critical factors that might lead to successful commercial pig production.

As stated earlier, the contribution of subsistence pig producers to the pig industry is negligible, although these producers are in large numbers compared with commercial pig producers. Emerging pig producers face problems such as high mortality rates, poor management, limited resources and an inability to access markets.

Although much attention has been focused on the critical success factors of small and micro enterprises (SMEs) in agriculture, most of the emphasis has been on subsistence farmers rather than emerging pork producers per se. No studies exist on the critical success elements for emerging pig producers and the factors that influence their transition to commercial production in South Africa. It is thus necessary to gain a deeper understanding of the critical factors that have an impact on the success of South African EPPs. This study seeks to fill the gap in the literature on critical success factors for emerging pig producers in the South African pork industry and to provide recommendations to address these issues.

The study investigates critical success factors of South African emerging pig producers in making a transition to commercial production. This study examines key drivers of success, operational management and technical measures of success in pig production and compares them against South African pig industry standards. Upon identification of the critical success factors, the belief is that emerging pig producers will focus on them, as well as identify ways to improve their production performance.

1.3 HYPOTHESIS

In order to have a deeper understanding of the critical success factors for emerging pig producers, the study seeks to confirm the following hypotheses:

1.3.1 Education levels of emerging pig producers determine successful and unsuccessful pig production.

1.3.2 Pig housing of emerging pig producers determines successful and unsuccessful pig production.

1.3.3 Previous experience of emerging pig producers determines successful and unsuccessful pig production.

1.3.4 Operational management practices of emerging pig producers determine successful and unsuccessful pig production.

1.3.5 Perceived CSF of emerging pig producers determines successful and unsuccessful pig production.

1.3.6 Key performance indicators for emerging pig producers are similar to South African pig industry norms.

1.4 RESEARCH OBJECTIVES

The purpose of this study is to identify factors critical for the success of emerging pig producers in the Mpumalanga and Gauteng provinces.

Specifically, the study seeks to:

1.4.1 Identify the critical success factors necessary for successful pig production in the case of emerging pig producers.

1.4.2 Measure the perceptions of emerging pig producers with reference to critical success factors.

1.4.3 Identify the impact of perceived critical success factors and the physical and economic performance factors of emerging pig producers' business.

1.4.4 Compare physical performance factors of emerging pig producers against South African pig industry norms.

1.5 IMPORTANCE AND BENEFITS OF THE STUDY

A complete perspective of critical success factors of the South African emerging pig producers (EPP) will allow owner and managers to pay attention to improving their competencies and achieving set goals. Based on these critical factors, EPPs will be able to identify and exploit their competencies in achieving the desired goals. It will also enable managers and owners to develop strategies to improve on the factors that may lead to the success of their businesses.

An investigation of CSF can help emerging pig producers to identify activities that require more attention for increased performance in their businesses. It will also help various stakeholders (government, SAPPO and private companies) to gain insight into the factors critical to the success of emerging pig producers. An understanding of these factors could enable the South African Government to develop appropriate policies and strategies directed at mitigating the challenges faced by emerging pig producers. The study seeks to add to the body of literature on the critical factors that impact on the success of emerging pig producers in order to assess their potential to engage in larger scale commercial pork production.

1.6 CONCEPTUAL FRAMEWORK

A conceptual framework forms a basis from which a researcher can perform an empirical analysis. Owing to the lack of a common model for defining the critical success concept, previous research has used various theories, such as the design, planning and shared experiences theories (Grunert & Ellegaard, 1992). The *design* school assumes that every business is unique and has to find its own match within the environment and case studies are commonly used. On the other hand, the *planning* school assists managers in their decision-making process by identifying and focusing on a small number of factors leading to an improved strategy formulation. It also allows researchers to gain an understanding of the perceived success factors and their influence in strategy formulation.

Finally, the *shared experiences* school assists in identifying the various strategies that relate to business success in different environments. It builds up empirical knowledge that serves as a guide in the selection of a business strategy and unveils actual causal relationships for success. Virtanen (2004) suggests that the selection of different theories and methodologies should be made according to the context of the study. This study makes use of the *planning* and *shared experiences theories* that view critical success factors as the means for developing a planning and marketing tool.

The theoretical framework in figure 1.2 guides this study in investigating the critical success factors for emerging pig producers in the Mpumalanga and Gauteng provinces in South Africa.

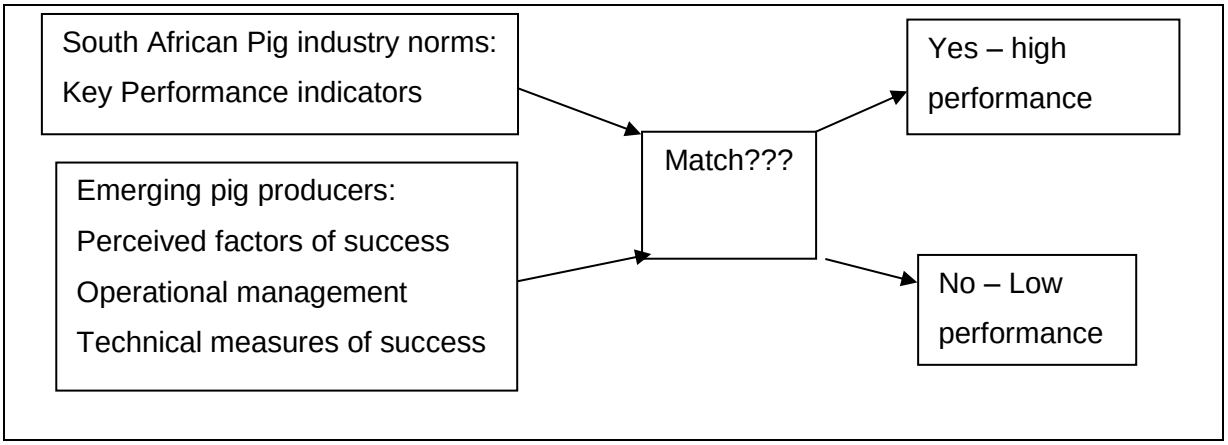

Figure1.2: Shared experiences view on key success factors
Adapted from Grunert and Ellegaard (1992)

The study examines perceived success factors, operational management practices, and technical measures of success in pig production. The study compares these factors against pig industry norms in South Africa. If these factors compare favourably with South African Pig industry norms, this will indicate high performance of the business and thus success. If factors do not match with pig industry norms, the business will thus likely be unsuccessful.

1.6.1 Selection of study area

The factors considered in the selection of the study areas were the ease of access and the efficient data collection possible within the limited resources and period. The map shown in Figure 1.3 shows the location of the Metsweding and Nkangala districts in the Gauteng and Mpumalanga provinces, which were selected as study areas.

Figure 1.3: Map showing selected study areas
Source: http://www.waynedam.com/southafrica/showdistrictasp?district=DC31

The study focused on Metsweding District in the Gauteng Province and Nkangala District in the Mpumalanga Province. The agricultural sector in Gauteng Province is mainly devoted to livestock production with intensive production systems, such as piggeries and poultry batteries. The Metsweding District Municipality is located in the north-eastern part of Gauteng and has a well-developed livestock industry. Nkangala District Municipality is located on the western part of Mpumalanga and shares its borders with Gauteng. This proximity unlocks opportunities to large agricultural markets. Maize and livestock production also make a high contribution to the agricultural sector.

1.6.2 Research design and data collection

Good practice dictates that, after a review of literature, the research instrument has to be developed, tested, and then data collection commenced. This section describes the research instrument for data collection, sources of data and method of analysing data.

1.6.2.1 Research instrument

The study is exploratory in nature since the aim was to identify critical success factors for emerging pig producers in the Gauteng and Mpumalanga provinces. This is a useful way of gaining a better understanding of a problem, especially when one is uncertain about the nature of the problem (Saunders, Lewis & Thornhill, 2007). Data collection was carried out by means of a structured questionnaire as the main instrument, as well as through observations and photographs.

The questionnaire consisted of three sections. The first section comprised open-ended and categorical questions on the socio-economic characteristics of respondents, such as demographic characteristics and wealth creation. The factors were age, gender, education, previous experience, sources of income and livestock assets. The second part consisted of 15 items that measured how emerging pig producers perceived the contribution of different factors to the success of their businesses. These items relate to statements on pig industry performance standards obtained from literature. A five-point Likert scale, anchored by not critical (1) to very critical (5), measured the perceived factors of success.

The third part used 22 items for the objective measurement of success. The reviewed literature provided measurement items on the critical success factors for emerging pig producers (Manchidi, 2009; Macleod, 2008), as well as different performance standards of a pig production enterprise. The questionnaire included open-ended and categorical questions on operational management and technical measures of success.

1.6.2.2 Sources of data

Secondary data: As a point of departure, secondary data obtained through a literature review gave an insight of the problems faced by emerging pig producers, and the South African pig industry statistics. A review of literature also provided an insight on perceived success factors and key performance measures that are necessary for a successful pig production enterprise.

Primary data: Measurement items for physical and economic performance measures in pig production were obtained from previous studies and existing literature (Manchidi, 2009), Pioneer Foods fact sheet and DAFF infopaks (Department of Agriculture, Fisheries and Forestry, undated, a; Department of Agriculture, Fisheries and Forestry, undated, b; Department of Agriculture, Fisheries and Foresty, undated, c). The study used a survey questionnaire to obtain quantitative data on actual performance related to operational management practice and physical performance measures in pig production. The study made a comparison of survey data against South African pig industry norms extracted from SAPPO guidelines and from Elsenburg research in the Western Cape.

The study used commercial pig production gross margin categories extracted from existing KZN enterprise budgets for pig production for the year 2011. These figures were adjusted to fit the common size of operations (10, 25 and 50 sows) for emerging pig producers. From these figures, categories of income and costs of production per sow or per adult pig to determine financial performance of the pig business were derived. The study used gross margin categories as financial indicators because respondents were unwilling to disclose detailed financial information about their business to strangers. The incomplete records, as well as poor records, kept by respondents made it difficult to estimate the financial performance of their pig businesses.

Respondents: SAPPO, ARC and an extension officer from Ehlanzeni municipality provided various lists of emerging pig producers in the Gauteng and Mpumalanga provinces. From these lists, only 11 respondents were contactable and participated in the study.

Because of the lack of a sampling frame, the study identified the remaining 39 emerging pig producers through snowballing, resulting in 46 respondents. Snowball sampling is a non-probability method for developing a research sample whereby the contacted respondents refer the researcher to other people who could participate in the study (Katz, 2006). Owing to lack of a sampling frame, possible biases may exist. For example, bias can result from interviewing a majority of respondents who were recruited by one particular person into the sample. Such respondents may have similarities in responses and access to resources.

Because of the exploratory nature of the research, the collection of data was obtained through the internet, primary data and observations. The researcher conducted on-site interviews using a questionnaire that consisted of open-ended and close-ended questions. The reason for the selection of this type of interview was to ensure a 100% response rate and to clarify areas that were unclear to the respondents.

Initially, 50 respondents participated in the study and only 4 of these respondents had 50 sows and above. The study focused on the 46 respondents who had less than 50 sows. According to SAPPO Chief Executive Officer, Simon Streicher, emerging pig farmers can start with a minimum number of 50 sows with an aim of expanding to a minimum of 200 sows that is required to produce economically (Personal communication, 2010). For the purposes of this research, the study assumes that pork producers with fewer than 50 sows are operating below the economic level (emerging) and those with 50 sows or more have a potential to operate at an economic level (emerging commercial). Both types of pig producers should be involved at least in the production and selling of pigs.

To test the validity and reliability of the questionnaire, three emerging pig producers were interviewed using the questionnaire. The interviews also gave an indication for how respondents would react to the questions asked and for ease of understanding.

1.6.3 Data analysis

Verification of the appropriateness of the data analysis method was obtained through expert advice sought from the Department of Statistics at the University of Pretoria. The data was entered into an Excel spread sheet and then analysed using an SAS program.

The conclusions are discussed below.

Socio-economic characteristics: Factors analysed included age, gender, sources of income, livestock assets, previous experience and education. Descriptive statistics used included frequency, percentages, mean and standard deviation, median, minimum and maximum values.

Perceptions of emerging pig producers on the critical success factors were categorised according to ranked responses. The researcher allocated weights for each ranked response on perceived success factors to get an overall perceived success score for each respondent. A rating scale of one (1) had a weight of zero (0) and a rating scale of five (5) had a weight of four (4).

Furthermore, ranks were combined into three categories, namely: low (scales 1, 2), moderate (scale 3) and high (scales 4 and 5). The study categorised each perceived variable as low, moderate or high.

Housing: The quality of housing and equipment was assessed through observations and taking photographs. The researcher took notes pertaining to the quality of walls, well-drained floors, good ventilation, and availability of feeders, drinkers, bedding, farrowing crates, heaters and creep area. Each variable received an equal weight of one (1), if available, or zero (0) if not available.

Operational management and physical performance: The factors were feeding, reproduction, general management including diseases and parasites, financial performance, as well as marketing.

These responses were compared against South African pig industry standards which were rated as below, average or above the norm. Owing to the different units of the technical measures of success, different weights were assigned to each score and were summed up to give an overall success score. The scores were allocated as follows: below norm = 0, average = 1 and above norm = 2. The study regarded respondents with high overall success scores as successful and those with low overall success scores as unsuccessful.

Assessing relationships: The study examined relationships for overall success scores for perceived success factors, operational management, physical performance, as well as housing, and compared these against personal characteristics, like education and previous experience. To assess these relationships, the study used the Mann-Whitney U test, a non-parametric equivalent of the t – test. Since the data was not normally distributed, the t- test would not be appropriate statistically to assess these relationships. The study used Spearman's rank correlation to measure the strength of association between overall success scores for perceived success factors and operational management, physical performance, as well as housing.

1.7 OVERVIEW OF CHAPTERS

This dissertation is organised as follows:

Chapter 1 presents an overview and justification of the research project, including background to the research, importance of the study, hypothesis, research objectives, implementation plan and study limitations.

Chapter 2 gives a brief overview of the features of South African agriculture and the South African pork industry in terms of its structure, trends in pork production, characteristics of pig producers and challenges faced by pig producers.

Chapter 3 further gives a comprehensive review of past research and literature on critical success factor measurement and criteria.

Chapter 4 presents a descriptive overview of emerging pig producers in the Gauteng and Mpumalanga provinces and a detailed analysis of the empirical data collected in this study.

Chapter 5 reports on the findings of the research study in terms of meeting the research objectives and confirming the hypotheses.

Chapter 6 provides findings of the research in relation to the research objectives, draws conclusions and makes recommendations based on the findings.

CHAPTER 2

SOUTH AFRICAN AGRICULTURE AND THE PORK INDUSTRY

This chapter provides a brief overview of the features of South African agriculture and the South African pork industry in terms of its structure, trends in pork production, characteristics of pig producers and challenges faced by pig producers.

2.1 SOUTH AFRICAN AGRICULTURE: AN OVERVIEW

The distinguishing characteristic of South African agriculture is its dualistic nature in having a distinct commercial sector and a small-scale farming sector. The agricultural sector is composed of both primary production and secondary production activities which are mainly resource production and primary processing, respectively.

The most common agricultural activities include crop production, mixed farming cattle ranching in the bush veld and sheep farming in the more arid regions. South Africa is the largest producer of maize in the Southern African Development community. Maize is the main component of animal feed rations, as well as the staple food in the Southern African region (Department of Agriculture, Forestry and Fisheries, 2012). The livestock industry is the largest national agricultural sector. For example, about 80% of agricultural land is for farming purposes, but only 12% is suitable for crop production and the rest is suitable for extensive livestock production. Owing to the different environmental and weather conditions, stockbreeders focus on developing breeds that are adaptable to these conditions.

The livestock sector contributes up to 49% of the agricultural output. South Africa meets about 85% of its meat requirements through local production and the remaining 15% through imports from Namibia, Swaziland, Botswana, New Zealand, Europe and Australia. In South Africa, roughly 8.5 million people derive their income directly or indirectly from the agricultural sector. This indicates the importance of the sector in the economy (South Africa Pocket Guide, 2011/2012).

2.2 AGRICULTURAL REGIONS IN SOUTH AFRICA

The farming regions in South Africa differ according to climate, natural vegetation, soil type and farming practices. Agricultural activities range from intensive crop production and mixed farming in high rainfall areas to cattle ranching in the bush-veld and sheep farming in more arid regions. Livestock is the largest agricultural sector in South Africa, with a population of 13.8 million cattle and 28.8 million sheep (South Africa Pocket Guide, 2011/2012). Stockbreeders concentrate on the development of breeds that are well adapted to diverse climatic and environmental conditions.

South Africa's poultry and pig farms are more intensive than the extensive sheep and cattle production operations. The predominant pig breeds are the South African Landrace, the Large White, the Duroc and Pietrain (Elsenburg Fact Sheet, 2009).

2.2.1 Farming conditions

Subsistence and emerging pig farmers keep pigs in order to supplement household income, as well as for their utility in converting waste into meat (Ubisi Mail, 2009). Emerging and subsistence farmers regard the raising of pigs as the best way to dispose of garden waste or over-supply of produce while also providing a valuable source of protein and organic manure. It is for these reasons that small farmers keep pigs as part of a lifestyle or as a means of making extra money (Pearson, n.d.).

Farming conditions greatly influence business success. The location of a business influences the farming conditions. Proximity to markets and easy access to input suppliers is important in reducing costs of production. The availability of other non-agricultural industries influences the type and number of buyers for the product. For example, emerging pig businesses with close proximity to markets, large number of buyers, access to basic services and good management can reduce costs of production. Environmental conditions also influence the size and type of the pig production system. To reduce piglet mortality, pig producers should ensure easy access to water, quality feed, electricity and proper housing to protect piglets from harsh weather.

2.2.2 Pig production systems

Most emerging pig producers practise semi-intensive pig production. They house pigs during the night and allow pigs to move around in a fenced area during the day. Uncontrolled breeding, high disease incidence, high mortality and low productivity characterise this production system (Maclean, 2006; Muhanguzi, Lutwama & Mwiine, 2012). On the other hand, commercial farmers use a highly-intensive production system where pigs are completely confined in pig houses. Controlled breeding and low piglet mortality can improve the productivity of the enterprise.

A pork production system has an influence on the scale of production, available finance, technology, technical skills, feed and quality of pork produced. Based on these resources and the product desired, an emerging pig producer may choose one or a combination of the following three strategies of pig production. Chiba (2004) describes these systems as:

The *farrow-to-feeder* system involves reproducing with breeding sows and selling piglets at eight weeks of age (15 – 30 kg) to producers who raise piglets to finishing stage. Emerging pig producers can use this strategy to establish or increase the number of sows to use in a farrow-to-finish operation.

The *feeder-to-finish* system involves buying piglets at eight weeks of age (15 – 30 kg) and feeding them to market weight. The advantage of this system is that overhead costs are minimal; it requires minimum labour and has a short-term cycle. The disadvantage is that it requires a reliable source in terms of health and quality when buying piglets.

The *farrow-to-finish* system involves breeding and farrowing sows, as well as raising piglets until they reach market weight (100 – 110 kg). Although this strategy has a long production cycle (7 – 8 months), high capital and labour requirements, it is flexible and can lead to good profits in the end.

Emerging pig producers may select one strategy or a combination, based on the available resources and aim of production. For example, it will be cheaper for producers to buy a few breeding sows and then use the farrow to feeder system to increase the number of breeding sows. A combination of a farrow to feeder strategy with a farrow to finish strategy improves cash flow, while also taking advantage of the long-run market potential.

2.3 TYPOLOGIES OF FARMERS IN SOUTH AFRICA

The dual nature of agriculture in South African explains the different types of farmers found in the industry. Vink and van Rooyen, (2009) describe the characteristics of commercial, emerging and small-scale farmers in terms of production unit, ownership and management style, and binding constraints, as well as the support needed. Vink and van Rooyen, (2009),describe these typologies of farmers as;

Commercial farmers in private property: consist of large-, medium- and small-scale farmers. Large- and medium-scale commercial farmers typically have more than one farm, which is often family owned, and sometimes rent in land for agricultural production. Large commercial farmers hire qualified labour to manage the farms and participate both in local and export markets. These farmers are constrained by the size of export market and lack of equity capital to expand their production.

Support is required in technology improvement and accessing export and financial markets. Medium commercial farmers are often family managed and typically the lack of land capital and poor management limit their production potential. The assistance required to enhance their production potential is the provision of mortgage capital for land acquisition and management training. For small commercial farmers, farming is a lifestyle and they farm on a part-time basis. Production potential for these farmers is limited because they have other commitments, and they lack the necessary time and management facilities.

Emerging farmers: these are small-scale commercial farmers found mainly in communal areas, and a few on privately owned lands, with some farmers involved in community development. They include new farmers or subsistence farmers who are progressing into commercial agriculture. Emerging farmers on privately owned farms are usually constrained by lack of capital, management capacity and farm infrastructure. On the other hand, emerging farmers in communal areas are constrained by lack of rights to land title, capital labour, poor management and lack of employment opportunities. Both groups of farmers require support in improving production, which includes the provision of grants, full farmer support, credit and physical farm infrastructure.

Characteristics of subsistence farmers in communal areas include communal ownership, private ownership and little participation in the formal market. They are mainly constrained by lack of employment. They require support in the form of social welfare transfers.

Table 2.1 shows the differences within these two subgroups, as described by Vink and van Rooyen, (2009).

Table 2.1: Typologies of farmers in South Africa

Production unit (Turnover '000)	Ownership and management	Number ('000)	Binding constraint	Support required
Large commercial on private property (**>R2000)**	○ Family owned, ○ Professionally managed. ○ Integrated with farms - rent in land	5.4	○ Market size ○ Equity capital	○ Access to export markets ○ Financial market ○ Innovation
Medium commercial on private property **(R300 - R2000)**	○ Owned and managed by family. ○ Integrated with other farms and ○ some renting in of land	17	○ Land capital management	○ Mortgage capital for land access ○ Management training
Small commercial on private property (<**R300)**	○ Family owned (part time) ○ Lifestyle farming (game ranches)	24	○ Time management	-
Commercial in communal areas **(>R300)**	○ Communally owned ○ Development projects ○ Private ownership	-	○ Capital management setup	○ Grants for land access ○ Property rights ○ Comprehensive farmer support ○ Credit ○ Physical infrastructure
Emerging commercial in communal areas **(< R300)**	○ >20 hectares ○ Communally owned ○ Small farmers in development project ○ Private ownership	35	○ Land (property rights) ○ Capital labour management ○ Employment opportunities	○ Grants for land access ○ Property rights ○ Comprehensive farmer support ○ Physical infrastructure ○ Institutional infrastructure
Subsistence farmer in communal areas Allotment Market areas	○ <20 hectares ○ Communal ownership ○ Private ownership ○ Limited participation in formal markets	1200	○ Employment opportunities	○ Social welfare transfers

Source: Vink and van Rooyen, (2009)

2.4 STRUCTURE OF THE SOUTH AFRICAN PORK INDUSTRY

Worldwide pork production has been increasing in meat and volume growth since 2007 (Eskort, 2011). Although production has been increasing, the number of pig farms has been decreasing. In 2009, worldwide pork production was 106 million metric tons and the largest pork producing nations in the world (in volume) were China (47%), followed by the EU (21%), the USA (10%) and the rest of the world (23%) (Eskort, 2011). According to this report, the South African pork industry makes an insignificant contribution (less than 1%) to trade in the world pork market.

In order to have a better understanding of the South African pork industry, this section gives an overview of the structure of the industry, trends in pork production and characteristics of producers. Different organisations and institutions exist within the South African pig industry. These include breeders, pig producers, feed suppliers, veterinary associations, logistics companies, processing industries and a producer's organisation (South African Pork Producers' Organisation, SAPPO). These organisations collaborate with each other in order to increase their performance in the production and marketing of pork products.

SAPPO is the official representative of pork producers in South Africa. The organisation is primarily concerned with administration, liaison with government, the promotion of pork and pork products, and matters of national interest, such as health and research. The main functions of SAPPO include attending to animal health, promotions, training and development of emerging farmers, statistics, industry protection, research, communication, and information (South African Pork Producers' Association, 2012). It also liaises with abattoir owners, the wholesale and retail sectors, the state, researchers and academics specialising in pork production studies. Under this umbrella body, there are provincial associations that are responsible for pig producers' issues at the provincial level.

The South African pork industry is a small, active industry that formally employs about 4 000 farm workers and 6 000 workers in the processing and abattoir sectors. There are approximately 400 commercial pig producers and 19 stud breeders in South Africa, and about 4 000 subsistence pig producers (Department of Agriculture, Forestry and Fisheries, 2011). These commercial pig producers own approximately 103 000 sows and 7 000 boars (South African Pork Producers' Association, 2012). According to this report, the Premier Pork Producers' Association is the largest provincial association in the country, representing approximately 60 % of sows in the country. This association covers Gauteng, Limpopo, Mpumalanga and North West Provinces. Other pork producers' associations are in KwaZulu-Natal, Western Cape, Eastern Cape, Free State and Northern Cape.

The total population of pigs in South Africa is estimated to be 1.599 million. Figure 2.1 shows the distribution of pigs among the provinces.

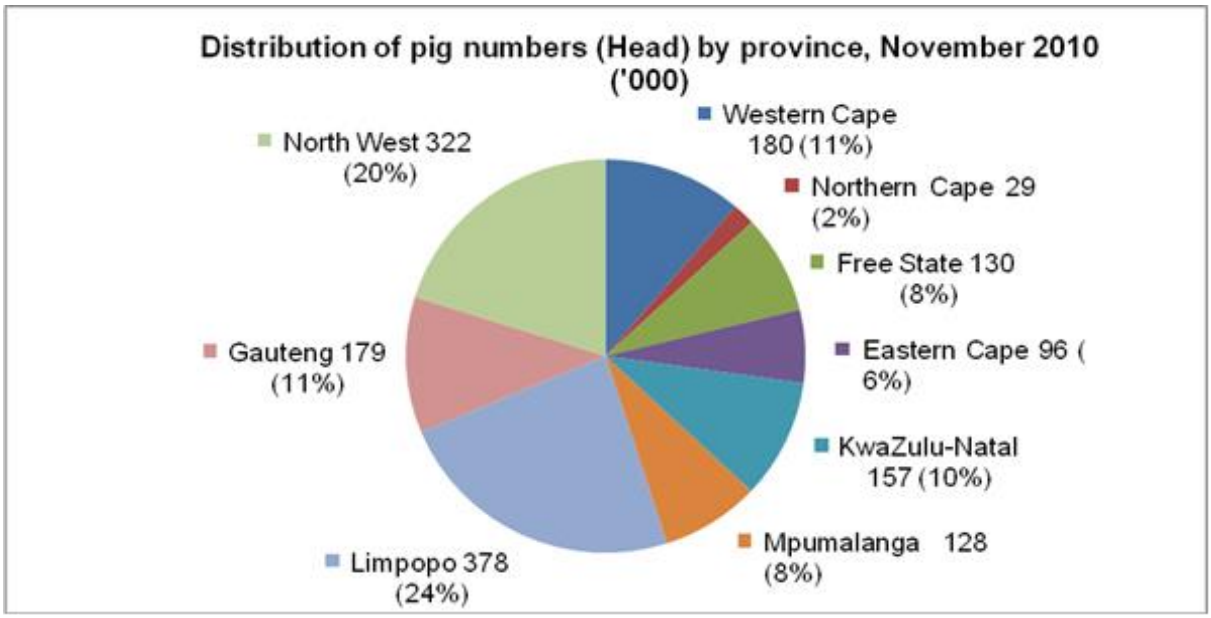

Figure 2.1: Distribution of pigs in South Africa
Source: Department of Agriculture, Forestry and Fisheries, 2013

Pigs are farmed in all nine provinces in South Africa, predominantly in the Limpopo Province at 378 482 (24 %), followed by the North-West Province at 321 703 (20 %), and the Western Cape at 180 301 (11 %). The remaining provinces represent approximately 45 % (718 514) of the total pig population.

2.5 TRENDS IN PORK PRODUCTION

Consumer attitudes determine the demand and supply of pork. The changing demands and preferences of consumers require the supply of differentiated products to suit consumer needs. A study on the determinants of pork consumption at the University of the Free State (Bloemfontein) states that quality assurance and value adding has a high likelihood of increasing household consumption more than twofold (Oyewumi & Jooste, 2006:185).

These findings have put greater emphasis on tangible attributes and have ignored intangible attributes, such as environmental aspects and ethical demands, which are

of growing concern to the consumer. Traceability with respect to health, environmental and social aspects of production at various stages within the pork chain are important for consumer demand. Absence of communication of these demands to a producer leads to ineffective competition (Van Rooyen, Esterhuizen & Doyer, 2001).

South Africa consumes approximately 2 million pigs and slaughters about 1.8 million pigs annually. About 60 to 65% of South African pork is processed and the remainder is consumed fresh (Eskort, 2011). This indicates that the industry is performing well in the supply of value-added products, thus it has the potential to increase profitability. However, since annual demand exceeds annual supply, this indicates that South Africa is a net importer of pork, resulting in a loss of local financial currency through imports. Table 2.2 indicates trends in pig numbers, slaughtering, average prices, production and consumption of pork in South Africa during the 2005/06–2009/10 period.

Table 2.2: Pig numbers, slaughtering, average price, production and consumption trends in South Africa from 2007/8 to 2011/12

Year (July to June)	Pig numbers (31 August)	Slaughtering[1]	Average price[2]	Production	Consumption	
					Total	Per capita
	1 000 head		C per kg	1 000 t		Kg/yr
2007/08	1 615	2 441	1 414.9	183.2	200	4.2
2008/09	1 613	2 381	1 585.4	182.3	201	4.1
2009/10	1 594	2 474	1 496.8	193.8	217	4.4
2010/11	1 584	2 600	1 526.2	207.2	233	4.7
2011/12	1 579	2 651	1 789.3	208.2	239	4.7

Source: National Department of Agriculture: Abstracts of Agricultural Statistics (2013:62)

Table 2.2 indicates a decrease of pig numbers in South Africa, as from 2009/10 to 2011/12 periods. Pig slaughtering (with the exception of 2008/09 period), production and consumption increased throughout the 2007/08 to 20011/12 periods.

[1] Purchase price of chilled carcasses

[2] Pigs slaughtered for commercial markets and for own consumption

In particular, production and consumption trends in South Africa increased simultaneously. Although pork production and consumption had a positive trend, consumption was greater than production during the 2008/09 to 20011/12 periods. This indicates that the pig industry had to supplement the deficit through imports over the five-year period. The pig industry faces a challenge to increase its production to meet the local demand for pork.

Pork, along with beef, sheep and lamb, is classified as red meat. In comparison to other red meats, pork production is lower than beef production but higher than sheep and lamb production. This indicates that beef is the largest competitor to pork among the red meats.

2.6 CHALLENGES FACING EMERGING FARMERS

Emerging farmers face challenges such as lack of finance to farm commercially, access to markets, lack of experience and training to produce commercially, lack of advice and mentorship to sustain a viable piggery, and failures to meet market requirements to deliver pigs that are ready for marketing to abattoirs (SAPPO guidelines). In addressing these challenges, SAPPO assists pig producers by:

2.6.1 Drafting business plans to assist farmers in sourcing funds from different financial institutions;
2.6.2 Providing training to potential and existing pig producers;
2.6.3 Providing mentorship to existing pig producers;
2.6.4 Identifying existing markets for pig producers; and
2.6.5 Providing continuous information to study groups.

In South Africa, emerging producers face high costs owing to food safety and testing requirements stipulated by the new Consumer Protection Act (CPA), which came into effect in April 2011. Quality assurance and consumer safety from communicable pig diseases is a priority for the South African pig industry. The Consumer Protection Act (CPA) aims to ensure quality and safety of consumers along the pork supply chain.

To comply with this act, each emerging pig producer should have an accredited veterinary consultant that visits, advises, and evaluates the farm and production processes frequently, as well as an in-house standard operating procedure that complies with the Quality Assurance Standards. Mockford in Porcus, (Mockford, 2012) has stated that emerging pig producers have no choice but to join SAPPO's Quality Assurance system, because it assures consumers of quality pork through this system.

The joint responsibility and high costs involved in the whole supply chain in ensuring transparency, traceability and accuracy is a great challenge to emerging producers. The high costs involved in complying with the new CPA create a possibility of further exclusion of emerging producers from the supply chain. To avoid further exclusion from the pork supply chain, South Africa needs to find creative ways to deal with the serious, unintended consequences of this Act (Ackerman, 2011).

Another challenge for emerging pig producers is the proposed legislation on animal feeds and environmental studies that requires state veterinarians to supervise and sign off feed mixed by the farmer. Feed costs constitute about 70% of the costs in pig production (see the DAFF infopak, 2011). To avoid these high costs, commercial, as well as emerging, pig producers, mix their own feed. This legislation has high cost implications, considering that pig farmers mix 75% of all pig feed and that pig producers have to seek services from private veterinarians (who are expensive) owing to the unavailability of state veterinarians (Louw, 2011). This is a challenge for pig producers and even more for emerging pig producers who do not have adequate finance nor enough storage space for the home-mixed feed.

The introduction of pig diseases to a healthy stock can occur through human actions, such as movements of people from unhealthy to healthy stock areas, as well as permitting an unclean environment to develop. In January 2012, four pig production units in Mpumalanga and Gauteng provinces were infected by African swine fever that was introduced through an auction sale in Sundra, near Delmas (Mockford, 2012).

According to Pote (2008), the availability of farm equipment, production and marketing information, inputs and infrastructure largely determines the production and marketing success of farmers. The South African Government, through the Department of Agriculture and Land Affairs, provides these services to emerging farmers through the comprehensive support programme (CASP). However, there has been little improvement in changing the situation of these farmers because of inappropriate policies which have failed to ensure that the right beneficiaries receive the right type and amount of support (Pote, 2008).

2.7 CHAPTER SUMMARY

This chapter gave an overview of the features of South African agriculture and the South African pork industry in terms of its structure, trends in pork production, characteristics of pig producers and challenges faced by pig producers.

This section highlighted the importance of the agricultural sector in the South African economy. The livestock sector contributes approximately half of agricultural output. This sector produces 85% of its meat requirements, and imports the remaining 15%, mainly from SADC countries, New Zealand, Europe and Australia. The common types of farming systems in South Africa include intensive and extensive farming systems. Poultry and pig farms are more intensive while sheep and cattle production are more extensive. A large number of small-scale pig producers practise subsistence pig production. On the other hand, commercial farmers use a highly intensive production system where pigs are completely confined in pig houses.

The South African Pork Producer's Organisation is the official representative of various stakeholders within the pig industry. About 65% of South African pork is processed and the remainder is consumed fresh. As noted above, the industry still falls short in meeting local demand for pork and as a result it imports pork cuts from other countries. Although the new Consumer Protection Act which was introduced in April 2011 and the proposed feed legislation aim to ensure consumer safety and animal welfare, these pose substantial challenges to all pig farmers as they involve high costs of compliance.

CHAPTER 3

CRITICAL SUCCESS FACTORS IN PIG PRODUCTION

This chapter will review literature on the definition, criteria and measurement of critical success factors, as well as key drivers of successful pig production. The belief is that these drivers will provide an insight into those of emerging pig producers. This chapter defines success, the criteria and measurement of success, and the key drivers to success in pig production.

3.1 DEFINING CRITICAL SUCCESS FACTORS

A common model for defining success does not exist. Previous attempts include the definition of success in terms of growth, sustainability and profitability (Morrison & Rothberg, 2012).

Defining success as survival is based on the assumption that profitable entrepreneurs decide to remain in business while those making a continuous loss decide, or are forced, to exit (Simpson, Tuck & Bellamy, 2004:483). Researchers argue that some business owners continue to conduct business even where they are not making profit for the sake of reputation and to maintain a certain class of customers (Harada, 2003:213). Business growth in terms of numbers of employees and a high growth in net worth are regarded as success, although the first aspect of this may not be true for business owners who may decide to replace their labour with fast and efficient technology. In some instances, businesses owners may decide to buy more assets instead of accumulating profits. It is important for them to look at their balance sheets and net worth before making such decisions. These cases indicate that defining success, as survival, may not be appropriate

In a literature review on small business success, Shonesky & Gulbro (2004), categorised variables of success into three, namely, owner characteristics, business characteristics and strategic issues. These authors also noted the absence of a common set of variables for business success owing to the differences that exist within each individual business and owner/manager. Factors for small business success can also indicate factors for failure of small businesses.

CSFs are the key activities that an organisation should do well with on a continuous basis to achieve its unique values and vision (Caralli, Stevens, Willke & Wilson, 2004). For the purposes of this study, success is defined as the continued operation of a pig business. This study assumes that successful emerging pig producers have a positive cash flow, increasing net worth or continue to operate their pig businesses.

3.2 CRITICAL SUCCESS FACTORS: CRITERIA AND MEASUREMENT

This study mentioned that analysts define success in various ways and use different approaches to measure success. Previous studies have measured success using a small number of variables, while others have focused on a wide range of variables (Chittithaworn, Islam, Keawchana & Yusuf, 2011). Hormiga Perez and Batista Canino (2009) preferred using a few indicators from different approaches to determine business success, rather than a large number of indicators. Some researchers have measured success subjectively (Simpson *et al*., 2004) while others have used objective measures (Harada, 2003) or a combination of both. According to Mäkinen, Rantamäki-Lahtinen, Ylätalo and Vehkamäki (2009), the nature and type of available data determines the type of approach to use in measuring success.

Various analysts view the appropriate approach for measuring success differently. For example, Mäkinen *et al*. (2009) emphasise the need to use both objective and subjective criteria in understanding the success of family farms. Reijonen, (2007) maintains that the measurement of success should be subjective while performance and growth should be objective. Walker and Brown, (2004) partially agree that both financial and non-financial criteria should be used to judge success, but argue that non-financial criteria are more important in judging success.

In their findings, Hormiga and Batista (2009) showed that subjective measures of success are more effective than financial measures.

3.2.1 Subjective measures of success

A majority of studies have measured success subjectively, whereas a few studies have used objective measures. Subjective measures are based on the perceptions of owner/managers. Previous studies have used subjective measures such as personal satisfaction, achievement, flexible lifestyle and joy (Walker & Brown, 2004); personal initiative, competency in finance (Roese & Taylor, 2006); education, training, and development; previous knowledge and experience (Simpson *et al*., 2004); personality of owner/manager, business strategy (Keil, 2008); business characteristics and external environment (Chittithaworn *et al*., 2011). It has also been noted that the way owner/managers perceive success relates to the performance of their businesses (Hormiga and Batista, 2009).

3.2.2 Objective measures of success

Financial criteria for success have been measured using objective indicators. Past research used quantitative measures, such as actual data, to evaluate the performance of the business. However, analysts have encountered problems in accessing actual performance data from small business owner/managers. This is the result of incomplete records being kept and the unwillingness of owner/managers to reveal business performance information to strangers. To deal with this problem, researchers have used indirect measures of financial performance. For example, Harada, (2003) examined increases in profitability, sales and growth of 5 911 Japanese firms using binary responses.

Various financial tools and methods for analysing the financial performance of a business enterprise exist. Financial ratios, net present values, partial budgets, and enterprise budgets evaluate financial performance of a business enterprise.

Although the first three financial tools are the most commonly used, Dhyuvetter and Smith, (2005) argue that the available data influences the type of analysis, which in turn determines the tool to be used.

Data on physical performance of the business measures the financial success of a business. The rationale is that the physical output of the business and market prices determine the financial success of a business. Owing to lack of reliable data on the performance of pig production businesses for emerging farmers, this study will use both subjective and objective measures of success. The literature review revealed that perceived critical success factors, operational management and marketing indicators have been commonly used to evaluate the physical performance of a business.

3.3 KEY DRIVERS FOR SUCCESSFUL PIG PRODUCTION

Successful pig production requires creative strategies for managing the production as a business, as well as for implementing these strategies themselves. According to Stender (2008), drivers for profitable pig production include, the number of pigs weaned per litter, the farrow to finish mortality rate, litters per sow per year, price per carcass weight of pigs sold, feed efficiency, weight of meat produced per pig, labour efficiency, operating cost per pig produced and the price of feed per ton. These key drivers include high sow performance, efficient reduction of costs and meeting the target output. Other drivers include meeting consumers' needs, and market and Government interventions or support.

3.3.1 High sow performance

Sows that produce large litters should have a good mothering ability and good milking ability to produce heavy, healthy piglets. The quality of management from farrowing to finishing also greatly influences the number of pigs sold per year. Key drivers to profitability include high number of pigs weaned per litter, high number of litters weaned per sow per year, and low piglet mortality (Stender, 2008). High mortality rates, especially before weaning, reduce the number of pigs produced.

3.3.2 Target output

The targeted number of pigs produced and sold per year drives the profitability of pig production. The number of weaned piglets per sow per year influences the targeted production output. The number of pigs sold per sow per year multiplied by the carcass weight per pig provides the production output. In addition to meeting the targeted output, efficient cost reduction strategies are important.

3.3.3 Efficient costs of production

The costs of production and the selling price are successful drivers of pig production. Key drivers to profitability include lower fixed costs per carcass weight, fewer hours of labour per carcass weight, lower operating costs per carcass weight, higher feed efficiency per carcass weight and lower price of feed per carcass weight (Stender, 2008).

The cost of feed makes up 70 % of the total production costs. High feed costs reduce revenues for pig farmers. The availability of balanced feed diets at a low cost is a driver of successful pig production. The high costs of pig feed, coupled with the rising costs of fuel, raise the overall costs of production and reduce the returns for pig farmers. In the light of these high costs of production, pig farmers have to reduce the supply leading to high losses. Because pig production requires a lot of fuel in transporting feed to mills and pigs to the market, emerging pig farmers can reduce feed and fuel costs by home-mixing their own feed.

The ability of pigs to convert feed into meat within a relatively short period greatly impacts on the amount of feed required to raise a pig to sellable weight. For efficient production, a pig should be able to gain 1 kg weight for every 3.6 kg of feed consumed (Scharlach-Spesfeed, 2005). The size of an operation also reduces the costs of production. Large sow operations spread fixed costs per unit, while small sow operations increase the costs of production. Healthy and disease-free pigs reduce the costs of veterinary services and medication.

3.3.4 Fast developing markets

The increasing consumer demand for pork and its products is a driver to rapid development of commercial pig production. Consumers usually demand safe, juicy and lean pork with less back fat, as well as environmentally friendly conditions for pig production (Visser, 2004). These consumers usually transmit their tastes and preferences through supermarkets and butcheries that then transfer this information to producers. Meeting these demands requires pig producers to select the appropriate breeds, feed a well-balanced diet and carry out proper disease management practices, as well as to ensure safety of produce along the pork supply chain. Commercial and emerging pig farmers aim to make profits by meeting the changing consumer tastes and preferences.

3.3.5 Government policies

Government policies and intervention in the pig industry drive the success of commercial pig production. Inefficient government support regarding international trade and importing of pork poses a threat to the South African pork industry. The pork industry faces challenges of cheap imports and dumping of pork in the South African market (Louw, 2011). Louw further states that South African producers cannot afford to produce at lower prices as producers in other subsidized countries. Pig farmers are faced with high feed prices resulting from imports of commercial feed ingredients and veterinary supplies.

3.4 CHARACTERISTICS OF THE ENTREPRENEUR

The success or failure of small businesses has always been associated with the characteristics of an entrepreneur. In support of this statement, Sharland, (2006) has revealed that age, gender, managerial activities and business size predict business success and profitability.

3.4.1 Age of farmer

The age of a farmer is likely to have an influence on the success of the farming enterprise. Sharland, (2006) associates older managers with rational decision-making and younger managers with high-risk taking. Younger farmers are risk takers, quick to adopt new technologies and more active, compared with older farmers (Dlova, Fraser & Belete, 2004; Machingura, 2007).

3.4.2 Gender

The involvement of married women in doing domestic chores and their exclusion in decision-making activities reduces their chances of success in farming (Machingura, 2007).

3.4.3 Education and training

Empirical studies have found a positive relationship between educated farmers and good record-keeping (Yeamkong, Koonawootrittriron, Elzo, & Suwanasopee (2010). Education is likely to have a positive influence on a farmer's managerial activities, such as accessing marketing information and implementing farm plans.

3.4.4 Household size

Farmers with large household sizes have greater chances of success but only if a majority of family members are old enough to work in the farm. However, large households with a majority of young family members spend a larger proportion of income on family expenditures and less on farm expenses (Machingura, 2007). This may cause farm production to suffer because additional farm labour has to be employed.

3.4.5 Access to farm information

Access to information and knowledge of farming is important for a successful farm entrepreneur. Farmers with access to various types of farming information have a greater chance of success (Machingura, 2007).

3.4.6 Access to off-farm income

A farmer with access to off-farm income has a high likelihood of success in his or her farming activities (Sikwela & Mushunje, 2013). This can be attributed to the fact that farmers can use the off-farm income to provide adequate operating capital to secure production resources.

3.5 CHAPTER SUMMARY

This chapter reviewed previous studies on the definition of critical success factors, literature on key drivers of success, criteria and measurement, as well as key drivers for successful pig production.

Although different researchers have defined success in various ways, this research defines success as survival of the pig business. Critical success factors, therefore, are those key areas that lead to continuous operation of the business. Variables that are commonly used to measure success are owner characteristics, business characteristics and strategic issues. Previous research studies have measured success using objective or subjective criteria, or a combination of both. Objective indicators measure financial criteria for success and subjective indicators measure perceived success.

Drivers for successful pig production include the number of pigs weaned per litter, the farrow to finish mortality rate, litters per sow per year, price per carcass weight of pigs sold, feed efficiency, weight of meat produced per pig, labour efficiency, operating cost per pig produced, and the price of feed per ton.

The key drivers to profitability include meeting the target output, reducing costs of production, meeting consumers' needs, and market and government interventions or support.

CHAPTER 4

DESCRIPTIVE OVERVIEW OF EMERGING PIG PRODUCERS IN THE GAUTENG AND MPUMALANGA PROVINCES

This chapter presents the method used, together with the findings and discussion of the study. It presents a descriptive analysis of critical success factors of emerging pig producers in the Mpumalanga and Gauteng provinces in South Africa.

4.1 METHOD USED, FINDINGS AND DISCUSSION

The data under analysis is from 46 emerging producers. Eleven producers were identified from a list obtained from SAPPO and ARC. The researcher accessed the remaining 25 emerging pig producers through references from those 11 producers. Owing to the absence of a sampling frame and the small number of respondents interviewed, it is impossible to carry out an inferential statistical analysis.

4.2 DESCRIPTION OF METHOD USED

This section describes the method used in collecting the primary data on characteristics of emerging pig producers, their perceptions of the success of their pig businesses, as well as the actual physical and economic performance indicators in pig production. Primary data collection was obtained through face-to-face interviews using a questionnaire as the main instrument. The study made use of telephonic interviews to follow up and to obtain answers to unclear responses. Data on housing was collected using photographs and a checklist on pig housing characteristics was drawn up following indicators collected from literature. The study compared physical and economic indicators of successful pig production against industry norms to assess whether there were any associations between responses of successful and unsuccessful pig producers.

The objectives of the research were to:

4.2.1 To identify the critical success factors necessary for successful pig production in the case of emerging pig producers;

4.2.2 Measure the perceptions of emerging pig producers with reference to critical success factors;

4.2.3 To identify the relationship of critical success factors on the physical and economic performance factors of emerging pig producers' businesses; and

4.2.4 To compare performance factors of emerging pig producers with industry norms.

To achieve the above objectives, the study used descriptive statistics such as means, standard deviations, and minimum and maximum values. Each variable for housing, operational management and physical performance was compared against related pig industry norms for commercial production in the South African pig industry. Owing to different units being used to measure success, a score was allocated to each variable and then an overall success score in each category (housing, operational management and physical performance) was calculated. An aggregate overall success score per farmer was then calculated. Different weights were applied when scoring the variables with reference to industry norms, where zero = below norm, 1= equal norm and 2 = above norm. Most of the pig industry norms are categorical and the study classified overall success scores as low, medium and high compliance.

The most critical factors were determined based on the overall success score. Responses with high overall success scores are regarded as very critical, while those with low overall success scores are regarded as less critical (Mahrouq, 2010; Roese & Taylor, 2006). Based on the overall success scores, respondents were regarded as unsuccessful = 0 (zero), less successful = 1 (one) and successful = 2 (two).

4.3 SOCIO-ECONOMIC CHARACTERISTICS OF EMERGING PIG PRODUCERS

This section discusses the owner/manager characteristics of emerging pig farmers in the Gauteng and Mpumalanga regions. Characteristics such as gender, age, highest educational level attained, household size and livestock asset base of respondents were considered. Demographic characteristics of households are important when analysing economic data because they influence the household's economic behaviour (Randela, 2005). Owing to these reasons, it is relevant to include these demographic characteristics in analysing the critical success factors of emerging pig producers in the Mpumalanga and Gauteng Provinces. The section below gives a summary of respondents' characteristics, based on the data collected.

4.3.1 Gender and Location

Figure 4.1 shows the gender distribution of emerging pig producers among all the respondents surveyed in the Gauteng and Mpumalanga provinces. The study used gender to investigate whether there were any differences in participation or ownership of the pig business.

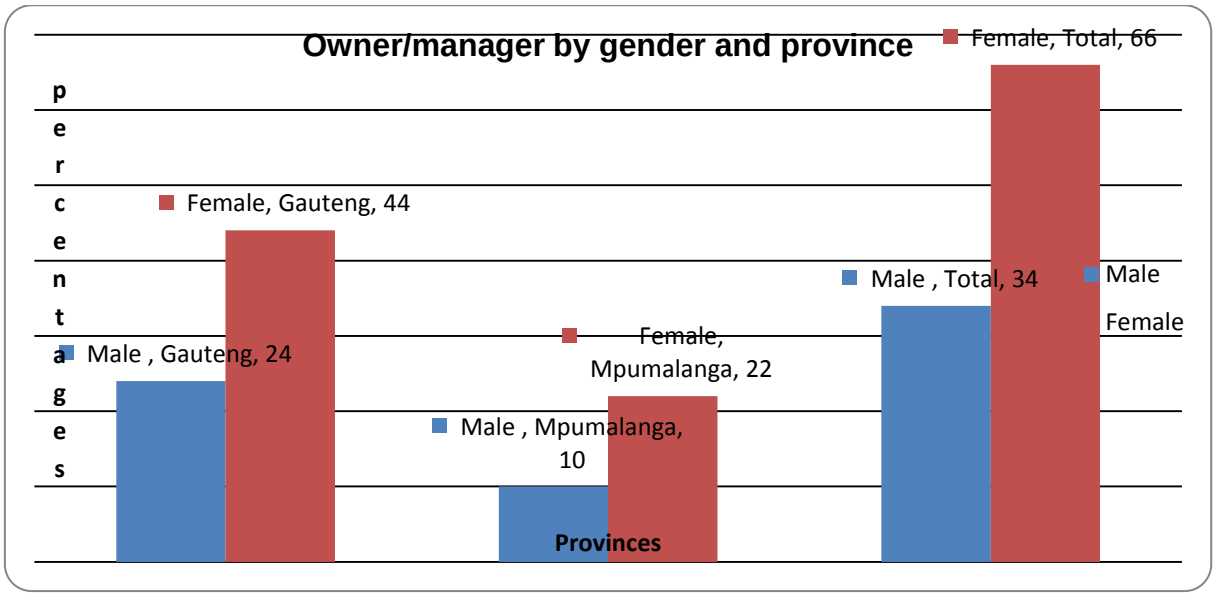

Figure 4.1: Owner/manager by gender and province
Source: Research findings, 2012

The Gauteng Province had a higher number of respondents (68%) than Mpumalanga Province (32%). Surprisingly, results presented in Figure 4.1 indicate a higher number of females (66%) than males (34%). These results show evidence of the increased likelihood of black women participating in commercial farming, as found by Aliber and Hart, (2009). This implies that support aimed at supporting emerging pig producers in these areas will benefit more females than men. The high participation of females in pig production could be explained by the common responsibilities of women as supervisors of household and agricultural activities, while men accept off-farm employment in the cities.

4.3.2 Age, education of owner/manager, size and age of business

Table 4.1 shows the age, education of owner/manager, age of business and ownership of business. The lowest age was 29 years and the age categories were widely spread, and consequently the study grouped together respondents below the age of 40. The age of the owner/manager is important because it can determine his or her farming experience. Older farmers can pass on their farming knowledge and experience to younger members of the family (Ngqangweni & Delgado, 2003). The majority of the respondents (50%) were between 41 to 50 years, and the minority (6%) of respondents were above 60 years. In this survey, there were few respondents (24%) below the age of 40. Older managers are considered to be more rational decision makers than young managers who are considered to be risk takers (Wallace, 2010). These findings indicate limited participation by young people in the emerging pig producer sector. This relates to the assumption that young people prefer off-farm employment to farming.

Table 4.1: Age, education of owner/manager, age of business and ownership gain

Characteristics	Frequency	Standard deviation	Percentage (%)
Age			
40 and below	11	0.53	24
41 -50	23	1.33	50
51 – 60	9	0.35	20
60 and above	3	0.71	6
Education			
No education	1	-	2
Grade 12 and below	26	3.21	57
Beyond Grade 12	19	1.53	41
Age of business			
2000 and before	7	0.55	15
2001 -2004	15	2.36	33
2005 -2009	24	2.95	52

Source: Research findings, 2012

The highest educational level achieved and work experience of the owner/manager determines the level of human capital available. It is common knowledge that educated owner/managers have good strategic planning abilities and record-keeping skills (Wallace, 2010). Of interest are the education levels of the pig producers, which are generally high. Table 4.1 shows that 41% (19) were educated beyond Grade 12 (technikons, colleges and universities) while 57% (26) were educated up to Grade 12 and 2% (1) had no education at all. Based on the high educational levels, the belief is that these emerging pig producers should have good management abilities and good record keeping skills.

Table 4.1 indicates that there are an increasing number of entries of emerging pig producers into the pork industry. This implies that more people are attracted to the industry. The age of the business is important because new businesses are associated with a high risk of failure while older businesses are associated with low risk of failure (Wallace, 2010). About 52% (24) of these businesses have been in operation for less than 5 years, which is still within the survival stage.

The size of the business is important because it can indicate good management practices and resource availability (Wallace, 2010). The survey shows that all (46) the respondents were operating below economic level (with less than 200 sows). Findings show that the average size of operation for emerging pig producers is 20 sows, with a minimum of 4 sows and a maximum of 40 sows. According to Simon Streicher, the Chief Executive Officer at SAPPO, emerging pig farmers need to start a pig production enterprise with at least 50 sows. He also stated that to make profit, a minimum of 200 sows is required. Generally, this implies that the scale of production is still low to realise profits in pig production.

4.3.3 Sources of knowledge

Profitable pig production requires technically skilled workers. Emerging pig producers with previous pig production experience have greater chances of success. According to Rose and Kumar (2006), the entrepreneur's previous work experience and family ownership of business have positive relationships with success. Table 4.2 shows the different sources of knowledge on pig production for emerging pig producers.

Table 4.2: Respondents' sources of knowledge on pork production

Source	Frequency	Percent
Learned from family	4	9
Previous work experience only	2	4
Workshops only	13	28
Family and workshops	21	46
Family and experience	2	4
Trial and error	4	9

Source: Research findings, 2012

Of interest is that most emerging pig producers received pig production knowledge and experience from the family (59%), supplemented by either workshops (28%) or experience (4%).

4.3.4 SAPPO membership

Networking skills, trust and reputation, are important assets in pig production. Pig farmers associated with commodity organisations such as SAPPO receive support services for pig production. SAPPO assists emerging pig farmers with production and marketing information and services on pig health, market prices, and updates farmers with current pig industry issues. A good reputation perceived between the farmer and his or her customers or input suppliers builds trust and frequency of interaction. Commercial farmers and processors prefer to buy pigs from reliable emerging pig farmers who can ensure a constant supply of pigs at the right quality and amount.

Pig producers who are members of SAPPO indicated that the benefits obtained included assistance in getting markets for their produce, getting up-to-date pork prices, information about diseases, and training. In this study, only 10% (5) of the respondents were members of SAPPO. Of the non-members, 69% (31) did not know about SAPPO, 27% (12) were in the process of joining and 4% (2) were not interested. The study found that emerging pig producers do not trust SAPPO and refer to it as an organisation for white pig producers. If emerging pork producers were to join SAPPO, the support received could greatly improve the performance of emerging pork producers. Public-private partnerships (PPPs) can play an important role in developing trust between SAPPO and emerging pig producers.

4.3.5 Wealth endowment

Wealth creation influences the success of a pig production enterprise. It determines the type and amount of resources for investment in pig production. Endowment in physical assets, such as land, livestock, social grants, pension, machinery and vehicles, contributes to capital investment in pig production. Such assets can be converted to monetary value and can be used to provide proper pig housing and good quality pig feed, to purchase breeding stock and provide water and electricity.

Table 4.3 shows research findings on the wealth endowment of emerging pig producers.

Table 4.3: Wealth endowment of owner/managers

Variable	N	Median	Mean	Std Dev	Min	Max
Household size	**46**	**7**	**7.48**	**2.16**	**4**	**13**
Adults working:						
On farm	46	3	2.63	0.90	1	5
Off farm	46	2	2.54	1.39	1	8
Children below 18 years	**46**	**2**	**2.35**	**1.40**	**0**	**7**
Livestock assets:						
Beef cattle (heads)	36	18	16.72	6.27	2	30
Dairy (heads)	7	6	12	11.40	2	33
Poultry (birds)	20	1000	1025	808	4	3000
Goats (heads)	16	15	15.06	5.92	5	25
Farm size (ha)	**46**	**21.15**	**20.51**	**7.21**	**2**	**43**

Source: Research findings, 2012

Household size is important since it affects the production and consumption patterns of households. Households with very young or very old people cannot assist in farming activities (Jari, 2009). From Table 4.3, the results show that the average number of people per household is 7 with a minimum of 4 and a maximum of 13 people per household.

Farm Labour supply: Evidence from literature shows a positive relationship between farm labour supply and farm operators' years of farming experience as well as gender distribution in the household (Anim, 2011). Results from this study indicate that emerging pig producers have a good supply of family labour for their businesses. On average, each household has 3 adults working on the farm and 3 adults working off the farm. The mean number of children below 18 is 2.3. This indicates that the interviewed emerging pig producers have a sound supply of labour for pig production and other farming activities.

Livestock assets per household: The level of asset ownership in each household shows the ability for the household to provide capital for production inputs in the business. All the emerging pig producers were involved in mixed farming. A high number of farmers (78.3%) owned beef cattle, followed by poultry (43.5%), goats (34.8%) and dairy cows (15.2%).

Land ownership is very important for farming households. The average farm size per household is 20 hectares. However, there were vast differences in farm sizes from a minimum of 2 hectares to a maximum of 43 hectares of land.

4.3.6 Production systems

A few of the emerging pig producers in the Mpumalanga and Gauteng provinces engage in intensive pig production while others engage in semi-intensive production systems. The main type of pig production followed by respondents is farrowing to finishing. Only one respondent specialised in farrowing to weaning production. The intensive system of pig production requires good housing that provides warmth to piglets and protects them from draught and cold.

4.3.7 Pig housing and equipment

According to Pearson (undated), successful pig production depends on two critical factors, namely the provision of comfortable and clean housing and the observation of the pig herd daily. This section discusses the quality of housing and facilities such as farrowing equipment, creep area, feeding equipment and good ventilation. This study has noted that comfortable and clean housing is essential for successful pig production. Poor housing and living conditions cause stress to pigs and leads to non-productive stock (Pearson, undated).

Figure 4.2 shows photographs of the various pig houses used by emerging pig producers;

Figure 4.2: Photographs of pig housing for emerging farmers
Source: Research findings, 2012

Emerging pig producers in the Mpumalanga and Gauteng provinces mainly engage in semi intensive pig production. The intensive system of pig production requires good housing that provides warmth to piglets and protects them from draught. About 9% of emerging pig producers had well-equipped housing, while 37% had average housing and the remaining 54% had poorly-equipped housing. Some emerging pig producers mentioned that the Department of Agriculture had built their pig houses as part of the comprehensive support programme. Other emerging pig producers financed their pig houses through bank loans or personal savings.

Emerging pig producers, who had built their own pig houses, used alternative materials such as stick and mud, stones and cement, as well as old planks, to reduce costs of building. Floors for pig houses were made mainly from cement and stone. Other pig houses were not properly built and lacked proper equipment.

The reasons stated by respondents for such poor states were that they could not build a proper structure because they were renting the farm or there was uncertainty over the land claims status of the farm. The types of feeders and drinkers included old used tyres, old drums or plastic buckets, as well as concrete drinkers and feeders.

4.4 OPERATIONAL MANAGEMENT PRACTICES

This section discusses the operational management practices of emerging pig producers such as breeding, feeding, farrowing management, pig health and markets.

4.4.1 Breeding

The most common pig breeds used by emerging pig producers are the land race and large white, as well as a mixture of these breeds with indigenous South African pig breeds. Sources of breeding stock for emerging pig producers are neighbours, auctions and commercial farmers. On average, emerging pig producers mate boars and gilts for the first time at the age of seven months. On average, each boar services 10 sows. The minimum number of sows mated per boar was four and the maximum was 15. Emerging pig producers cull old sows after three years of reproduction and old boars after four years of reproduction. Sows should be culled after six to eight (3 – 4 years) farrowings (birthings) or sooner if the production performance is low (Elsenburg Fact Sheet, 2009). The average number of days between weaning of piglets and mating of sows is 9 days. Operational management practices of emerging pig producers are shown in Table 4.4;

Table 4.4: Operational management practices for emerging pig producers

Variable	N	Median	Mean	Std Dev	Min	Max
Age at first mating of gilts	46	7	7.17	1.21	6	12
Culling of sows (years)	46	3	3.44	0.53	3	5
Furthest distance to market (km)	46	112.5	109.93	45.96	10	200
Piglets per sow per litter	46	11	10.93	1.15	8	13
Age of weaning piglets (days)	46	35	34.84	5.42	28	49
Pigs sold per year	46	12	18	14	6	67
Litters per sow per year	46	2	2.00	0.03	2	2.25
Piglet mortality/litter (number)	46	4	4.17	1.49	1	8
Sows mated per boar (number)	46	10	9.86	3.00	4	15
Days between weaning and mating	46	7	8.54	3.31	3	14

Source: Research findings, 2012

4.4.2 Feeding and water

Pig feed constitutes the highest cost of production and amounts to 60 to 80 % of the production costs (Department of Agriculture, Fisheries and Forestry, undated, a). As a result, some feed producers change the composition of feed by substituting cheap products or by increasing fat content (Hall, Ehui & Delgado, 2004:16), thus affecting the quality of the final meat product Most emerging pig producers cannot afford to exclusively feed commercially prepared feed because it is very expensive. Only 4 % of the respondents feed commercially prepared food to their pigs, about 37 % feed home-mixed feed (mainly maize and concentrates) and the remaining 59 % feed home-mixed feed, together with kitchen leftovers and vegetables.

Home mixing of feed is a challenge for emerging pig producers owing to lack of storage facilities. Emerging pig farmers need small quantities of feed owing to their small herd size and the storing of large quantities for a lengthy time can result in mouldy feed. Pigs need a balanced diet and should be provided with adequate, good quality water. Pigs consume large amounts of water, thus fresh, clean water should always be available to pigs.

Figure 4.3 shows one of the types of feed used by emerging pig producers in feeding their pigs.

Figure 4.3: One of the types of feed given to pigs
Source: Research findings 2012

The most common source of water supply for pig businesses is borehole (72%), followed by piped water (54.3%) and water from rivers (6.5%), respectively. The majority of emerging pig producers (96%) supply water twice a day and 4% supply water once a day. Although emerging pig producers use boreholes for water supply, they stated that electricity costs are high and that they cannot afford to fix their boreholes that often break down. In addition, water pipes are very old and the emerging pig farmers cannot afford to repair them.

4.4.3 Farrowing and management practices

Farrowing house management greatly influences the mortality rate and number of pigs sold. About 50% of piglets die before weaning, particularly within the first two days after farrowing (Elsenburg fact sheet, 2009).

To avoid the infection of piglets through the umbilical cord and the high piglet mortalities through crushing and cold, a clean farrowing house equipped with a farrowing crate and proper heating is required (Ubisi Mail, 2009). The farrowing equipment used by emerging pig producers is shown in Figure 4.4.

Figure 4.4: Farrowing equipment used by emerging pig producers
Source: Research findings, 2012

In total, 89% of emerging pig producers lacked farrowing equipment. The number of piglets born alive per sow per litter greatly influences the number of pigs sold and heavy birth weights are associated with better chances of survival. Findings show that about 4 out of 11 (36%) piglets die per sow per litter. This is a high mortality rate, considering the average piglet mortality rate of 18% for commercial pig producers (Manchidi, 2009). Generally, the average age for weaning piglets is 35 days, although some emerging pig producers allow self-weaning of sows.

This indicates a poor weaning programme, or total lack thereof, given that the average weaning age for commercial pig production is 28 days. On average, emerging pig producers mate sows 8.5 days after weaning.

Figure 4.5: Early weaning and late weaning of piglets
Source: Research findings, 2012

Figure 4.5 shows a pig production system where piglets were weaned at 28 days (picture A, controlled weaning) and piglets aged over 35 days in picture B (self-weaning). Controlled weaning increases the number of litters per sow per year, leading to increased number of piglets produced per sow per year. On the other hand, self-weaning increases the length of the production cycle and reduces the number of litters per sow per year.

4.4.4 Pig health and diseases

According to Peter Mockford, a SAPPO veterinary consultant, disease outbreak is still a challenge to pig producers (Mockford, 2012. Research findings show that the three most common diseases and parasites experienced by emerging farmers in their pig businesses are round worms (36%), diarrhoea (32%) and mange (17%).
These findings indicate poor management practices in pig production by emerging pig producers.

4.4.5 Markets

The most common market for selling pigs reared by emerging pig producers is at the local villages (71.7%). Other markets were auctions (65.2%), abattoirs (23.9%) and butcheries (19.6%). The reasons for selling in these markets were that they are close to the farm and offer high prices. Emerging pig producers receive low prices for pork at auctions and butcheries because buyers (mostly large commercial pig producers) claim that the pigs are of poor quality owing to suspected poor feeding and weak management practices. Accordingly, the emerging pig producers' main market is the local community, which is not reliable but offers a higher price (R30/kg on average) than butcheries, auctions or abattoirs (R12/kg on average), although the latter markets are reliable markets for small producers.

Seeing that the average formal market price is R16/kg, selling to the local community offers good prices. This market has inconsistent buyers and low volume sales compared to butcheries, auctions and abattoirs, which are reliable but offer lower prices. The average cost of transport per kilometre is R3.25 and the average distance travelled when going to market pigs is 110 km. General marketing problems faced by emerging pig producers include high fuel costs (73.9%), long distances (39.1%) and poor roads (15.2%).

4.5 CRITICAL FACTORS OF SUCCESS

This research assumes that the quality of housing, operational management practices and technical measures are critical for successful pig production. This study used various sources of literature to formulate South African pig industry norms. The study compared responses against South African pig industry norms, categorised as below average (score = 0), average (score = 1) and above average. (score = 2) These categories were given weights and then a combined score per variable and per category was used to arrive at a total success score.

4.5.1 Operational management success scores

The key performance indicators that reflect on management practices, such as age of first mating of gilts, number of sows per boar, culling age, and days between weaning and mating have been discussed under operational management. Emerging pig producers' daily management practices or strategies influence the success of their pig production. Poor management practices, such as poor feeding, breeding practices and disease control, lead to unhealthy and unproductive stock. The variables used to examine operational management practices include pig health, type of feed, water frequency, breeding of gilts per sow, and first mating age of gilts.

Figure 4.6 indicates findings on success scores based on the operational management practices of emerging pig producers.

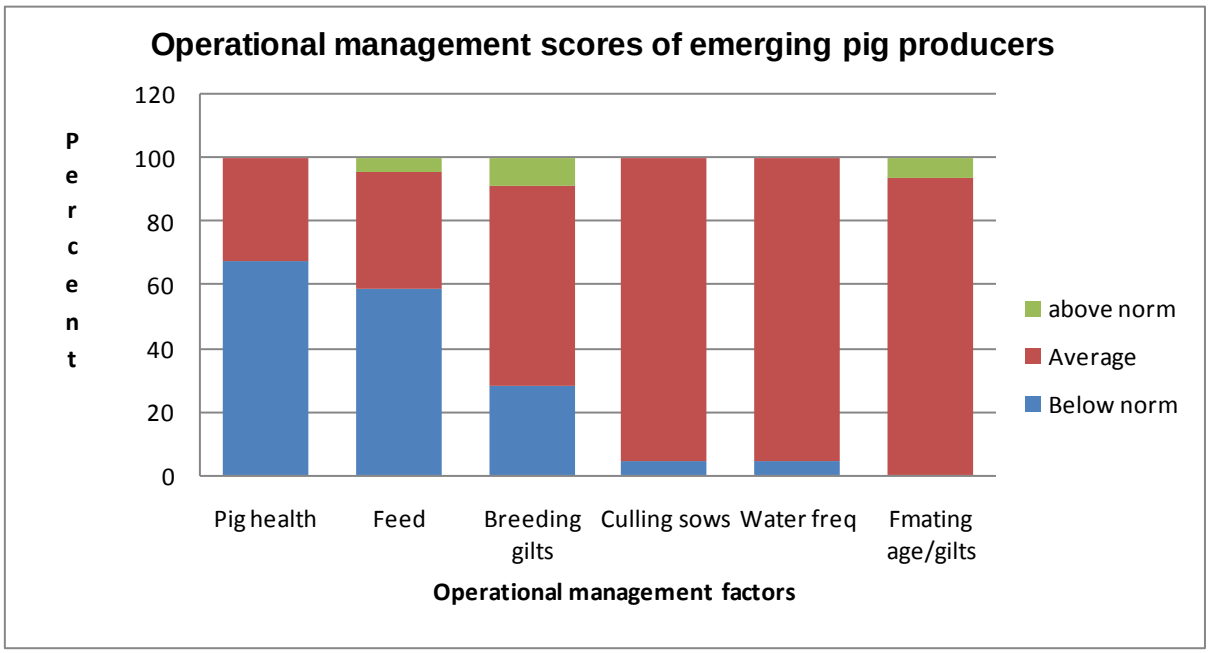

Figure 4.6: Operational management scores
Source: Research findings, 2012

Results from Figure 4.6 show operational management scores of emerging pig producer's practices. Results show that emerging pig producers had high success scores in the culling of sows, supplying water at least twice a day and age of first mating of gilts.

Pig health and feeding management practices had low success scores. The study shows that although respondents knew of the diseases and parasites that affected the health of their pigs, they did not have a vaccination schedule for their pigs. Although respondents fed home-mixed pig feed, the feed ration is not balanced. Emerging pig producers manipulate feed to contain high proportions of cheap ingredients as may be necessary at any particular point in time. Alternatively, if home-mixed feed is not available, emerging pig producers feed kitchen leftovers to pigs.

4.5.2 Technical measures scores

The study acknowledges the importance of discussing social and economic characteristics of successful and unsuccessful emerging pig producers. In this study, social characteristics such as age, level of education and gender did not influence the success of respondents in pig production. As a result, this study could not state the characteristics of successful and unsuccessful emerging pig producers. This section categorizes critical factors of success for emerging pig producers based on their operational management practices.

Management practices of a business are commonly measured by the success or failure of a business (Chittithaworn *et al*., 2011). Good operational management practices, such as farrowing management, sow weaning to mating interval, low mortality (pre and post weaning), and feeding practices drive the profitability of a pig business. This study investigated the critical factors of success for emerging pig producers in the previous year (2011) and compared these with pig industry norms gained from various literatures (see Appendix B, page.96). Performance levels were categorized as follows; below norm (unsuccessful), at norm (successful) and above norm (very successful). Table 4.5 compares emerging pig producer's critical factors in pig production performance in 2011 against the industry norms.

Table 4.5: Comparison critical factors in pig production performance against pig industry norms.

Criteria	Below norm		Industry norm		Above norm	
	Norm	Unsuccessful	Norm	Successful	Norm	Very successful
Average number of piglets born/litter	<8	4 (8.7)	8-10	14 (30.43)	>10	27 (58.7)
Age of piglets at weaning (days)	>35	12 (26.09)	28-35	34 (73.91)	<28	0 (0)
Average number of litters/sow/year	<1.8	45 (97.83)	1.8	0 (0)	>1.8	1(2.17)
Dead piglets/litter (%)	>10	46 (100)	10	0 (0)	<10	0 (0)
Number of sows mated/ boar	<10	22 (47.83)	10 -12	24 (52.17)	>12	0 (0)
Days from weaning sow to mating	>7	10 (21.74)	4 -7	36 (78.26)	3-4	0 (0)
Cost of production/adult pig (Rand)	>1500	13 (28.26)	1000-1500	20 (43.48)	<1000	13 (28.26)
Cost of production/sow/litter(Rand)	>4000	8 (17.39)	2000-4000	26 (56.52)	<2000	12 (26.08)
Income/adult pig (Rand)	<1000	5 (10.87)	1000-1500	14 (30.43)	>1500	27 (58.7)
Income/sow/year (Rand)	<4000	4 (8.7)	4000-6000	12 (26.09)	>6000	20 (65.22)

Source: Research findings, 2012

Rearranging the above data into successful and unsuccessful factors for emerging producers, Table 4.6 shows the frequencies and percentages of unsuccessful factors for respondents (below norm) and successful (at norm and above norm). From Table 4.6, majority of emerging pig producers had high average pig mortality, little number of litters per sow per year and less than average number of sows mated per boar.

Table 4.6: Comparison of critical factors in pig production performance for unsuccessful and successful respondents in 2011.

Criteria	Unsuccessful		Successful	
	Below Norm	Count (%)	Norm /Above	Count (%)
Average number of piglets born/litter	<8	4 (8.7)	8-10	42 (91.3)
Age of piglets at weaning (days)	>35	12 (26.09)	28-35	34 (73.91)
Average number of litters/sow/year	<1.8	45 (97.83)	1.8	1 (2.17)
Dead piglets/litter (%)	>10	46 (100)	10	0 (0)
Average number of sows mated/ boar	<10	22 (47.83)	10-12	24 (52.17)
Days from weaning sow to mating	>7	10 (21.74)	5 -7	36 (78.26)
Cost of production/adult pig (Rand)	>1500	13 (28.26)	1000-1500	33 (71.74)
Cost of production/sow/litter(Rand)	>4000	8 (17.39)	2000-4000	38 (82.61)
Income/adult pig (Rand)	<1000	5 (10.87)	1000-1500	41 (89.13)
Income/sow/year (Rand)	<4000	4 (8.7)	4000-6000	30 (91.3)

Source: Research findings, 2012

From Table 4.6, it is evident that emerging pig producers had high success scores for average income per sow per litter, piglets born per sow per litter and average income per adult pig. High incomes can be attributed to the fact that respondents obtain vegetables or kitchen leftovers very cheap or free of charge from restaurants, supermarkets, hospitals and schools. The marketing of pigs in villages or locations contributes to high incomes of respondents owing to the fact that customers collect their produce from the farm and accordingly respondents do not incur transportation costs to the market.

Factors such as piglet mortality, litters per sow per year, sales per sow per year and number of sows mated per boar had low success scores. The low scores for these factors indicates poor sow performance which leads to a reduction in the number of pigs produced and thus the profitability of the enterprise.

4.5.3 Housing and equipment

The study evaluated pig housing and farrowing equipment by observation. The aim of this evaluation was to check whether emerging pig producers provide basic housing and farrowing equipment. In this study, the quality of equipment was not part of the assessment. The researcher used a scoring sheet with a list of features to observe in the pig houses. The researcher allocated a score of one (1) if the feature was available and zero (0) if not available. Features observed are shown in Figure 4.7.

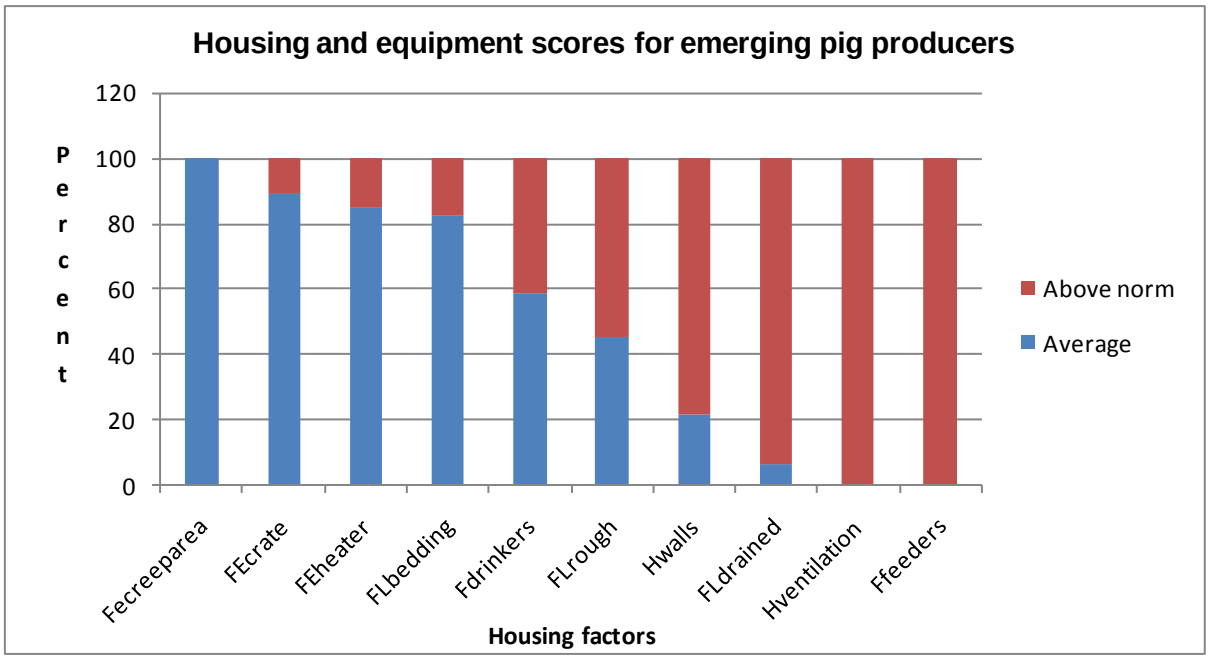

Figure 4.7: Housing and equipment success scores
Source: Research findings, 2012

It is important to provide warmth to piglets in the farrowing pen as they are born with only 14% of fat. The provision of heaters and bedding in the farrowing pen provides warmth to piglets seeing that they have less fat to protect them against cold. Excess cold and crushing of piglets is the main cause of the 50% piglet mortality (Ubisi Mail, 2009). It is important to ensure that the farrowing pen is equipped with bedding and heaters to reduce piglet mortality. The research findings in Figure 4.7 show that the farrowing pens of most respondents are not well equipped.

Features such as creep area, farrowing crate, and provision of heaters, bedding and drinking equipment in the pig house received low success scores. On the other hand, emerging pig producers had high success scores in the provision of feeders, good ventilation of the pig house, well-drained floors and good walls. The types of feeders ranged from old car tyres, used metal drums to concrete feeders.

4.6 FINANCIAL PERFORMANCE IN PIG PRODUCTION

Financial statements provide useful data for the objective indicators of business performance. However, researchers have encountered problems in obtaining such data, especially from small farmers owing to incomplete or lack of proper records and the reluctance of farmers to reveal personal financial information. Because of this problem, researchers resort to alternative ways of getting financial information, for an example by using binary responses such as yes or no (Harada, 2003). On account of the unreliable and incomplete financial records from respondents, response categories on income and costs were adapted from the KZN gross margins.

This study examined emerging pig producers' financial performance using an enterprise budget. The researcher adjusted ranges of figures from the KZN pig commodity budget (Combud) for commercial pig farmers to fit emerging farmers' scales of operation (10, 25 and 50 sows). This study excluded the use of net worth because this requires data related to whole farm information, which is not easy to access. An enterprise budget examines alternative situations related to income or production levels or management interventions. A weakness of the enterprise budget is that it relies on projections. Dhyuvetter & Smith (2005) argue that this is not a serious issue for producers who have good historical data to use in making these projections.

Table 4.7: Respondents' production costs and income per adult pig and per sow

Cost/income range (R/adult pig)	Production cost	Gross Income	Sow cost/income range (R/sow)	Production cost	Gross Income
	Count (%)	Count (%)		Count (%)	Count (%)
[R0-R1000)	13 (28.26)	5 (10.87)	[R0-R2000)	12 (26.09)	4(8.7)
[R1000-R1500)	20 (43.48)	14 (30.43)	[R2000-R4000)	26 (56.52)	12(26.09)
[R1500-R2500)	12 (26.09)	23 (50)	[R4000-R6000)	8 (17.39)	25(54.35)
>R2500	1 (2.17)	4 (8.7)	>R6000	-	5(10.87)

Source: Research findings, 2012

The adjusted figures from KZN combuds show that the average cost of production is R1500/pig and R4000/sow, respectively. Surprisingly, results show that emerging pig producers are making gross profits in their pig production enterprises. Findings from Table 4.7 show that 71% of emerging pig producers surveyed have lower costs of production per pig than average and 29% have higher cost of production than average. About 59% of respondents receive income per pig that is higher than the cost of production per pig and the remaining 41% receive income per pig that is lower than the average. This may be attributable to low costs of feed, such as kitchen leftovers, and to reduced transport costs to the market, as well as selling in local villages where the price is not determined by the quality of product.

4.7 SUMMARY OF CHAPTER FINDINGS

This chapter has explained the objectives of the study, data collection methods and the analysis with respect to emerging pig producers in the Gauteng and Mpumalanga provinces. The study categorised the data collected into five broad headings of perceived success factors, personal characteristics, operational management, housing and physical measures of performance. Findings of the study indicate that increasing numbers of farmers are entering pig production, with a high participation of women and a low participation of youth in pig production. Half the number of respondents was aged between 41 to 50 years. Respondents perceived the number of piglets per sow per litter as the most critical factor that contributes to their success in pig production.

Emerging pig producers perceived the cost of production, weaning age and market distance as less critical in contributing to the success of their pig businesses.

Factors that contribute to the success of emerging pig producers include culling, first mating of gilts, supply of water, number of piglets born per sow per litter, income per pig, income per sow, and participation in local markets, such as villages. Factors that have a negative influence in the success of emerging pig producers include high piglet mortality, small number of litters per sow per year, and low number of sows mated per boar. The next chapter discusses the results using non parametric statistics to assess if there is any relationship between the variables and the strength of association.

CHAPTER 5

ASSESSING RELATIONSHIPS BETWEEN THE VARIOUS FACTORS OF SUCCESS

The previous chapter discussed demographic characteristics of emerging pig producers, perceptions of success and objective measures of success. This chapter discusses the results of the study in relation to the hypotheses. The study seeks to confirm the following:

i. Education levels of emerging pig producers determine successful and unsuccessful pig production.
ii. Pig housing used by emerging pig producers determines successful and unsuccessful pig production.
iii. Previous experience of emerging pig producers determines successful and unsuccessful pig production.
iv. Operational management practices of emerging pig producers determine successful and unsuccessful pig production.
v. Perceived CSF of emerging pig producers determine successful and unsuccessful pig production.
vi. Key performance indicators for emerging pig producers are similar to South African pig industry norms.

In examining these relationships, the study compared raw data against South African standards for commercial pig production. Because criteria for emerging pig producers in South Africa do not exist, the study used standards for commercial pig production. The study classified responses for each variable as below, average or above the pig industry norm. Because the units for the quantifiable variables were different, the study allocated equal weights to each variable to arrive at an overall score for perceived success factors, operational management, physical measures and housing.

To get an overall success score, the researcher aggregated individual scores in each category. This study regarded emerging pig producers with high raw scores as successful while those with low raw scores as unsuccessful. The study used Spearman's rank correlation to assess the degree of association between overall success and pig housing, operational management, as well as perceived success factors.

When making comparisons between two groups of small sample sizes that are normally distributed, the t-test is used. In this study, tests for normal distribution indicate that the data is not normally distributed, therefore the Mann Whitney U test, which is a non-parametric equivalent of the t-test, is used. This test compared education levels and previous experience against perceived success factors, operational management, technical measures and housing.

5.1 EDUCATION AND OVERALL SUCCESS SCORES

The study compared overall success scores against the highest education levels attained by respondents. The Mann-Whitney U test compared success scores of respondents educated below grade 12 and those educated at grade 12 and above, as shown in Table 5.1 below.

Table 5.1: Relationship between overall success scores and education

Variable	Mann-Whitney U Test (p <.05) By variable Education		
	Valid N > Grade 12	Valid N <= Grade 12	2*1 sided exact p
Perceived success factors	19	26	0.239
Operational management	19	26	0.776
Physical measures of success	19	26	0.936
Housing	19	26	0.900
Overall success score	19	26	0.640

Source: Research findings, 2012

Results from Table 5.1 show the relationship between overall success scores (perceived, operational, physical and housing scores) and education. Results when using this sample data are not strong enough to conclude that there is evidence of a statistically significant association between education (0.6408) and overall success.

The group with education levels of Grade 12 and below ranked higher than the group with education levels of Grade 12 and above. The Mann–Whitney U test indicates a p-value greater than 5% (p>0.05), therefore the null hypothesis cannot be rejected. This implies that for this group of respondents, education is not related to success factors for emerging pig producers.

5.2 PREVIOUS WORK EXPERIENCE AND OVERALL SUCCESS SCORES

To examine the relationship between overall success scores and previous work experience of respondents, the study used the Mann-Whitney U test. The study compared success scores of respondents with less than five years work experience against those of respondents with five years and above. Table 5.2 below shows findings from the analysed data.

Table 5.2: Relationships between overall success scores and previous work experience

Variable	Mann-Whitney U Test (p <.05) By variable work experience		
	Valid N <5 years	Valid N >=5 years	2*1 sided exact p
Perceived success factors	33	13	0.735
Operational management	33	13	0.847
Physical measures of success	33	13	0.980
Housing	33	13	0.225
Overall success score	33	13	0.717

Source: Research findings, 2012

Results from Table 5.2 show the relationship between overall success scores (perceived, operational, physical and housing overall scores) and previous work experience. The group with less than five years' experience (<5 years) ranked higher than the group with five years and above (>=5). Results when using this sample data are not strong enough to conclude that there is evidence of a statistically significant association between previous work experience (0.717802) and overall success. The Mann–Whitney U test indicates a p-value greater than 5% (p>0.05), therefore the null hypothesis cannot be rejected. This implies that for this group of respondents, previous work experience is not related to success factors for emerging pig producers.

5.3 HOUSING AND OVERALL SUCCESS SCORES

Spearman's rank correlation assessed whether there is any association between housing and operational management, as well as physical success scores, as shown in Table 5.3.

Table 5.3: Relationships between overall success scores and housing success scores

Variable	Housing success scores Correlation coefficient r=0.05 = 0.232
Operational management	-0.11
Physical success scores	0.10

Source: Research findings, 2012

Results from Table 5.3 show that operational management (-0.1148) has a slight, almost negligible, negative correlation with housing success scores. The overall physical success (0.1015) has a positive but not significant relationship with overall housing success scores of emerging pork producers. This implies that respondents who had high housing scores had low overall operational management scores in pig production. Similarly, respondents with low housing scores had high overall operational management scores. Respondents with high overall physical success scores also had high housing scores, although for this group of respondents, the results are not strong enough to conclude that good housing is associated with physical success in pork production.

5.4 OPERATIONAL MANAGEMENT AND PHYSICAL SUCCESS SCORES

The study examined physical success and operational management success scores to ascertain whether there is any association between these two factors, as shown in Table 5.4.

Table 5.4: Correlations between operational management scores and physical success scores

Variable	Operational management success scores Correlation coefficient r= 0.05 = 0.232
Physical success scores	0.09

Source: Research findings, 2012

The results from Table 5.4 show that there is a slight positive, but not significant, correlation between operational management and physical success scores (0.0959) of respondents. Therefore, from this group of respondents, the results are not strong enough to conclude that physical success factors are associated with operational management success factors.

5.5 PERCEIVED SUCCESS FACTORS AND OVERALL SUCCESS SCORES

Data in Table 5.5 show the relationship between perceived success factors and overall success, operational management, physical success and housing scores.

Table 5.5: Correlations between perceive success factors and overall success scores

Variable	Perceived success scores Correlation coefficient r=0.05 = 0.232
Operational management	0.19
Physical total	0.04
Housing total	-0.10
Overall success	0.04

Source: Research findings, 2012

The results from Table 5.5 show that overall success (0.0428), operational management (0.1984), and physical success (0.0464) have a positive, but not significant, relationship with perceived success factors for emerging pork producers. Housing (-0.1022) had a negative relationship with perceived success factors. This implies that respondents who had high housing scores perceived themselves as less successful in pig production. Similarly, respondents with low housing scores perceived themselves as successful.

5.6 SUMMARY OF CHAPTER FINDINGS

This chapter has discussed findings on the relationships between overall success scores and: education, previous experience, housing, operational management and perceived success factors of emerging pig producers. The Mann-Whitney U test results from the analysed data indicate that for this group of respondents, education and previous work experience do not relate to success factors for emerging pig producers. The group with education levels of Grade 12 and below ranked higher than the group with education levels of Grade 12 and above. The group with less than five years' experience (<5 years) group ranked higher than the group with five years and above (>=5). This implies that for this sample data, a majority of respondents had education levels of grade 12 and below and had previous experience of less than five years.

When using Spearman's rank correlation, the results show a positive but not significant correlation between overall success factors and operational management and perceived success factors. This implies that an increase in operational management scores also increases overall success scores. Similarly, an increase in perceived success scores also increases overall success scores. However, these results are not strong enough to conclude that overall success is associated with operational management and perceived success factors. Housing scores have a negative correlation with perceived success factors of emerging pig producers. This implies that respondents with high housing scores had low scores and had low perceived success scores.

CHAPTER 6

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

This chapter provides a summary and draws conclusions from the study by highlighting challenges and critical success factors for emerging pig producers. The study makes specific recommendations in this regard.

6.1 SUMMARY

The purpose of the study was to identify critical success factors for emerging pig producers in the Mpumalanga and Gauteng provinces in South Africa. The study carried out an exploratory research survey that involved 46 emerging pig producers contacted through referrals from a list obtained from SAPPO and the ARC. The study conducted face to face interviews using questionnaires. The study collected data on respondents' characteristics, perceived success factors, operational management and technical measures of success in pig production.

Data analysis included the use of spread sheets and STATA 10. Because of the small number of respondents interviewed, the study used only descriptive statistics, such as frequency, mean and standard deviations, to analyse collected data. The study used South African pig industry norms to compare operational and technical indicators of success in pig production. The study weighted participants' responses and categorised overall scores as below, average and above industry norms.

The study found out that a high number of women in the Gauteng and Mpumalanga provinces participate in keeping and raising pigs. Respondents engage in mixed livestock farming to diversify their income. Beef cattle and poultry are the mostly kept species of livestock. Respondents kept an average of 20 sows with a minimum of four sows and a maximum of 40 sows. According to Simon Streicher, Chief Executive Officer of SAPPO, emerging pig producers should start with a minimum of 50 sows and expand to 200 sows for them to realize economic profits. Majority of respondents had experience in pig farming but their production practices are still poor.

Respondents gained experience as children when their families kept pigs at subsistence level; others attended pig production workshops at ARC and a few got experiences through trial and error.

Management of breeding stock is a big challenge to respondents. There was a high mortality rate of piglets at weaning due to poor farrowing equipment and poor pig housing. Piglets died mainly due to cold and crushing. Although a majority of respondents received pig housing support from the department of agriculture through the CASP programme, these house were not maintained and were in a poor state. Respondents stated that they do not have money to maintain the pig housed. Most respondents weaned pigs after 35 days and others allowed self-weaning. Diseases of pigs resulted mainly from poor management practices. The main diseases and parasites of pigs reported by respondents include worms, diarrhoea and mange. Respondents were aware of vaccination programme but did not use it because they cannot afford to buy the medication.

Results indicated that critical success factors for emerging pig producers are availability of cheap family labour, low feed costs and participation in informal markets, such as selling pork in local villages, schools and at the farm. It is clear that these success factors apply in this context owing to the small scale of operation. The critical success factors will differ in situations where the business produces a large number of pigs on a monthly basis. Emerging pig producers mainly used home-mixed feed and kitchen leftovers to feed their pigs, resulting in low cost of feed.

The reason given was that although commercial feed was balanced and good for pigs, it is too expensive in comparison to kitchen leftovers that are obtained free of charge or very cheap from hospitals, schools and restaurants. The study noted that a few respondents, especially those with more than 20 sows, fed their pigs mainly home-mixed and commercial feed.

6.2 CONCLUSIONS

The findings of the study have drawn attention to critical success factors of emerging pig producers in the Gauteng and Mpumalanga provinces. This section makes conclusions based on these findings. Within the selected research framework, this section also highlights contributions of the study to the body of literature and emerging producers' success as follows:

6.2.1 Pig production practices of respondents

Results of this study show that emerging pig producers are operating at a very small scale to realise economic profits. Findings indicate that breeding sows for emerging pig producers range from 4 – 40. Emerging pig producers need to have a minimum of 50 breeding sows in order to break even. According to Nyoka (Nyoka, 2012), to realise economic profits, emerging pig producers should have a minimum of 200 breeding sows. The small scale of production and low productivity of pigs prevents emerging pig producers from supplying a constant number of pigs to markets. This prevents them from participating actively in the market because they are unable to ensure contracts with supermarkets, butcheries and abattoirs, as these outlets require trust as well as consistency in supply and quality.

The study shows that management practices of emerging pig producers are at a low level. Emerging pig producers' practices include feeding mainly kitchen leftovers and management methods which result in high mortality rates owing to cold and crushing. Generally, the pig houses are not well equipped and lack proper farrowing equipment, such as farrowing crates, creep areas and heaters for the young piglets. Most emerging producers interviewed had proper pig houses, which were built through the assistance from government (through CASP). The common diseases and parasites that affect their pig stock are worms, mange and diarrhoea. These conditions arise from poor management practices such as poor nutritional and health practices. Such practices can lead to low production while increasing the costs of production and as a result reduce the returns for the pork business.

Respondents feed their pigs mainly kitchen leftovers that they receive from schools, shops, restaurants and hospitals free. Respondents make use of available local material, such as plastic containers and old tyres, as feeding and drinking equipment for pigs. Respondents do not keep production and financial records, few respondents kept records but they were incomplete. This made it difficult to get information on costs of production and income from respondents. In addition to this, respondents could not disclose their financial information because they feared that if they do so, they may not get support directed to pig farmers.

Common markets for farmers are local people and auctions. Respondents sell to local people because they receive a high price compared to other markets. Respondents sell to auctions because they can receive fast cash to pay for personal needs and to buy pig feed. Majority of respondents are not members of SAPPO, a commodity organisation for pig producers. As a result, respondents do not receive support offered to members such as networking, training in pig production and access to market information.

6.2.2 Critical success factors of emerging pig producers

Research findings show that critical success factors impacting on the performance of emerging pig producers include average income per sow per litter, piglets born per sow per litter, average income per adult pig, provision of feeders and drinkers for pigs. Challenges faced by emerging pig producers high mortality rates, long farrowing intervals, small litter sizes, poor weaning practices and poorly equipped housing. To address these challenges, active participation, involvement and provision of support by government, SAPPO and the private sector can play an important role in reducing the impact of these challenges.

6.2.3 Relationships among variables

This study concluded that there are no significant differences between successful pig production and education levels, as well as previous work experience of successful and unsuccessful emerging pig producers.

This means that the level of education does not influence pig producers. However, there was a positive but not strong relationship between success, operational management and perceived success factors.

Both successful and unsuccessful emerging pork producers considered the success factors as equally critical. Similarly, both groups viewed perceived success factors, operational management, housing and physical success measures in the same way. The objectives of the study were achieved, although the findings are not strong enough to explain the relationships between overall success scores of successful and unsuccessful emerging pig producers.

6.3 RECOMMENDATIONS

This study has identified a number of factors that are critical for the success of emerging pig producers. Based on the research findings, the study makes the following recommendations to assist the transition of emerging pig producers into commercial production:

6.3.1 Public and private sector partnerships (PPPs)

Government, private sector and non-governmental organisations have received great recognition as drivers for the success of SMEs (Keil, 2008:45). Partnerships between government and the private sector (for example, the commodity organisation, SAPPO, research institutions and input suppliers) are important in developing programmes to assist the development of emerging pig producers. To develop effective programmes, a clear understanding by government of the critical success factors and problems faced by emerging pig producers is necessary in order to develop policies aimed at addressing these issues.

These policies should provide room for sound public and private partnerships, which include support at industry level and producer level, taking into consideration heterogeneity of producers within the pork industry.

The Government, in partnership with SAPPO, should develop proactive business and entrepreneurial training programmes aimed at achieving long-term sustainable solutions. To achieve this, the above challenges should be included in the syllabi in order to address the specific problems of emerging pig producers. Training in the whole production cycle and business skills, such as initial business planning and implementation, costing, economies of scale and finance management, is essential. Soft skills, such as networking, entrepreneurship, negotiating and procurement skills, should be included.

The format of training needs reconsideration to include alternative forms of training that will enhance understanding, retention and transfer of knowledge. These should include demonstrations, workshops, facilitated group discussions and distance learning supplemented with audio-visuals. Field visits to local large commercial or successful emerging pig producers' farms could provide motivation to emerging pig producers.

Policies aimed at supporting emerging pork producers should facilitate adequate skills transfer and the promotion of youth participation by funding young pig producers, for example by providing educational and research bursaries, market contracts, value addition opportunities and hosting 'Young Pork Producer of the Year' awards.

6.3.2 South African Pork Producers' Organisation

As a commodity organisation, SAPPO, plays a big role in coordinating activities and representing stakeholders within the pork supply chain. The study ascertained that emerging pig producers did not trust SAPPO and referred to it as an organisation for white pig producers. Special efforts in communication and creating trust in these producers are required and this can be possible through PPPs.

SAPPO can facilitate the transition of emerging pork producers to commercial production through capacity building, providing support and improving participation of emerging pig producers in the pork chain.

This will entail designing support strategies that will enable an emerging pig producer to develop as a person (entrepreneur) which should translate into skills needed for business development, making profit and expanding into commercial production. The ultimate success and impact of this support service rests on the shoulders of PPPs and producers as recipients of support, which should be reflected in their commitment, the level to which they will access and make use the support available at their disposal, and their willingness to implement the given advice and information. SAPPO should redesign its support strategies to include the following:

6.3.2.1 Develop business models that emerging farmers can pursue, such as training in the full production cycle, costing, business skills, contracting, mentorship and linking emerging pig producers to the supply chain. Business skills training should empower emerging pig producers to develop a business attitude and expertise. They should conduct business as a separate unit from personal or household activities. Training of emerging pig producers in business skills should place more emphasis on initial business planning, costing, and economies of scale, record keeping, and business expertise and developing a business attitude. The study found that emerging pig producers keep poor records or do not keep them at all. It is crucial that training in record keeping should not only focus on how to keep records but also encourage the adoption of the practice of record keeping.

6.3.2.2 Training of emerging pig producers should include cost reducing strategies with more emphasis on costing and economies of scale. Before starting the business, they should calculate costs of the different pork production systems, based on the available resources and select the most cost efficient system. Economies of scale result in low costs per unit of production and as a result reduce the total production costs and increase profit margins. It is important for emerging pig producers to be skilled in operating at an appropriate economic scale to increase their returns on production.

6.3.2.3 Business mentorship is one of the most recognised models that have been effective in transferring business skills to small and emerging farmers. This model ensures the transfer of practical business skills, thus introducing emerging farmers to product and input markets. Most importantly, mentoring provides coaching which can empower pork producers to develop the business mindset required for successful commercial production. Mentors can be large commercial, or established emerging, pig producers in the local community, as this reduces costs of travelling and the mentees can visit the mentor's farm as a means of motivation.

6.3.2.4 Contracting can play an important role in developing emerging pig producers for commercial production. Depending on the type of contract, emerging pig producers can have access to product markets, input supplies and gain knowledge from technical advice provided by contractors. However, private companies are reluctant to work with individual farmers owing to high risks involved, such as defaulting on contracts, and inconsistent supply and quality. Training of emerging pig producers should emphasise the importance of collective action, negotiating and honouring contracts. The high transaction costs of contracting, as well as logistically remote locations make it difficult for emerging pig producers to access markets. However, they can utilise collection points to ensure traceability. They should form an association, coordinate their production activities and negotiate for contracts with local private businesses.

6.3.3 Emerging pig producers

Emerging pig producers can adopt various strategies for developing their pork businesses into commercial enterprises. This requires good business planning and a structured approach. Selecting the production system that matches the available resources in terms of capital, land, labour, management and marketing skills is important for low-cost production and increased returns. The following strategies may assist the transition of emerging pig producers to commercial production:

6.3.3.1 *SAPPO membership:* Emerging pig producers should join existing pork producer forums or establish local producer forums in order to share their skills, resources, and problems and success stories. The collective action available in such forums builds economies of scale, increases negotiating power, and minimises transaction costs through collaborative buying, processing and marketing syndicates. Emerging pig producers (as an association) should join SAPPO (the commodity organisation) to make use of the services offered such as training, mentorship, market information and participation in pig producers' study groups. Study groups can be cost saving, time saving, and allow for direct support to the targeted group. Through the study groups, they can coordinate activities such as buying production inputs, production activities and then negotiate for marketing contracts with local food processors. As a group it will be easier for them to identify their needs and to seek the appropriate support.

6.3.3.2 *Selecting the type of production system*: The selection of an appropriate pig production system leads to improved performance in pig production. Most emerging pig producers engage in the farrow-to-finish production system. The farrow-to-finish system has the longest production cycle, highest capital and labour requirements, but has greater flexibility and long-run market potential. This system is ideal for a pig producer with high initial capital and production resource requirements for the whole production cycle. Emerging pig producers with low capital may adopt the farrow-to-feeder system to expand into a farrow-to-finish operation. Alternatively, they could adopt the feeder-to-finish system to reduce overhead costs, utilise minimum labour and gain income within a short-term.

6.3.3.3 *Reducing feed costs:* Feed cost is the highest component of the total cost of production. Emerging pig producers may employ feed cost reduction strategies by selecting a production system with low feed costs and by growing grain crops to produce home-mixed feed. The three types of pig production systems have an impact on feed costs. Feed costs in the farrow-to-finish operation are 75%, in the feeder-to-finish operation these are 65% and in the farrow-to-feeder operation these make up 50% of the total expenses (Kephart, Greaser, Harper & Moore, 2001).

6.4 FURTHER RESEARCH

This study recommends further research in the following areas.

6.4.1 The study only focused on technical factors in the success of emerging pig producers. Accordingly, there is a need for further research on the influence of institutional factors in the success of emerging pig producers.

6.4.2 The study has also identified limited participation of emerging pig producers in formal markets. There is a need for further research on how to link emerging pig producers to these markets.

6.4.3 Respondents were unwilling to answer questions relating to the financial performance of their businesses. As a result, there were no responses to questions related to farm gross margins. To obtain this information, respondents were given categories to select from, which provided a general rather than an actual picture on financial performance. A criticism of the questionnaire is that, in terms of measuring financial performance, it would have been better to collect data on average total number of pigs sold per year, convert them to carcass dressed weight (kg) and multiply by current prices of pork obtained from ABSA, FNB, etc. to estimate total income per pig business. There is a need to conduct a study on financial performance of emerging pig producers using this method and other financial indicators.

6.4.4 Owing to time and resource constraints, the study focused on emerging pig producers in the Mpumalanga and Gauteng provinces, which is not representative of the whole country. There is a need to conduct a similar study in other provinces to reinforce these findings.

6.4.5 A database that contains a list of active emerging pork producers with contactable phone numbers in Mpumalanga and Gauteng provinces was not available. This will in general be the case with small farmers. Lack of such data limited the number of participants in this study.

The lack of a sampling frame renders the findings unrepresentative of emerging producers in the Mpumalanga and Gauteng provinces. A study that will compile a comprehensive database and profile of emerging pig producers which can be used in developing further business models is necessary.

6.4.6 The limited information on small to large, as well as developing to commercial, farmers in the different stages of the lifecycle is significant. The study was forced to use commercial pork production standards as nothing was available for emerging pig producers. A study that will develop standards or norms specifically for emerging pork producers to use as a benchmark for performance evaluation needs be conducted.

6.4.7 Although subsistence or backyard pig producers are many in number, they are not included in the study and require a separate study.

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APPENDICES

APPENDIX A

Data collection instrument(s)

Title: Critical success factors of emerging pig producers: Case study of selected areas in Gauteng and Mpumalanga provinces

Section A: Questionnaire – Emerging pig producers

Critical success factors of emerging pig producers: Case study of selected areas in Gauteng and Mpumalanga provinces

Farm	
Interviewee	
Area/Location	
Contact number	

Dear respondent

Thank you for your willingness to complete this survey. The purpose of this survey is to determine the critical success factors of emerging pig producers in the Mpumalanga and Gauteng Provinces. The survey should not take more than 40 minutes to complete. This is an anonymous and confidential survey. You cannot be identified and the answers you provide will be used for research purposes only.

Please answer all the questions. There are no wrong or right answers.

V0	

A. Socio – economic characteristics

1. Gender [1] = female [2] = male | A1 |

2. Race

[1] = Black [2] = Coloured [3] = White [4] = Other (specify) | A2 |

3. In which province is the business located? ..... | A3 |

4. Please indicate your age at your last birthday.....years. | A4 |

5. Highest level of education

[1] =Primary [2] =Secondary [3] =Matric | A5 |

6. a. Are you the owner of the business [1] Yes [2] No | A6a |

b. In which year was the business founded/ started? | A6b |

7. Household size ..... | A7 |

8. Number of adults above 18 years working; | A8 |

On [ ] . Off farm [ ]

9.. Number of children below 18 years [ ] | A9 |

10. Farming experience (years)

<5 [1] 5 -10 [2] >10 [3] | A10 |

11. Are you a member of the South African Pig Producer's organisation (SAPPO)? | A11a |

[1] Yes [2] No

b. If you answered **No to question 11a**, please give a reason | A11b |

If you answered **yes to question 11a,** how did your membership benefit the business?

.....

.....

12. What pig breeds do you use for breeding? (you may mark **more than 1**) | A12 |

Duroc [1] Land race [2] Large white [3]

13. Source**s** of income (you may mark **more than 1** option) | A13a |

Pig production [1] Other agricultural activities [2] Off farm [3] | A13be |

| A13c |

Social grant [4] Pension [5] Remittance [6] | A13d |

| A13e |

| A13f |

Other (please specify)..... | A13g |

14. Types of assets on the farm

Asset		Count		
a.	Live		A14a	
b.	Dairy		A14b	
c.	Poultry		A14c	
d.	Goats		A14d	
e.	Farm		A14e	
f.	Other		A14f	

B. Perceived Critical success factors

15. Please rate the importance of the following factors in the success of your pig production business

Factor	Not critical	Slightly critical	Moderately critical	Very critical	Extremely critical		
a. Number of piglets born per sow per litter	1	2	3	4	5	B15a	
b. Age of piglets at weaning	1	2	3	4	5	B15b	
c. Number of pigs sold per sow per year	1	2	3	4	5	B15c	
d. Number of litters per sow per year	1	2	3	4	5	B15d	
e. Piglet deaths at weaning	1	2	3	4	5	B15e	
f. Quality of pig housing	1	2	3	4	5	B15f	
g. Quality of feed	1	2	3	4	5	B15g	
h. Quality of water	1	2	3	4	5	B15h	
i. Culling of unproductive breeding stock	1	2	3	4	5	B15i	
j. Frequency of marketing pigs	1	2	3	4	5	B15j	
k. Distance to market	1	2	3	4	5	B15k	
l. Cost of production per adult pig	1	2	3	4	5	B15l	
m. Cost of production per sow	1	2	3	4	5	B15	
n. Income per sow	1	2	3	4	5	B15n	
o. Income per adult pig	1	2	3	4	5	B15o	

C. Physical measures of success

16. Please answer the following about your management practices in pig production

Practice			
a. Age at first mating: (1		C16a.1	
: (2)		C16a.2	
b. Number of sows mated per		C16b	
c. Age of weaning piglets (days)		C16c	
d. How soon after weaning do		C16d	

17. What is your practice on culling pigs

	Practice		
a. Boars		C17a	
b. Sows		C17b	

18. Performance of the farm business

Criteria			
Average number of piglets born /sow/litter		B18a	
Age of piglets at weaning (days)		B18b	
Average number of pigs sold/sow/year		B18c	
Average number of litters/sow/year		B18d	
Average piglet mortality (deaths/sow/year)		B18e	
Average number of sows mated/ boar		B18f	
Days from weaning sow to mating		B18g	
Cost of production per adult pig (Rand)		B18h	
Cost of production per sow per litter (Rand)		B18i	
Income per adult pig (Rand)		B18j	
Income per sow per litter (Rand)		B18k	
		B18l	

19. What are your water sources for pig production (you may

Borehole [1] Piped [2] River [3] C19

20. . How frequently do you supply water to your pigs

Once every 2 days [1] Once a day [2] Two times a day [3] C20

D. Health and Disease management plan

21 a. Do you have a Yes [1] No [2] C21

b. If yes, what are the **three most important** diseases that you control in your piggery?

Type of disease/parasite	

1.	
2.	
3.	

C21b1	
C21b2	
C21b3	

D. Transport and Marketing

22. Where do you market your pigs? (you may mark **more than 1**) C22b

Abattoirs [1] Auctions [2] Butcheries [3] Local [4] C22c

Other (Please specify).....

23. a. How many times do you market your pigs in a year?

Once [1] Two times [2] Three times [3] > four times [4] C23a

b. Why do you sell to the market you selected above, in 23? C23b

Close to the [1] Cash sales [2] Better prices [3]

Other (please specify).....

24.. What is the **primary** mode of transport that you use to take your pigs to the market?(mark **only ONE**)

Own [1] Public [2] Hired [3] C24

Other (please specify).....

25. a. How much does it cost (R/km) to use this mode of transport? C25a

b. What is the furthest distance you travel to market (km)? C25b

26. What are the problems faced in transporting your pigs to the market?

Long distances [1] Poor roads [2] Expensive [3]

C26a	
C26b	
C26c	

Other (specify).....

E. Financial indicators of physical performance

27. Please indicate the total gross margin for your pig business D27

1. [R0 – R100.000)
2. [R 100,000 – R200.000)
3. [R 200,000 – R300.000)
4. >R400,00

28. Please indicate the total cost for the pig business for the D28

1. [R0 – R100.000)
2. [R 100,000 – R200.000)
3. [R 200,000 – R300.000)
4. >R400,00

29. Please indicate your cost of producing one adult pig D29

1. [R0 – R1,000)
2. [R 1,000 – R1,500)
3. [R 1,500 – R2,500)
4. >R2500

30. Please indicate cost of production per sow | D3 |

1. [R0 – R2,000)
2. [R 2,000 – R4,000)
3. [R 4,000 – R6,000)
4. >R6,000

31. Please indicate your gross income per | D3 |

1. [R0 – R1,000)
2. [R 1,000– R1,500)
3. [R 1,500 – R2,500)
4. >R2,500

32. Please indicate your annual gross income | D3 |

1. [R0 – R2,000)
2. [R 2,000– R4,000)
3. [R 4,000 – R6,000)
4. >R6000

Thank you for completing the questionnaire. We appreciate your effort.

APPENDIX B

South African Pig Industry Norms

1. OPERATIONAL MANAGEMENT NORMS

Performance Measure	Poor	Performance level		
		Weight =1	Good	SOURCE
Breeding practices (first breeding - months) Gilts boars	 >8 >8	 7-8 7-8	 7 7	Elsenburg fact sheet SAPPO guidelines Ubisi mail 2009, Elsenburg fact sheet
Culling - sows (years)	>4	3 -4	>3	Ubisi mail 2009, Elsenburg fact sheet
Feeding (type)	Kitchen leftovers	Concentrate & maize only	Commercial feed	
Pig diseases and parasites (Pneumonia, Mastitis, round worms, mange, abortion)[1]		Any 3		Elsenburg fact sheet, 2009
Water (frequency/day)	<2	2	>2	
Pigs sold/sow/year	<16	16 -20	>20	Sappo fact sheet Ubisi mail 2009
Total weight			**11**	

The cut off points (based on the weighted index) will be as follows:

< 3 = not successful

4-6 = moderately successful

7-9= successful

>9 = Very successful

2. PHYSICAL PERFORMANCE FACTORS (NORMS)

Criteria	Unit	Poor	Average	Good	Source
Average number of piglets born /sow/litter	No.	<8	8 -10	>10	1,3, 4
Age of piglets at weaning	Days	>35	35	<28	1,3
Average number of pigs sold/sow/year	No.	<16	16-20	>20	1,3, 4
Average number of litters/sow/year	No.	<1.8	1.8	>1.8	1,3, 4
Average piglet mortality (deaths/sow/year)	%	>10	10	<10	-
Average number of sows mated/ boar	No.	<10	10 -12	10	1, 3, 4
Days from weaning sow to mating	No.	>7	4 -7	3-4	1, 3
Cost of production per adult pig	Rand	>1500	1000-1500	<1000	2
Cost of production per sow per litter	Rand	>4000	2000-4000	<2000	2
Income per adult pig	Rand	<1000	1000-1500	>1500	2
Income per sow per litter	Rand	<4000	4000-6000	>6000	2

Key:

[1]Elsenberg factsheet, 2009

[2]KZN Combud for pigs, 2010: Figures adjusted to fit 25 -50 sows

[3]Sappo fact sheet

[4]Ubisi mail 2009

[5]Machindi, 2009