

**Measuring employee engagement in a South African Poultry  
producer**

by

**Andries Steyn**

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Supervisor: Prof H. Nienaber

Co-Supervisor: Prof N. Martins

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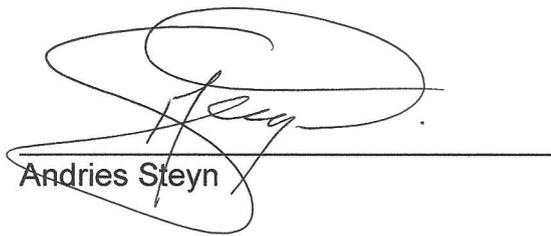
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## DECLARATION

Student number: 0302-714-7

I, Andries Steyn, declare that **MEASURING EMPLOYEE ENGAGEMENT IN A SOUTH AFRICAN POULTRY PRODUCER** is my own work, except as indicated in the references and acknowledgements. It is submitted in accordance with the requirements for the degree of Magister Technologiae at the University of South Africa. It has not been submitted before for any degree or examination to this or any other university.



Andries Steyn

29 February 2016

## **ABSTRACT**

Employee engagement in the workplace can be beneficial towards an organisation. Most of the scales measuring employee engagement were found not to be suitable for the South African context. Recently, researchers developed a scale measuring employee engagement in a diverse South African context, and on multiple levels such as organisational and individual levels. This study tested this newly developed instrument for initial reliability and validity in a poultry producer.

The original instrument was pre-tested and after minor amendments used to collect data through an electronic web-based questionnaire from employees in the selected organisation. The selected organisation reflected the profile of typical South African employees.

Exploratory Factor Analysis was used to determine the factorial structure and Cronbach Alpha was used to establish the internal reliability of the instrument scale. The instrument tested reliable and valid for the poultry producer.

Further analyses of the data were done to determine significant differences between various biographical groups within the selected organisation. The measurement instrument was designed to test engagement on the organisational level, team level and the individual level which was confirmed in the survey result analysis.

## **ACKNOWLEDGEMENTS**

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Most importantly, I wish to thank my wife Engela for her enduring patience, understanding and support during this project. I also wish to acknowledge my children and grandchildren who lost some special time with their dad and granddad.

I dedicate this work to the most important things in my life: my Lord and my family.

Andries Steyn

## **LIST OF ABBREVIATIONS**

ANOVA	Analysis of Variance
CFA	Confirmatory Factor Analysis
DAFF	Department of Agriculture, Forestry and Fisheries
EFA	Exploratory Factor Analysis
GDP	Gross Domestic Product
HQ	Headquarters
HR	Human Resources
JSE	Johannesburg Stock Exchange
KMO	Kaiser-Meyer-Olkin
PAF	Principal Axis Factoring
SAPA	South African Poultry Association
SPSS	Statistical Package for the Social Sciences
UNISA	University of South Africa
UWES	Utrecht Work Engagement Scale

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# **CHAPTER 1: INTRODUCTION**

## **1.1 Introduction**

Employee engagement is important to organisations in creating and shaping a competitive advantage. Although there is a number of measurement scales available internationally that measure employee engagement, the content of measuring measurement scales cannot be applied to other countries (Nienaber & Martins, 2014). This observation was confirmed by Rothman and Rothman (2010) while testing the reliability of the Utrecht Work Engagement Scale (UWES) in a South African context. They pointed out that the most often used measurement scale to determine employee engagement, the UWES, was not ideal in a South African context, and that more research is needed for the development of a reliable measurement scale that also measures the physical, emotional and cognitive components of engagement. UWES considers the individual level of engagement while Nienaber and Martins' (2014) research resulted in an instrument that measure engagement simultaneously at all three organisational levels; namely organisation, team and individual levels. Viljevac, Cooper-Thomas and Saks (2012) also observed that the reliability and validity of both the UWES and May, Gilson and Harter scale, two scales which emerged in the academic literature—the most often used scales to measure work engagement (individual level)—are less than optimal. Therefore, authors in this study field called for further research. Nienaber and Martins (2014) researched and developed an employee engagement measurement scale for a South African context based on the measuring of employee engagement on organisational-, individual-, and organisational level.

## **1.2 Background and context of the study**

The purpose of the study is to validate the newly developed employee engagement measurement scale by determining the reliability and validity of the measurement scale measuring employee engagement in a South African context, built on the framework proposed by Macey and Schneider (2008)—tailored for a South African environment—by drawing on the existing theory of employee engagement. The researchers, Nienaber and Martins (2014), concluded that engagement is a complex

construct. They recommended that the developed instrument/scale be validated to ensure its reliability and factorial validity for the South African context.

The main research question of this study is as follows: Is the newly developed employee engagement scale a reliable and valid scale for measuring employee engagement in a poultry producer? The objectives of the study are to investigate (1) the reliability, (2) the construct (factorial) validity, of the employee engagement scale within the context of a large South African company and (3) to measure employee engagement in the organisation and conduct comparisons between various business units and biographical groups. The selected company for this research is listed on the Johannesburg Stock Exchange (JSE) under Consumer goods, Food and Beverages, Food producers sector company (the organisation). The contribution of this study would be that a reliable and valid employee engagement measuring scale is available for future use.

The secondary objectives of this research study are to determine the level of employee engagement in the selected organisation on:

- Individual level
- team level; and
- organisational level

Significant differences are determined between various biographical groups by using statistical analysis such as Analysis of Variance (ANOVA).

A South African company, listed on the JSE, was selected for the research project for validation of the employee engagement measurement scale in a South African context. Since the organisation's employee base represents a diverse multi-cultural composition, it is representative of a typical South African context.

The organisation is a Southern African poultry producer. Key activities comprise manufacturing of animal feeds, broiler genetics, production and sales of day-old hatchlings and hatching eggs, breeder and broiler production, abattoir, further processing operations, and sales and distribution of various key poultry brands. It is

part of manufacturing sector which is the second largest contributor to South African Gross Domestic Product (GDP).

According to The Department of Agriculture, Forestry and Fisheries (DAFF), the broiler industry is the largest agricultural sub-sector in South Africa. The total value of production from fowl slaughters for the 2011/2012 season was R26.9 billion (DAFF 2013), representing 16.35% of agriculture's contribution to the GDP. In addition, poultry represents one of the cheapest and most accessible sources of animal protein for South African consumers. Poultry consumption accounts for almost half of total animal protein consumed in South Africa in 2011 and 2012. Total poultry consumption in 2011 and 2012 was in excess of 1.8 million metric tons; more than 36 kg per capita (South African Poultry Association (SAPA), 2013). SAPA (2013) further indicates that the industry employs more than fifty-six thousand people directly, while contributing indirectly to an additional 108,000 jobs throughout the poultry value chain. In 2012, the industry consumed more than four thousand tons of feed (including more than 2.5 thousand tons of maize); illustrating its relative importance and contribution to total employment within the agricultural sector.

Although the selected organisation has operations in various Southern African countries, focus for this research was limited to the South African components only.

The organisation comprises of:

- A poultry division consisting of broiler productions, which includes rearing and laying farms, as well as hatcheries for day-old chick supply, processing plants, distribution, sales and marketing operations with a substantial broiler processing capacity per week
- an animal feed division with seven strategically placed well equipped feed mills which produce a wide range of specialised products for all commercially farmed animal species
- analytical laboratories for analysing feed and water samples for the agricultural sector

At the time of the survey, the employee component of the organisation consisted of 7,751 permanent employees and 4,672 contractors.

Employee diversity *versus* the national demographic diversity of South Africa is compared in Table 1.1 below.

**Table 1.1: Employee distribution in comparison with the national demographics**

	South Africa population as per Census 2011*	Race group as % of South Africa global population	Total employee component	Race group as % of total employee component	Potential survey population	Race group as % of the potential survey population	Potential population as % of the total permanent employee component	Survey participants	Survey participants as % of potential population
Black African	41,000,938	80%	6140	79%	1062	50%	17%	46	4.33%
Indian/Asian	1,286,930	2%	84	1%	82	4%	98%	48	58.54%
Coloured	4,615,401	9%	841	11%	313	15%	37%	22	7.03%
White	4,586,838	9%	686	9%	667	31%	97%	279	41.83%
No response								4	
<b>Total permanent employee component</b>			<b>7751</b>		<b>2124</b>		<b>27%</b>	<b>399</b>	<b>18.79%</b>
Contractors			4672						
<b>Total</b>	<b>51,490,107</b>		<b>12,423</b>						

Source: Compiled from company data and \*Stats SA, 2012

The representation of employees in the selected organisation is as follows:

Black Africans represent eighty percent of the South African population and represent seventy-nine percent of the selected organisation. The white population of South Africa and the organisation is equally represented at nine percent; whereas the population which represent the Coloured and Indian populations showed variances. In conclusion, the selected organisation's employee profile is representative of the national demographics of South Africa.

### 1.3 Problem statement

The rationale of the research is to determine the reliability and factorial validity of a newly developed measurement scale, measuring employee engagement on individual and organisational level in a South African context and specifically a poultry producer.

A measurement scale to determine employee engagement was developed for a South African context, as reflected in the research article “An Employee Engagement Instrument and Framework Building on Existing Research” by Nienaber and Martins (2014). This study concluded the first step in the Hinkin (1998) scale development process, illustrated as follows:

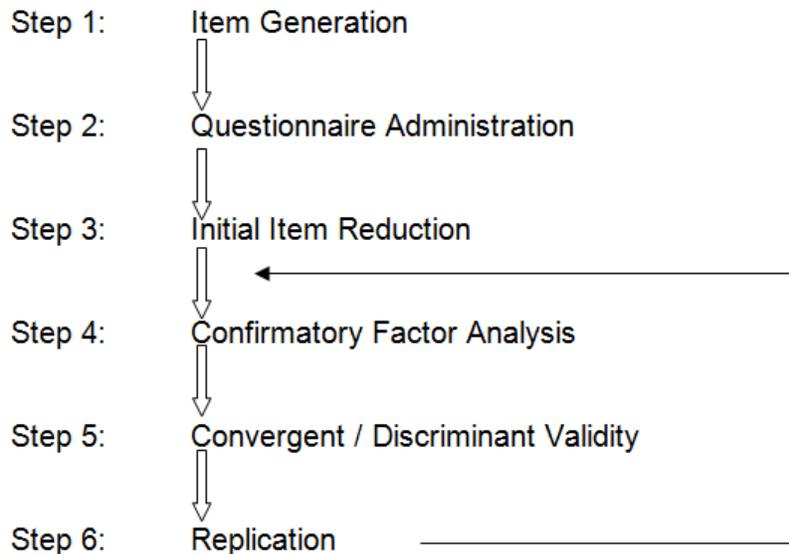


Figure 1.1: Scale development process (Hinkin, 1998)

In the conclusion of the article, the authors recommended that the newly developed instrument/scale be validated to ensure its reliability and factorial validity, specifically in the South African context. This research study will therefore focus on the following steps of the Hinkin scale development process namely:

- Step 2: Questionnaire Administration, as the instrument will be tested within a selected South African organisation to collect data for statistical analysis
- Step 3: The reliability analysis will result in item reduction

- Step 4: Factorial validity will be determined

An empirical study will be done by using the measurement scale to collect data for the purpose of statistical analysis to test for reliability and factorial validity of the scale.

The overall research design follows a quantitative research approach. This methodological study (Mouton, 2008), apply a survey design. A survey is a useful tool in describing the characteristics of a large population (Babbie, 1990). Statistical analysis will be used to determine reliability (Cronbach Alpha) of the measurement scale, and factor analysis to determine the factor structure and validity of the measurement scale.

The problem statement is summarised as follows:

- To contribute towards testing the newly developed instrument, measuring employee engagement in a typical South African organisation, for validity and reliability
  - Cronbach Alpha will be applied to test the instrument for reliability
  - factorial analysis specifically, Exploratory Factor Analysis (EFA), will be applied to test for validity
- A secondary analysis of the collected data will be done to measure employee engagement in the organisation and do comparisons between –
  - various Business units
  - various biographical groups

The analysis of variance (ANOVA) will be applied to determine significant differences between the various biographical groupings.

#### **1.4 Significance of the study**

Contribute towards a validated tool to measure employee engagement in a South African context, which will fill an existing gap. This research study will validate the newly developed and researched employee engagement instrument/scale in a South African context for reliability and factorial validity and specifically for a poultry producer.

Employee engagement became prominent due to the amplified attention it received in recent literature. This amplified attention originated from the influence employee engagement has on sustaining a competitive advantage, which in turn leads to successful organisational performance. Drawing on the framework of Macey and Schneider (2008), and given the importance of employee engagement, an employee engagement measuring scale was developed which can be used to reflect on individual, team and organisational dimensions, especially in a South African context (Nienaber & Martins, 2014). This research will contribute towards a reliable and valid measurement instrument to test for employee engagement which might assist towards alleviating the vagueness associated with the concept of “engagement”, which endangers the achievability of a competitive advantage and therefore influences organisational performance, as noted in business results.

This study will provide direction to the study field of employee engagement to contribute towards a validated tool to measure and understand employee engagement in a South African context, with the advantage to assist in measuring employee engagement simultaneously at an individual and organisational level.

According to the Hinkin (1998) scale development process, this study will add value, since it will provide input and clarity on steps two to four, and ultimately contribute towards a reliable and valid employee engagement test instrument, available for a diverse, multi-cultural context for example, South Africa.

An organisation consists of employees who work together in teams in order to achieve the goals of the organisation. It can therefore be stated that individuals work in teams, and teams work together in an organisation. The goals of an organisation are based on a strategy of competitive advantage where each position within an organisation has been designed to achieve these goals (David, 2012). Should engagement be successfully tested with a reliable and valid instrument, both on individual and organisational level, the outcome thereof will contribute towards the organisation being more effective, with an enhanced competitive advantage.

## **1.5 Method**

A survey design and method will be used for this methodological study (Mouton, 2008). A survey is a convenient instrument in collecting and describing the opinions and characteristics of a large group or population (Babbie, 1990). Reliability of the instrument will be determined by means of the Cronbach Alpha analysis, whilst factor analysis will be applied to determine the factor structure and validity of the measurement scale. The tests for differences between distributions, and the analysis of variance (ANOVA) will be applied to determine significant differences between the various biographical groupings. The results per biographical group will assist management of the organisation to determine the level of employee engagement in different areas, specifically in the following categories: 'Business unit'; 'Age group'; 'Job grade'; 'Job category'; 'Gender group', and 'Highest qualification'. Additionally, the feedback will assist management in determining which focus areas needs attention in order to increase the levels of engagement on organisational, team and individual levels.

## **1.6 Delimitations of the study**

A questionnaire will be made available to all the employees who have access to company computers with access to the internet and intranet. The study will be performed *via* the intranet of the organisation. Temporary employees and contract workers in the company will be excluded from the research survey, since their contract period is considered to be too limited to influence overall engagement. Since the data will be collected *via* a web-based questionnaire, permanent employees who do not have access to company computers linked to the intranet of the organisation, will also be excluded from the study. There will be no other access besides the intranet of the organisation for participation in the survey.

The estimated 2,124 permanent employees of the organisation who have access to company computers, linked to the intranet of the organisation, will be requested to participate on a voluntary basis. The entire population within the organisation will be approached to complete the survey, ensuring that all staff members are included and consider themselves valued. In order to perform a valid study for statistical analysis a

minimum of 365 completed, useful, questionnaires will be required. The methodology will be discussed in detail in Chapter 3.

## **1.7 Definition of terms**

Definition of terms will assist the reader to understand various concepts regarding the research and will assist to provide context.

### **Survey:**

According to Mouton (2008:152) a survey can be defined as “Studies that are usually quantitative in nature and which aim to provide a broad overview of a representative sample of a large population”. The purpose of a survey is to produce statistics, which is a quantitative or numerical description of some aspects of the study population (Fowler, 2009).

### **Test for validity:**

Test for validity refers to the degree to which the test actually measures what it claims to measure. Test validity is also the extent to which inferences, conclusions and decisions made based on test scores are appropriate and meaningful (Wiid & Diggines, 2013).

### **Non-parametric test:**

A Non-parametric test would be used if the construct score is not normally distributed. For this study, in case of a lack of normality, the Kruskal-Wallis test was applied. (Wiid & Diggines, 2013)

### **Factor analysis:**

Factor analysis is a major technique in statistics to demonstrate which variables clump together to form super-ordinate variables. Factor analysis reverses the traditional thinking of generating numerous items that measure a particular variable, by attempting to join closely related individual items to form a theoretical concept, and to detect simple patterns in a more complex pattern of relationships among variables (Burns & Burns, 2008).

**Reliability:**

Reliability refers to the consistency of the measurement, or the degree to which a measurement scale measures the same way each time it is used under the same condition with the same subjects (Wiid & Diggins, 2013).

**1.8 Chapter summary and road map for the research project**

Researchers recommended that the scale measurement instrument be evaluated and tested for reliability and validity. A typical South African diverse organisation was requested to test the instrument within the organisation to determine the level of employee engagement in the organisation, obtaining data to perform the statistical analysis for the reliability and validity tests.

A literature study will follow that will focus on the definition of employee engagement, the methodology to develop a measurement instrument, and the proposition that will be incorporated into the measurement instrument to understand the compilation of the instrument, and to comprehend the impact of the EFA, upon obtaining the results of this research study.

The survey population will be determined to understand the biographical compilation of the population. A predefined instrument/questionnaire will be used for data collection purposes. This questionnaire consists of two sections; namely the biographical data of the participant, and the predefined items. Thereafter the biographical section will be aligned with the biographical compilation of the survey population and the instrument will be pre-tested to determine understand ability.

Data collection will be by means of a web-based questionnaire on the intranet of the chosen organisation. Data will be analysed by using approved statistical analytical software to determine the reliability and validity of the newly developed instrument.

The collected data and the analysis thereof will be used to determine whether significant differences exist between the biographical groups.

This study will be concluded by a summary of the results and recommendations to the test organisation regarding the levels of employee engagement in the organisation, and recommendations on the possibilities of further research on this topic.

## CHAPTER 2: LITERATURE REVIEW

### 2.1 Introduction

This chapter focuses on a literature review of what employee engagement entails, followed by measurement instruments.

Both organisational and individual levels of employee engagement have recently received increased attention in the literature work, which originates from the role employee engagement plays in sustaining competitive advantage—which could lead to better-quality business results and successful organisational performance (Attridge, 2009; Gruman & Saks, 2011; Lockwood, 2007)—and sustainable employee engagement (Van Rooy *et al*, 2011). The complex concept of engagement (Lockwood, 2007) was described as “slippery” and “tricky” (Schaufeli & Salanova, 2011) with many different reasons provided to explain the obscurity of the concept.

On the one hand, employee engagement and work engagement is often argued to be the same, although two very different concepts (Kahn, 1990; Saks, 2006). The confusion often leads to these terms being treated as the same concept by most researchers and practitioners (Schaufeli & Salanova, 2011), where the latter stated that employee engagement is a broader concept than work engagement. Employee engagement can include the connection with the employee’s professional or occupational role as well as with their organisation. Work engagement refers to the relationship of an individual or employee with their work.

On the other hand, it is argued that employee engagement, a construct in itself, and the measuring thereof, is not well developed for South African organisations (Nienaber & Martins, 2014). They further established that evidence to this statement is provided by the various definitions provided in the available literature, as well as the substitutable use of psychological states, qualities, behaviours and their qualifications and outcomes (Macey & Schneider, 2008). Furthermore, various theories such as the Exchange theory (Saks, 2006) and Motivation theory (Kahn, 1990; Meyer & Gagné, 2008) also contribute to the explanation of engagement.

These different applications of the concept lead to incoherence in results and outcomes. It is arguable that, the purpose of engagement to create a competitive advantage for both the organisational and individual levels, cannot be improved or optimised.

Competitive advantage was first used by Alderson in 1964. Nienaber and Martins (2014) stated that an organisation attracts the attention of customers by providing them with superior value, outshining the competitors in the field. Value in competitive advantage refers to the ability of an organisation to provide something competitors cannot, or improving on the products they already provide (David, 2013).

Research conducted by Nienaber *et al.* (2002) identifies three distinct dimensions to competitive advantage: Firstly, the arena in which organisations competes with each other; secondly, consumer or customer value, also known as customer capital, and lastly having access to assets. These assets include the employment force of an organisation, often referred to as talent capital or human capital, and structural capital, referring to processes and systems, and lastly, resources to provide customer value in the chosen stadiums.

Amongst the three dimensions mentioned above, employees can be identified as the most important for the value they add to the organisation in terms of their knowledge, abilities, experience, outlooks and behaviours. These competences are to a great extent influenced by the workplace and are more likely to change because of the workplace (Frese, 2008; Van Rooy *et al.*, 2011).

From a strategic management perspective, it is apparent that competitive advantage is a central part in the success of an organisation. It is therefore important for an organisation to realise the connection between the work completed by the employed individual and the strategies encompassed by the organisation, (Cheese *et al.*, 2008; Lockwood, 2007), since it creates the driving force for employee engagement (Lewis & Heckman, 2006; Lockwood, 2007), influencing and facilitating the organisational performance as a whole (Harter *et al.*, 2002; Lockwood, 2007).

The vagueness related to the concept of “engagement” endangers the viability of a competitive advantage and consequently influences organisational performance, as noted in business results. Drawing on the framework of Macey and Schneider (2008), as adapted, and considering the comments on the framework, the designed instrument must reflect on engagement on both individual and organisational level, specifically in a South African environment. This research aims to contribute to the clarification of the concept ‘engagement’, on both organisational and individual levels, and especially contribute to its application in a South African environment. Both academics and practitioners will benefit from this research in their own way. Academics will benefit by receiving a measure of a clear construct, whereas practitioners will be offered a clear general basis and mechanism for a better understanding and management of employee engagement.

## **2.2 Background for the development of a measurement instrument/scale for measuring Employee Engagement in a South African context**

The theoretical perspective of Employee Engagement as foundation for the development of an employee engagement instrument for the South African context is discussed.

Upon their research Van Rooy *et al.* (2011) commented that engagement is still a new and underdeveloped concept in need of more research to fully understand all its precursors, process mechanisms, components and aims. According to Frese (2008) many authors have contributed to the concept of engagement using diverse labels, indicating that the concept itself has no concrete meaning and that clarification is still required. Meanwhile Saks (2008) concluded that current methods, theories and measurement devices still need some further development, alteration and integration. Robertson and Cooper (2010) support the view of Saks and that is the reason for further research to be done.

Authors, on the topic of engagement, appear to share a unanimous view that engagement is a concept with many levels and dimensions of influence (Frese, 2008; Kahn, 1990; Macey & Schneider, 2008; Parker & Griffin, 2011; Robertson & Cooper, 2010; Van Rooy *et al.*, 2011); therefore contributing to the complexity of the construct.

Agreement among authors also exist with regards to beliefs of engagement that moderately overlap with constructs which are employee-focused (Employee Outlook, 2012; Endres & Mancheno-Smoak, 2008; Frese, 2008; Juniper, 2012; Kahn, 1990; Newman & Harrison, 2008; Parker & Griffin, 2011; Robertson & Cooper, 2010); therefore, threatening discriminant validity (Saks, 2008; Harter & Schmidt, 2008; Newman & Harrison, 2008). However, the study by Christian *et al.* (2011) indicates discriminant validity in the case of the Macey and Schneider (2008) framework. Authors however, disagree on the dimensions thereof and/or the correct terminology to address these dimensions. (Dalal *et al.*, 2008; Frese, 2008; Griffin *et al.*, 2008; Hirschfeld & Thomas, 2008; Juniper, 2012; Macey & Schneider, 2008; Robertson & Cooper, 2010; Saks, 2008; Schaufeli & Salanova, 2011) It can be debated whether being in a psychologically positive state and positive personal behaviour are in fact due to the influences of engagement, or an individual's personal characteristics, to change or improve an unsatisfactory situation (Frese, 2008; Parker & Griffin, 2011).

Nienaber and Martins (2014) stated that with regards to personal engagement, Kahn (1990) expressed that individuals prefer psychological circumstances where they can display their real identities, ideas and emotions, and personal engagement is to engage personal energy into labour, whether physical, cognitive or emotional. By citing various authors, Kahn (1990) supports his views on personal engagement and deems personal engagement as underlying effort, involvement, flow, mindfulness and intrinsic motivation. Kahn (1990) further cites authors who affirm that self-expression inspires imagination, the use of personal voice emotional manifestation, legitimacy, non-defensive communication, liveliness and virtuous behaviour.

Frese (2008) sees engagement, personal initiative, pro-activeness, taking charge and voice as very similar concepts, and does not differentiate between them. He does however state that there is a need to develop an active performance concept (proactive personality and personal initiative behaviour), which includes engagement, and the effect (positive affectivity) it has on a changing work environment.

According to Masson, Royal, Agnew, and Fine (2008) engagement concepts used in the work place by consultants included creating a connection between both

organisational and, in combination, affective commitment (having enough pride in the organisation to recommend it as an employer), prolonged loyalty (remaining with the organisation with the intent of continual commitment), and discretionary effort (feeling motivated and inspired by the organisation to do more than is expected of you). Academic literature refers to engagement mainly on work level. Saks (2006) addresses both these views.

Nienaber and Martins (2014) came to the conclusion that despite these differences, several instruments for measuring the different dimensions of engagement are available, whether provided by academics or practitioners. Some of the instruments provided by academics focus on state engagement, consequently the psychological aspect of engagement, as suggested by Kahn (1990) and divulged by authors such as Rothman and Rothman (2010), for example, the UWES. Other instruments offered by Saks (2006) and Harter *et al.* (2002), focus on the organisational level and are more often used by practitioners such as Gallup.

Attridge (2009) noted that most of these instruments available for measuring engagement are on individual level. Van Rooy *et al.* (2011) however, identified how these measuring instruments fail for their inability to identify functional insights and solutions. This notion is supported by Masson *et al.* (2008). Based on these findings, they further suggest that engagement measurement instruments should be able to measure a variety of influences, posed in a meaningful manner that is easily comprehensible and applicable (Van Rooy *et al.*, 2011), while being reliable and valid.

According to Rothmann and Rothmann (2010), the UWES instrument is not reliable enough to be an optimal functioning system. They suggest further research to improve this instrument in terms of physical, emotional and cognitive components of engagement. To highlight these findings, it is also pointed out that the construct of engagement is not fully hypothesised, and therefore cannot be fully or successfully put into effect. Many authors in the field therefore call for further research to be conducted.

### **2.3 Employee engagement measurement instruments**

Nienaber and Martins (2014) developed an employee measurement instrument for the South African context. This research and the developed scale measurement instrument is relatively new and the validity and reliability need to be confirmed. The result of their research serves as the basis for this research to test and confirm the measurement scale's reliability and validity.

According to Nienaber and Martins (2014), comprehensive research studies were conducted between 1990 and 2013, focusing on engagement on both organisational and individual levels. The research can be grouped as conceptual papers; research focusing on the developing and validating of engagement measurement instruments; research focuses mainly on the validation of engagement measuring instruments; and studies focusing on testing engagement and related concepts.

Kahn (1990) and Macey and Schneider (2008) are examples of researchers who focused on conceptual papers regarding engagement.

Kahn (1990), sought to conceptualise personal engagement by exploring the working conditions in which people individually engage and disengage. The dimensions identified through in-depth interviews and studies are meaningfulness, psychological safety, and psychological availability. With regards to meaningfulness, task and role characteristics, and work interactions were measured. Regarding psychological safety, interpersonal relationships, group and intergroup dynamics, management style and process as well as organisational norms were measured. Concerning psychological viability, physical and emotional energy, insecurity and outside life, were measured. These conditions aid to explain the variance between people offering or withhold aspects of themselves in their work roles.

Macey and Schneider (2008), developed a theoretical framework to measure trait engagement, state engagement, behavioural engagement, trust, transformational leadership and work attributes. Trait engagement, or a positive view of life and work, includes aspects such as a proactive personality, autotelic personality, positive effect and conscientiousness. State engagement or feelings of energy and absorption,

includes aspects such as satisfaction, involvement, commitment and empowerment. Regarding behavioural engagement, organisational citizenship behaviour, pro-active or personal initiative, role expansion and adaption were measured, whilst concerning work attributes, aspects of variety, challenge and autonomy were measured. Their key findings relate to propositions about the effects of work attributes and leadership as the main effects on state and behavioural engagement, and as moderators of the relationships among the three facets of engagement. Thoughts on the measurement of the three facets of engagement and potential antecedents are expressed. Schaufeli *et al.* (2002) and (2006), May *et al* (2014) and Barnes and Collier (2013) also studied the development and validating of engagement measurement instruments.

According to Schaufeli *et al.* (2002) and (2006), UWES identified three sub-dimensions of engagement namely: Vigour, dedication and absorption. Characteristics of engagement were more persistent in the affective–cognitive psychological state. The 17-item scale of UWES consists of vigour (six items), dedication (five items) and absorption (six items). The 9-item scale consisting of vigour (three items), dedication (three items), and absorption (three items) were analysed through Confirmatory factor analysis (CFA) and a multiple group Business unit. The key findings confirmed the validity and reliability of UWES as a representative instrument of engagement.

May *et al.* (2004), aimed to test the conceptualisation of engagement at work (Kahn, 1990) by examining the determinants and mediating effects of the three psychological conditions of meaningfulness, safety and availability. The dimensions tested included psychological dimensions consisting of engagement which comprised of thirteen items, meaningfulness (six items), safety (three items) and availability (five items). Other dimensions tested were job enrichment (fifteen items), work role fit (four items), rewarding co-worker (ten items) and supportive supervision relations (ten items), co-worker norm adherence (three items), resources (eight items), self-consciousness (three items) and outside activities (eleven items). The test was conducted by means of a questionnaire and path analysis. It was concluded that meaningfulness had the strongest relation to engagement among the three

psychological conditions. Job enrichment and work role fit are partially facilitated by psychological safety. A path-analytic framework of engagement was developed.

Barnes and Collier (2013) sought to contribute to the literature on work engagement by study antecedents, outcomes and measurement, especially in a services environment. They used existing measures to develop a 42-item instrument, comprising work engagement, service climate (five items), job satisfaction (four items), affective commitment and adaptability (five items), and career commitment (six items). The test was conducted by means of a questionnaire and structural equation modelling. Empirical evidence showed that service climate, job satisfaction, and affective commitment influence work engagement. Work engagement is conceptualised as a multi-dimensional higher order construct which exhibits a superior fit compared to a simple first order conceptualisation.

Various researchers conducted studies where they validated engagement measurement instruments. Examples of these research results are discussed below.

Storm and Rothman (2003) conducted a self-report questionnaire to assess work engagement, on an individual level, by using the UWES work engagement scale, consisting of twenty-four items focusing on vigour, dedication and absorption. The test was conducting by way of a structural equation model, which confirms the 3-factor model of work engagement consisting of vigour, dedication and absorption.

Balducci, Fraccaroli and Schaufeli (2010) aimed to validate the 9-factor UWES in an Italian environment. The factors tested were vigour, dedication and absorption by means of a multiple-group CFA. Their key finding confirmed that the Italian version of the UWES-9 was consistent with the original Dutch version.

Christian *et al.* (2011) sought to test the Macey and Schneider (2008) model. The following dimensions were tested by way of meta-analytic path modelling: Autonomy, task variety, task significance, feedback, transformational leadership, conscientiousness, positive affect, work engagement, task performance, and contextual performance. The path model of the authors suggests that task variety

and task significance seem to be related to engagement, and they found provisional evidence that leadership is related to work engagement, which is in turn related to job performance.

Mills *et al.* (2012), also wanted to validate the UWES 17-item and 9-item scales. The dimensions measured were vigour, dedication and absorption. This was done by an EFA and a CFA. Their analysis supported a multifactor conceptualisation of the construct.

Viljavec *et al.* (2012), investigated the validity of UWES and the May *et al.* (2004) scale measuring engagement. The UWES factors of vigour, dedication and absorption, and the cognitive, emotional and physical factors of May *et al.* (2004) were measured. This was done by way of a questionnaire and a CFA and structural equation modelling. Some evidence for convergent, discriminatory and predictive validity was found for both scales. Neither showed discriminant validity to job satisfaction. The three UWES factors performed slightly better than the three May *et al.* (2004) measured. Viljavec *et al.* (2012), came to the conclusion that neither measure should be considered an adequate measure of job engagement.

Studies, testing engagement and related concepts, were done by various researchers. Examples of these research results are discussed below.

Laschinger and Leiter (2006), tested a theoretical model of professional nurses' work environments, linking conditions for professional nursing practice to burnout, engagement and nurses' reports of adverse patient events. The factors tested were strong leadership (four items), RN/MD collaboration (nine items), policy involvement (three items), staffing adequacy (four items), nursing model of care (eight items), emotional exhaustion (nine items), depersonalisation (five items), personal accomplishment (eight items) and adverse events. The methods used conducting this test was a questionnaire and structural equation modelling. They found that burnout partially mediates the relationship between work-life and adverse events. There was higher level of engagement and ultimately safer patient care in a work environment with more support for professional practice.

Salanova *et al.* (2005) tested the mediating role of service climate between the antecedents (organisational resources and work engagement) and employee performance and customer loyalty. The dimensions included organisational resources (training, autonomy, and technology) (eleven items), service climate (four items), work engagement (the UWES vigour, dedication and absorption) (seventeen items), employee performance (six items) and customer loyalty (three items). The test was conducted by means of structural equation modelling. Salanova *et al.* (2005) support a full mediation model in which organisational resources and work engagement predict service climate, which in turn predicts employee performance and customer loyalty.

Hakanen *et al.* (2006), tested a model with two parallel processes of work-related wellbeing among teachers; namely: An energetic process, and a motivational process. Work engagement (UWES factors of vigour, dedication and absorption – seventeen items), burnout and ill-health (ten items), job demands and resources (eight dimensions, twenty items) and organisational commitment (two items), were tested by means of a questionnaire and structural equation modelling. They established that burnout mediates the effect of high job demands on ill health, work engagement mediates the effects of job resources on organisational commitment and burnout mediates the effects of a lack of resources on low work engagement.

Llorenset *al.* (2006) sought to test the job-demands-resources model simultaneously in two countries by using different occupational samples. The dimensions tested were work engagement (UWES 17-items scale), quantitative overload (three items), emotional overload (three items), job control (five items), social support (five items), performance feedback (three items), organisational commitment (four items) and burnout (nine items). This was based on the Spanish questionnaire. The tests were conducted using a questionnaire and structural equation modelling. They partially support the hypothesis and found that burnout partially mediates the effect of job demands on organisational commitment, and work engagement partially mediates the effect of job resources on organisational commitment.

Hallberg *et al.* (2007), aimed to examine the effects of type 'A' behaviour patterns on burnout and work engagement. The dimensions tested were autonomy, workload, achievement striving, irritability or impatience, work engagement (UWES (nine items)), emotional exhaustion or burnout, and cynicism or burnout. The methods used for the examination were a questionnaire and hierarchical regression analysis. They found that type behaviour and work engagement share thirteen percent of common variance and there is no significant interactions between type 'A' and workload.

According to Nienaber and Martins (2014) the engagement instrument was constructed with due regard to existing instruments measuring the dimensions comprising the construct. The theoretical summary above highlights the different purposes of measuring engagement, the dimensions used, the method/analysis and the key findings. It is apparent from this summary that the purposes of measurement vary greatly, although many studies focus on some aspect(s) of engagement; that different constructs are applied when measuring engagement. Different dimensions are measured and the key findings differ due to the methods applied to analyse the data as well as the different contexts in which the assessments were conducted. In a number of instances Structural Equation Modelling was used to confirm the theoretical models developed. A remarkable observation is, in most instances, existing questionnaires or measuring instruments were combined to measure employee engagement.

## **2.4 Chapter Summary**

It is apparent from the literature study that there are many approaches to engagement measurement scales. The available measurement instruments were mostly designed to measure either on an individual level (Rothman & Rothman, 2010) or on the organisational level (Nienaber & Martins, 2014). There are no consensus in the literature on the dimensions comprising engagement and therefore Nienaber and Martin conducted the research to develop a scale measurement instrument which test multiple dimensions and levels.

The researchers Nienaber and Martins (2014) focused specifically on developing a scale measuring instrument which will measure employee engagement on an organisational level and an individual level within a South African context.

The next chapter will focus on the compilation of the instrument and the various propositions that were addressed. The instrument will be tested to confirm the validity and reliability, using EFA for validity and Cronbach Alpha for reliability.

The organisation used for the study represents a typical demographically diverse South African company. The researcher strived to develop an instrument which can be used in a South African context. The selected organisation is a representative choice for conducting an initial item reduction study.

## CHAPTER 3: RESEARCH DESIGN AND METHODOLOGY

### 3.1 Introduction

In this chapter, a discussion on the research design and methodology used to prepare for testing the instrument to measure employee engagement in a South African context for reliability and initial validation follows.

Determining the reliability and factorial validity of the newly developed employee engagement measurement instrument are the primary objectives of this study. The instrument will be tested in a South African organisation that reflects the distinctive profile of South African employees.

The organisation selected for this research, is listed on the JSE. It is listed on the main board of the JSE under Consumer, Food and Beverages, Food Producers.

The problem statement is revisited to ensure that the research approach addresses the problem statement, which is summarised as:

- To contribute towards testing the newly developed instrument, measuring employee engagement in a typical South African organisation, for reliability and validity
  - using Cronbach Alpha to test the instrument for reliability; and
  - using Exploratory Factor Analysis (EFA) to test for validity
- A secondary analysis of the collected data were done to measure employee engagement in the organisation for comparison between:
  - Various Business units; and
  - various biographical groups
- The analysis of variance (ANOVA) was applied to determine significant differences between the various biographical groupings.

The research design and methodology process was as follows:

- Define the methodology: Positivist
- Research design: Methodological
- Method:

- Define the population
- Survey
- Used the instrument for data collection
- Data analysis
- Pre-testing the research instrument and adapting accordingly
- Process of electronic data collection via the organisation's intranet
- Data analysis and interpretation
- Limitations to the study
- Test for reliability
- Test for validity
- Determine the current status of employee engagement in the organisation

### **3.2 Research methodology/paradigm**

A positivist methodology was followed, since this study focused on the validation of a newly developed measuring instrument. A positivist methodology relies heavily on experimental and manipulative methods with the use of quantitative methods (Cresswell, 1998). Data were collected by using the developed instrument, and statistically analysed to determine Cronbach Alpha and factorial validity.

Mouton (2008) defined a methodological study as studies aimed at developing new methods such as questionnaires, scales and tests of data collection and sometimes also validating a newly developed instrument through a pilot study.

Typical applications of a methodological study are validating existing scales and test by means of item -, factor -, and discriminant analytical studies.

EFA as applied in this study aims at developing a factor structure from the empirical data. Methodological studies are usually done in parallel with empirical studies such as surveys.

### **3.3 Research design**

As described in Chapter 1.3, this research is based on the Hinkin scale development process, with specific focus on steps two to four; being questionnaire administration, initial item reduction and EFA. The research was designed around these principles and focused on data collection by using the developed measurement scale or instrument for statistical analysis purposes.

Fowler (2009) defines the purpose of a survey as to produce statistics which is a quantitative or numerical description of some aspects of the study population. Not all surveys require that a small sample of the population be selected, as the entire population is easily accessible which eliminates several sources of error (Andres, 2012).

The key research questions were twofold; namely to obtain data for analytical and statistical analysis to test the measurement scale for validity and reliability, and to determine the level of employee engagement in the organisation.

### **3.4 Population and sample**

#### **3.4.1 Population**

As described in Chapter 1, the selected organisation's employee profile is representative of the national demographics of South Africa. Black Africans represent eighty percent of the South African population, whereas seventy-nine percent of the employees of the selected organisation are Black Africans. The white population of South Africa and the organisation are equally represented at nine percent. There were slight variances of nine percent versus eleven percent in the Coloured population, and two percent versus one percent in the Indian/Asian population.

Permanent employees of the organisation were approached to constitute the population for the research study, with the limitation that they had to be linked to a company computer linked to the intranet of the company. The survey was electronically based, hence the imperative need for computer access to the network and intranet of the organisation.

The demographic composition of the staff employed by the organisation at the time of the survey was as follows:

- The number of employees at the time of the study was 12,423.
- 7,751 of the employees were permanent employees, and the remaining 4,672 employees were contracted and therefore excluded from the study.
- 5,627 of the permanent employees were considered unskilled, labour workers and did not have access to computers, and were therefore excluded from the study. If any of these employees had access to a computer on the intranet of the organisation, they would have received a letter of invitation to participate.

Only 2,124 employees of the potential population met the criteria mentioned previously. They were suitably skilled or semi-skilled candidates for the survey, with access to computers.

- The employee figures of the organisation concluded at the time of the survey is set out in Table 3.1 below.

**Table 3.1: Employee composition as per date of survey**

Occupational level	Male					Female					TOTAL	Contractors	Survey responses	Responses as % of Total
	Black African	Indian / Asian	Coloured	White	Sub-total	Black African	Indian / Asian	Coloured	White	Sub-total				
Top Management (Exco, COO's, Director)	1			18	19				1	1	20	4672	19	95%
Executive Management (Plant, Farms, etc.)		2	1	27	30			2	2	4	34		30	88%
Managers / Professionals	5	4	5	85	99	2	2	3	22	29	128		128	100%
Supervisors / Junior management / foremen	97	30	33	265	425	25	6	24	61	116	541		65	12%
Semi-skilled employees	716	22	150	69	957	216	16	95	117	444	1401		156	11%
Unskilled employees	2392	1	203	12	2608	2686	1	325	7	3019	5627		1	
<b>Total employees</b>	<b>3211</b>	<b>59</b>	<b>392</b>	<b>476</b>	<b>4138</b>	<b>2929</b>	<b>25</b>	<b>449</b>	<b>210</b>	<b>3613</b>	<b>7751</b>	<b>4672</b>	<b>399</b>	
<b>Potential employee component to be targeted for this survey</b>	<b>819</b>	<b>58</b>	<b>189</b>	<b>464</b>	<b>1530</b>	<b>243</b>	<b>24</b>	<b>124</b>	<b>203</b>	<b>594</b>	<b>2124</b>			

Source: Compiled from company data

Table 3.2 displays the job categories in the organisation as associated with different business groups.

**Table 3.2: Distribution of categorised jobs in the Business units**

Distribution of categorised jobs in the Business units							
Business unit	Job Categories						
	Management	Professional	Technical advisor	Sales and Marketing	Farms Operations	Plant Operations	Administrative
Group Headquarters (HQ)	x						x
Farms Division HQ	x	x					x
Business unit A	x	x		x	x	x	x
Business unit B	x	x		x	x	x	x
Business unit C	x	x	x	x		x	x
Business unit D	x	x					x
Business unit E	x	x	x	x	x		x
Business unit F	x	x	x	x	x		x

Source: Compiled from company data

### 3.4.2 Population sample

The envisaged population, as previously discussed, was formally invited by means of a letter of invitation to voluntarily and anonymously take part in the survey.

Hinkin (1998:111) suggested a norm of 150 usable responses for EFA and 200 for CFA. Burns and Burns (2008:445) suggested a norm of 5:1 which implies that had the questionnaire existed of seventy-three questions or statements, five times the number of useful questionnaires was required to adhere to a statistical viable sample size. The complete questionnaire consisted of eighty-one questions of which eight were biographical information and seventy-three were statements.

Costello and Osborne (2005) caution researchers to remember that EFA is a “large-sample” procedure and can therefore easily be generalised; or, if the sample is too small, it is unlikely that results can be replicated. In other words, more is better. The norm of the bigger the response the better, urged the researcher to opt for the norm

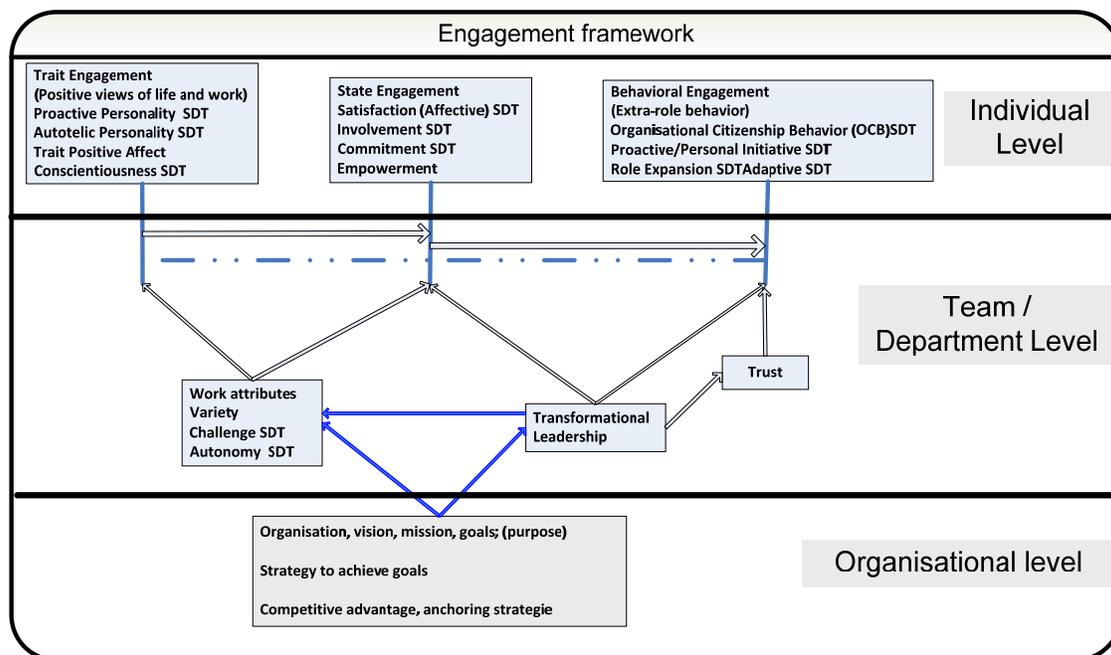
of 5:1; therefore, 365 useful questionnaire responses were needed for this survey to comply.

### 3.5 The research instrument and pre-testing

#### 3.5.1 The research instrument

The scale measuring employee engagement as researched and developed by Nienaber and Martins (2014) was used to collect data.

The instrument was developed to address and measure engagement on three levels namely: Individual-, team/department- and organisational level.



**Figure 3.1: The engagement framework as proposed by Nienaber and Martins (2014)**

The engagement framework as adapted from Macey and Schneider by Nienaber en Martins (2014) clearly displays the three distinct levels with the seven components and the various engagement components.

Nienaber and Martins (2014) developed the initial instrument or questionnaire for measuring employee engagement. This instrument was divided into two segments:

- Section one consisted of ten questions pertaining to collecting the biographical/demographic information of a worker, which included qualifications, experience and tenure.
- Section two used a 5-point Likert scale (Hinkin, 1998) attempting to evoke a response. Statements about engagement were presented, which required a response. A total of seventy-three statements were presented of which fifty pertained to individual level engagement, twelve to team or departmental level engagement and ten to organisational level engagement.

According to Stone, as referred to by Hinkin (1998), it is vital that the scale used by a researcher during a survey questionnaire must produce adequate variance among the participants of the study for consequent statistical analysis afterwards. Cook, Hepworth and Warr (1981) considers the 5-point Likert scale as the most frequent scale used when conducting a survey questionnaire. Kerlinger and Hinkin are also in agreement that it would be the most useful scale when studying behavioural responses. (Hinkin, 1998). Although scales of seven and nine points have been used by researchers, the 5-point scale was introduced as the method of measure.

The seventy-three questions in the survey were formulated and organised in such a manner that fourteen diverse propositions or dimensions were taken into account. A summary of the various dimensions or propositions, which were used to compile the scale measurement instrument (Nienaber & Martins, 2014) as well as the level of engagement tested, follows.

**Proposition 1: Satisfaction**

The dimension of satisfaction entails aspects, for example the energy level at work, and whether employees find the work inspiring and enjoyable. Sub-dimensions measured are for example the feeling of energy and enthusiasm. Typical items measuring this dimension are whether the employee is energetic and feels enthusiastic about their work. Engagement is measured at individual level.

**Proposition 2: Organisational commitment**

Organisational commitment consists of three sub-dimensions: Energy to support the organisation, feeling pride as a member of the organisation, and personal identification with the organisation. A typical item addressing this dimension is whether the employee feels committed to the organisation. The brand of the organisation is well known in the market and the employee is excited by the vision and mission of the organisation. Engagement is measured at individual level.

**Proposition 3: Job involvement**

Job involvement concentrates on two sub-dimensions, being task engagement and job commitment. Typical items addressing this dimension are whether the job role is clearly defined, and whether the employee enjoys their work. Engagement is measured at individual level.

**Proposition 4: Feelings of empowerment**

This dimension focuses on necessary knowledge and skills needed in the work environment and whether the employee possesses the necessary knowledge and skills to perform their work. Engagement is measured at individual level.

**Proposition 5: Job and work settings**

Job and work settings concentrate on feelings of persistence, vigour, energy and dedication. The significance of their job, and a sentiment that the work provides for work-life balance are typical items measuring this aspect. Engagement is measured at individual level.

**Proposition 6: Feelings regarding involvement**

This dimension involves self-esteem, self-efficiency and self-identity. Typical items measuring this dimension are whether the skills and abilities of the employee are utilised. The individual employees accept accountability for their performance in the organisation. Engagement is measured at organisational level.

**Proposition 7: Engagement behaviours**

Innovative behaviours and initiative are measured in this dimension. Typical items measuring this dimension are whether the organisation provides a stimulating environment, and whether initiative is encouraged. Engagement is measured at organisational level.

**Proposition 8: Engagement behaviour actions**

The prominence in this dimension is on behaviour that relates to work engagement. Typical items measuring this dimension are measured by items determining whether the employee is inspired and devoted to their work and wake up positively going to work. Engagement is measured at individual level.

**Proposition 9: Role expansion behaviours**

This dimension focuses on aspects such as job related opportunities and challenges. Typical items measuring this dimension include perseverance—even when experiencing difficulties—and sensing that client service exceeds expectations. Engagement is measured at individual level.

**Proposition 10: Behavioural engagement**

Behavioural engagement focuses on teamwork. Typical measuring items would include—even when experiencing difficulties—whether the team will finalise a task and adapts to changes. Engagement is measured at both organisational and individual level.

**Proposition 11: Engagement as a disposition**

Engagement as a disposition has three sub-dimensions being measured, being conscientiousness, pro-active personality and an autotelic personality. Typical measuring items would include whether employees work methodically; view their mistakes as a learning opportunity, and are devoted to their work. Engagement is measured both at organisational- and individual level.

### **Proposition 12: Engagement outputs**

Productivity, customer satisfaction, revenues and leadership correspond to this dimension. Typical items measuring this dimension constitute whether employees identify opportunities for their customers, and whether their immediate manager inspires the team. Engagement is measured at organisational level.

### **Proposition 13: Feelings of trust**

The trust relationship between managers, subordinates and colleagues are measured in this dimension. Engagement is measured at individual level.

### **Proposition 14: Personal and environment fit issues on engagement**

Team goal achievement, organisational conditions, organisational strategy and performance are measured in this dimension. Sub-dimensions are goal achievement and organisational conditions. Typical items measuring this dimension include whether the team continuously strives to improve their performance in line with the business objectives, and whether managers accept responsibility for their respective Business units. Engagement is measured at both team- and organisational level.

It appears that some of the items measure more than one proposition, which will be clarified by factor analysis and item analysis when validating the instrument.

#### **3.5.2 Pre-testing**

A number of preparatory steps were implemented prior to the distribution of the questionnaire. A pilot test is a sure way to examine the level of comprehensibility of the questionnaire and the possible interpretation of questions. A pilot test was conducted with ten participants of the envisaged population for this specific exploratory purpose. Cost was managed by including only Gauteng branches in the pre-test phase.

Management of several operating units were contacted directly to nominate employees for the pre-test, emphasising that nominations had to be at random within the befitting criteria. The criteria focused on suitably representation of the job

categories and job grades. Table 3.3 below represents the distribution of employees used during pre-testing to evaluate the instrument before data collection commenced.

**Table 3.3: Participants in the pilot testing phase per job category**

Distribution of participants in the pilot test per job category per Business unit							
Business unit	Job Categories						
	Management	Professional	Technical advisor	Sales and Marketing	Farms Operations	Plant Operations	Administrative
Business unit A	1	1		1		2	1
Business unit B				1			
Business unit C			1	1		1	

*Source:* Compiled from pre-test results

**Table 3.4: Participants in the pilot testing phase per job grade**

Distribution of participants in the pilot test per job grade per Business unit					
Business unit	Job grade				
	Top management	Executive management	Manager / Professional	Supervisor / Junior manager / Foreman	Employee / Semi-skilled
Business unit A		1	1	3	1
Business unit B			1		
Business unit C			1	1	1

*Source:* Compiled from pre-test results

The participants in the pre-testing phase were a typical representation of the participants in the survey and will consequently provide valuable input to the interpretation of the questions.

The participants were subjected to an orientation session before the pilot group was introduced to the instrument, explaining the purpose of the study and a concise, but detailed explanation on the completion of the test. The questionnaire (Annexure A) was subsequently presented to be completed, where after the participants gave input on the context and content in order to amend the final questionnaire.

Although the participants of the pre-test were requested to refrain from taking part in the actual test—and all participants agreeing to this request—no measures were implemented to guarantee their exclusion.

The feedback from the participants resulted in the following changes in the questionnaire:

**Table 3.5: Tabular comparison of changes made to the original questionnaire**

Question number:	Original question:	Question changed to:
Question 6	Which <b>Department</b> do you work in?	Which <b>Business unit</b> do you work in?
Question 8	Are you affiliated to a union?	Delete question completely. Employees are not comfortable to answer this question
Question 9	I can describe the relationship between the organisation and the Union I am affiliated to as:	Delete question completely
Question 10	Below Std 6 (Grade 8)	Std 6 (Grade 8) and below
Section B	Proposition 1 - 14	Remove proposition descriptions from questionnaire as it can influence the reply to the various questions
Question 12	I feel <b>enthusiastic</b> about my work	I feel <b>positive</b> about my work
Question 16	People in my <b>team</b> frequently go above and beyond the requirements of the job	People in my <b>Business unit</b> frequently go above and beyond the requirements of the job
Question 30	Question added	If I do not have the required skills, my Business unit provides the necessary training
Question 35	I feel my work provides for work - life balance	I feel my work provides for balance between work and life
Question 44	When I get up in the morning, I feel like going to work	When I get up in the morning, I am eager to go to work
Question 63	My immediate manager inspires people in my <b>team</b>	My immediate manager inspires people in my <b>Business unit</b>
Question 68	I trust senior management	I trust my manager's manager

(Table 3.5 cont.)

Question number:	Original question:	Question changed to:
Question 74	I have the system support I need to do my job effectively	I have the support of my team members to do my job effectively
Question	Question added	I have the support from my immediate manager to do my job effectively
Question 79	My immediate manager gives me feedback that helps me to improve my performance	My immediate manager gives me regular feedback that helps me to improve my performance
Question 82	I am satisfied with my salary package if I compare it to those of similar positions in my company	Question deleted completely. Salary packages are confidential and employees do not know what their colleagues earn

Source: Compiled from feedback data

### 3.5.3 Final questionnaire/Survey Instrument

Amendments made to the instrument were a result of the pilot test, based on the perspective of the researcher as well as the opinions and comments of the participants.

The final questionnaire consisted of:

- Section one: eight biographical questions
- Section two: seventy-three statements based on a five-point Likert scale (Hinkin, 1998) focused on evoking a response

An independent research company, responsible for the administration and monitoring of the survey, uploaded the final questionnaire (Annexure B) on an electronic web-based system. This independent research company was also responsible for monitoring the responses for possible inclusion in the statistical analysis. The data were analysed with the assistance of a qualified statistician of UNISA by means of the Statistical Package for the Social Sciences (SPSS).

### **3.6 Procedure for data collection**

As mentioned an independent research company was appointed to administer the data collection. This company uploaded the final questionnaire on a web-based platform made available for the collection of the data, linking it to the intranet of the organisation. All employees of the organisation who had access to computers linked to the intranet of the organisation could access the link to participate in the survey. By contracting an independent research company contributed to warrant confidentiality and anonymity of any employees participating in the survey. No personal information was requested from participants.

All employees received a formal letter of invitation from the Human Resources (HR) director (Annexure C) by e-mail *via* the global mailing list of the organisation. The letter of invitation was also posted on the intranet page of the organisation. Confidentiality and anonymity were guaranteed, with the option that any participant might withdraw at any stage of the survey. The data collecting process complied throughout with the ethical principles prescribed by the ethics committee of UNISA. The ethical clearance certificate is attached as Annexure D.

The survey company created an internet link for an easy accessible, user-friendly portal to the questionnaire. Both the letter of invitation and the link to the questionnaire were published on all the computers linked to the intranet of the organisation. Upon opening the link, participants were once again reassured that participation was voluntary and confidential, and reminded of the option to withdraw at any stage of the survey. Participants were reassured that should a sub-group represent less than five employees; the demographic data will not be revealed to protect the confidentiality of the respondents. It is assumed that participating in the survey confirms consent by the participants. Access to the survey was available to all participants for the period 17 December 2013 to 31 January 2014, collecting a total of 399 completed questionnaires. The link was disabled after the cut-off date, and the statistical analysis commenced.

### **3.7 Data analysis and interpretation**

The collected data were analysed with the assistance of a qualified statistician from UNISA using the SPSS version 23 software application.

Commencing the analysis the factors regarding individual statements/questions in the questionnaire must be identified. An interim analysis of the correlations between variables can be examined prior to conducting the factor analysis. According to Kim and Mueller as referenced by Hinkin (1998) any variable that correlates at less than 0.4 with all other variables may be deleted from the analysis.

The EFA would most likely present one or more constructs/factors from the statements analysed. The number of common variance clarified by a factor is known as the Eigenvalue (Burns & Burns, 2008). The number of factors to be retained depends on underlying theory and quantitative results (Hinkin, 1998). A strong theoretical justification for determining the number of factors to be retained and the examination of item loadings on latent factors provides a confirmation of expectations (Hinkin, 1998). Factors in consideration for analysis with an Eigenvalue greater than one, is identified as Kaiser's rule (Burns & Burns, 2008). The Kaiser principle and the Scree test explained below were applied to support the theoretical distinctions.

According to Burns and Burns (2008) an alternative method of determining valid factors is suggested by Cattell. The Scree plot is a method to calculate the amount of valid constructs/factors using a graph to plot Eigenvalues. At the level the graph starts to balance out, the supplementary factors explain less variance than a single variable. Acceptable factors can therefore be said to exist on or above where the plot line levels out (Burns & Burns, 2008).

The following criteria were applied to determine the number of factors:

- Cumulative percentage explained by the factors > 60%
- The Kaiser Guttman rule (Eigenvalues greater than one)
- Look for a noteworthy decline in the Scree plot

In order to determine if an EFA would be useful, a Bartlett's test for sphericity can be conducted. If only weak connections exist between separate variables in a factor analysis, the analysis would be a worthless pursuit. To determine if an EFA would be applicable, the Kaiser-Meyer-Olkin (KMO) value can be determined to provide a measure. For an EFA to be a usable measure, a value of at least 0.5 or greater must be reached on a scale between zero and one (Wiid & Diggines, 2013).

According to the SPSS, the KMO differs from the Bartlett's test, since the KMO is expected to give a value above 0.5 to be adequate. Bartlett's test should give a probability value of 0.05 or less. Therefore, it is concluded that connections exist between variables, which will be sufficient evidence for the researcher to continue with the factor analysis and to identify underlying factors; however, it would be useless to continue with the factor analysis where neither of the tests measurements is met (Burns & Burns, 2008).

Costello and Osborne (2005) conducted a study regarding best practices by using EFA. They concluded that it is still most appropriate to apply EFA in exploring a data set.

### **3.8 Limitations of the study**

The survey were conducted electronically in the selected organisation and only employees with access to company computers linked to the intranet of the organisation could participate in the survey, hence participation was limited to an estimated 2,124 employees of the 7,751 permanent employees of the organisation. It was however anticipated that the results acquired will be adequate to do the required statistical analysis to determine the reliability and validity of the instrument as per the research objective.

### **3.9 Testing the reliability of the dimensions or constructs in the questionnaire**

Reliability can be defined as a reference on the consistency an instrument of measurement is applied. It can also be stated as the extent to which it is applied

every time it is used in terms of conditions and the type of subjects used (Wiid & Diggines, 2013).

Price and Mueller as referred to by Hinkin (1998), stated that reliability can be calculated in a number of ways, but the most commonly accepted measure in field studies is internal consistency reliability, using Cronbach Alpha.

An item analysis by means of the Cronbach Alpha will be used to assess the reliability of the different dimensions/factors in the employee engagement instrument (Wiid & Diggines, 2013).

In order to determine the sufficiency of a measurement instrument, two closely associated factors are of critical importance, being validity and reliability. Any instrument must be proven reliable to be considered valid, although the reliability of an instrument is not reliant upon the validity of the instrument.

As mentioned previously, reliability of an instrument refers to the ability of the instrument to be consistently applied. Objective measurements of the reliability of the instrument can be done by means of Cronbach Alpha. It is the most commonly used approach since it requires only one test to be administered as opposed to many other “test retest reliability estimates”. Using Cronbach Alpha has an additional advantage, since the measurement consists of a multiple item measurement for a specific construct. Both will therefore be tested in this research.

The overall Cronbach Alpha value for reliability can be interpreted as follows:

**Table 3.6 Interpretation of Cronbach Alpha values**

Interpretation of Cronbach Alpha values		
Unacceptable reliability	Acceptable reliability	Good reliability
<b>&lt;0.6</b>	<b>0.6 - 0.8</b>	<b>&gt;0.8</b>

*Source:* Compiled using information from Wiid and Diggines, (2013)

Some authors use a cut-off point of 0.7 for acceptable reliability, which was suggested by Nunnally (1978) (Wiid & Diggines, 2013).

### 3.10 Testing for Validity

According to the “Scale Development Process” (Hinkin, 1998) this research focuses on the initial item reduction which is the third step in the process of scale development where the items are tested for validity.

The Scale development process as defined by Hinkin (1998) can be summarised as follows:

- Step 1- Item generation
- Step 2- Questionnaire Administration
- Step 3- Initial Item Reduction which in this study was done using EFA
- Step 4- Confirmatory Factor Analysis
- Step 5- Convergent / Discriminant Validity
- Step 6- Replication

To test validity of all factors/constructs, an EFA is performed to estimate if/what set questions contribute to the factors or constructs of the questionnaires. Factor analysis is a statistical method used to describe variability among observed variables in terms of fewer unobserved variables called factors, constructs or dimensions (Wiid & Diggines, 2013).

According to Hinkin (1998) factor analysis allows the reduction of a set of observed variables to a smaller set of variables. This smaller set of variables creates a condensed representation of the original set of observations providing evidence of construct validity.

The purpose of factor analysis is simplification. This is done by categorising elementary factors that clarify a larger amount of other correlating variables in a prudent way (Burns & Burns, 2008). Items are considered to correlate when they share a common trait; which shared trait is called a factor, dimension or construct.

Factors can be regarded as a super-variable because of the connections created and seen between different groups of variables, having high inter-correlations (with aspects in the group) but low correlations with any group (Burns & Burns, 2008).

Factor analysis differs greatly from other statistical approaches, as it studies the patterns of relations between variables in order to uncover underlying factors that unite groups of factors. Grouping of variables are referred to as factors (Burns & Burns, 2008).

Factor analysis consists of two kinds of approaches: The EFA approach and the CFA (Burns & Burns, 2008; Wiid & Diggines, 2013.) The EFA approach was implemented during the statistical analysis of the survey as the primary step in the validation process. CFA is merely a process of confirmation of the factor structure identified by the EFA. It is therefore important that the EFA establish constructs correctly to be confirmed by the CFA in a follow-up study. The EFA is considered an exploratory approach in nature (Burns & Burns, 2008) aiming to reduce data sets consisting of a large amount of variables into compact amount of factors. Underlying factor structures or models can therefore be identified.

Upon commencement of the analysis, the factors regarding individual statements/questions in the questionnaire had to be identified. Prior to conducting the factor analysis, an interim analysis of the correlations between variables might be examined. According to Kim and Mueller, as referenced by Hinkin (1998), any variable that correlates at less than 0.4 with all other variables may be deleted from the analysis, although it is not a set rule.

The EFA will most likely present one or more constructs/factors from the statements under analysis. The number of common variance clarified by a factor is known as the Eigenvalue (Burns & Burns, 2008). The number of factors to be retained depends on underlying theory and quantitative results (Hinkin, 1998). A strong theoretical justification for determining the number of factors to be retained and the examination of item loadings on latent factors provides a confirmation of expectations (Hinkin, 1998). When factors in consideration for analysis have an Eigenvalue that is greater

than one, it is identified as Kaiser's rule (Burns & Burns, 2008). The Kaiser criteria and the Scree test, which will be explained below, were used to support the theoretical distinctions.

According to Cattell as referenced by Burns and Burns (2008) an alternative method of determining valid factors is suggested and is known as a Scree plot. The Scree plot is a method to calculate the amount of valid constructs/factors using a graph to plot Eigenvalues. At the level that the graph starts to even out, the supplementary factors explain less variance than a single variable. Acceptable factors can therefore be acknowledged to exist on or above at the point where the plot line levels (Burns & Burns, 2008).

The following criteria were applied to determine the number of factors:

- Cumulative percentage explained by the factors > 60%
- The Kaiser Guttman rule (Eigenvalues greater than one)
- Look for a noteworthy decline in the Scree plot

To determine if an EFA would be useful, a Bartlett's test for sphericity could be conducted. If only weak connections exist between separate variables in a factor analysis, the analysis would be a worthless pursuit. To determine if an EFA would be applicable, the KMO value can be determined to provide a measure. For an EFA to be a usable measure, a value of at least 0.5 or greater must be reached on a scale between zero and one (Wiid & Diggines, 2013).

According to the SPSS, there is a difference between KMO and Bartlett's test. It is expected of the KMO to give a value above 0.5 to be adequate; where the Bartlett's test should give a probability value of 0.05 or less, which means that connections exist between variables. This provides sufficient evidence to the researcher to continue with the factor analysis and to identify underlying factors. In a case where neither of the tests measurements is met, it would be useless to continue with the factor analysis (Burns & Burns, 2008).

In a study done by Costello and Osborne (2005) regarding best practices by using EFA, they concluded that it is still most appropriate to make use of EFA in exploring a data set. The EFA was applied in this research to determine the factorial validity of the instrument.

### **3.11 Determine the current status of employee engagement in the organisation**

The survey company was responsible for the administration of the survey and collecting responses of participants. They had to provide management of the organisation with subsequent feedback regarding the status of Employee Engagement within the organisation. The researcher received the information in Excel format for further analysis. The reliability and validity of the questionnaire (instrument) was evaluated and determined by using these results. The differences between biographical groups within the test organisation were done using a series of analytical tests as listed below:

- Cronbach Alpha to determine the reliability of the instrument
- EFA to determine the validity of the instrument
- ANOVA to determine any significant differences between biographical groups
- “ANOVA when there are more than two independent groups in one sample that need to be compared at a single quantitative measure or score. ANOVA specifically tests difference in average in different groups, for example ethnic groups or age groups” (Maree, 2007:229).

ANOVA is a collection of statistical models, and their associated procedures, where the observed variance is partitioned into components due to different explanatory variables. ANOVA is a statistical technique for helping to construe whether there are real differences between the means of three or more categories of a variable based on sample data.

“The t-test is used to test differences between the means of two matched groups”. The t-test was used to test for differences between means of independent groups (for

example males/females; managers/employees; professional/support staff) (Maree, 2007:229).

A Non-parametric test would be used if the construct score is not normally distributed. For this study, in case of a lack of normality, the Kruskal-Wallis test was applied. (Wiid & Diggines, 2013)

If the results showed a lack of normality, the ANOVA means could still be used for interpretation purposes, but the Wilcoxon rank-sum test was used as a substitute of the t-test to test differences between the means of two matched groups (Wiid & Diggines, 2013).

### **3.12 Chapter Summary**

This chapter focused on the research methodology used to execute the research study in order to determine whether the measurement instrument which was developed to test employee engagement in a South African context, is valid and reliable.

The research design and methodology process was as follows:

- The research methodology was defined and a positivist approach will be followed.
- The research design concluded that a survey would be used.
- The research population was defined and described as well as some background on the selected organisation—a typical South African organisation—was provided.
- The research instrument, consisting of various propositions to test employee engagement on the individual-, team- and organisational levels was described. A detailed description on the method used with pre-testing was provided to ensure comprehension of the questions.
- The process of data collection through an electronic web-based questionnaire was discussed.
- Data analysis and interpretation were performed using the SPSS version 23 software with the assistance of a qualified statistician.

- A limitation to the study was that all the employees who did not have access to a computer linked to the intranet of the organisation were excluded from the survey.
- The instrument was tested for reliability by using Cronbach Alpha.
- Once the instrument tested as reliable, it was tested for validity using EFA.
- *Status quo* of employee engagement in the organisation was determined by performing ANOVA analysis to determine any significant differences between biographical groups.

## **CHAPTER 4: RESEARCH RESULTS AND DISCUSSION THEREOF**

### **4.1 Introduction**

This research focused on testing a newly developed instrument/scale, measuring employee engagement in a South African context, for reliability and validity, and specifically for a poultry production.

The objectives of the key research questions were twofold: To obtain reliable data from employees of a typical South African company which could be used for analytical and statistical analysis to test for validity and reliability, and to determine the level of employee engagement in the organisation.

Results feedback in this chapter concentrates on:

- The results of the survey in terms of:
  - the number of responses
  - the demographic profile of the participants
  - implications of the study
- results of Cronbach Alpha analysis which established the internal reliability of the scale and its subscales
- results of EFA determining the factorial structure as the initial validation of the instrument
- extensive analysis on the employee engagement levels in the organisation, utilised for the research

### **4.2 Data collecting and response compliance**

In paragraph 3.4.2 above, the norm of the-bigger-the-response-the-better, urged the researcher to opt for the norm of 5:1. The questionnaire consisted of seventy-three statements (excluding the eight biographical questions) which implied that 365 useful questionnaire responses were needed for this survey to comply, should the norm of five useful responses for each statement be followed.

At closing of the web page on 31 January 2014, a total of 399 useable responses were received.

### 4.3 Initial validation of the instrument

The researcher, with the support of a qualified statistician, used the data collected through the survey to conduct the statistical analysis. The data were analysed using the SPSS version 23 software package. To test for validity, EFA was employed to explore the factorial structure (Burns & Burns, 2008).

The suitability of the data for use of factor analysis had to be assessed by studying the KMO values and the Bartlett's Test of Sphericity (Burns & Burns, 2008) as indicated in chapter 3.10. An EFA is a usable measure if a value of at least 0.5 or greater are reached on a scale between zero and one (Wiid & Diggins, 2013). The KMO of 0.955 was considered acceptable.

Bartlett's test should give a probability value of 0.05 or less (Wiid & Diggins, 2013)—which means that significant connections exist—providing sufficient confirmation for the researcher to continue with the factor analysis and to identify underlying factors. In this occurrence the resulting p-value was smaller than 0.01(0.000) which was more than adequate. These results are reflected in Table 4.1 below.

**Table 4.1 KMO and Bartlett's Test**

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.955
Bartlett's Test of Sphericity	Approx. Chi-Square	19080.178
	df	2628
	Sig.	.000

Source: Calculated from survey results

**Table 4.2: Eigenvalues**

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	28.688	39.298	39.298	28.262	38.715	38.715	10.710	14.671	14.671
2	4.081	5.590	44.888	3.701	5.070	43.785	10.320	14.139	28.810
3	3.478	4.765	49.653	3.073	4.209	47.994	8.763	12.004	40.814
4	2.510	3.438	53.091	2.123	2.909	50.902	6.486	8.885	49.699
5	2.127	2.913	56.004	1.676	2.296	53.199	2.209	3.026	52.725
<b>6</b>	<b>1.643</b>	<b>2.250</b>	<b>58.255</b>	<b>1.180</b>	1.616	54.815	1.526	2.090	54.815
7	1.373	1.881	60.136						
8	1.269	1.738	61.874						
9	1.214	1.663	63.538						
10	1.159	1.587	65.125						
11	1.119	1.532	66.657						
12	0.995	1.363	68.020						
13	0.962	1.317	69.337						
14	0.940	1.288	70.625						
15	0.882	1.208	71.833						
16	0.856	1.173	73.006						
17	0.830	1.138	74.144						
18	0.770	1.055	75.199						
19	0.728	0.997	76.196						
20	0.688	0.943	77.139						
21	0.658	0.902	78.041						
22	0.649	0.888	78.929						
23	0.629	0.862	79.791						
24	0.610	0.836	80.627						
25	0.585	0.801	81.428						
26	0.566	0.776	82.204						
27	0.553	0.757	82.961						
28	0.539	0.738	83.699						
29	0.514	0.705	84.403						
30	0.493	0.676	85.079						
31	0.482	0.660	85.739						
32	0.466	0.639	86.377						
33	0.455	0.623	87.000						
34	0.449	0.615	87.615						
35	0.420	0.575	88.190						
36	0.400	0.548	88.738						
37	0.400	0.547	89.285						
38	0.393	0.539	89.824						
39	0.370	0.507	90.331						

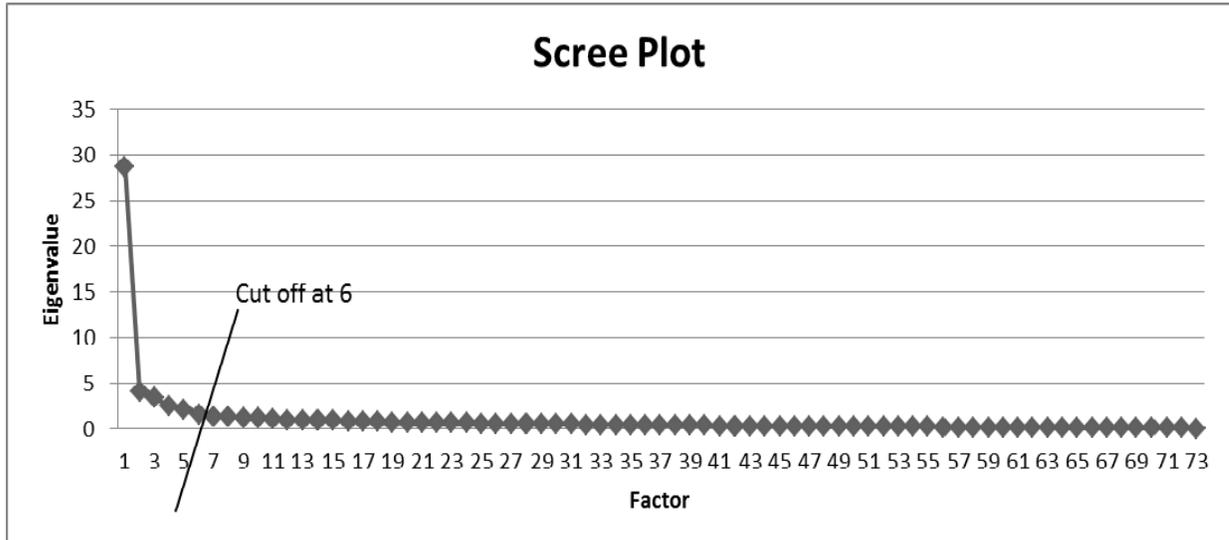
(Table 4.2 cont.)

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
40	0.365	0.499	90.830						
41	0.346	0.475	91.305						
42	0.336	0.460	91.765						
43	0.332	0.454	92.219						
44	0.304	0.416	92.635						
45	0.293	0.401	93.036						
46	0.285	0.390	93.427						
47	0.278	0.381	93.807						
48	0.269	0.369	94.176						
49	0.262	0.360	94.536						
50	0.252	0.345	94.881						
51	0.250	0.343	95.224						
52	0.237	0.325	95.549						
53	0.229	0.313	95.862						
54	0.223	0.306	96.168						
55	0.217	0.297	96.465						
56	0.204	0.279	96.744						
57	0.202	0.276	97.020						
58	0.197	0.270	97.290						
59	0.183	0.251	97.541						
60	0.177	0.242	97.784						
61	0.168	0.229	98.013						
62	0.159	0.218	98.231						
63	0.153	0.210	98.441						
64	0.146	0.200	98.641						
65	0.143	0.196	98.837						
66	0.131	0.179	99.016						
67	0.122	0.167	99.183						
68	0.119	0.163	99.346						
69	0.112	0.153	99.499						
70	0.102	0.140	99.639						
71	0.095	0.130	99.769						
72	0.090	0.123	99.892						
73	0.079	0.108	100.000						

Extraction Method: Principal Axis Factoring

*Source:* Calculated from survey results

The Scree plot is a method used to decide on the number of valid factors in a graph plotting the Eigenvalues. At the point the graph levels out, the supplementary factors explain less variance than a single variable. Acceptable factors can therefore be said to exist on or above where the plot line levels (Burns & Burns, 2008).



**Figure 4.1 Scree Plot**

*Source:* Calculated from survey results

The first six factors exhibited Eigenvalue greater than or near one; which accounts for fifty-eight percent of the cumulative variance (Table 4.2), which is acceptable in the social science environment and the results of a Scree plot test also suggested that only the first six factors were meaningful.

The above results confirmed that an EFA with the Principal Axis Factoring method (PAF) and oblique rotation should be applied for six factors.

Table 4.3 displays the loadings of the variables and the way the loadings extracted onto the six factors. A factor loading of more than 0.400 indicates that an item or statement loaded sufficiently on a specific factor. An item loading of more than 0.400 on more than one factor indicates cross loading which is not viable. Loadings of less than 0.300 are not included in the results below (Burns & Burns, 2008). Results of less than 0.400 are highlighted in yellow in Table 4.3 below.

**Table 4.3: Pattern matrix<sup>a</sup> with factor loadings**  
**Pattern Matrix<sup>a</sup>**

Question	Factor					
	1	2	3	4	5	6
40	0.698					
31	0.680					
75	0.636					
61	0.597					
60	0.594					
38	0.589					
39	0.561					
41	0.542					
32	0.539			-0.319		
47	0.510					
37	0.483					
77	0.478					
78	0.456					
44	0.433					
30	0.431					
45	0.407					
35	0.401					
24	0.357					
81	0.318					
68	0.305					
55		0.853				
56		0.834				
53		0.795				
52		0.773				
54		0.771				
57		0.763				
71		0.698				
51		0.682				
50		0.640				
69		0.601				
73		0.552				
76		0.472				
67		0.343				
72	0.329	0.331				
46						
14						
65			-0.909			

(Table 4.3 cont.)

Question	Factor					
	1	2	3	4	5	6
62			-0.877			
63			-0.832			
64			-0.754			
74			-0.691			
79			-0.664			
66			-0.637			
80			-0.479			
70	0.315		-0.389			
58						
12				-0.875		
11				-0.837		
25				-0.811		
10				-0.766		
13				-0.746		
9				-0.657		
15				-0.628		
33				-0.626		
43				-0.587		
17				-0.560		
18				-0.559		
16				-0.470		
21	0.353			-0.436		
20	0.340			-0.403		
49				-0.402		0.308
22				-0.358		
36				-0.351		
29				-0.336		
23						
48						
19						
28					0.803	
27					0.753	
26				-0.322		-0.496
59						0.454
34						-0.348
42						0.336

Extraction Method: PAF

Rotation Method: Oblimin with Kaiser Normalization

<sup>a</sup> Rotation converged in 17 iterations

Source: Calculated from survey results using SPSS

The PAF yielded six factors of which factors five and six consisted of two items/statements each. A factor with less than five valid items was ignored. Only items with communalities above 0.2 were included (Costello & Osborne, 2005). This resulted that only four factors were used for further analysis.

Based on the remaining four factors, a complete new EFA was performed and are reflected in Table 4.4 below. The final results of the EFA were supported by the Cronbach Alpha value per factor that is greater than 0.8 which indicate good reliability. (Nienaber & Martins, 2015) This will be discussed in detail below.

**Table 4.4: Exploratory factor analysis on 4 factors**

Factor	Question	Factor Loading	Reliability
1	40	0.698	0.935
	31	0.680	
	75	0.636	
	61	0.597	
	60	0.594	
	38	0.589	
	39	0.561	
	41	0.542	
	32	0.539	
	47	0.510	
	37	0.483	
	77	0.478	
	78	0.456	
	44	0.433	
	30	0.431	
45	0.407		
35	0.401		

(Table 4.4 cont.)

Factor	Question	Factor Loading	Reliability
<b>2</b>	55	0.853	<b>0.947</b>
	56	0.834	
	53	0.795	
	52	0.773	
	54	0.771	
	57	0.763	
	71	0.698	
	51	0.682	
	50	0.640	
	69	0.601	
	73	0.552	
	76	0.472	
Factor	Question	Factor Loading	Reliability
<b>3</b>	65	-0.909	<b>0.925</b>
	62	-0.877	
	63	-0.832	
	64	-0.754	
	74	-0.691	
	79	-0.664	
	66	-0.637	
	80	-0.479	
Factor	Question	Factor Loading	Reliability
<b>4</b>	12	-0.875	<b>0.951</b>
	11	-0.837	
	25	-0.811	
	10	-0.766	
	13	-0.746	
	9	-0.657	
	15	-0.628	
	33	-0.626	
	43	-0.587	
	17	-0.560	
	18	-0.559	
	16	-0.470	
	21	-0.436	
	20	-0.403	
49	-0.402		

Source: Nienaber and Martins (2015)

Questionnaire items and corresponding factor loadings are presented in Table 4.4. In interpreting the rotated factor pattern, an item was said to load on a given component if the factor loading was 0.40 or greater for that component and less than 0.40 for the other. Using these criteria, seventeen items were found to load on the first factor

which was subsequently labelled “Organisational level”. Twelve items loaded on the second factor labelled “Team level”. Eight items loaded on the third factor labelled as “Immediate manager” and fifteen items loaded on the fourth factor labelled “Individual level”.

#### **4.4 Testing the reliability of the dimensions in the survey questionnaire**

Item analysis was conducted to assess the reliability of the four different dimensions or factors from the EFA *via* Cronbach Alpha values.

Reliability refers to the consistency of your measurement, or the degree to which an instrument measures the same way each time it is used under the same condition with the same subjects (Wiid & Diggines, 2013).

The overall Cronbach Alpha value for reliability can be interpreted as follows:

- Cronbach Alpha above 0.8 – good reliability
- Cronbach Alpha between 0.6 and 0.8 – acceptable reliability
- Cronbach Alpha below 0.6 – unacceptable reliability
- Some authors use another cut-off of 0.7, which is suggested by Nunnally (1978) for acceptable reliability

(Wiid & Diggines, 2013)

Estimates of internal consistency for the four factors were measured by Cronbach Alpha, and all exceeded 0.80 and are reported in Table 4.5. None of the items were left out.

**Table 4.5: Correlations and Coefficient Alpha Reliability Estimates for the Survey variables**

Variables	Items	Items omitted	Cronbach Alpha	Reliability
Organisational level	40, 31, 75, 61, 60, 38, 39, 41, 32, 47, 37, 77, 78, 44, 30, 45, 35	None	0.935	Good
Team level	55, 56, 53, 52, 54, 57, 71, 51	None	0.947	Good
Immediate manager	65, 62, 63, 64, 74, 79, 66, 80	None	0.925	Good
Individual level	12, 11, 25, 10, 13, 9, 15, 33, 43, 17, 18, 16, 21, 20, 49	None	0.951	Good

Internal consistency of responses was assessed by using Cronbach Alpha. Reliability estimates were between 0.925 and 0.951. These results indicated an excellent reliability of the constructs considering that 0.7 were deemed adequate and a Cronbach Alpha of 0.8 a good reliability.

## 4.5 Biographical Information of Survey Results

### 4.5.1 Years of service with the organisation

**Table 4.6: Years of Service**

Response	Frequency	Percent	0	20	40	60	80	100
0 to 1 year	47	11.8%						
2 to 3 years	55	13.8%						
4 to 5 years	55	13.8%						
6 to 10 years	95	23.8%						
11 years and longer	147	36.8%						
No Response	0	0.0%						

The information indicates that 36.8% of the respondents had ten years or more service with the company while 39.4% had less than six years of service. Almost twenty-four of the respondents had six to ten years of service at the time of the survey.

#### 4.5.2 When were you born?

**Table 4.7: Birth Categories**

Response	Frequency	Percent	0	20	40	60	80	100
Born between 1978 and 2000	122	30.6%						
Born between 1965 and 1977	163	40.9%						
Born between 1946 and 1964	113	28.3%						
No Response	1	0.3%						

The results indicated that 69.2% of the respondents were older than thirty-seven years at the time of the survey in 2014, of which 28.3% were older than fifty years.

#### 4.5.3 What is your race?

**Table 4.8: Race Groups**

Response	Frequency	Percent	0	20	40	60	80	100
African	46	11.5%						
Coloured	48	12.0%						
Indian	22	5.5%						
White	279	69.9%						
No Response	4	1.0%						

The majority of participants in this survey, 69.9%, are white; however the gender distribution are more balanced with 52.9% of participants who are male opposed to 45.9% female.

#### 4.5.4 What is your gender?

**Table 4.9: Gender Groups**

Response	Frequency	Percent	0	20	40	60	80	100
Male	211	52.9%						
Female	183	45.9%						
No Response	5	1.3%						

The female respondents represented a little less than the average of fifty percent at the time of the survey.

#### 4.5.5 Which Business unit do you work in?

**Table 4.10: Business units**

Response	Frequency	Percent	0	20	40	60	80	100
Group HQ	18	4.5%						
Farms Division HQ	38	9.5%						
Business Unit A	103	25.8%						
Business Unit B	73	18.3%						
Business Unit C	121	30.3%						
Business Unit D	11	2.8%						
Business Unit E	7	1.8%						
Business Unit F	28	7.0%						
No Response	0	0.0%						

At the time of the survey, Business units ‘A’, and ‘B’, represented the majority of employees. It represented the broiler operations with a vast component of unskilled labour on the farms and at the processing plants.

Business unit ‘C’ represented the feed mill operations and consists of seven different plants throughout South Africa. Cumulatively it is the largest Business unit. The responses also represented the highest number of responses being 30.3% of all responses received.

Business unit ‘D’ represented the laboratory operation employing highly skilled professionals, and the majority of the relevant employees participated.

Business units ‘E’ and ‘F’ represented the grandparent breeder operation and the commercial breeder operations respectively, Business unit ‘E’ being one of the smaller operations with a majority of unskilled farm labourers, and it seemed that participation was limited. Informal discussions with employees of this Business unit revealed the reason for the limited participation could be distrust. Although anonymity and confidentiality were guaranteed at the launch of the survey, they feared victimisation should they participate and reveal their dissatisfaction, since there were unresolved issues with management.

#### 4.5.6 How will you categorise your job?

**Table 4.11: Job Category**

Response	Frequency	Percent	0	20	40	60	80	100
Management	114	28.6%						
Professional	42	10.5%						
Technical Advisor	15	3.8%						
Sales and Marketing	35	8.8%						
Farms Operations	20	5.0%						
Plant Operations	31	7.8%						
Administrative	138	34.6%						
No Response	4	1.0%						

The management and administrative job categories represented the highest participation in the survey with 28.6% and 34.6% respectively. All managers and administrative personnel in the organisation had access to computers linked to the intranet of the organisation; consequently 63.2% of all responses were representative of these job categories.

#### 4.5.7 How will you categorise your job grade?

**Table 4.12: Job grade**

Response	Frequency	Percent	0	20	40	60	80	100
Top Management (Exco, COO's, Director)	19	4.8%						
Executive Management (Plant, Farms, etc)	30	7.5%						
Manager	128	32.1%						
Supervisor	65	16.3%						
Employee	156	39.1%						
No Response	1	0.3%						

According to Table 3.1: 'Employee composition as per date of survey', 95% of Top management participated in the survey. Although the job grade 'Manager' reflected one hundred percent participation, some of the employees might have erroneously categorised themselves as 'Managers', their job title being 'Farm manager', rather than 'Supervisor'. The category 'Manager' reflected participation of 32.1%—the topmost participation—although it only represented eleven percent of the probable participants.

#### 4.5.8 What is your highest qualification?

**Table 4.13: Highest Qualification**

Response	Frequency	Percent	0	20	40	60	80	100
Std 6 (Grade 8) and below	1	0.3%						
Std 7 - 8 (Grades 9 to 10)	9	2.3%						
Std 9 - 10 (Grades 11 to 12)	105	26.3%						
Certificate	70	17.5%						
Diploma	102	25.6%						
First Degree	43	10.8%						
Post Graduate Qualification	67	16.8%						
No Response	2	0.5%						

The results, as per Table 4.13 above, indicates that 70.7% of the participants held a tertiary qualification which included certificates, diplomas, degrees and post graduate qualifications. Should only diploma and degree qualifications be considered, 53.2% of the respondents held a formal tertiary qualification. The participants that held a secondary school education represented 28.9% of the participants of which only 2.6% held grade ten or less. This corresponds with the results of job categories since most of the administrative employees and the managers, who represented 63.2% of the participants, held higher qualifications.

#### 4.6 Results of Biographical Groups

In calculating the factor scores, the average of the reliable items per validated factor was calculated. For example, the calculation of factor one organisational score was the average of questions 40, 31, 75, 61, 60, 38, 39, 41, 32, 47, 37, 77, 78, 44, 30, 45, and 35. In calculating the average, higher scores indicate more agreement and lower scores, less agreement. An ANOVA was conducted for each factor/construct and biographical variable. The histograms of the distributions as well as skewness measurements indicated that the factor scores were not normally distributed and therefore the Kruskal-Wallis tests, a Non-parametric test, were used as described in par 3.11.

The Kruskal-Wallis or Wilcoxon tests were used to test for significant differences between the categories of the various biographical variables for the four factors as reflected in Tables 4.4 and 4.5. Although only ranks are considered with the Kruskal-Wallis test, the factor means were only used for interpretation purposes.

To assess between which categories the significant differences were, Non-parametric Multiple Comparison tests were done.

#### **4.6.1 Investigating significant differences between the categories of the biographical variables for the factor 'Organisational level':**

The results of testing for significant differences between the categories of the eight biographical variables for the factor 'Organisational level' are presented in Table 4.14.

**Table 4.14: Kruskal- Wallis / Wilcoxon results for Factor: Organisational Level**

Independent variable		Chi Square	DF	Probability	Significance < 0.05
1	Years of service	2.9346	4	0.5688	Not
2	Birth categories	4.5834	2	0.1011	Not
3	Race groups	1.2245	3	0.7471	Not
4	Gender groups	3.0046	1	0.0830	Not
5	Business units	21.6370	7	0.0029	Significant *
6	Job category	13.2369	6	0.0394	Significant *
7	Job grade	15.0125	4	0.0047	Significant *
8	Highest qualification	3.0351	6	0.8044	Not

\*Non parametric multiple comparisons were performed

Source: Calculated from survey results

Question 5: Which Business unit do you work in?

**Table 4.15: Non parametric multiple comparison based on results for Business units**

Level	- Level	Score Mean Difference	Std Err Dif	Z- Value	p-Value
Business unit C	Business unit A	30.2399	8.68491	3.48189	0.0005*
Business unit F	Business unit A	25.0962	8.08772	3.10300	0.0019*
Business unit B	Business unit A	17.6257	7.79296	2.26175	0.0237*
Business unit F	Farms division	10.5451	4.77797	2.20703	0.0273*
Business unit A	Group HQ	-22.6793	8.95759	-2.53186	0.0113*

Source: Calculated from survey results

In the results above, Business unit A showed significant differences with Business units C, F, B and Group HQ. There is also a significant difference between the Farms division and Business unit F.

**Table 4.16: Overall results for Business units for Organisational level**

Means for Oneway ANOVA: Question 5, Factor 1		
Level	Number	Mean
Group HQ	18	3.75286
Business unit F	28	3.63025
Business unit C	121	3.5255
Business unit B	73	3.438
Business unit D	11	3.37333
Farms Division	38	3.33289
Business unit E	7	3.27731
Business unit A	103	3.20291

Source: Calculated from survey results

It is evident from the mean in Table 4.16 that there was a significant difference between Business unit A, being the lowest (less engaged), and the four highest ranked means which consisted of Group HQ, and Business units F, C and B respectively. Business unit A was the least profitable unit in the organisation at the time of the survey. Morale of the employees was low with a relative high personnel turnover; whereas Business units F, C and B were the most profitable units and the morale of the employees were high. It is evident from the survey that the engagement on organisational level for these units measured much higher than Business unit A.

Question 6: How will you categorise your job?

**Table 4.17: Non parametric multiple comparison based on job categories for Organisational level**

Level	- Level	Score Mean Difference	Std Err Dif	Z- Value	p-Value
Professional	Management	-20.8358	8.14904	-2.55685	0.0106*
Administrative	Management	-28.7689	9.22094	-3.11995	0.0018*

Source: Calculated from survey results

According to the outcome for question six displayed in Table 4.17 which is evident from the 'Mean' displayed in Table 4.18, the engagement of job category 'Management' was significantly higher than the 'Professional' and 'Administrative' job categories.

**Table 4.18:** Overall results for job categories for Organisational level

Means for Oneway ANOVA: Question 6, Factor 1		
Level	Number	Mean
Management	114	3.58569
Farms Operations	20	3.54632
Sales and marketing	35	3.47311
Plant Operations	31	3.40714
Technical advisor	15	3.37157
Professional	42	3.28571
Administrative	138	3.28122

Source: Calculated from survey results

Question 7: How will you categorise your job grade?

**Table 4.19:** Non parametric multiple comparison based on results for job grades on Organisational level

Level	- Level	Score Mean Difference	Std Err Dif	Z-Value	p-Value
Supervisor	Top management	-13.9093	6.35845	-2.18753	0.0287*
Employee	Executive management	-24.3628	10.72893	-2.27076	0.0232*
Employee	Manager	-28.0402	9.79087	-2.86391	0.0042*
Employee	Top management	-31.0855	12.30507	-2.52624	0.0115*

Source: Calculated from survey results

The results in Table 4.19 above display a significant difference between the job grade 'Employee' and the job grades 'Top management', 'Executive management', and 'Manager'. There is also a significant difference between job grade 'Top management' and 'Supervisors'. According to the analysis displayed in Table 4.20, the job grade 'Employee' displayed the least engaged followed by 'Supervisors'. The three levels of management are the most engaged, of which 'Top management' exhibits the highest level of engagement.

**Table 4.20:** Overall results for job grades for Organisational level

Means for Oneway ANOVA: Question 7, Factor 1		
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Level	Number	Mean
Top management	19	3.73065
Executive management	30	3.61569
Manager	128	3.53277
Supervisor	65	3.35742
Employee	156	3.26613

Source: Calculated from survey results

The means in Table 4.20 above support the Non-parametric multiple comparison results which disclosed a significant difference between the job grade 'Employee' at the lowest level of engagement, and the highest levels of engagement from job grades 'Top management', 'Executive management' and 'Managers'.

#### 4.6.2 Investigating significant differences between the categories of the biographical variables for the factor 'Team level':

The results of testing for significant differences between the categories of the eight biographical variables for the factor two, 'Team level' are presented in Table 4.21.

**Table 4.21: Kruskal- Wallis / Wilcoxon results for Factor: Team Level**

Independent variable	Chi Square	DF	Probability	Significance <0.05
1   Years of service	3.2629	4	0.5148	Not
2   Birth categories	4.6151	2	0.0995	Not
3   Race groups	4.7203	3	0.1935	Not
4   Gender groups	1.7361	1	0.1876	Not
5   Business units	24.949	7	0.0008	Significant *
6   Job category	18.9316	6	0.0043	Significant *
7   Job grade	17.5072	4	0.0015	Significant *
8   Highest qualification	6.5732	6	0.3621	Not

\*Non parametric multiple comparisons were performed

Source: Calculated from survey results

To assess the significant differences between the various categories, Non-parametric Multiple Comparison tests were conducted. The results showed a significant difference between Business units, job categories and job grades, analysed below.

Question 5: Which Business unit do you work in?

**Table 4.22: Non parametric multiple comparison based on results for Business units on Team level**

Level	- Level	Score Mean Difference	Std Err Dif	Z-Value	p-Value
Business unit B	Business unit A	22.9743	7.77169	2.95616	0.0031*
Business unit F	Business unit A	16.9882	8.0766	2.10339	0.0354*
Business unit F	Business unit D	10.6997	4.04014	2.64834	0.0081*
Business unit D	Group HQ	-9.6667	3.24496	-2.97898	0.0029*
Business unit D	Farms Division	-12.6017	4.87843	-2.58314	0.0098*
Business unit A	Group HQ	-20.8193	8.94553	-2.32734	0.0199*
Business unit D	Business unit C	-24.1983	11.95878	-2.02348	0.0430*
Business unit D	Business unit B	-24.792	7.82682	-3.16757	0.0015*
Business unit C	Business unit B	-25.1477	8.2543	-3.04662	0.0023*
Business unit C	Group HQ	-25.2089	10.11703	-2.49173	0.0127*

Source: Calculated from survey results

The results in Table 4.22 above display a variety of significant differences between the employees of the various Business units. It is evident from the means in Table 4.23 that the level of engagement in Business units A, D and E were less than the rest of the employees. As a team, Group HQ had the highest level of engagement followed by Business units F and B respectively. The Business unit (D) representing the science laboratories showed the lowest level of engagement on team level, which might be contributed to the limited number of employees in the Business unit who are mostly professionals and specialists on their respective study fields, and therefore work autonomously. Business unit E had the second lowest level of engagement on team level although their financial performance was above average. Business unit E experienced a turmoil period with significant changes in the management structure during the period before and during the survey, which might have had a negative influence on the level of the engagement on team level.

**Table 4.23: Overall results for Business units on Team level**

Means for Oneway ANOVA: Question 5, Factor 2		
Level	Number	Mean
Group HQ	18	4.35859
Business unit F	28	4.27890
Business unit B	73	4.24620
Farms Division	38	4.15550
Business unit C	121	4.00716
Business unit A	103	3.97140
Business unit E	7	3.90909
Business unit D	11	3.49669

Source: Calculated from survey results

Question 6: How will you categorise your job?

**Table 4.24: Non parametric multiple comparison based on job categories for Team level**

Level	- Level	Score Mean Difference	Std Err Dif	Z-Value	p-Value
Plant Operations	Farms Operations	-10.7758	4.24629	-2.5377	0.0112*
Plant Operations	Management	-17.4583	8.47379	-2.06026	0.0394*
Administrative	Management	-30.9153	9.18769	-3.36486	0.0008*
Administrative	Farms Operations	-32.8594	10.89981	-3.01468	0.0026*

Source: Calculated from survey results

According to the results per Table 4.24 above, there was a significant difference on engagement level between employees of the 'Plant operations' and 'Administrative' job categories and employees in the job categories 'Farms operations'. It is supported in Table 4.25 below that the employees of job categories 'Farms operations' and 'Management' exhibited the highest level of engagement on team level.

Although the job category 'Technical advisors' exhibited the lowest mean as per Table 4.25, there was no significant difference with any other job category as per

Table 4.24, Non-parametric multiple comparison based on job categories for team level, above.

**Table 4.25:** Overall results for job categories for Team level

Means for Oneway ANOVA: Question 6, Factor 2		
Level	Number	Mean
Farms Operations	20	4.36818
Management	114	4.19984
Sales and marketing	35	4.19429
Professional	42	4.12359
Plant Operations	31	3.95992
Administrative	138	3.92161
Technical advisor	15	3.91515

Source: Calculated from survey results

Question 7: How will you categorise your job grade?

**Table 4.26:** Non parametric multiple comparison based on results for job grade on Team Level

Level	- Level	Score Mean Difference	Std Err Dif	Z-Value	p-Value
Supervisor	Executive management	-13.7385	6.05392	-2.26935	0.0232*
Employee	Manager	-28.6802	9.76368	-2.93744	0.0033*
Employee	Top management	-29.1371	12.27344	-2.374	0.0176*
Employee	Executive management	-31.3378	10.69214	-2.93092	0.0034*

Source: Calculated from survey results

According to the results in Table 4.26 above, it is evident that the job grades 'Employees' and 'Supervisors'—at team level—showed a significant difference with regards to engagement levels of all three management levels. The calculated means as per Table 4.27 below display that job grade 'Employees' followed by job grade 'Supervisors' were the least engaged at team level in comparison with the three managerial job grades which showed high levels of engagement at team level.

**Table 4.27:** Overall results for job grades on Team level

Means for Oneway ANOVA: Question 7, Factor 2		
Level	Number	Mean
Top management	19	4.32488
Executive management	30	4.31515
Manager	128	4.18395
Supervisor	65	4.01725
Employee	156	3.93333

*Source:* Calculated from survey results

#### **4.6.3 Investigating significant differences between the categories of the biographical variables for the factor 'Immediate manager':**

Non-parametric Multiple Comparison tests were conducted and the results showed that there was a significant difference between the Business units, job categories and job grades, analysed below.

**Table 4.28: Kruskal-Wallis results for factor: Immediate manager**

Independent variable		Chi Square	DF	Probability	Significance <0.05
1	Years of service	2.4821	4	0.6479	Not
2	Birth categories	2.3486	2	0.309	Not
3	Race groups	2.0857	3	0.5548	Not
4	Gender groups	1.0379	1	0.3083	Not
5	Business units	16.3702	7	0.0219	Significant *
6	Job category	17.6526	6	0.0072	Significant *
7	Job grade	15.1416	4	0.0044	Significant *
8	Highest qualification	2.645	6	0.8519	Not

\*Non parametric multiple comparisons were performed

Source: Calculated from survey results

Question 5: Which Business unit do you work in?

**Table 4.29: Non parametric multiple comparison based on results for Business units**

Level	- Level	Score Mean Difference	Std Err Dif	Z-Value	p-Value
Business unit F	Business unit C	19.5046	9.02369	2.16149	0.0307*
Business unit B	Farms Division	17.6063	6.41841	2.7431	0.0061*
Business unit B	Business unit A	16.3266	7.77793	2.0991	0.0358*
Business unit F	Farms Division	11.9098	4.76732	2.49821	0.0125*
Business unit F	Business unit D	8.0406	4.02775	1.9963	0.0459*
Business unit D	Business unit B	-16.8941	7.83684	-2.15573	0.0311*
Business unit C	Business unit B	-19.1189	8.29767	-2.30412	0.0212*

Source: Calculated from survey results

The results in Table 4.29 above show a variety of significant differences between the employees of the various Business units. It is evident from the calculated means in Table 4.30 below that Business units D, 'Farms division' and 'E' were less engaged than the rest of the employees of Business unit F. The level of engagement of Business units D and 'Group HQ' was the highest concerning 'Immediate manager', followed by Business unit B. The Business unit (D) representing the Science

laboratories) had the lowest level of engagement on the level of ‘Immediate manager’. This can be contributed to the limited number of employees in this Business unit, which consisted mostly of professionals and specialists on their respective study fields, and therefore worked autonomously.

**Table 4.30: Overall results for Business units on immediate manager level**

Means for Oneway ANOVA: Question 5, Factor 3		
Level	Number	Mean
Business unit F	28	3.94898
Group HQ	18	3.94444
Business unit B	73	3.8865
Business unit C	121	3.61413
Business unit A	103	3.56796
Business unit E	7	3.46939
Farms Division	38	3.37218
Business unit D	11	3.14286

Source: Calculated from survey results

Question 6: How will you categorise your job?

**Table 4.31: Non parametric multiple comparison based on job categories for the level of ‘Immediate manager’**

Level	- Level	Score Mean Difference	Std Err Dif	Z-Value	p-Value
Plant Operations	Farms Operations	-11.1871	4.25152	-2.63132	0.0085*
Sales and marketing	Management	-17.5514	8.31858	-2.1099	0.0349*
Professional	Management	-21.0639	8.13896	-2.58804	0.0097*
Administrative	Management	-24.3719	9.20244	-2.64841	0.0081*
Plant Operations	Management	-25.6027	8.48324	-3.01804	0.0025*

Source: Calculated from survey results

The employees of the job categories ‘Farms Operations’ and ‘Management’ show the highest level of engagement as far as the “Immediate manager” factor is concerned; whereas the employees of the ‘Administrative’, ‘Professional’ and ‘Plant operation’

job categories displayed lower engagement with the professional employees' engagement the lowest level of engagement. This is supported by the outcome of the ANOVA mean displayed in Table 4.32 below.

**Table 4.32:** Overall results for job categories for the immediate manager level

Means for Oneway ANOVA: Question 6, Factor 3		
Level	Number	Mean
Farms Operations	20	3.95714
Management	114	3.8797
Technical advisor	15	3.72381
Sales and marketing	35	3.6
Administrative	138	3.56418
Professional	42	3.43594
Plant Operations	31	3.24654

Source: Calculated from survey results

Question 7: How will you categorise your job grade?

**Table 4.33:** Non parametric multiple comparison based on results for job grades on immediate manager level

Level	- Level	Score Mean Difference	Std Err Dif	Z-Value	p-Value
Manager	Executive management	-18.2688	9.2621	-1.97242	0.0486*
Supervisor	Executive management	-19	6.07037	-3.12996	0.0017*
Employee	Manager	-19.7767	9.77716	-2.02275	0.0431*
Employee	Executive management	-32.8481	10.7105	-3.0669	0.0022*

Source: Calculated from survey results

The results show a significant difference in the level of engagement with the immediate manager between the job grades 'Employee' and 'Supervisor' versus the job grades 'Executive management' and 'Manager'.

Where the role of "Immediate manager" is concerned, the job grades 'Supervisor' and 'Employee' showed a significant difference (far less engaged) towards employee engagement than the three management categories. According to the results in Table 4.34 below, the job grade 'Supervisor' are the least engaged; reason might be

that the supervisors and employees do not 'trust' their managers or do not feel engaged towards their immediate managers.

**Table 4.34:** Overall results for job grades for the immediate manager level

Means for Oneway ANOVA: Question 7, Factor 3		
Level	Number	Mean
Executive management	30	4.11905
Top management	19	3.92481
Manager	128	3.74665
Employee	156	3.51557
Supervisor	65	3.49158

*Source:* Calculated from survey results

#### 4.6.4 Investigating significant differences between the categories of the biographical variables for the construct 'Individual level':

The results of testing for significant differences between the categories of the eight biographical variables for the factor 'Individual level' are presented in Table 4.35

**Table 4.35:** Kruskal- Wallis results for factor: Individual Level

Independent variable	Chi Square	DF	Probability	Significance <0.05
1   Years of service	5.783	4	0.216	Not
2   Birth categories	14.9199	2	0.0006	Significant
3   Race groups	0.8602	3	0.835	Not
4   Gender groups	11.6886	1	0.0006	Significant
5   Business units	14.0964	7	0.0495	Significant *
6   Job category	32.2711	6	0.0001	Significant *
7   Job grade	43.7013	4	0.0001	Significant *
8   Highest qualification	1.359	6	0.9683	Not

\*Non parametric multiple comparisons were performed

*Source:* Calculated from survey results

To determine the significant differences between different categories, Non-parametric Multiple Comparison tests were conducted for each result with a significant difference, as discussed below.

Question 2: When were you born?

**Table 4.36: Non parametric multiple comparison based on results for age on individual level**

Level	- Level	Score Mean Difference	Std Err Dif	Z-Value	p-Value
Between 1946 and 1964	Between 1978 and 2000	32.81409	8.871342	3.698887	0.0002*
Between 1965 and 1977	Between 1978 and 2000	25.43159	9.859151	2.57949	0.0099*

Source: Calculated from survey results

The results show a significant difference between the younger and older employees respectively. The younger employees seemed to be less engaged on an individual level than their older colleagues, supported by the ANOVA means displayed in Table 4.37 below.

**Table 4.37: Overall results for age groups on the individual level**

Means for Oneway ANOVA: Question 2, Factor 4		
Level	Number	Mean
Between 1946 and 1964	113	4.01079
Between 1965 and 1977	163	3.89373
Between 1978 and 2000	122	3.62986

Source: Calculated from survey results

Question 4: What is your gender?

The Non-parametric Kruskal-Wallis comparison test is only done when more than two variables are available. There was no significant difference between the genders based on one-way ANOVA mean. The female employees were less engaged as their male counterparts.

**Table 4.38:** Overall results for gender on the individual level

Means for Oneway ANOVA: Question 4, Factor 4		
Level	Number	Mean
Male	211	3.96606
Female	183	3.70787

*Source:* Calculated from survey results

Question 5: Which Business unit do you work in?

**Table 4.39:** Non parametric multiple comparison based on results for Business units on individual level

Level	- Level	Score Mean Difference	Std Err Dif	Z-Value	p-Value
Business unit C	Business unit A	18.2787	8.68354	2.10499	0.0353*
Business unit F	Business unit A	17.6468	8.08579	2.18245	0.0291*
Business unit F	Business unit D	12.1558	4.05064	3.00097	0.0027*
Business unit D	Group HQ	-6.9571	3.24173	-2.1461	0.0319*
Business unit D	Business unit B	-15.4296	7.87054	-1.96043	0.0499*
Business unit D	Business unit C	-29.3058	12.03506	-2.43504	0.0149*

*Source:* Calculated from survey results

On an individual level, the employees of Group HQ and Business unit F had the highest level of engagement; whereas the employees of Business units A and D were less engaged, and unit D's employees had the lowest level of engagement. This is supported by the outcome of the mean shown in Table 4.40 below.

**Table 4.40: Overall results for Business units for the individual level**

Means for Oneway ANOVA: Question 5, Factor 4		
Level	Number	Mean
Group HQ	18	4.06667
Business unit F	28	4.00696
Farms Division	38	3.93158
Business unit E	7	3.91429
Business unit C	121	3.89843
Business unit B	73	3.87182
Business unit A	103	3.69119
Business unit D	11	3.42424

Source: Calculated from survey results

Question 6: How will you categorise your job?

**Table 4.41: Non parametric multiple comparison based on results for job categories on individual level**

Level	- Level	Score Mean Difference	Std Err Dif	Z-Value	p-Value
Farms Operations	Professional	11.9571	4.89603	2.44221	0.0146*
Plant Operations	Farms Operations	-8.8016	4.25635	-2.06788	0.0387*
Administrative	Sales and marketing	-23.6577	9.47234	-2.49755	0.0125*
Professional	Management	-24.8108	8.14715	-3.04533	0.0023*
Administrative	Farms Operations	-37.4678	10.93907	-3.42513	0.0006*
Administrative	Management	-44.659	9.21842	-4.84455	<.0001*

Source: Calculated from survey results

Employees of the 'Farms Operations' and 'Management' job categories were the most engaged on an individual level whereas the 'Administrative' and 'Professional' employees were the least engaged on an individual level. According to the mean in Table 4.42, the job grade 'Technical Advisors' displayed the lowest mean as far as engagement on an individual level is concerned, but it did not show a significant difference with any other job grade group besides the 'Administrative' job grade in the Kruskal-Wallis analysis displayed in Table 4.41 above.

**Table 4.42: Overall results for job categories on the individual level**

Means for Oneway ANOVA: Question 6, Factor 4		
Level	Number	Mean
Farms Operations	20	4.19
Management	114	4.0713
Sales and marketing	35	3.98898
Plant Operations	31	3.86114
Professional	42	3.64354
Administrative	138	3.63908
Technical advisor	15	3.6054

Source: Calculated from survey results

Question 7: How will you categorise your job grade?

**Table 4.43: Non parametric multiple comparison based on results for job grades on individual level**

Level	- Level	Score Mean Difference	Std Err Dif	Z-Value	p-Value
Supervisor	Top management	-19.4526	6.3531	-3.06191	0.0022*
Manager	Executive management	-20.2643	9.27107	-2.18576	0.0288*
Supervisor	Executive management	-23.2872	6.07846	-3.8311	0.0001*
Supervisor	Manager	-23.8234	8.49949	-2.80293	0.0051*
Employee	Top management	-42.7168	12.30111	-3.4726	0.0005*
Employee	Manager	-45.7902	9.78846	-4.67798	<.0001*
Employee	Executive management	-49.5006	10.72676	-4.61469	<.0001*

Source: Calculated from survey results

Employees—on an individual level— of the ‘Employee’ and ‘Supervisor’ job grades were the least engaged; whereas the various ‘Management’ job grades were most engaged. The job grade ‘Executive managers’ showed the highest level of engagement. The Kruskal-Wallis results above show a significant difference between the job grades of ‘Employee’ and ‘Supervisor’ versus the three ‘Management’ grades, evident from the mean result in Table 4.44 below.

**Table 4.44:** Overall results for job grades on the individual level

Means for Oneway ANOVA: Question 7, Factor 4		
Level	Number	Mean
Executive management	30	4.27111
Top management	19	4.22456
Manager	128	4.02946
Supervisor	65	3.72553
Employee	156	3.61202

*Source:* Calculated from survey results

#### 4.7 Chapter Summary

A summary of the results and requirements for the research to be valid and the instrument to be reliable and valid herewith:

- The KMO test was conducted to determine whether the EFA would be a usable measure. According to Wiid and Diggins, (2013) a value of at least 0.5 or greater must be reached on a scale between zero and one. The KMO tested 0.955 which indicated that the EFA could be used.
- The Eigenvalues presented a cumulative result of 58.255% for six factors.
- The Scree plot cut off resulted in six factors.
- When the factor loadings were done, two factors were eliminated since they did not comply with the norm of at least five items to be associated with them; therefore four factors were left as valid factors.
- Cronbach Alpha was used to test for reliability on the four factors. For the instrument to test reliable, a Cronbach Alpha value of higher than 0.8 was required.

**Table 4.45:** Reliability test of factors with Cronbach Alpha

Test the 4 factors for reliability with Cronbach Alpha			
Factor	Level	Factor items	Cronbach Alpha
Factor 1	Organisational level	17 items	0.935
Factor 2	Team level	12 items	0.947
Factor 3	Immediate manager	8 items	0.925
Factor 4	Individual level	15 items	0.951

*Source:* Calculated from survey results

All four factors tested reliable with values higher than the required 0.8.

The results showed the recommended item reduction to the scale measurement instrument which is in line with step three of Hinkin's scale development process. The items were reduced from seventy-three to fifty-two.

A summary of the significant differences in biographical groups of the survey results of the selected organisation based on the four factors are explained below in two stages, being the results of the most- and the least engaged.

**Table 4.46: Most engaged biographical groups per factor**

Two Most engaged biographical groups per factor					
Question/statement	Organisational level	Team level	Immediate manager level	Individual level	
2	When were you born?			1946-1964 (Oldest employees)	
4	What is your gender?			Males	
5	Which Business unit do you work in?	Group HQ / Business unit "F"	Group HQ / Business unit "F"	Business unit "F" / Group HQ	Group HQ / Business unit "F"
6	How will you categorise your job?	Management / Farms Operations	Farms Operations / Management	Farms Operations / Management	Farms Operations / Management
7	How will you categorise your job grade?	Top Management / Executive Management	Top Management / Executive Management	Executive Management / Top Management	Executive Management / Top Management

Source: Calculated from survey results

**Table 4.47: Least engaged biographical groups per factor**

Two Least engaged biographical groups per factor				
Question/statement	Organisational level	Team level	Immediate manager level	Individual level
2	When were you born?			1978 - 2000 (youngest employees)
4	What is your gender?			Females
5	Which Business unit do you work in?	Business unit "A" and "E"	Business unit "D" and "E"	Business unit "D" and "A"
6	How will you categorise your job?	Administrative / Professionals	Technical Advisors / Administrative	Technical Advisors / Administrative
7	How will you categorise your job grade?	Employee / Supervisors	Employee / Supervisors	Employee / Supervisors

*Source:* Calculated from survey results

The analysis of the summary of results exposed that the groups that were most engaged in statements five, six and seven, were the same for each factor; whereas the employees that were most engaged on individual level were the oldest group, and male employees.

The most engaged employees were:

Business units: Group HQ and Business unit "F"

Job category: 'Management' and 'Farms Operations'

Job grade: 'Top management' and 'Executive management'

The reason for low levels of employee engagement should be identified and addressed. The relevant areas on an individual level were both the youngest employee group and the female employees. Regarding statements five, six and seven, the groups that showed the lowest level of engagement were:

Business units: "A", "D" and "E" as well as the 'Farms division'

Job category: 'Administrative' employees, 'Professional' employees, 'Technical advisors', and the 'Plant operations' groups.

Job grades: 'Employee' and 'Supervisor'

Since the organisation deals with a very competitive market, an improvement of employee engagement can contribute towards the organisation's competitive advantage. The results showed a significant difference in employee engagement between 'Management' that were very engaged, and 'Employees' and 'Supervisors' who were less engaged.

The results of this research conform with the research done by Nienaber and Martins (2015).

#### **4.8 Chapter Summary**

The main objective of this study was to determine the reliability and validity of a newly developed scale measuring employee engagement in a diverse multi-cultural environment in the South African context.

The instrument was tested in a typical South African organisation and the data collected was made available to the researcher to test the instrument for validity, using the EFA to determine the factorial structure, and Cronbach Alpha to establish the internal reliability of the scale.

The results revealed that the third step in the initial item reduction of scale development was concluded, that the scale tested reliable and valid; therefore steps four to six of the scale development process as per Hinkin (1998) could proceed.

The four factors that resulted from the initial item reduction, represented the following levels of employee engagement were tested:

- Factor 1 test engagement on Organisational level using seventeen items
- Factor 2 test engagement on Team level using twelve items
- Factor 3 test engagement on Immediate manager level using eight items
- Factor 4 test engagement on Individual level using fifteen items

The conclusion and recommendations regarding the outcomes of this research study are discussed in Chapter 5.

## **CHAPTER 5: CONCLUSIONS AND RECOMMENDATIONS**

### **5.1 Introduction**

The problem statement for the purpose of this study is:

- To contribute towards testing the newly developed instrument, measuring employee engagement in a typical South African organisation, for reliability and validity
  - Cronbach Alpha was used for the reliability test
  - factorial analysis was used for the validity test, and
- A secondary analysis of the collected data was done to measure employee engagement in the organisation and do comparisons between –
  - various Business units
  - various biographical groups
- The analysis of variance (ANOVA) will be applied to determine significant differences between the various biographical groupings.

This study collected survey data from employees from a typical South African organisation, using a web-based questionnaire. EFA was used to determine the factorial structure and Cronbach Alpha was used to establish the internal reliability of the scale and its subscales.

### **5.2 Conclusions of the research study**

The survey organisation represented a typical South African context, representative of the demographics of the country.

The organisation represented a variety of work disciplines such as; Farm operations, Production plant operations; Sales and marketing, Administrative and Professionals. The newly developed scale, measuring employee engagement on organisational, team and individual levels were tested for reliability and validity.

The EFA tested and resulted in four primary factors namely:

- Organisational level
- Team level
- Immediate manager level
- Individual level

The outcome of the factorial validity test showed four distinct factors. Although the statistical analysis showed six factors, two of them had less than five items and were therefore ignored.

The Cronbach Alpha analysis on these four factors proved the test to be reliable. Internal consistency of responses was assessed by Cronbach Alpha. Reliability estimates were between 0.925 and 0.951. These results indicated an excellent reliability given the fact that 0.7 were deemed adequate and a Cronbach Alpha of 0.8 a good reliability.

On Organisational level, Team level, Immediate Manager level and Individual level the results showed significant difference between Business units, job categories and job grades. On individual level additional significant differences showed in the gender and different age groups.

The questionnaire was developed to test engagement on multiple levels and the results complemented the instrument with a successful item reduction and tested reliable and valid, which proved that the initial validation and item reduction (step three) as per the scale development process of Hinkin (Figure 1.1), was successful. Therefore, the instrument development process could progress to steps four to six of the mentioned scale development process.

### **5.3 Limitations of the research**

The test organisation had 7,751 permanent employees at the time of the survey. Due to the data collection method used, only a possible 2,124– or twenty-seven percent– of the permanent employees could participate in the research, of which 399 participated. The actual participants represented almost nineteen percent of the potential survey population but only five percent of the permanent employees of the organisation. It was also noted that the majority of the participants were white. It is

evident from the results that the lower ranked employees who participated were less engaged than their senior counterparts. If the limitations described are taken into account, most of the employees who were excluded in the research, were lower level employees.

#### **5.4 Recommendations**

The instrument, if amended according to the outcome of the statistical analysis, can be used for further validation using the confirmatory factor analysis (CFA) to confirm the internal reliability and construct validity of the instrument.

The significance of this research is that management of the test organisation utilise the results to focus on areas with significant differences between the various biographical groups, and determine why the differences exist, and address those differences to positively change the engagement levels of the employees. The results on all the different levels pointed towards Business units, Job categories and Job grades, with the exception of the individual level where age groups and gender can be added, as common denominators for significant differences. Cause analysis will focus on these differences. Resolving these significant differences can contribute towards a higher level of engagement of the workforce of the organisation. If the necessary attention is given to improve the level of engagement, it will contribute towards an overall better competitive advantage for the organisation.

It is recommended that a follow-up survey in the same organisation be conducted regarding employee engagement, and that all permanent employees be included in the study. It will therefore be necessary to revisit the methods of data gathering to include all the employees instead of excluding those who do not have access to computers which are linked to the organisation's intranet.

#### **5.5 Suggestions for further research**

The instrument successfully passed the initial reliability and validity test by using EFA and other techniques. Questions such as "Does an instrument have the same structure across certain population subgroups?" might be addressed by CFA. Researchers should be cautioned against drawing substantive conclusions based on exploratory analysis. CFA, as well as other latent variable modelling techniques allow

researchers to test hypotheses *via* inferential techniques, and could provide more informative analytic options (Costello & Osborne, 2005).

## **5.6 Chapter Summary**

Employee engagement is vital to organisations and its management, since it creates and shapes a competitive advantage. A number of instruments are available to measure engagement; however, the validity of widely used instruments measuring engagement was found to be less than optimal. The employee engagement measurement scale researched and developed to measure employee engagement concurrently on multiple levels, specifically in a diverse multicultural South African context, was validated for reliability and validity.

The instrument tested reliable and valid on four levels of engagement.

The contribution of this study is that a tested reliable and valid employee engagement measuring scale is available for future use.

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**APPENDIX A – Original questionnaire/instrument as developed by  
the researchers Nienaber and Martins (2014)**

**January 2013**

**Compiled by:**

Prof N. Martins and Prof H. Nienaber  
University of South Africa

**[Questionnaire not included as it is available from the researcher]**

## **APPENDIX B – Final questionnaire/instrument as used in the survey**

**[Questionnaire not included as it is available from the researcher]**

## APPENDIX C – Letter of authorisation from the organisation

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Memorandum

**To:** All employees of the [REDACTED] group

**From:** [REDACTED]

**Date:** 2013-11-01

**Subject:** Survey on employee engagement

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It is important for Top and Executive Management of [REDACTED] to understand the engagement and commitment levels of our staff members. In an attempt to understand what is important to our employees and to identify any possible concerns of our staff members, [REDACTED], in conjunction with Unisa, is conducting a survey. To help us in arriving at this point, we would like to urge staff members to take the time to complete the questionnaire which is available on the link, to an independent website, given below.

This survey aims to measure employee engagement at both individual and organisational level, in a South African context. As such it should indicate what the factors, which contribute to employee engagement, are. Armed with this knowledge, management can create or improve an environment to optimise employee engagement at both individual and organisational level and secure a competitive advantage for [REDACTED].

Participation is on a voluntary basis and you can withdraw at any stage if you so wish, without any negative consequences.

Participation is on an anonymous and confidential basis – no one will know who said what

The questionnaire will be available on the following web link [http://www.orgdia.co.za/survey/\[REDACTED\]/engagement.htm](http://www.orgdia.co.za/survey/[REDACTED]/engagement.htm) from 2013-11-11 to 2013-12-13. Every employee in the [REDACTED] group, with access to a computer, is hereby invited to complete the questionnaire during this period.

What does the questionnaire consist of?

Section 1:

**Biographical (personal) information:** These questions are designed to gauge the feelings of different divisions within [REDACTED]. The information on race and gender, for instance, would ensure that any concern by any groupings in this regard is appropriately addressed.

Section 2:

Following are answers to some of the questions you might have regarding this project.

**Why do I need to complete this questionnaire?**

**Your participation is vital in gaining an accurate reflection of the perceptions of all the employees. This study will only be relevant if you participate. The results will enable management to determine whether we are moving towards achieving our goals.**

What will be done with my answers?

**The results of this survey will be used to continue to make [REDACTED] a place where you can learn and grow where your differences and concerns are appreciated, valued and addressed and your ideas sought, tested and used.**



## APPENDIX D – Ethical clearance certificate



COLLEGE OF ECONOMIC AND MANAGEMENT SCIENCES  
RESEARCH ETHICS REVIEW COMMITTEE

02 July 2015

Ref #: 2013\_CEMS\_039

Name of applicant: Mr Andries Steyn

Student No #: 03027147

Dear Mr Andries Steyn

**Decision: Ethics Approval**

**Name:** Mr Andries Steyn, [Andries@zonemail.co.za](mailto:Andries@zonemail.co.za), 082 800 6800

**Proposal:** Validating an employee engagement measurement instrument in a South African Context

**Qualification:** Master's Degree

Thank you for the application for research ethics clearance by the College of Economic and Management Sciences Research Ethics Review Committee for the above mentioned research. Final approval is granted for the duration of the project.

**For full approval:** The revised application was reviewed in compliance with the Unisa Policy on Research Ethics by the CRERC on **19 June 2015**.

The proposed research may now commence with the proviso that:

- 1) The researcher/s will ensure that the research project adheres to the values and principles expressed in the UNISA Policy on Research Ethics.
- 2) Any adverse circumstance arising in the undertaking of the research project that is relevant to the ethicality of the study, as well as changes in the methodology, should be communicated in writing to the CRERC.



University of South Africa  
Pretoria Campus, Muckleneuk Ridge, City of Tshwane  
PO Box 392 UNISA 0003 South Africa  
Telephone: +27 12 429 3111 Facsimile: +27 12 429 4150  
[www.unisa.ac.za](http://www.unisa.ac.za)