

Employee engagement and satisfaction of self-determination needs: An exploratory study in the contract research sector

E.H. de Wet
24747009

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Supervisor: M.M. Heyns
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DEDICATION

When I said, My foot slippeth; thy mercy, O LORD, held me up.

In the multitude of my thoughts within me thy comforts delight my soul. Psalm 94:18,19.

In loving memory of my mother

1928 - 2011

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ABSTRACT

Orientation: The pharmaceutical industry is forced to contain costs by outsourcing drug testing to commercial contract research organisations (CROs), which ensure the performance of clinical trials by experienced employees who must competently and skilfully exercise due care and diligence. Talent in South Africa is scarce, expensive and hard to retain.

Research purpose: To investigate the relationship between the satisfaction of self-determination needs and employee engagement in the South African contract research sector. In addition, relationships to perceived managerial support, emotional exhaustion and intention to leave were investigated.

Motivation for the study: Organisations and researchers should be made aware that a lack of employee engagement has financially harmful implications for business throughout the world, with a loss of productivity, low retention rates and decreased profitability.

Research design, approach and method: A quantitative, cross-sectional approach was employed. The convenience sample (n=260) included CRO-employed males and females of 18 years and older, with different levels of education and tenure. Confirmatory factor analysis and calculation of Cronbach's alpha were used for validity and reliability testing. Data were summarised descriptively. Coefficients of correlation and Cohen's d effect size were computed to assess relationships.

Main findings: Employee engagement was found to have a strong positive relationship with the satisfaction of self-determination needs, a moderate positive relationship with perceived managerial support and moderate negatively related to both emotional exhaustion and intention to leave.

Practical/managerial implications: The study highlights the relationship between needs satisfaction and employee engagement in the workplace; especially perceived managerial support should be considered in order to promote and sustain employee engagement.

Contribution/value-add: The study provides increased knowledge toward efficiency and effectiveness of CRO services by exploring the elements through which employee engagement and satisfaction of self-determination needs impact on the attraction and retention of staff, particularly of male employees, in the contract research sector.

KEY TERMS: Employee engagement, self-determination theory, needs satisfaction, managerial support, emotional exhaustion, intention to leave, contract research

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LIST OF ABBREVIATIONS AND DEFINITION OF TERMS

χ^2	Chi-square
CFA	Confirmatory factor analysis
CFI	Comparative fit index
CRO	Contract research organisation
MBI	Maslach Burnout Inventory
MRS	Manager Relations Scale
N-NFI	Non-normed fit index (Tucker-Lewis index)
PAW	Problems at Work
PCS	Perceived Competence Scale
RMSEA	Root mean square error of approximation
SDT	Self-determination theory
SRMR	Standardised root mean square residual
SSRS	Supportive Supervisor Relations Scale
TIS	Turnover Intention Scale
UWES	Utrecht Work Engagement Scale
WBNSS	Work-related Basic Need Satisfaction Scale (also abbreviated in the literature as W-BNS)
WCS	Work Climate Survey

CHAPTER 1 ORIENTATION AND PROBLEM STATEMENT

1.1 Introduction

This exploratory study investigated the relationship between employee engagement and satisfaction of self-determination needs in the South African contract research sector, which involves clinical research for the pharmaceutical/biotechnological/medical device industry. In addition, relationships between perceived managerial support and work-related functioning concepts of emotional exhaustion and intention to leave were researched.

Chapter 1 provides the contextual background to justify the study rationale and research objectives. It describes the planned research methodology and explains the limitations that were foreseen within the scope of the study. An overview of the study structure concludes the chapter. Details on research instruments and statistical analysis are presented in Chapter 3.

1.2 Background to the study

Recent trends to curb increasing domestic costs in the pharmaceutical industry have led to the outsourcing of drug testing and clinical trials to contract research organisations (CROs), especially with services and operations in low and middle income countries, including South Africa (Abodor, 2012:239; BioCrossroads, 2008:8; Gaidos, 2013:27). CROs are profit-oriented providers of researchers and facilities for the performance of clinical trials. When developing an innovative molecule into a market authorised drug, CROs can deliver all these services more expeditiously and cost-effectively than the clients themselves. This provides for a value proposition that CROs could offer to clients with regard to pharmaceutical, biotechnology and medical device developments. To answer to this value proposition, CROs are required to ensure the performance of clinical trials by experienced employees who can competently and skilfully exercise due care and diligence.

Individuals, who have the abilities to gather, analyse, interpret and synthesise information as subject matter experts are in demand to deliver better decision-making and quality services in the contract research sector. In the pharmaceutical industry, employees who have a better understanding of the local language, culture and norms of their respective countries contribute toward healthier interpersonal relations and improved trial execution (Abodor, 2012:239). Skilled, experienced staff provides a competitive advantage in the presence of a growing demand for such talent by most leading CROs involved in pharmaceutical, biotechnology and medical device developments (BioCrossroads, 2008:5). With high turnover and scarcity worldwide, attracting and retaining skilled employees who can operate in a high-performance

culture has become of strategic importance (McShane & Von Glinow, 2010:18). Especially in emerging markets including South Africa, talent is scarce, expensive and hard to retain (Dewhurst *et al.*, 2012:2; Rothmann *et al.*, 2013:1).

Attitudinal and behavioural outcomes at the individual level may be considered a core driver of overall organisational performance (Wright & Haggerty, 2005:171) and a competitive advantage. Allen *et al.* (2003:114) show that supportive human resource practices make employees feel valued for their contributions. It has been consistently found that temporary workers show higher intention to leave and less organisational citizenship behaviour than permanent workers; “temporary workers are part of an organisation’s periphery” (Isaksson, 2006:26). Furthermore, supportive practices are related to the subsequent affective attachment and development of perceived organisational support, which significantly negatively correlate with turnover intent (Allen *et al.*, 2003:114). Moreover, research has shown that autonomous self-regulation and perceived managerial/supervisor support are negatively related to turnover intent (Eisenberger *et al.*, 2002:570; Williams *et al.*, 2014:414). Drawing on the social exchange theory, research has revealed that supportive line manager behaviour impacts positively on individual performance, and is mediated by employee engagement (Alfes *et al.*, 2013:839).

Kahn (1990:694) defines personal engagement as the “harnessing of organization members’ selves to their work roles: in engagement, people employ and express themselves physically, cognitively, emotionally, and mentally during role performances”. Based on a needs-satisfying approach he conceptualised employee engagement in the context of task behaviour and role performance (Shuck, 2011:308). Thus, it is because engaged employees identify with their work that they put so much effort into it. Despite a comprehensive theoretical model of psychological presence, Kahn (1992:321) did not operationalise the construct. Taking an approach of engagement as the driving energy in one’s work role, Schaufeli *et al.* (2002:74) define and operationalise work engagement as an experienced psychological state characterised by vigour (physical dimension), dedication (emotional dimension) and absorption (cognitive dimension), which is associated with the impact of job resources and personal resources on organisational outcomes. Viewing employee well-being on a spectrum, burnout represents the unwell-being end with employee engagement leading to the positive antithesis and concept of well-being (Maslach *et al.*, 2001:416; Schaufeli *et al.*, 2008:173). Burnout as a state of mental weariness is conceptualised descriptively as a three-dimensional construct that comprises emotional exhaustion, cynicism and lack of professional efficacy with feelings of insufficiency and poor job-related self-esteem or a lack of personal accomplishment (Maslach *et al.*, 2001:399). Significant relationships between work engagement and burnout with turnover intention were found in a predictive model (Du Plooy & Roodt, 2010:1).

Evidence exists that job resources, including supervisor support are positively related to employee engagement (Bakker *et al.*, 2008:191). These resources play an intrinsic motivational role through the fulfilment of basic psychological needs for autonomy, relatedness and competence (Ryan & Frederick, 1997:557; Van den Broeck *et al.*, 2008:290). From the perspective of self-determination theory (SDT), Rothmann *et al.* (2013:8) show that supportive, trusting, non-controlling manager relations contribute to positive work-related outcomes and low intention to leave in the South African agricultural sector.

Similar research, linking employee engagement and the satisfaction of psychological needs, could not be found for the contract research sector. This study was planned to explore a set of factors thought to be related to strong work relationships and the proposed benefits to the individual and the organisation. Recognising the inherent relationship between work relationships and employee well-being (Bakker *et al.*, 2008:191; Truss *et al.*, 2013:2658), it was also planned to investigate relationships between perceived managerial support and work-related functioning concepts of emotional exhaustion and intention to leave.

SDT provides for a perspective of well-being – the content of a person's life, the processes of living well, and the pursuit of virtue and excellence. According to this theory, human well-being is underpinned by an employee's ability to satisfy the innate needs of autonomy, competence and relatedness (Deci & Ryan, 2000:262). Haivas *et al.* (2014:326) show that the satisfaction of autonomy and competence needs is causally related to the autonomous forms of motivation; whereas, the satisfaction of relatedness need could be related to controlled forms of motivation. Kuvaas (2008:46) shows that job autonomy, managerial support for self-determination needs, as well as task interdependence are positively related to intrinsic motivation.

Once needs are satisfied, employee motivation improves and productivity benefits (McShane & Von Glinow, 2010:134). However, the reverse is also true (Deci & Ryan, 2000:262).

For the purposes of this research study, a cross-sectional survey was designed. It was planned to include office-based staff employed by global CROs with offices in a predefined geographical area of South Africa.

1.3 Problem statement

One of the biggest challenges managers face in South Africa today is attracting and retaining key talent, with the local pharmaceutical industry particularly affected by an excessive demand in relation to the available talent (Anon., 2015; Rothmann *et al.*, 2013:1). Talent availability in South Africa may be threatened further by the low growth of the economy and the general deterioration of the national education system. Special effort should be made to attract and

retain qualified or experienced people with attributes that are conducive to productivity and sustainability. In the corporate environment the needs of stakeholders, especially the customer, are frequently satisfied at the expense of the well-being of the employee (McShane & Von Glinow, 2010:13). This is observable in the contract research environment where pockets of skilled workers in low-cost locations are incorporated into faceless, global organisational structures, and are expected to satisfy their clients (Adobor, 2012:239). For most organisations, a high turnover of staff is associated with a considerable loss of intellectual capital and high costs of replacement (McShane & Von Glinow, 2010:18).

It was against this background that the research questions for the current study were formulated as follows:

- (a) Do employees in the contract research sector perceive their self-determination needs as being satisfied at work?
- (b) What is the prevalence and intensity of engagement among the employees in the contract research sector?
- (c) Considering the faceless world many workers in the contract research sector work in, what are employees' perceptions of managerial support at work?
- (d) What is the prevalence and intensity of work-related functioning concepts of emotional exhaustion and intention to leave among the employees in the contract research sector?
- (e) What are the relationships between these constructs?

From a perspective of SDT, it is posited that the satisfaction of self-determination needs relates positively to employee engagement and perceived managerial support, and negatively to work-related functioning concepts of emotional exhaustion and intention to leave.

Elucidation of employees' levels of engagement and work-related functioning, as well as their perceptions of managerial support is expected to increase knowledge of human behaviour at both individual and organisational levels in the workplace. It was thought that this research could contribute toward knowledge and interventions regarding the attraction and retention of skilled, experienced staff in the contract research sector, as well as to the efficiency and effectiveness of CRO services.

The research objectives are outlined below.

1.4 Research objectives

1.4.1 General objective

The aim of this study was to investigate the relationship between the satisfaction of self-determination needs and employee engagement in the South African contract research sector serving the pharmaceutical industry. In addition, relationships to perceived managerial support and work-related functioning concepts of emotional exhaustion and intention to leave were researched.

1.4.2 Specific objectives

The specific objectives of the current study were to:

- (1) Develop a conceptual understanding and definitions of the key concepts relevant to the satisfaction of self-determination needs and employee engagement, by conducting a literature review;
- (2) Empirically assess the levels of needs satisfaction, employee engagement, perceived managerial support, emotional exhaustion and intention to leave, using a compilation of documented scales and subscales;
- (3) Determine the relationships between the constructs; as well as in relation to biographical data; and,
- (4) Make recommendations regarding human resources interventions, as applicable to the findings of this study.

The scope of the study is briefly outlined below.

1.5 Scope of the study

The study involved principles of Organisational Behaviour, with an emphasis on the individual level. Arguably, indicators at the individual level provide better and more reliable measures for longer-term outcomes of organisational sustainability and employee well-being than aggregate outcome variables at organisational level.

The study primarily focused on the contract research sector serving the pharmaceutical industry in South Africa, with its unique and significant challenges.

The planned research methods are briefly outlined below.

1.6 Research methodology

This section outlines the planned research methodology for conducting the study in two phases, i.e., a literature review and an empirical research study. The research approach and research design, including sampling technique and sample size, are discussed. The eligibility criteria for research participation are stated. The planned research methods and measuring instruments are described.

1.6.1 Research approach, research design and research methods

1.6.1.1 Phase 1: Literature review and sources

A literature review was done regarding employee engagement, perceived managerial support, emotional exhaustion and intention to leave, with SDT guiding the research.

The consulted sources included:

1. Journal articles
2. Books and chapters in books
3. Other sources, such as dissertations and references to internet sources

Literature cited for the research topic was gathered through the internet, as well as library searches into scientific journals addressing research underpinned by the theory, with particular emphasis on application in the South African context. The EbscoHost facility available through the Library webpage of the North-West University was used to research references to e-journals, books, chapters in books and dissertations, and to access internet sources.

Sources utilised in EbscoHost searches included: Academic Search Premier, Business Search Premier, eBook Collection, E-Journals, International Pharmaceutical Abstracts, PsycARTICLES and PsycINFO. Appropriate keywords were searched and advanced search filters were applied to improve relevance to the research questions.

For the research questions selected for this exploratory study, the following key terms were listed: *Employee engagement, self-determination theory, needs satisfaction, managerial support, emotional exhaustion, intention to leave, contract research.*

1.6.1.2 Phase 2: Empirical study

For the purposes of the empirical study, a quantitative approach was planned. The study did not involve any interventions and the results are presented in numerical format. The non-experimental research design comprised a cross-sectional survey as the valid method to investigate the research objectives and for the collection of reliable data. Primary data were treated statistically to obtain study results. Data analysis was exploratory and correlational. Descriptive statistics are presented. Survey questionnaire scales and subscales were validated and data were tested for reliability. Inferential statistics were performed as data allowed.

Guidance was taken from Rothmann *et al.* (2013:4), who utilised a similar approach and research design to investigate the constructs of concern in the South African agricultural sector. Research in this study was planned to replicate elements of previous research and to extend empirical research into the fields of needs satisfaction and employee engagement.

1.6.2 Research subjects

1.6.2.1 Characteristics of study population and eligibility criteria

The target population involved office-based employees from the contract research sector identified at global CROs within a predefined geographical area of South Africa.

Male and female subjects of any race who were 18 years of age or older and willingly consented to voluntarily participate in the study were included.

Non-responders were excluded.

1.6.3 Sampling and sample size

Considering usefulness, credibility and the availability of resources, convenience sampling was applied to meet the study's research objectives. As little variation in the target population was expected, it was thought that the exploratory study could serve as a pilot study to studies using more structured samples that allow for the randomisation and generalisation of findings to the population (Saunders *et al.*, 2009: 233, 241).

At the time of study conduct, CROs with office facilities in the predefined geographical area of South Africa had an estimated total employee compliment of approximately 350 office-based staff members, representing the target population (N) for this exploratory study. Survey questionnaires were distributed by hand to the entire population for completion and were collected by hand within a reasonable time.

Geographical area was the main reason for choosing the sample frame.

Execution of the empirical study was planned for July 2015.

1.6.4 Research instruments

Questionnaires similar to those used in previous research were utilised to facilitate discussion and conclusion on study results. Operationalised similarly, the terms employee engagement and work engagement are used interchangeably for the purposes of this study (see Section 2.3.3). Preference was given to validated scales and subscales available in the open domain.

- (1) The Work-related Basic Need Satisfaction Scale (WBNSS) was used to measure satisfaction of self-determination needs.
- (2) The Utrecht Work Engagement Scale (UWES) was used to measure employee engagement.
- (3) An adapted Supportive Supervisor Relations Scale (SSRS), combined with the Perceived Competence Scale (PCS) was used to evaluate perceived managerial support.
- (4) The emotional exhaustion subscale of the Maslach Burnout Inventory (MBI) was applied to assess emotional exhaustion at work.
- (5) The Turnover Intention Scale (TIS) was used to investigate intention to leave.

In addition, biographical data were collected.

Research instruments are detailed and referenced in Chapter 3.

1.6.5 Research procedure and approvals

The research project was submitted to the Ethics Committee of the North-West University for evaluation and acceptance. Permission was obtained from management of the identified CROs to access their offices for the distribution and collection of survey questionnaires.

The Ethics Committee of the North-West University (Potchefstroom Campus), South Africa, evaluated and accepted the research project. The project number is EMS15/03/31-1/09.

An informed consent letter based on principles of Good Clinical Practice accompanied the survey questionnaire. Office-based employees in the contract research sector were invited to voluntarily participate in the research study.

Raw data were collected and transcribed to an electronic database. The data set was treated statistically, as appropriate for the exploratory study.

1.6.6 Statistical analysis

Primary data were captured and coded on an Excel spreadsheet. Data were summarised descriptively and displayed graphically. Questionnaires were validated and data were tested for reliability. Inferential statistics to evaluate relationships were performed as data allowed.

Statistical methods are detailed in Chapter 3.

1.6.7 Ethical considerations

The researcher is committed to scientifically sound and ethical research.

The research project was submitted to the Ethics Committee of the North-West University for evaluation and acceptance. Approval (EMS15/03/31-1/09) was obtained before questionnaires were distributed to potential research subjects.

The researcher is familiar with the principles of Good Clinical Practice and adhered to these, as applicable. Using an informed consent letter, subjects were invited to participate in the research study. They were allowed to participate voluntarily and they were not coerced to join. Participation was strictly anonymous. Use of a field worker to hand out and collect the survey questionnaires contributed to objectivity and anonymity. Subjects were fully informed on the nature of the current research study, the research process, their roles and responsibilities, as well as confidentiality of personal data and study information. They were assured that personal information and study data would be handled confidentially at all times. Subjects were allowed to ask questions and raise concerns. They were permitted to request feedback on their study results (although none made use of the offer). Subjects could have withdrawn consent at any time in which case their data would not have been used. It was emphasised that study results would be used for academic purposes only.

A copy of the informed consent letter is presented in Appendix A.

The researcher is aware of what plagiarism entails and the consequences of transgression.

1.7 Value-added and limitations

Data were examined for relationships and generalised to theory. Generalisation to the population was not anticipated for this exploratory study, which investigated a convenience

sample. As a cross-sectional survey was planned, the study did not address issues of directionality or causality. It was thought that if findings of the current study are encouraging, follow-up longitudinal studies could be considered to evaluate directionality or to assess interventions for purposes of examining causal relations among variables.

1.8 Chapter division and layout of the study

CHAPTER 1: ORIENTATION AND PROBLEM STATEMENT

CHAPTER 2: LITERATURE REVIEW

CHAPTER 3: EMPIRICAL RESEARCH METHODOLOGY

CHAPTER 4: EMPIRICAL RESULTS AND FINDINGS

CHAPTER 5: CONCLUSIONS AND RECOMMENDATIONS

1.9 Chapter summary

Chapter 1 provides descriptions on the background to the study, problem statement, research objectives, scope of the study and research methodology (including proposed research participants and measuring instruments), as well as value added and limitations.

Chapter 2 provides the literature review relevant to the study.

CHAPTER 2 LITERATURE REVIEW

2.1 Introduction

The purpose of the literature review was to develop a conceptual understanding and definitions of the key concepts of consideration.

In Chapter 2, SDT is reviewed as underpinning theory and guidance. Employee engagement is discussed relevant to SDT, together with other topics. These include perceived managerial support and work-related functioning concepts of emotional exhaustion and intention to leave.

From the perspective of SDT, it is posited that satisfaction of self-determination needs relates positively to employee engagement and perceived managerial support, and negatively to work-related functioning concepts of emotional exhaustion and intention to leave. In this chapter, the related antecedents, manifestations and/or consequences are examined for self-determination needs, especially in the context of the pharmaceutical industry and with an emphasis on the contract research sector.

The literature review provides for a conceptual understanding and definitions of the key concepts, with SDT as the underpinning theory and guidance. The proposed hypothetical model depicting the relationships between needs satisfaction and constructs investigated in this study, is presented in Figure 2.1 (also see Section 2.6).

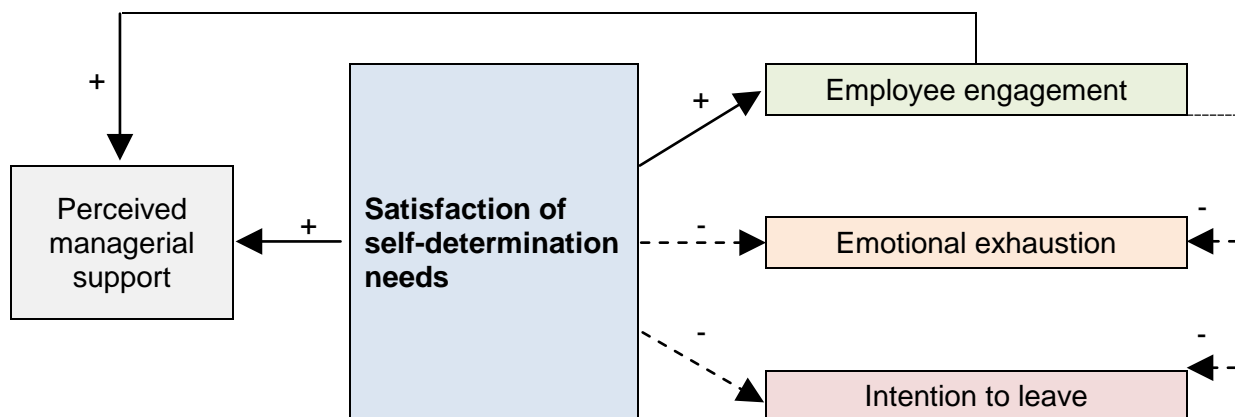


Figure 2.1 Proposed hypothetical model illustrating relationships between needs satisfaction and constructs investigated in the research study

Data source: Own design.

The literature review also provides for research into appropriate instruments to measure the levels and/or perceptions of constructs. Preference was given to validated questionnaires available in the open domain.

2.2 Self-determination theory

2.2.1 Background information

Self-determination can be described as the experience of “a sense of choice in initiating and regulating one's own actions” (Deci *et al.*, 1989:580).

Developed out of research on goal-directed behaviour, SDT differentiates the goal contents and regulatory processes of goal pursuit by using the concept of innate psychological needs and the degree to which these needs are satisfied. The innate psychological needs of autonomy, competence and relatedness were identified as essential nourishment for sustained psychological growth, integrity and well-being, regardless of culture. The research found that motivation is underpinned by basic and common psychological needs in all cultures, despite superficial differences in cultural values (Deci & Ryan, 2000:227; Deci & Ryan, 2008a:18). Satisfaction of these universal needs is associated with most effective functioning, optimal development and well-being (Deci & Ryan, 2000:227).

SDT, empirically based on human motivation, provides a sound theoretical framework for the evaluation of social relationships in the workplace (Deci & Ryan, 2008b:182). People need to feel autonomous, competent and related to others and are assumingly activated and self-motivated by personal successes. Needs satisfaction recognises the interaction between a person's inherent activity and social environments in a wide range of life's domains. If the social environment supports the satisfaction of the basic psychological needs of autonomy, competence and relatedness, a person's inherent activity and natural growth processes (including motivation) are fostered with subsequent positive psychological, behavioural and developmental outcomes. When needs are reasonably satisfied, people engage in activities they find interesting (intrinsic motivation) or important (well-internalised extrinsic motivation). However, the reverse is true when needs are thwarted, with deleterious and self-perpetuating effects on many well-being outcomes. Failure to satisfy self-determination needs is associated with insufficiencies in well-being and successive defensive adaptations (Deci & Ryan, 2000:262).

The relationship between the satisfaction of self-determination needs and employee engagement in the workplace is pivotal to the current research study, with relevant descriptions of the impact of perceived managerial support and the negative experiences of emotional

exhaustion and intention to leave. The latter two constructs are considered to be insufficiencies in well-being and defensive adaptations to satisfaction disregard. For this reason, the key components of SDT are described, starting with the differentiation of motivation supported by the theory.

2.2.2 Intrinsic and extrinsic motivation

Intrinsic motivation can be described as “a basic, lifelong psychological growth function” (Deci & Ryan, 2000:232), that leads to the postulation of intrinsically motivated behaviour being underpinned by a person’s need for self-determination. Determined by the positive feelings resulting from spontaneously satisfying activities, intrinsically motivated behaviour can be defined as the activities “that individuals find interesting and would do in the absence of operationally separable consequences” (Deci & Ryan, 2000:233; Deci & Ryan, 2008a:15).

Early research states that the psychological importance of input that results in intentional behaviour can be categorised as either *informational* or *controlling*, with the former fostering self-determination and the latter negatively impacting on self-determination (Deci *et al.*, 1989:580). *Informational* refers to autonomous supportive, competence-promoting input.

Research has found that tangible rewards, threats of punishment, deadlines, surveillance, negative feedback and controlling social climates tend to undermine intrinsic motivation. Activities providing for choice, actions of positive performance feedback and supportive social climates enhance intrinsic motivation. These interactions are attributed to the satisfaction of basic needs of autonomy and competence, or lack thereof. Despite the positive or negative impact on intrinsic motivation, the nature of the social context within which the activities take place plays a deciding role. Controlling social climates negatively interact with intrinsic motivation, whereas supportive, informational social climates enhance intrinsic motivation (Deci & Ryan, 2008a:15).

In contrast, extrinsic motivation can be defined as “engaging in an activity because it leads to some separate consequence”, such as a tangible reward or activity to avoid punishment (Deci & Ryan, 2008a:15).

Internalisation of extrinsic motivation is considered to be “an essential aspect of psychological integrity and social cohesion” (Deci & Ryan, 2000:232). It refers to the process of how people engage with structures and representations of themselves and their world. Three different types of internalisation can be distinguished, i.e., introjection, identification and integration. Introjection refers to “people taking in an external contingency, demand, or regulation but not accepting it as their own”. Identification involves “people accepting the importance of the

behaviour for themselves and thus accepting it as their own". Integration refers to internalisation "in which people have succeeded at integrating an identification with other aspects of their true or integrated self". The latter represents internalisation in its fullest sense; it is the way through which behaviour that has been extrinsically motivated indeed becomes autonomous and self-determined. Although viewed as a natural propensity, effective internalisation depends on the degree of satisfaction of basic psychological needs. In addition, high levels of support are conducive to integration (Deci & Ryan, 2008a:16).

Motivated behaviour is underpinned by a person's needs, which necessitates the examination of needs as fundamental determinants of human behaviour and the associated theories.

2.2.3 Theories: Needs as fundamental determinants of human behaviour

Many researchers have described needs as fundamental drivers of human behaviour. Probably the best known to a large audience is the five-level hierarchical order of basic needs: physiological, safety, love, esteem and self-actualisation, described by Maslow (1943:370). Research shows significant relationships between the nature of supervision and employees' job attitudes. Campbell (1971:524) postulates an important role for supervisors in needs satisfaction of belongingness, recognition and appreciation.

Without differentiation between transitions among needs, McClelland describes the basic needs of achievement, power and affiliation to motivate individuals at higher or lower levels. In the management context highly driven by power, the implication is that the person is interested in influencing people. If low in affiliation need, the manager has little regard for what employees think of or say about his decisions. These components of effective managerial behaviour (high in power, low in affiliation) should be associated with a high level of self-control (activity inhibition), in order to function optimally within organisational systems and to follow orderly procedures (McClelland & Boyatzis, 1982:737). Research reveals that this leadership profile is related to success at executive management level, but not at operational levels. Cornelius and Lane (1984:32) show that high affiliation need is related to job performance and favourable employee attitudes at first-line supervision level. This implies that motivation by power may not be critical for managerial success at operational levels. In this research study, office-based staff employed by global CROs at their South African facilities was included in a cross-sectional survey. Since this represents operational level in a professionally oriented service industry, organisational focus on McClelland's Need Theory is not applicable to the research.

Whereas Maslow (1943:370) proposes hierarchically ordered needs, SDT considers the three innate psychological needs for autonomy, competence and relatedness as fundamental self-

determinants of human behaviour (Deci & Ryan, 2000:262). There is exponential growth in the empirical literature confirming the favourable effects of needs satisfaction as defined by SDT, in many domains of life including the workplace (Van den Broeck *et al.*, 2010:984). Besides its association with employees' optimal functioning, satisfaction of self-determination needs is also related to supervisors' leadership styles and employees' work-related well-being.

As satisfaction of self-determination needs in the workplace is pivotal to the current research study, the basic psychological needs are defined as concepts of SDT, as well as in the context of organisational psychology literature.

2.2.4 Definition of basic psychological needs

SDT's concept of autonomy refers to acting volitionally. It is described as the "desire to self-organize experience and behaviour and to have activity be concordant with one's integrated sense of self". It "concerns the experience of integration and freedom and it is an essential aspect of healthy human functioning" (Deci & Ryan, 2000:231). Although often used interchangeably, autonomy should not be confused with independence. The latter refers to not relying on others or acting alone, by choice or controlled (Deci & Ryan, 2008a:16). Thus, autonomy as an SDT concept refers to the "subjective experience of psychological freedom and choice during activity engagement" (Van den Broeck *et al.*, 2010:982). In contrast, the concept of autonomy is often considered in organisational psychology to be a task characteristically related to decision latitude and control over skill utilisation.

The need for competence refers to employees' innate desire to feel effective in interacting with the environment. It is described as the "propensity to have an effect on the environment as well as to attain valued outcomes within it" (Van den Broeck *et al.*, 2010:982). As an affective experience of effectiveness, competence satisfaction allows employees to engage in challenging tasks to adapt to environmental demand. If the need is frustrated, individuals feel helpless and unmotivated (Deci & Ryan, 2000:231). Associated with outcome expectancies and self-efficacy, the concept of competence is undisputed in organisational psychology.

Relatedness refers to individuals' inherent "desire to feel connected to others – to love and care, and to be loved and cared for" (Deci & Ryan, 2000:231). It is their natural tendency to integrate themselves into the social matrix. The need for relatedness is satisfied through the development of close and intimate relationships which heightens a sense of communion. In organisational psychology the concept is consistent with concepts of social support and loneliness at work (Van den Broeck *et al.*, 2010:982). Although not considered to be direct opposites, loneliness refers to the subjective experience of social deficiencies and deficits in

interpersonal relationships, whereas social support refers to the availability of social resources conveying attitudes of caring. Considering the realities of a person's social environment with regard to support and loneliness, a similar environmental impact could apply in the workplace (Wright, 2005:18).

The current research study aims to empirically assess the levels of satisfaction of autonomy need, competence need and relatedness need, as individual constructs and overall, in eligible subjects. For this purpose measurements of satisfaction of self-determination needs were examined in the literature review.

2.2.5 Measuring satisfaction of self-determination needs

To measure satisfaction of self-determination needs in the workplace, the WBNSS was developed and validated in order to facilitate future research on the concepts supported by SDT (Van den Broeck *et al.*, 2010:981).

Measuring satisfaction of self-determination needs in this study is described in Section 3.5.1.

2.2.6 Relevance of self-determination in various applied settings

Being a theory that encompasses a wide range of meaningful phenomena and principles of motivation applicable across cultures and in many of life's domains, a vast amount of research has been generated, including application in the field of health care (Deci & Ryan, 2008a:14). SDT research in the domain of health care and health promotion focuses on patients' perceptions of medical practitioner support for their basic psychological needs (Ng *et al.*, 2012:325).

Despite the rich collection of the literature, research on self-determination in the workplace could not be found for the contract research sector. Previous research on concepts of SDT in the pharmaceutical industry is minimal. Mamdoo (2012:27) considers autonomy among the factors that were investigated as promoters of employee engagement in the pharmaceutical manufacturing industry. In his/her research, autonomy was defined as the "freedom to make decisions in their job" and whether "managers encourage open communication".

It is considered that the current research study will contribute to the body of knowledge on SDT, particularly in the field of contract research activities.

The definitions of basic psychological needs concepts provide for refined conceptualisation of self-determination, which has different antecedents and various manifestations and/or consequences. Drawn from the proposed hypothetical model presented in Figure 2.1, the key

concepts relevant to needs satisfaction are examined in the literature review, starting with employee engagement which is pivotal to this research study.

2.3 Employee engagement

Growing evidence is emerging which indicates that employee engagement significantly positively contributes to individual productivity, performance, organisational commitment and individual well-being, with a negative relationship to turnover intentions. High levels of engagement are related to improved performance and individual well-being (Truss *et al.*, 2013:2658). With the focus on this inherent relationship, employee engagement is predictive of job performance and client satisfaction (Bakker *et al.*, 2008:187). The latter especially provides for a competitive advantage in the contract research sector (Da Silva Tamashiro, 2012:41).

2.3.1 Conceptualisation of engagement

Several definitions of engagement can be derived from everyday connotations, including involvement, commitment, passion, enthusiasm, focused effort and energy.

Engagement as the state of being engaged is defined in the Merriam-Webster dictionary as “emotional involvement or commitment”. Common to the practice- and research-driven definitions is the belief that employee engagement is a desirable condition with both attitudinal and behavioural components that have organisational purpose (Macey & Schneider, 2008:4). With knowledge being an organisational commodity, employee engagement is viewed as “an undeniable dominant source of competitive advantage at all levels” (Shuck, 2011:305).

In order to interpret research findings in terms of actionable implications, it is paramount to define engagement in the context of the workplace. Engagement presents a complex and thorough perspective on an employee’s relationship with work.

Following an integrative review of academic definitions of engagement, Shuck (2011:307) defines employee engagement in terms of four major approaches:

A. Kahn’s (1990) need-satisfying approach

Based on a needs-satisfying approach, Kahn (1990:694) conceptualises employee engagement in the context of task behaviour and role performance, and defines personal engagement as the “harnessing of organization members’ selves to their work roles: in engagement, people employ and express themselves physically, cognitively, emotionally, and mentally during role performances”. Kahn (1990:694) designed a theoretical framework grounded in empirical research and existing theoretical frameworks to illustrate how work-

related psychological experiences and work contexts influence the processes of people presenting and absencing their selves during performance of tasks. He assumes that people are constantly adjusting themselves in their role performance at work, by varying the degree of psychological presence. Thus, employee engagement signifies psychological presence when occupying and executing a formal organisational role.

Kahn (1990:700) continues by defining personal engagement as “the simultaneous employment and expression of a person’s ‘preferred self’ in task behaviors that promote connections to work and to others, personal presence (physical, cognitive, and emotional), and active full role performances”.

Supporting the notion that critical psychological states impact on people’s intrinsic motivation, Kahn (1990:703) describes three psychological conditions that determine how people inhabit their work roles. These psychological conditions are *meaningfulness*, *safety* and *availability*.

Meaningfulness is defined as the positive “sense of return on investments of self in role performances”; thus, involving the promotion of dignity, self-appreciation and sense of value in work interactions (Kahn, 1990:705).

Safety is defined as the ability to “show and employ self without fear of negative consequences to self-image, status, or career”; thus, involving the need for support, trust and openness in interpersonal relationships (Kahn, 1990:705).

Availability is defined as the “sense of possessing the physical, emotional, and psychological resources necessary for investing self in role performances” and is associated with feelings of capability (Kahn, 1990:705). Tangibly, availability could imply physical resources, whereas intangibly, availability could point to opportunities for learning and career/skills development, good job fit and organisational commitment (Shuck, 2011:308).

Subsequent research suggests that all three psychological conditions concerning the needs-satisfying approach are important constructs in the development of engagement.

It is evident that Kahn’s conceptualisation of engagement provides a popular, theoretical framework for future studies (Shuck, 2011:308).

B. Maslach *et al.*’s (2001) burnout-antithesis approach

This perspective is based on the conceptualisation of employee engagement as the positive antithesis of burnout on a single continuum (Maslach *et al.*, 2001:417) or as a distinct

concept negatively related to burnout (Schaufeli, 2013:17). As a positive antithesis, engagement is regarded as the opposite of the three dimensions of burnout, i.e., exhaustion, cynicism and ineffectiveness/lack of accomplishment. Thus, burnout is rephrased as being “an erosion of engagement with the job” (Maslach *et al.*, 2001:416). Based on this definition, employee engagement was operationalised as the reverse of the scores on the Maslach Burnout Inventory-General Survey (Maslach *et al.*, 2001:402).

With the description “a positive, fulfilling, work-related state of mind that is characterized by vigor, dedication, and absorption”, Schaufeli *et al.* (2002:74) define work engagement as the driving energy in one’s work role; an experienced psychological state; and, a concept in its own right. Being a state of mind, engagement does not focus on any particular object, event, individual or behaviour. Based on this definition, Schaufeli *et al.* (2002:71) operationalise engagement by developing the UWES.

C. Harter *et al.*’s (2002) satisfaction-engagement approach

Harter *et al.* (2002:269) define employee engagement as “the individual’s involvement and satisfaction with as well as enthusiasm for work”. The research focused on measuring attitudinal outcomes (satisfaction, loyalty, pride, customer service intent, and intent to stay with the company) and measuring/identifying issues pertaining to the antecedents to attitudinal outcomes that are within control of the manager.

Research using this approach reveals a positive relationship between employee engagement and manager self-efficacy scores, and brings a new dimension to engagement, i.e., employee satisfaction (Shuck, 2011:313). Harter *et al.* (2002:276) conclude that employee satisfaction and engagement are related to significant business results at levels that are important across all organisations.

D. Saks’s (2006) multidimensional approach

The multidimensional concept of employee engagement refers to the development of a three-component model that embraces cognitive, emotional and behavioural elements described by Kahn (1990:692), Maslach *et al.* (2001:397) and Harter *et al.* (2002:268).

Saks (2006:602) defines engagement in the academic literature as “a distinct and unique construct that consists of cognitive, emotional, and behavioral components that are associated with individual role performance”, underpinned by the social exchange theory. Thus, engagement is distinctive from related constructs such as organisational commitment, organisational citizenship behaviour and job involvement. Engagement presents a two-way

relationship between the employer and employee with a meaningful difference between job and organisational engagement. Guided by rules of exchange, engagement is built on trust, loyalty and mutual commitments (Saks, 2006:603).

2.3.2 Antecedents and consequences of engagement

An antecedent can be defined as a specific condition or factor that explains/influences/predicts emerging behaviour in practice; whereas, a consequence refers to a resulting effect of specific activities or conditions (Saks, 2006:604).

Of the four perspectives, it is Kahn's (1990) need-satisfying approach and the Maslach *et al.* (2001) burnout-antithesis approach that provide for theoretical models of employee engagement. Kahn (1990:703) found that the psychological conditions of meaningfulness, safety and availability are associated with employee engagement. Based on this theoretical model, May *et al.* (2004:11) show these conditions to be significantly related to engagement, with meaningfulness the strongest. Positive predictors include: job enrichment and role fit for meaningfulness; rewarding co-worker and supportive supervisor relations for safety; and, resource availability for psychological availability. Conversely, adherence to co-worker norms and self-consciousness negatively relate to safety. Participation in outside activities is a negative predictor of availability. Maslach *et al.* (2001:414) propose six areas of work-life that encompass the major organisational antecedents to burnout: workload, control, reward, community, fairness and values. As a positive antithesis of burnout, engagement presages a sustainable workload, feelings of choice and job control, recognition and suitable rewards, a supportive work community, fairness and justice, and meaningful and valued work (Maslach *et al.*, 2001:417).

Based on these theoretical models, Saks (2006:604) identifies job characteristics, rewards and recognition, perceived organisational and supervisor support, and distributive and procedural justice as antecedents to employee engagement.

Job characteristics: Psychological meaningfulness can be attained from task characteristics when employees are allowed to use personal discretion and different skills, as well as the opportunity to make important contributions (Saks, 2006:604). Research reveals that the job enrichment-engagement relationship is related to meaningfulness, which relates positively to job enrichment and work fit (May *et al.*, 2004:11). A lack of feedback and autonomy consistently relate to all three dimensions of burnout (Maslach *et al.*, 2001:407).

Rewards and recognition: A lack of recognition devalues both work and employee, and a lack of reward contributes to feelings of inefficacy. From the perspective of the positive antithesis of

burnout, appropriate recognition and reward is important for engagement and attributes to tolerance of a greater workload (Maslach *et al.*, 2001:414).

Perceived organisational and supervisor support: Kahn (1990:708) finds that psychological safety is promoted by supportive and trusting interpersonal relationships where employees have the flexibility to fail without fearing the consequences. May *et al.* (2004:11) show that supportive supervisor relations are positively related to psychological safety. A lack of supervisor support is found to be an important factor related to burnout (Maslach *et al.*, 2001:407).

Distributive and procedural justice: Predictable and consistent distribution of rewards using fair procedures contributes to psychological safety. Saks (2006:613) suggests that fairness perceptions of procedural justice allow for reciprocity with greater organisational engagement.

Rich *et al.* (2010:617) conclude that engagement as conceptualised by Kahn is associated with the relationship between value congruence, perceived organisational support, core self-evaluation, as well as task performance and organisational citizenship. Shuck (2010:8) shows that job fit, affective commitment, and psychological climate significantly relate to employee engagement; that employee engagement significantly relates to both discretionary effort and intention to leave. Hierarchical regression analysis indicates a causal relationship between affective commitment and intention to leave, mediated by employee engagement (Shuck, 2010:8).

Consequences

Various attractive and important benefits are associated with employee engagement. Besides higher customer satisfaction ratings and employees staying longer with organisations, engaged employees contribute significantly to increased sales and cost reductions (Shuck, 2010:15).

Evidence reveals that a lack of employee engagement has financially harmful implications for business throughout the world, including major economies such as the United States, Germany, Australia and the Asian market. These effects are attributed to a loss of productivity, low retention rates and decreased profitability, all of which could be lessened through the development of employee engagement (Saks, 2006:600; Shuck, 2010:17).

2.3.3 Measuring engagement

Schaufeli (2013:15) describes work engagement as “the relationship of the employee with his or her *work*” and employee engagement to include “the relationship with the *organization*”, based on the definitions of Kahn (1990:694) and Schaufeli *et al.* (2002:71), respectively. Although the

latter could be referred to as organisational commitment, both definitions describe engagement as a psychological state. The conceptualisations correspond in terms of a physical-energetic (vigour), an emotional (dedication), and a cognitive (absorption) component. Thus, employee engagement and work engagement are mostly used interchangeably. This allows for the similar operationalisation of the concepts.

As described in Section 3.5.2, employee engagement is defined according to Kahn (1990:694) and operationalised using the UWES (Schaufeli *et al.*, 2002:71).

2.3.4 Employee engagement in context

Evidence exists that job resources, including supervisor support are positively related to employee engagement (Bakker *et al.*, 2008:191). The current research study postulates relationships between satisfaction of self-determination needs, employee engagement and perceived managerial support, as displayed in Figure 2.1. The proposed hypothetical model was designed by the researcher for the purposes of this research study.

2.4 Managerial support

2.4.1 Defining managerial support

Managerial support can be defined as “managers’ behaviors that enhance subordinates’ feelings of personal worth” (Deci *et al.*, 1989:580). This implies that managers need to support autonomy, provide positive feedback and acknowledge the subordinate’s perspective. Such behaviour promotes self-determination and enhances trust overall. Consequently, trustworthy, supportive managers provide for feelings of psychological safety and subordinates experience a willingness to invest themselves at work (Deci *et al.*, 1989:581; May *et al.*, 2004:16).

2.4.2 Consequences of managerial support

Various studies (Deci & Ryan, 2008a:15; Kahn, 1990:708; May *et al.*, 2004:16; Rothmann & Rothmann, 2010:3; Rothmann *et al.*, 2013:1; Williams *et al.*, 2014:404) elucidated the role of autonomy support in the workplace and emphasise the importance of perceived managerial support in effective employee performance.

Baard *et al.* (2004:2016) show that perceived managerial support is significantly related to satisfaction of people’s intrinsic needs for autonomy, competence and relatedness, with substantially predicted performance evaluations.

Kuvaas (2008:46) shows that job autonomy, managerial support for basic psychological needs of autonomy, competence and development, as well as task interdependence are positively related to intrinsic motivation. The research provides support for SDT. In addition, the research reveals a relatively strong positive relationship between intrinsic motivation and work performance.

Supportive managerial behaviour fostering psychological safety is linked to employees' perceptions of trustworthiness. Categories of such behaviour include behavioural consistency (predictability), behavioural integrity (consistency between words and deeds), sharing and delegating control (participation in decision-making), accurate explanations and open communication, and demonstrations of genuine concern for employees (consideration, protecting subordinates' interests and refraining from exploitation) (May *et al.*, 2004:16).

Managerial support, also considered to be intrinsic to trustworthy managerial behaviour, positively contributes to creativity, task performance and psychological safety (May *et al.*, 2004:30).

Managerial support of autonomy is related to employees who experience basic psychological needs satisfaction, greater job satisfaction and employee engagement with obvious greater psychological health and well-being. Such employees trust their top management and measurably contribute to greater individual and organisational performance (Deci & Ryan, 2008a:19). In addition, Deci *et al.* (1989:580) show that organisational development intervention which focuses on self-determination can benefit managers' interpersonal orientations with consequent radiation to subordinates.

Williams *et al.* (2014:404) emphasise the importance of workplace interventions supporting the satisfaction of basic psychological needs. From the perspective of SDT, workplace interventions show that managerial support is related to lower levels of somatic symptom burden among employees.

2.4.3 Measuring managerial support

In their study to assess self-determination in a work organisation by investigating managers' interpersonal orientations, Deci *et al.* (1989:582) utilised three questionnaires, i.e., the Problems at Work (PAW) questionnaire; the Work Climate Survey (WCS); and, the Employee Attitude Survey.

The PAW questionnaire was designed to assess managers' orientations. It comprised vignettes describing typical problems managers might encounter with a subordinate and possible ways of

dealing with the problems. Responses elucidated the degree to which support for self-determination was available. Managers were highly supportive of self-determination when listening, acknowledging feelings, providing feedback when appropriate and encouraging subordinates to provide own solutions to problems. In contrast, managers who were highly controlling prescribed solutions generated without employee input and enforced the use thereof through reward or punishment. The WCS questionnaire was customised to contain three parts. The first part included items to assess perceived freedom, trust and quality of supervision. However, due to inadequate internal consistency the items for perceived freedom could not be used. The Employee Attitude Survey questionnaire was an instrument specifically developed by the participating corporation for longitudinal survey before and after interventions (Deci *et al.*, 1989:583). Study data revealed that managers' interpersonal support for subordinates' self-determination was particularly related to trust variables (Deci *et al.*, 1989:588).

In their study to explore the determinants and mediating effects of the psychological conditions preceding engagement as defined by Kahn (1990:694), May *et al.* (2004:21) measured supportive supervisor relations by using the SSRS. Study data demonstrated that supervisor relations may play an important role in hierarchical organisations. Supportive supervisor relations it was found, have a strong effect on psychological safety, confirming previous research in this regard (May *et al.*, 2004:30).

Viewing manager relations as an important determinant of employee's commitment and intention to leave, Rothmann *et al.* (2013:3) used the Manager Relations Scale (MRS) (based on the SSRS) to measure participants' experiences of managerial support and trust in the South African agricultural sector. The authors reveal an alpha coefficient of 0.95 for the one-dimensional scale. The MRS, however, did not adequately measure competence-promoting behaviour and should therefore be adapted (Rothmann *et al.*, 2013:8). Perceived competence underpinned by SDT, measures individuals' view of their ability or skill under autonomy-supportive and controlling contexts (Williams & Deci, 1996:767). Thus, adapted questions from the PCS may contribute to the evaluation of competence-promoting managerial support (Smith *et al.*, 1995:53; Williams & Deci, 1996:770).

For the purposes of this study, employees' perceptions of managerial support for self-determination needs satisfaction will be evaluated using the SSRS as described by May *et al.* (2004:37) and extended with adapted questions from the PCS to evaluate competence-promoting behaviour (Smith *et al.*, 1995:53; Williams & Deci, 1996:770).

2.4.4 Managerial support in context

Employees in roles of low decision authority associated with high job demands often experience a high incidence of emotional exhaustion. Supervisor support has been shown to buffer the adverse effect of job demands, especially in situations with low decision authority (Willemse *et al.*, 2012:828).

Increases in hours worked and the participation of women in the workforce lead progressively to more work-family conflict, especially for employees of multinational organisations. In the Brazilian context, Casper *et al.* (2011:648) show that employees who perceive greater managerial support reported higher affective organisational commitment and continuance commitment. Employees decide to stay at their jobs “because they want to rather than because they have to”; “workers interpret their (supervisor) support as a benefit from the organization” (Casper *et al.*, 2011:648). These findings support earlier research conducted in Anglo cultures.

Studies conducted in the health care sector mainly investigated provider-patient relations. Research has shown that provider support of autonomy beneficially contributes to disease prevention and management activities, treatment outcomes and medication compliance (Deci & Ryan, 2008a:20).

Based on these findings it is expected that employees with low decision authority working to high job demands in multinational organisations, such as the pharmaceutical industry and related contract research environment, will benefit from supervisor support, irrespective of the local culture. Research studies to this effect in the contract research sector could not be found in the literature.

2.5 Work-related functioning: Emotional exhaustion and intention to leave

From the perspective of SDT, managerial support is found to be related to lower levels of work-related functioning, including emotional exhaustion and intention to leave (Deci & Ryan, 2008a:19; Williams *et al.*, 2014:404). A short overview of these elements of work-related functioning is presented in the succeeding subsections.

2.5.1 Overview of elements of work-related functioning

The current study focuses on work-related functioning as defined by emotional exhaustion and intention to leave, in relationship to needs satisfaction, employee engagement and perceived managerial support.

As the most obvious manifestation of the complex syndrome, exhaustion is pivotal to burnout. It is described as prompting “actions to distance oneself emotionally and cognitively from one’s work” (Maslach *et al.*, 2001:403). “It refers to feelings of being overextended and depleted of one’s emotional and physical resources” (2001:399). Emotional exhaustion can be defined as a pervasive and enduring variety of work-related strain that manifests in general loss of feeling and concern, trust, interest and spirit. Conceptualised as the first stage of burnout, it provides a critical point for intervention. Whereas burnout is almost exclusively associated with services that deal with clients, emotional exhaustion can also be applied as a unique indicator of the quality of working life in task-fatiguing conditions. Supportive managerial behaviour plays a mitigating role in the incidence of emotional exhaustion (Gaines & Jermier, 1983:567).

Job demands and workload frequently result in emotional exhaustion among employees in the medical field (Bria *et al.*, 2014:104). Research shows that emotional exhaustion can be reduced through the positive perception of relationships with supervisors, with resultant feelings of confidence and accomplishment (Yeun *et al.*, 2013:226). Work-family conflict, fairness of rewards, perceived workload and role ambiguity are significant variables impacting on work exhaustion (Khanna & Maini, 2013:18). Recent research conducted in selected South African occupations associated with an environment of high job demands and inadequate resources revealed exhaustion levels that could be indicative of a lack of organisational support and growth opportunities (Jorgensen *et al.*, 2013:449).

Considering the elements of SDT, conflicting results were reported for the relationship between emotional exhaustion and autonomy (Gaines & Jermier, 1983:567). A perceived lack of job autonomy is found to be a powerful antecedent to work exhaustion in the private banking sector (Khanna & Maini, 2013:16). Pertaining to competence, emotional exhaustion shows a negative correlation with personal accomplishment in hospital nurses (Yeun *et al.*, 2013:225). Empirical evidence (Gaines & Jermier, 1983:567) suggests that departmental membership is an important factor underpinning stress in the workplace; this may point to the importance of relatedness in self-determination. Both managerial support and autonomous self-regulation at work are significantly related to lower levels of emotional exhaustion and intention to leave (Williams *et al.*, 2014:414).

Intention to leave can be defined as an employee’s aim/plan/intent to voluntarily find a new position with another organisation (Lambert *et al.*, 2001:233). It refers to “the subjective estimation of an individual regarding the probability of leaving an organization in the near future” (Cho *et al.*, 2009:375). It is described as “individuals’ own estimated probability (subjective) that

they are permanently leaving the organization at some point in the near future” (Vandenberg & Nelson, 1999:1315).

As the last element in the withdrawal cognition process, intention to leave implies a cognisant, premeditated desire to leave an organisation in the near future (Cho *et al.*, 2009:375). Despite the fact that the reasons for the intention are often unknown, intention to leave is considered to be the determinant that consistently and immediately precedes actual employee turnover (Lambert *et al.*, 2001:233; Van Schalkwyk *et al.*, 2010:1). Research has consistently revealed that intention to leave is the strongest predictor of actual turnover (Cho *et al.*, 2009:375).

Employee turnover is a leading challenge for today's organisations worldwide. The four core antecedents to turnover include: demographic characteristics; work environment; job satisfaction; and, intention to leave, with job satisfaction as a highly prominent antecedent of intention to leave (Lambert *et al.*, 2001:233). Employee engagement is an antecedent to job satisfaction and is related to lower staff turnover saving companies appreciably in lost productivity, and recruitment and retraining costs (Shuck, 2010:15).

Research has found intentions underpinned by disaffection with the organisation and its values to be the most prominent reason for the loss of valued employees, with a subsequent loss of organisational effectiveness (Vandenberg & Nelson, 1999:1313). Research has demonstrated that perceived managerial/supervisor support and autonomous self-regulation are negatively related to turnover intent (Eisenberger *et al.*, 2002:570; Williams *et al.*, 2014:414).

The pharmaceutical industry is particularly vulnerable to high turnover rates among sales and marketing employees. Research conducted in Pakistan revealed that turnover in this sector, particularly among sales and marketing staff, is related to a lack of organisational commitment, organisational support and job satisfaction. The research confirms the role of managerial support and employee engagement in employee retention (Sajjad & Nas, 2013:13411; Shuck, 2010:15). Similar results were reported by Tymon *et al.* (2011:293) who conducted managerial support research across a large and diverse set of national, international and global organisations operating in India.

Whilst there appears to be a rich collection of research on emotional exhaustion and intention to leave in the health care and pharmaceutical industry, the literature could not be found on studies conducted in the contract research sector.

2.5.2 Measuring work-related functioning of emotional exhaustion and intention to leave

Emotional exhaustion

Emotional exhaustion is conceptualised as the first stage of burnout and provides a critical point for intervention. Although there is no universal agreement on the measurement of burnout, the Maslach Burnout Inventory–General Survey (Maslach *et al.*, 2001:402; Poghosyan *et al.*, 2009:2) is the recommended and most commonly used instrument of burnout measurement. The three-factor instrument assesses the core dimensions of the burnout experience (emotional exhaustion, depersonalisation and personal accomplishment) with the exhaustion subscale applicable as a measure of emotional exhaustion at work (Maslach *et al.*, 2001:402). Often only the emotional exhaustion subscale is used for its strong predictive value (Poghosyan *et al.*, 2009:2).

Research conducted internationally in the nursing sector reports an internal consistency of the MBI of 0.80 to 0.93 for exhaustion across countries (Poghosyan *et al.*, 2009:15). In the South African work context, internal consistency for exhaustion of 0.83 was reported in various occupational groups, including educators and administrative personnel, as well as staff from the insurance industry and correctional services (Jorgensen *et al.*, 2013:450).

Intention to leave

As research into the field of turnover has grown, the variety of measures to assess intention to leave has increased, resulting in no single, agreed upon measure to evaluate the construct. Taken from different propensity-to-leave scales, Sjöberg and Sverke (2000:248) modified the original questions into statements to devise the TIS.

2.5.3 Work-related functioning in context

Evidence reveals that healthy employees and healthy organisations complement each other synergistically. Employee well-being provides for a competitive advantage and increased work performance. Given the number of hours at work, it is in the best interest of both employers and employees to identify workplace factors that impact on well-being. Stress at the workplace contributes significantly to emotional exhaustion and intention to leave. Managerial climate is one of the important factors that affect employee wellness and work satisfaction.

Elucidation of employees' perceptions of managerial support for basic psychological needs will increase the knowledge toward efficiency and effectiveness of CRO services, as well as attracting and retaining talent in the contract research sector.

2.6 Hypotheses

Based on the literature review, the researcher argues that satisfaction of self-determination needs underpins employee engagement. Organisations, and in particular managers, should realise that employee engagement significantly, positively contributes to individual well-being, with a negative relationship between engagement and turnover intentions (Truss *et al.*, 2013:2658).

The literature review provided for a conceptual understanding and definitions of the key concepts, with SDT as the underpinning theory and guidance. Based on the relevant literature findings, the following hypotheses are stated for the study:

Hypothesis 1: Satisfaction of self-determination needs relates positively to employee engagement.

Hypothesis 2: Satisfaction of self-determination needs relates positively to perceived managerial support.

Hypothesis 3: Satisfaction of self-determination needs relates negatively to emotional exhaustion.

Hypothesis 4: Satisfaction of self-determination needs relates negatively to intention to leave.

Hypothesis 5: Employee engagement relates positively to perceived managerial support.

Hypothesis 6: Employee engagement relates negatively to emotional exhaustion.

Hypothesis 7: Employee engagement relates negatively to intention to leave.

In addition, the relationships to perceived managerial support, emotional exhaustion and intention to leave were investigated.

2.7 Chapter summary

Chapter 2 provides the literature review relevant to the study. Conceptual understanding and definitions of key concepts were developed for the satisfaction of self-determination needs and the impact thereof on employee engagement, perceived managerial support and work-related functioning of emotional exhaustion and intention to leave.

Chapter 3 presents the empirical research methodology of the study.

CHAPTER 3 EMPIRICAL RESEARCH METHODOLOGY

3.1 Introduction

The aim of this study is to investigate the relationship between satisfaction of self-determination needs and employee engagement in the contract research sector in South Africa. In addition, relationships to perceived managerial support and work-related functioning concepts of emotional exhaustion and intention to leave have been researched.

Chapter 3 presents the research approach, design, population and sampling used in this study. The measuring instruments that were applied are described in detail. An explanation is provided of data analysis and statistical methods used in this research study.

3.2 Research approach

To evaluate the knowledge claims brought to this study, it was decided to follow a quantitative approach to investigate the research objectives of the study.

Welman *et al.* (2005:6) describe quantitative research as an approach that “underlies the natural-scientific method in human behavioural research” and emphasise that the research findings are limited to “what we can observe and measure objectively”. Creswell (2003:7) describes quantitative research as “a deterministic philosophy in which causes probably determine effects or outcomes”, with knowledge obtained through “careful observation and measurement of the objective reality”.

For the quantitative approach, it is paramount to develop numeric measures of observation. Such measures allow for testing a theory when studying human behaviour. This research study into human behaviour involves a quantitative approach with no interventions; study results are presented in numerical format.

3.3 Research design

Considering the strategy of inquiry to be used, a non-experimental cross-sectional survey research design was selected for this study.

Welman *et al.* (2005:52) define any research design as “a plan according to which we obtain research participants (subjects) and collect information from them. In it we describe what we are going to do with the participants, with a view to reaching conclusions about the research problem”. Underpinned by the theory of knowledge embedded in the philosophical stance, methodology from Crotty’s model (1998:2) refers to the “strategy or plan of action that links

methods to outcomes” and that “governs our choice and use of methods”. Thus, the design of quantitative research guides the research process from data collection to interpretation of results, with the intent of generalising from a sample to a population (Creswell, 2003:5, 14).

Research in this study has replicated elements of previous research. Thus, the research design comprises a cross-sectional survey as the valid method for collection of reliable data, similarly to the research design utilised by Rothmann *et al.* (2013:4) to research the topics of interest in the South African work context.

3.3.1 Population and sample

With the quantitative approach, methodology entails data, evidence and rational considerations to shape the underpinning knowledge. Either measures of data collection are completed by participants or observations are recorded by the researcher (Creswell, 2003:7).

Distinction is made between probability sampling and non-probability sampling. Although probability sampling has the advantage of results being generalised to the population, non-probability sampling is frequently used for convenience and economical considerations (Levine *et al.*, 2014:54; Welman *et al.*, 2005:56). In this study, convenience sampling was applied to meet the study’s research objectives (Saunders *et al.*, 2009:233, 241). The target population involved office-based employees from the contract research sector in the predefined geographical area. Costs and timeframe were considered when the sampling technique was selected.

Male and female subjects of any race who were 18 years of age or older and who willingly consented to participate voluntarily in the study were included in the study.

Non-responders were excluded from the study.

Questionnaires were distributed by hand to the entire population for completion and were collected by hand within one week after distribution. A field worker was used to contribute to objectivity and anonymity.

Response rate results are presented in Chapter 4.

3.3.2 Hypotheses

To develop relevant true statements, relationships between variables are modelled in terms of research questions or hypotheses (Creswell, 2003:8). For this study, the hypothetical model

displayed in Figure 2.1 was formulated to illustrate the proposed relationships between the constructs investigated in this study.

Hypotheses based on the relevant literature findings are stated in Section 2.6.

3.4 Research methods

Competent inquiry requires objective research, involving data collection methods and conclusions that are examined for bias in accordance with acceptable standards of validity and reliability (Creswell, 2003:8, 17).

(a) Validity of the questionnaires

Validity reflects the extent to which the objective of the study represents what the researcher wants to investigate (Welman *et al.*, 2005:9). Validity can be subdivided into two broad measures of validity, i.e. external and internal.

With regard to this research study, self-reporting survey questionnaires are susceptible to measurement reactivity, which is a pronounced threat to the construct validity of the measurement (Welman *et al.*, 2005:149). Construct validity is described as the “degree to which inferences can legitimately be made from the operationalizations in your study to the theoretical constructs on which those operationalizations were based” (Trochim, 2006). Construct validity, which is seldom investigated in itself, is mostly theoretical and refers to the underlying concepts investigated for interrelationships. Two types of construct validity were described – convergent validity which refers to “the degree to which two methods of measuring a concept is similar and correlate highly with one another”, and discriminant validity which refers to “the degree to which a single method of measuring two concepts yields different results” (Eby, 1993:28; Welman *et al.*, 2005:143).

Internal validity can be applied limitedly in well-designed, non-experimental studies to assess multivariate relationships (Welman *et al.*, 2005:107). As a validity procedure, confirmatory factor analysis (CFA) is used to statistically fit the hypothetical model to the study data (Field *et al.*, 2012:750; Steiger, 2013:9).

In this study convenience sampling was applied. Non-probability sampling techniques are subject to bias that may render results meaningless. Response results should thus not be used for valid statistical inference to a population (Levine *et al.*, 2014:57). The statistical method of CFA is theory- or hypothesis driven. It allows for the testing of hypotheses about a particular factor structure and fit measurements to evaluate the proposed hypothetical model. The validity

of the survey results using CFA allows for statistical inference of the data to theory (Albright & Park, 2009:3).

CFA results for this study are presented in Chapter 4.

(b) Reliability of data

The reliability of test scores or measurement in any study – qualitative or quantitative – is pivotal to understanding the observed relationship between variables. Reliability should be reported and considered in result interpretation in all studies, even if the focus of the study is not psychometric in nature (Henson, 2001:178).

Reliability refers to “consistent and stable measurement of data as well as replicability” (Welman *et al.*, 2005:9). Thus, the reliability of measurement concerns consistency of ranking (generalisation) when using a particular test or instrument to obtain data from the same subject, irrespective of systematic conditions, such as measurement occasion, measurement form or measurement administrator/user. The reliability of measurement also concerns replicability, which refers to obtaining comparable results should the research be repeated. Subject to the unsystematic source of variation, different kinds of reliability are described, of which internal consistency reliability is emphasised in this research study (Welman *et al.*, 2005:145).

Henson (2001:177) describes internal consistency as “item homogeneity, or the degree to which the items on a test jointly measure the same construct”. However, Panayides (2013:687) warns against the synonymous use of internal consistency and homogeneity. In his research paper, the latter is defined as “the unidimensionality of a set of items”, whereas internal consistency refers to “the degree of interrelatedness between the items”. Thus, he contends that internal consistency is a pre-requisite for homogeneity.

Determination of internal consistency provides for optimising costs, the timing of research and reactivity of subjects in survey research. Cronbach’s coefficient alpha is one of the most popular reliability statistics in use to determine internal consistency of the measurements of a survey’s instruments (Panayides, 2013:687). The statistic can be used to measure internal consistency reliability for measures comprising multiple categories, e.g., Likert scale data (Henson, 2001:181).

The commonly accepted rule when using Cronbach’s alpha is that reliabilities of 0.70 to better are indicative of acceptable to good internal consistency. Panayides (2013:695) argues that high alpha results do not necessarily imply a unidimensional scale. Furthermore, alpha values exceeding 0.90 may reflect the unnecessary duplication of content in lengthy questionnaires,

pointing to redundancy rather than homogeneity. Therefore, it is advisable for researchers to apply caution when reporting Cronbach's alpha results.

Reliabilities of data for this study are presented in Chapter 4.

3.5 Measuring instruments

3.5.1 Work-related Basic Need Satisfaction Scale

Satisfaction of basic psychological needs as defined by SDT is identified as a significant predictor of people's optimal functioning in various life domains. Work-related basic need satisfaction represents the satisfaction of self-determination needs in a corporate environment. Nevertheless, research into this field in the context of the workplace seems to have been impeded by the lack of a validated measure. The WBNSS was developed and validated in order to facilitate future research on the concepts supported by SDT (Van den Broeck *et al.*, 2010:981).

In this research study, the WBNSS was used for the self-reporting of satisfaction of self-determination needs in the workplace. The scale comprised statements on the three basic psychological needs, i.e., autonomy (5 items); competence (6 items); and, relatedness (6 items). For the assessment of autonomy, statements such as "I feel free to express my ideas and opinions in this job" were included. For the assessment of competence, statements such as "I don't really feel competent in my job" were included. For the assessment of relatedness, statements such as "I don't really feel connected with other people at my job" were included. The statements were evaluated on a 5-point Likert response scale varying from 1 (strongly disagree) to 5 (strongly agree).

Research in Dutch-speaking communities reveals that the reliabilities of the three subscales of autonomy, competence and relatedness were on average 0.81, 0.85 and 0.82, respectively. In addition, it was proved that study participants' responses to the items were not significantly affected by impression management, despite the scales relying on self-report (Van den Broeck *et al.*, 2010:993). Research conducted on managers in the South African agricultural sector supports the three-factor structure, with alpha coefficients of 0.80, 0.77 and 0.87 for autonomy, competence and relatedness needs satisfaction, respectively (Swart, 2011:77). Further research in the South African agricultural sector, as well as research performed in the information technology industry in South Africa confirms reliabilities (Diedericks, 2012:78; Rothmann *et al.*, 2013:6). Coetzer (2014:75) reported alpha coefficients of 0.82 for autonomy and 0.89 for relatedness, which are within the acceptance range for internal consistency. An alpha coefficient of 0.47 was reported for competence need, with unreliability of the construct

attributed to the statement “I do not really feel competent in my job”. This argument is aligned with that of Van den Broeck *et al.* (2010:996), who suggested that the subscale for competence “leaves room for improvement”.

Alpha coefficients show acceptable internal consistency for basic research (Nunnally & Bernstein, 1994:251).

The WBNSS takes approximately 5 minutes to complete and is available in the open domain (Van den Broeck *et al.*, 2010:981).

3.5.2 Utrecht Work Engagement Scale

Employee engagement is defined according to Kahn (1990:694) and operationalised using the UWES developed by Schaufeli *et al.* (2002:71). Thus, the terms employee engagement and work engagement are used interchangeably in this study. Employee engagement is not measured as the positive antithesis of burnout (Maslach *et al.*, 2001:417) or as a distinct concept negatively related to burnout (Schaufeli, 2013:17). For the purposes of this study, emotional exhaustion is investigated separately and evaluated for its relationship to employee engagement.

In this research study, the UWES of 17 items was used for self-reporting of employee engagement (Schaufeli *et al.*, 2002:89; Schaufeli & Bakker, 2004:48). The scale comprised three subscales, i.e., vigour (6 items); dedication (5 items); and, absorption (6 items). Vigour refers to energy and resilience, with the willingness to invest effort and persistence in the face of difficulties. High levels of vigour imply energy, zest and endurance; not being easily fatigued when working. Dedication refers to a strong identification with one’s work, along with feelings of enthusiasm and pride in the work. High scores imply that employees find their work to be meaningful, inspiring and challenging. Absorption refers to being happily engrossed and immersed in one’s work, with subsequent difficulty to detach oneself from it. Employees with high absorption levels tend to be unaware of everything else around them, including time. For all three subscales, low scores indicate the reverse (Schaufeli & Bakker, 2004:5).

The statements were measured on a 7-point scale ranging from 0 (never) to 6 (every day). To calculate mean scale scores for each of the three UWES subscales, as well as the total score, the scores on the specific scale were added up and divided by the number of items on the subscale involved, as applicable (Schaufeli & Bakker, 2004:33).

Research in various countries reveals that the fit of the three-factor UWES structure to data is superior to that of alternative factor models. The UWES, using the English version, is validated

in a sample of South African police officers, showing alpha coefficients of 0.78 for vigour; 0.89 for dedication; and, 0.78 for absorption (Storm & Rothmann, 2003:62). Research into different language groups in the South African insurance industry confirms construct equivalence for English and Afrikaans-speaking participants, as well as the three-factor structure of the UWES-17 (Coetzer & Rothmann, 2007:13). Structural equivalence is confirmed in a convenient sample of emergency medical technicians, comprising white and black employees (Naudé & Rothmann, 2004:459). In a study conducted at six organisations (correctional services, education, engineering, insurance industry, academic and non-academic staff of higher education institutions), Rothmann and Rothmann (2010:8) report alpha coefficients of 0.71 for vigour; 0.85 for dedication; and, 0.67 for absorption.

Despite widespread use, inconclusive evidence regarding the dimensionality of the UWES-17 may lead to conflicting interpretation of scores. In the South African context, De Bruin *et al.* (2013:2) show that the summative score is more representative of work engagement in a population of information technology workers than when scores are interpreted for each dimension separately. Meta-analysis of research data reveals high inter-correlations between the three dimensions, with the strongest mean relationship between vigour and absorption (Christian & Slaughter, 2007:2). To avoid illusory information of overlapping subscales, De Bruin *et al.* (2013:7) advise that work engagement should be interpreted as a unidimensional construct. On the other hand, Coetzer and Rothmann (2007:10) show a poor fit with the data for the one-factor model.

The UWES takes 5 to 10 minutes to complete. It is available free for use for non-commercial scientific research (Schaufeli *et al.*, 2002:89; Schaufeli & Bakker, 2004:48).

3.5.3 Measurement of Managerial Support

Managerial support refers to manager behaviour that enhances employees' feelings of self-worth. Research shows that trustworthy, supportive manager behaviour creates feelings of psychological safety and employee experiences of a willingness to invest in them at work (Deci *et al.*, 1989:581; May *et al.*, 2004:16). The SSRS was developed to measure employees' perceptions of managerial support (May *et al.*, 2004:21). Adapted questions from the PCS, described by Smith *et al.* (1995:53) and Williams and Deci (1996:770), respectively, may provide support for the measurement of competence-promoting manager behaviour.

In this research study, the SSRS and the adapted PCS were used to measure employees' perceptions of managerial support. The SSRS comprised statements on managerial support (6 items) and trust (4 items). These items included statements, such as "My supervisor helps

me solve work-related problems”. The adapted PCS comprises 4 items that are related to confidence, capability, ability to achieve goals, and how well the individual met the challenge. For both scales, the statements were evaluated on a 7-point scale ranging from 1 (strongly disagree) to 7 (strongly agree).

Rothmann *et al.* (2013:3) used the MRS (based on the SSRS) to measure participants’ experiences of managerial support and trust in the South African agricultural sector. Validity data on the PCS is limited as the PCS is designed so that wording can be adapted to relate to the specific area of research.

Both the SSRS and the PCS are available in the public domain in the English language.

3.5.4 Measurements of Work-related Functioning

3.5.4.1 Emotional exhaustion measurement

Emotional exhaustion, conceptualised as the first stage of burnout, can be defined as a pervasive and enduring variety of work-related strain that manifests in general loss of feeling and concern, trust, interest and spirit (Maslach *et al.*, 2001:399). The three-factor Maslach Burnout Inventory–General Survey was developed to extend burnout research into different factorial structures and among professional roles which did not necessarily involve demanding social interactions. It is the most preferred version of the MBI for application in a variety of occupational contexts and across nations (Bria *et al.*, 2014:104; Maslach *et al.*, 2001:402). The emotional exhaustion subscale describes feelings of depletion of physical and emotional resources, without direct reference to people as the source of these feelings. Emotional exhaustion was found to be related to mental and physical strain, work overload, and role conflict at work.

In this research study, the emotional exhaustion subscale of the MBI (Maslach & Jackson, 1981:102) was used to assess emotional exhaustion at work. The scale comprised 9 items, such as “I feel emotionally drained from my work”. The statements were evaluated on a 7-point scale varying from 0 (never) to 6 (every day).

Recent research conducted in selected South African occupations associated with an environment of high job demands and inadequate resources revealed exhaustion levels that could be indicative of a lack of organisational support and growth opportunities (Jorgensen *et al.*, 2013:449).

3.5.4.2 Intention to leave measurement

In this research study, the TIS (Sjöberg & Sverke, 2000:248) was used to elicit intention to leave. The scale comprised 3 items, such as “I feel that I could leave this job”. The statements were evaluated on a 5-point Likert scale varying from 1 (strongly disagree) to 5 (strongly agree).

Rothmann *et al.* (2013:4) used the TIS to measure intentions to leave in the South African work context. The researchers reported an alpha coefficient of 0.83.

3.5.5 Biographical information

A biographical questionnaire was prepared to elicit information about the demographic characteristics of the participants, including gender, age, level of education and employment-related information.

3.6 Statistical analysis

3.6.1 Evaluation of validity and reliability

Non-probability sampling survey results are subject to measurement error and cannot be generalised to the population (Levine *et al.*, 2014:58). In this study a convenience sample was investigated using a survey questionnaire. To lend objectivity and credibility for generalising results to the sample, it is crucial to examine the validity and reliability of the measuring instruments and data.

In this study, CFA and Cronbach’s alpha analysis were performed as described in Section 3.4 before descriptive and inferential statistics were performed.

CFA was applied to measure the fit of the model to the data. Calculations were performed using R version 3.2.2 (2015-08-14) as copyrighted by The R Foundation for Statistical Computing and licensed to the Biostatistician consulted for this study.

Absolute fit indices

For this study, chi-square (χ^2) (the test of absolute fit of the model), root mean square error of approximation (RMSEA) and standardised root mean square residual (SRMR) were evaluated to assess how well the proposed theory fits the data.

RMSEA favours parsimony to indicate “how well the model, with unknown but optimally chosen parameter estimates would fit the populations covariance matrix”. SRMR is defined as the

standardised “square root of the difference between the residuals of the sample covariance matrix and the hypothesised covariance model” (Hooper *et al.*, 2008:54).

Values for RMSEA lower than 0.08 and SRMR lower than 0.08 indicate a close fit between the model and the data. In a well-fitting model the RMSEA confidence interval should have a lower limit close to 0 and the upper limit should not exceed 0.08 (Hooper *et al.*, 2008:54).

Incremental fit indices

For this study, the comparative fit index (CFI) and the Tucker-Lewis index were evaluated to assess relative fit, assuming all latent variables are uncorrelated.

The CFI is considered to be one of the most popular fit statistics as it performs well despite sample size. Based on the assumption that all latent variables are uncorrelated, the CFI compares the sample covariance matrix to the assumed null model. The Tucker-Lewis index is a non-normed fit index (N-NFI) not sensitive to sample size (Hooper *et al.*, 2008:55).

The cut-off criterion of ≥ 0.90 for incremental fit statistics was regarded as acceptable (Hooper *et al.*, 2008:55).

In this study, models were assessed for significant loading of items onto the associated scales.

Cronbach’s alpha analysis was applied to measure the internal consistency of data, using the calculator described by Wessa (2014) and available in the open domain. The commonly accepted rule when using Cronbach’s alpha is that reliabilities of 0.70 to better is indicative of acceptable to good internal consistency.

Results of CFA and Cronbach’s alpha analysis are presented in Chapter 4.

3.6.2 Presentation of data

Primary data were captured on an Excel spreadsheet. Data were cleaned and coded by the researcher. The analysis set is defined as data of subjects who fully completed the survey questionnaires; missing data were not imputed. Only complete data were utilised for statistical analysis. Applicable to all statistical calculations in this study, numbers were rounded to the least significant figures.

Based on the nature of the data values obtained from the completed survey questionnaire, variables of this study were classified as categorical variables and discrete numerical variables to provide for ordinal data.

Categorical variables can be defined as values to be placed in qualitative categories (Levine *et al.*, 2014:48). In this study categorical variables related to biographical information which included answers to the following questions:

- (a) What is your gender?
- (b) What is your age?
- (c) What is the highest level of education you have completed successfully?
- (d) How long have you been working overall for your current employer?

Categorical variables were organised in summary tables for each question (Levine *et al.*, 2014:72). Data are visualised in bar charts to emphasise how categories for single categorical variables directly compare to one another (Levine *et al.*, 2014:85).

Numerical variables can be defined as values that characterise quantities into either discrete values or continuous responses (Levine *et al.*, 2014:48). In this study discrete variables related to the questionnaires, measuring work-related basic need satisfaction (Van den Broeck *et al.*, 2010:981); employee engagement (Schaufeli *et al.*, 2002:89; Schaufeli & Bakker, 2004:48); perceived managerial support (May *et al.*, 2004:21; Smith *et al.*, 1995:53; Williams & Deci, 1996:770); emotional exhaustion (Maslach & Jackson, 1981:102); and, intention to leave (Sjöberg & Sverke, 2000:248). There are no continuous variables defined for this study.

Discrete variables were organised by frequency distribution (Levine *et al.*, 2014:76). To show the joint responses for each question from the survey questionnaire, data are displayed per category in side-by-side bar charts.

3.6.3 Descriptive statistics

In this study, primary data were analysed descriptively using Microsoft Excel 2010, licensed to the researcher. Measures of central tendency and dispersion were calculated and reported. Counts and percentages were computed to determine frequencies of needs satisfaction, employee engagement, perceived managerial support, emotional exhaustion and intention to leave, as well as for biographical data. As the survey questionnaire in this study provided for ordinal data, conclusions from descriptive statistics involved the median and interquartile range.

Measures of central tendency computed for data include arithmetic mean, median and mode. All values play an equal role when computing the mean, which is the most common measure of central tendency. The median represents the middle value in an ordered array of data ranked

from smallest to largest, and is not effected by extremes. The mode represents the value that shows most frequently in a data set (Levine *et al.*, 2014:136).

To describe the variation and shape of data, measures of dispersion computed for continuous data include the range as a descriptive measure of the total spread of data, and variance and standard deviation as measures of data scatter around the mean (Levine *et al.*, 2014:141). For ordinal data, the first and third quartiles were computed. The interquartile range for numerical variables is a measure of the spread in the middle 50% of the data. As with the median and mode, the interquartile range is not affected by extreme values (Levine *et al.*, 2014:154).

Descriptive statistics of survey results are presented in Chapter 4.

3.6.4 Inferential statistics

For assessment of relationships between constructs, variables were treated as continuous data. The coefficients of correlation were computed using Microsoft Excel 2010, licensed to the researcher. The hypotheses described in Section 2.6 were investigated. Relationships between constructs and biographical data are reported overall and by subgroups, as applicable.

The coefficient of correlation was used to measure the strength of a linear relationship between two numerical variables, where +1 means a perfect positive correlation and -1 means a perfect negative correlation. A coefficient of zero implies no linear relationship. As a standardised measure of observed effect, the coefficient of correlation is generally applied to measure the size of effect. Values of ± 0.1 represent a small effect, ± 0.3 a medium effect and ± 0.5 a large effect (Field *et al.*, 2012:209; Levine *et al.*, 2014:167).

As both variables are treated equally, correlation alone cannot support causality; it only suggests tendencies contained in the data. An estimate of the strength of the linear relationship can be assessed using the coefficient of determination, r^2 . Although r^2 provides useful measurements for the substantive significance of an effect, causal relationships cannot be inferred (Field *et al.*, 2012:222).

Correlation results for this study are presented in Chapter 4.

3.6.5 Effect size

Convenience sampling does not allow for statistical inference to the population. Instead of reporting only descriptive statistics to obtained data, effect sizes can be calculated for practical significance. Practical significance is defined as “a large enough difference to have an effect in practice” (Ellis & Steyn, 2003:51).

Calculation of effect size is frequently used in clinical psychology. This method of assessment of group differences gives probability to data and facilitates conclusions on practical significance (Magnusson, 2014).

In this study Cohen's d statistics were calculated as a difference of means, using Microsoft Excel 2010 licensed to the researcher.

The following formula was applied:

$$\delta = \frac{\mu_2 - \mu_1}{\sigma}$$

Where, δ is the population parameter of Cohen's d, homogeneous population variances were assumed and μ_1 is the mean of the respective population (Magnusson, 2014).

The following guidelines aided the interpretation of effect size (Cohen, 1988:273; Magnusson, 2014):

d-value	Effect	Difference
0.2	Small	No practical significant difference
0.5	Medium	Practical visible difference
0.7	Large	Practical significant difference

Effect size reveals “the probability that a person picked at random from a treatment group will have a higher score than a person picked at random from the control group” (Magnusson, 2014).

Interpretation of Cohen's d statistics is further aided by the visualisation of % overlap and the probability of superiority, as illustrated in Figure 3.1, Figure 3.2 and Figure 3.3, respectively.

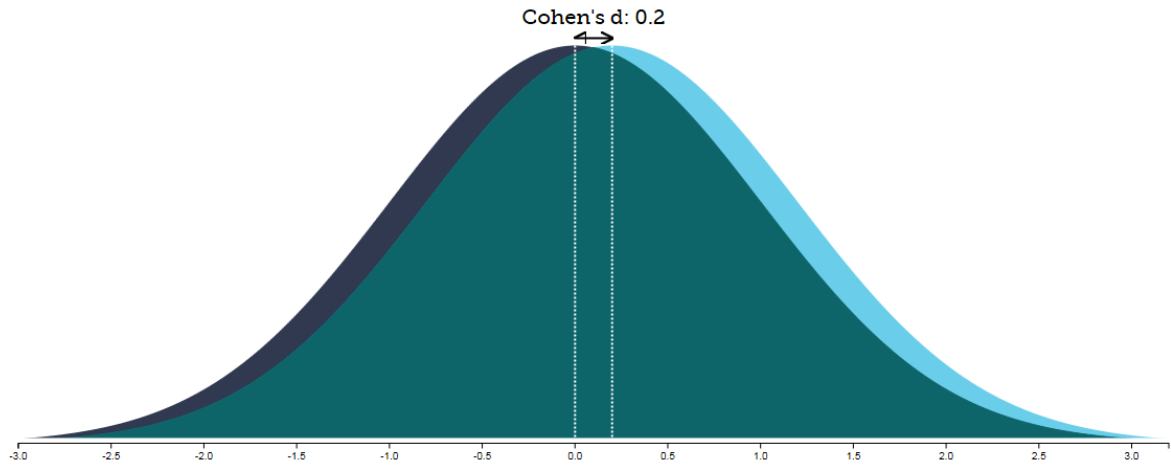


Figure 3.1 Visualisation of Cohen's d effect size at d value of 0.2 (small effect)

Data source: Magnusson, 2014.

With Cohen's $d = 0.2$, there is a 92% overlap between groups, with a 56% probability of superiority, representing a small effect.

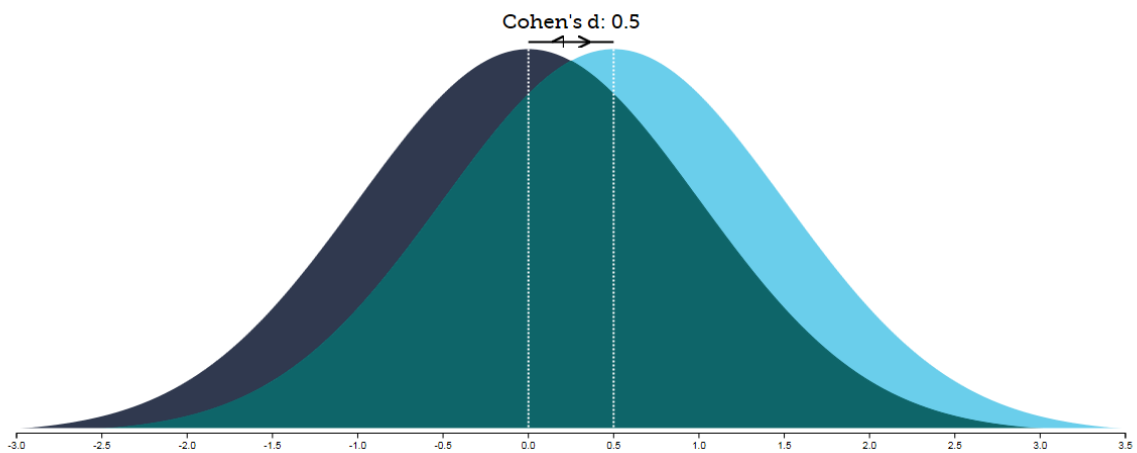


Figure 3.2 Visualisation of Cohen's d effect size at d value of 0.5 (medium effect)

Data source: Magnusson, 2014.

With Cohen's $d = 0.5$, there is an 80% overlap between groups, with a 64% probability of superiority, representing a medium effect.

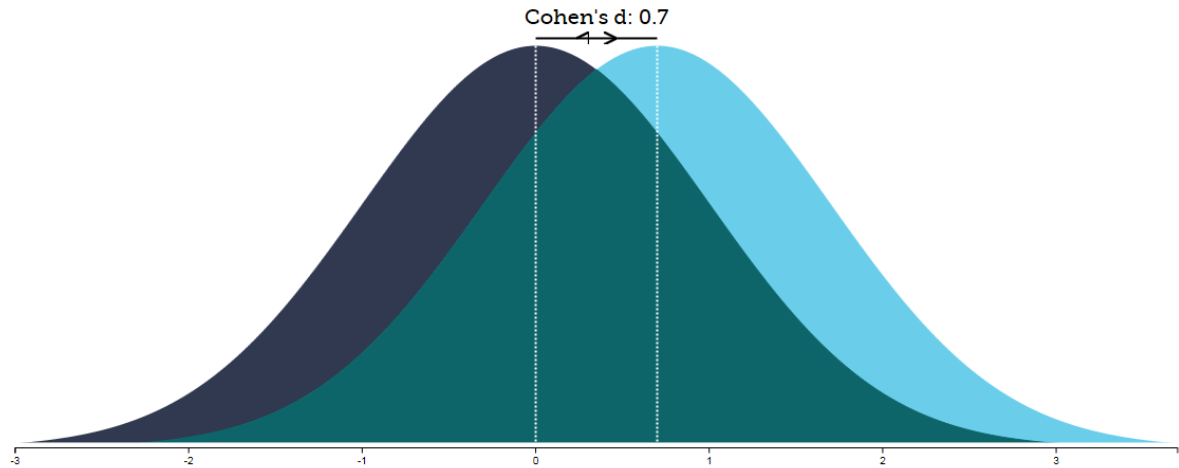


Figure 3.3 Visualisation of Cohen's d effect size at d value of 0.7 (large effect)

Data source: Magnusson, 2014.

With Cohen's $d = 0.7$, there is a 73% overlap between groups, with a 69% probability of superiority, representing a large effect.

For this study, Cohen's d values are presented in Chapter 4.

3.7 Chapter summary

Chapter 3 describes the research methodology in terms of the research approach, research design and research methods. A quantitative approach was followed to conduct a non-experimental, cross-sectional survey in eligible subjects using validated questionnaires.

Results of the empirical research are presented in Chapter 4.

CHAPTER 4 EMPIRICAL RESULTS AND FINDINGS

4.1 Introduction

Research methodology in terms of research approach, research design and research methods was described in Chapter 3. In this chapter the empirical research results are presented for assessments of levels of satisfaction of self-determination needs and employee engagement, as well as perceived managerial support, emotional exhaustion and intention to leave. Characteristics of the targeted sample are revealed in terms of the response rate and biographical information. The validity of the questionnaires was evaluated in the context of the sample and the reliability of data was assessed. Data are summarised descriptively and presented graphically. Inferential statistics were performed to determine exploratory correlational relationships. Effect size was evaluated for practical significance.

4.2 Characteristics of the targeted sample

4.2.1 Response rate

Research indicates an average response rate of 52.7 ($\pm 20.4\%$) for studies that used survey data collected from individuals (Baruch & Holtom, 2008:1139). A response rate of 100% is rarely achieved. A bias above the average response rate could arguably be attributed to coercion rather than voluntary response. Various reasons for not responding were reported. These included too busy (22%); considering the questionnaires not to be relevant (14%); no return address provided (12%); and, formal company policy not to complete surveys (22%) (Baruch & Holtom, 2008:1142).

Data for this study were collected in August and September 2015.

A total of 311 survey questionnaires were distributed by hand to office-based employees of four global CROs located in the predefined geographical area of South Africa. Of these, 260 survey questionnaires were returned fully completed. This constitutes a response rate of 83.6%. The high response rate is attributed to the good rapport between the researcher and CRO staff. Anecdotal reasons for non-responding were reported, of which *too busy* seemed to arise most frequently. For reasons of concern about industrial espionage, the predefined geographical area is not disclosed.

4.2.2 Biographical profile

The biographical data section of the survey questionnaire was prepared to elicit information about the demographic characteristics of the participants, including gender, age, level of education and employment-related information.

4.2.2.1 Gender and age

Of the 260 respondents, 98 (38%) were male and 162 (62%) were female. The gender frequency is depicted in Figure 4.1.

These results are aligned with real-life observations of gender distribution in the participating CROs.

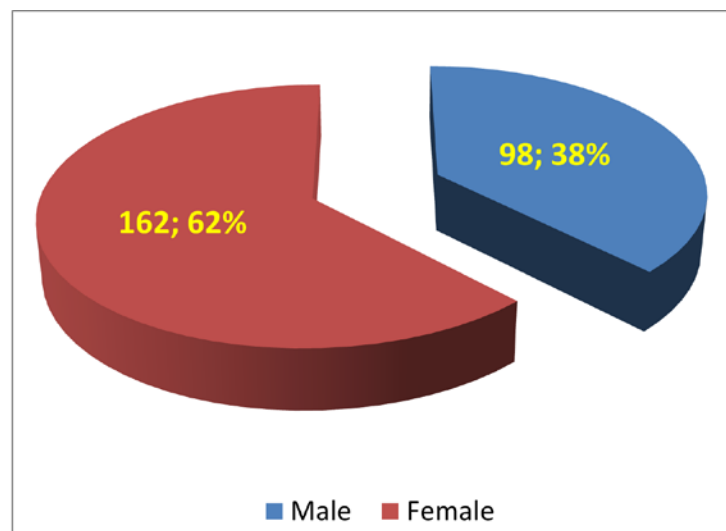


Figure 4.1 Respondents by gender

Overall age distribution is graphically presented in Figure 4.2. Of the 260 respondents, 131 (50%) were between 26 and 35 years old. Of these, 53 (40%) were male and 78 (60%) were female. Gender frequencies per age interval are graphically presented in Figure 4.3. Females were represented in all age intervals. All 7 respondents of 56 years and older were female. The majority of males were between 18 and 45 years old.

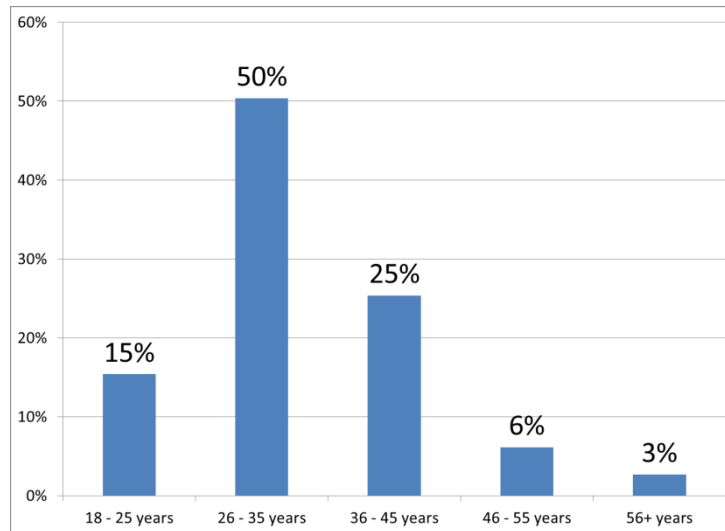


Figure 4.2 Percentage of respondents by age interval – overall distribution

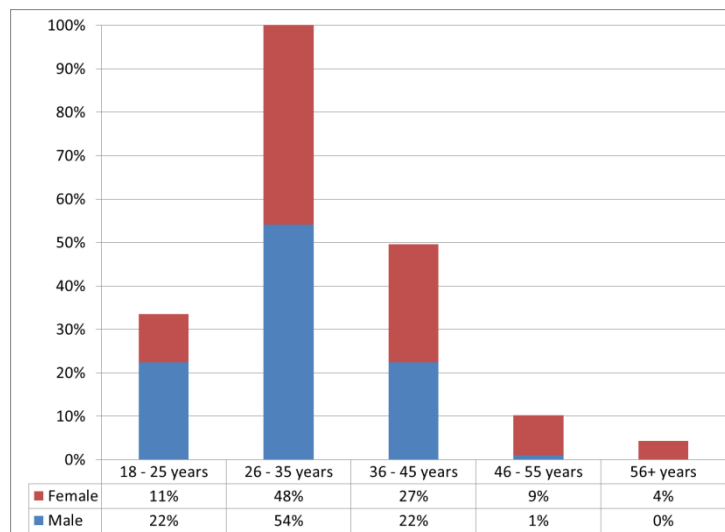


Figure 4.3 Percentage of male and female respondents by age interval

In this study, 50% of respondents were between 26 and 35 years old and 99% males were 45 years or younger. Although this admittedly could indicate that the participating organisations provide job opportunities to the younger workforce, investigation into retention of staff, especially male employees, needs serious reflection.

4.2.2.2 Level of education

Level of education was not an eligibility criterion.

The overall level of education distribution is graphically presented in Figure 4.4. Data revealed the highest frequency (37%) at the level of Diploma, but no degree.

Of the 260 respondents, 66 (25%) had a level of education of Matric or less and 193 (75%) had tertiary qualifications at different levels. Of those with tertiary qualifications, 67 (35%) were male and 126 (65%) were female. For one subject the level of education was not specified.

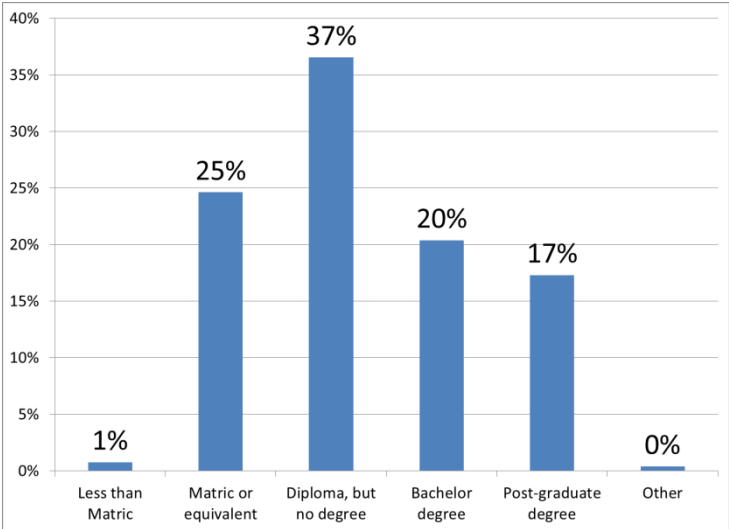


Figure 4.4 Percentage of respondents by level of education – overall distribution

Of the 193 respondents who had tertiary qualifications, 95 (49%) held a Diploma, but no degree, and 98 (51%) held at least one degree. Of those holding degrees, 31 (32%) were male and 67 (68%) were female. Gender frequencies are presented in Figure 4.5.

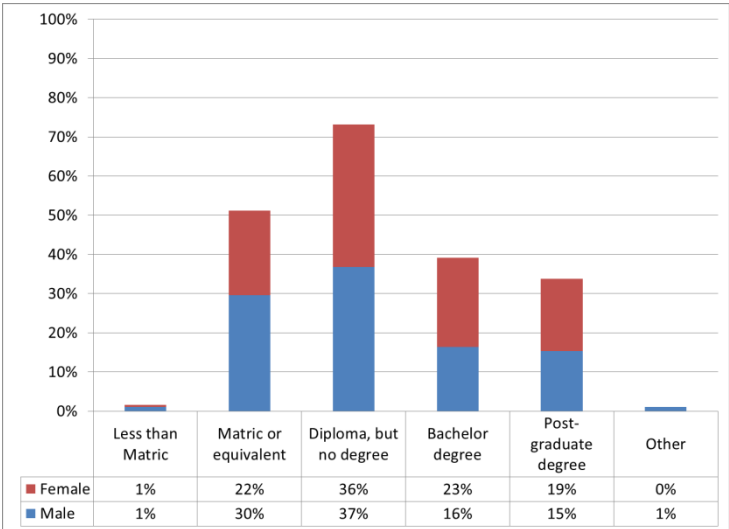


Figure 4.5 Percentage of male and female respondents by level of education

From the level of education results it can be deduced that the participating CROs require limited tertiary education or less from employees. It is standard practice in the pharmaceutical industry for organisations to host strong internal learning and development programmes, presenting both instructor-led sessions and self-paced e-learning training assignments. The CROs participating in this study are thought to be no exception to the rule.

4.2.2.3 Work duration with current employer

Work duration with current employer was not an eligibility criterion.

The overall work duration with current employer distribution is presented in Figure 4.6. Data revealed the highest frequency (35%) at the work duration level of 3 to 5 years.

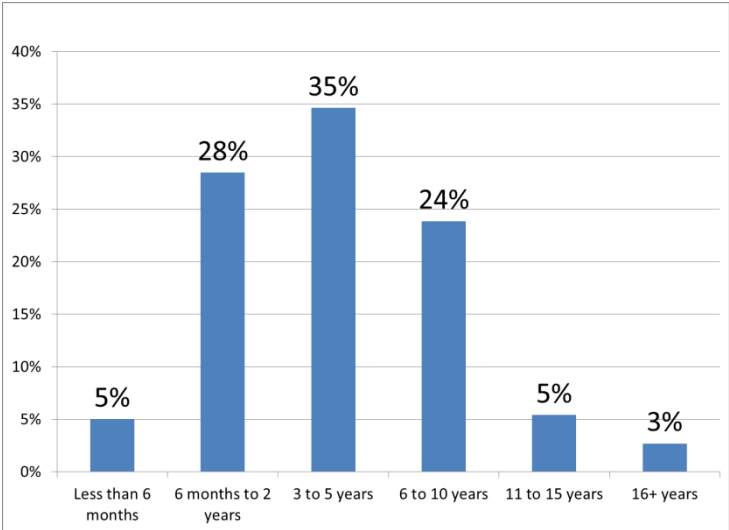


Figure 4.6 Overall distribution of respondents by work duration with current employer

Of the 260 respondents, 177 (68%) indicated that they have worked for their current employer for 5 or fewer years. Of these, 78 (44%) were male and 99 (56%) were female.

In this study, 50% of the respondents were 26 to 35 years old and 75% had tertiary qualifications at different levels. These results might explain the work duration of 5 or fewer years reported by the majority of respondents employed by the participating CROs. High turnover of staff is associated with the considerable loss of intellectual capital and high costs of replacement for most organisations (McShane & Von Glinow, 2010:18). For this reason, further investigation into turnover and retention of staff is warranted.

Gender frequencies per work duration are presented in Figure 4.7.

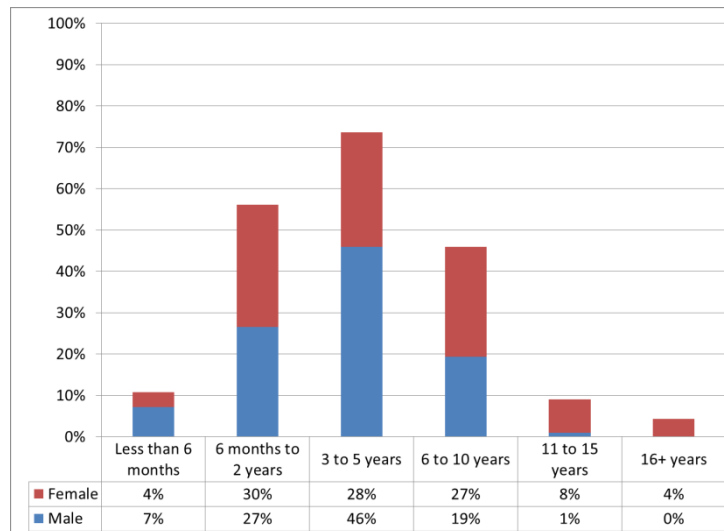


Figure 4.7 Percentage of male and female respondents by work duration with current employer

4.2.2.4 Summary of biographical data

Of the 260 respondents included in the study, 38% were male and 62% were female; 50% were between 26 and 35 years old; 75% had tertiary qualifications at different levels; and, 68% reported work duration with their current employer of 5 or fewer years.

4.3 Evaluation of validity and reliability

4.3.1 Cronbach's alpha analysis

The research used a survey questionnaire comprising sections to address needs satisfaction, employee engagement, perceived managerial support, emotional exhaustion and intention to leave.

Cronbach's alpha analysis was applied to measure internal consistency of the scales and subscales of the survey questionnaire used in this study.

Results are presented in Table 4.1.

Table 4.1 Cronbach's alpha analysis

Scales and subscales	Number of items	Cronbach's alpha
WBNSS: Satisfaction of self-determination needs	17	.95
Autonomy	5	.88
Competence	6	.89
Relatedness	6	.86
UWES: Employee engagement	17	.97
Vigour	6	.91
Dedication	5	.94
Absorption	6	.92
Perceived managerial support	14	.96
SSRS: Supportive supervisor relations	10	.97
PCS: Perceived competence	4	.96
MBI: Emotional exhaustion	9	.96
TIS: Intention to leave	3	0.93

MBI = Maslach burnout inventory; PCS = perceived competence scale; SSRS = supportive supervisor relations scale; TIS = turnover intention scale; UWES = Utrecht work engagement scale; WBNSS = work-related basic need satisfaction scale.

The Cronbach's alpha values for the scales and subscales were found to be acceptable. All alpha values were above the stated minimum requirement of 0.7 and ranged from 0.86 to 0.97. This implied that data could be used for statistical analysis. Although alpha values in excess of 0.9 were calculated, no corrective steps were undertaken to remove potential duplicate questions. It was considered that the statements included in the sections were taken from validated questionnaires available in the open domain and that these were specially developed and validated for the purpose of psychometric measurement.

4.3.2 Confirmatory factor analysis

After internal consistency had been confirmed, CFA was performed to investigate fit between the measurement models of needs satisfaction, employee engagement and perceived managerial support and the obtained study data (Albright & Park, 2009:3). Using R version 3.2.2, items of the questionnaires were defined as continuous and the maximum likelihood (ML) estimator was used.

For Model 1, all observed variables were specified to measure the latent variable of satisfaction of self-determination needs (which consisted of three first-order latent variables of autonomy, competence and relatedness). For Model 2, all observed variables were specified to measure

the latent variable of employee engagement (which consisted of three first-order latent variables of vigour, dedication and absorption). For Model 3, all observed variables were specified to measure the latent variable of perceived managerial support (which consisted of two first-order latent variables of supervisor support and perceived competence).

A summary of the fit statistics are presented in Table 4.2.

Table 4.2 Fit statistics for scales of needs satisfaction, employee engagement and perceived managerial support

Model	Absolute fit indices				Incremental fit indices	
	χ^2	<i>df</i>	RMSEA	SRMR	CFI	N-NFI
1	315.18	116	0.08	0.04	0.93	0.92
2	1314.44	116	0.15	0.02	0.94	0.93
3	783.71	76	0.17	0.02	0.93	0.92

χ^2 = chi-square statistic; *df* = degrees of freedom; CFI = comparative fit index; CI = confidence interval; N-NFI = non-normed fit index (Tucker-Lewis index); RMSEA = root mean square error of approximation; SRMR = standardised root mean square residual.

The RMSEA suggests an acceptable fit for Model 1 with the data. The SRMR indicates acceptable fit with data for all three models. Results show that all three models achieved CFI and N-NFI which represent acceptable fit (Hooper *et al.*, 2008:55).

It was concluded that the fit indices suggest that the measurement models fit the obtained data adequately (Hooper *et al.*, 2008:54). No modification investigations were performed.

Validity of measurement models and reliability of data were demonstrated. Details of the CFA are presented in Appendix B. Study data were analysed descriptively and relationships between various constructs were investigated subsequently.

4.4 Descriptive statistics

Measures of central tendency and dispersion were calculated and reported. As the survey questionnaire in this study provided for ordinal data, conclusions on descriptive statistics involved the median and the interquartile range.

To calculate descriptive statistics and frequency of responses for each of the subscales, as well as the total score, the values listed for each question were added up and divided by the number of items of the subscale or scale, as applicable.

4.4.1 Satisfaction of self-determination needs

Findings for the measurement of satisfaction of self-determination needs, as measured by the WBNS, are presented descriptively in Table 4.3 and Table 4.4.

Table 4.3 Satisfaction of self-determination needs assessments – summary of responses

Descriptive statistic	Factors			
	Autonomy	Competence	Relatedness	Needs satisfaction
Number of subjects (n)	260	260	260	260
Mean	3.52	3.53	3.41	3.49
Standard deviation	0.76	0.77	0.74	0.71
Maximum	5	5	5	5
Minimum	1	1	1	1
Median	4	4	4	4
Interquartile range (Q1-Q3)	3-4	3-4	3-4	3-4

Based on median values, subjects agreed to satisfaction of self-determination needs of autonomy, competence and relatedness, as well as needs satisfaction overall. Responses ranged from strongly disagree to strongly agree. The middle 50% of data ranged from neutral to agree responses.

Table 4.4 Satisfaction of self-determination needs assessments – frequency of responses

Scale	Score	Factors			
		Autonomy	Competence	Relatedness	Needs satisfaction
Number of subjects	n	260	260	260	260
Strongly disagree	1	8	9	12	10
Disagree	2	27	29	30	29
Neutral	3	79	74	90	81
Agree	4	115	111	97	107
Strongly agree	5	32	38	31	34

Of the 260 respondents, 146 (56%) agreed or strongly agreed to personal experiences of autonomy, 148 (57%) to competence and 129 (49%) to relatedness at work. Overall, 141 respondents (54%) agreed or strongly agreed to satisfaction of self-determination needs. On average, 31% of respondents provided neutral responses to questions.

Frequencies are presented graphically by question in Figure 4.8.

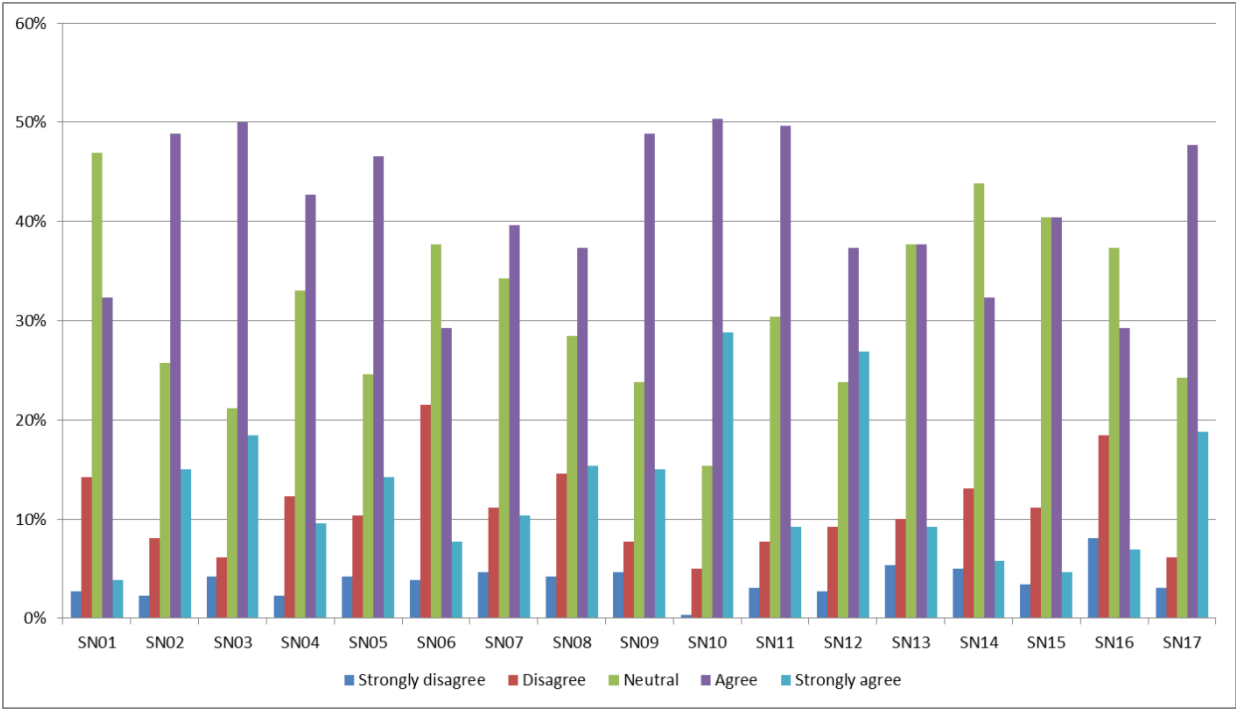


Figure 4.8 Satisfaction of self-determination needs assessments – frequency of responses by question

The statements most frequently agreed to were: *The tasks I have to do at work are in line with what I really want to do* (50%) for autonomy; *I am good at the things I do in my job* (50%) and *I have the feeling that I can even accomplish the most difficult tasks at work* (50%) for competence; and, *Some people I work with are close friends of mine* (48%) for relatedness.

4.4.2 Employee engagement

Findings for the measurement of employee engagement, as measured by the UWES, are presented descriptively in Table 4.5 and Table 4.6.

Table 4.5 Employee engagement assessments – summary of responses

Descriptive statistic	Factors			
	Vigour	Dedication	Absorption	Employee engagement
Number of subjects (n)	260	260	260	260
Mean	4.00	4.05	3.82	3.95
Standard deviation	1.28	1.42	1.36	1.30
Maximum	6	6	6	6
Minimum	0	0	0	0
Median	4	4	4	4
Interquartile range (Q1-Q3)	3-5	3-5	3-5	3-5

Based on median values, subjects experienced vigour, dedication and absorption, as well as employee engagement at least once a week. Responses ranged from never to every day. The middle 50% of data responses ranged from a few times a month to a few times a week.

Table 4.6 Employee engagement assessments – frequency of responses

Scale	Score	Factors			
		Vigour	Dedication	Absorption	Employee engagement
Number of subjects	n	260	260	260	260
Never	0	10	9	15	12
A few times a year or less	1	12	13	13	13
Once a month or less	2	20	22	19	20
A few times a month	3	45	41	51	46
Once a week	4	53	52	53	53
A few time a week	5	80	70	74	75
Every day	6	40	52	34	42

Of the 260 respondents, 173 (67%) experienced vigour; 175 (67%) dedication; and, 161 (62%) absorption at least once a week. Overall, 169 respondents (65%) reported experiences of employee engagement at least once a week.

Frequencies are presented graphically by question in Figure 4.9.

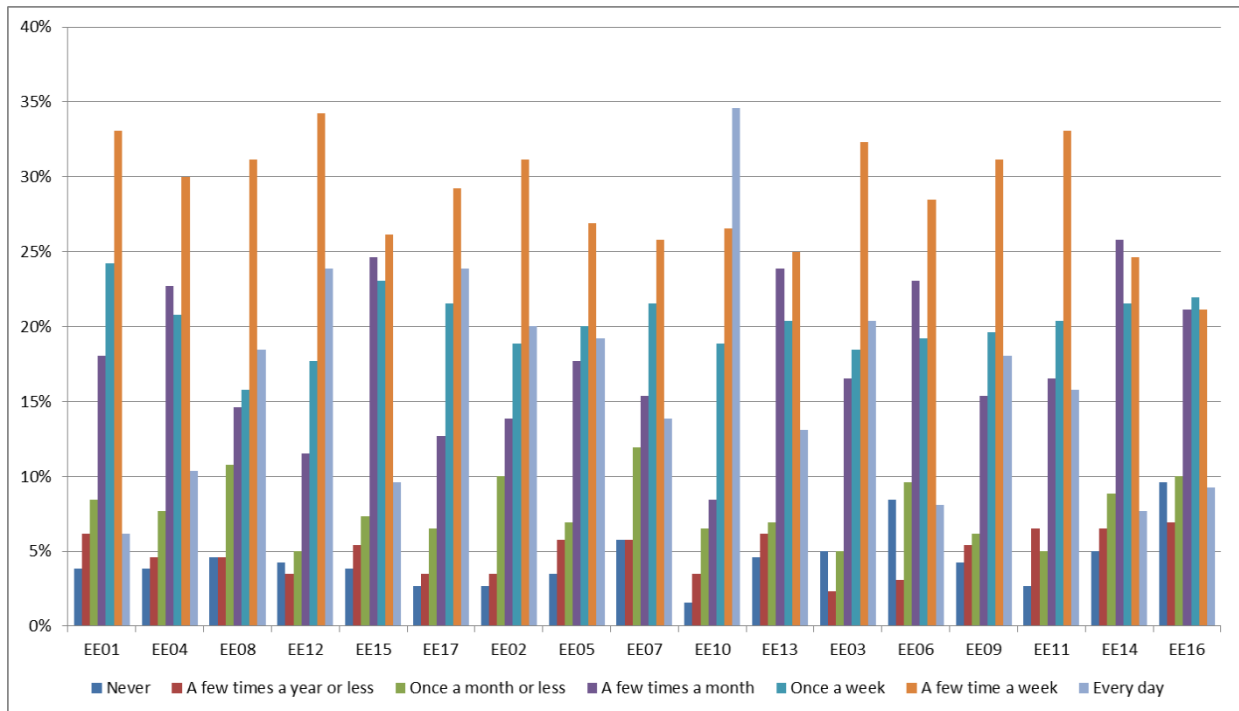


Figure 4.9 Employee engagement assessments – frequency of responses by question

The statements most frequently responded to in the category of a few times a week were: *At my job, I feel strong and vigorous* (34%) for vigour; *My job inspires me* (31%) for dedication; and, *At my job, I am very resilient, mentally* (33%) for absorption. The highest frequency (35%) in the questionnaire was reported for the statement *I am proud on the work that I do* in the response category of every day, for the subscale of dedication.

4.4.3 Perceived managerial support

Findings for the measurement of employees’ perceptions of managerial support, as measured by the adapted SSRS combined with the PCS, are presented descriptively in Table 4.7 and Table 4.8.

Based on median values, subjects agreed to supportive supervisor relations, perceived competence and perceived managerial support. Responses ranged from strongly disagree to strongly agree. The middle 50% of data for supportive supervisor relations ranged from neutral to agree responses; for perceived competence, from agree to strongly agree responses; and, for perceived managerial support, from slightly agree to agree responses.

Table 4.7 Perceived managerial support – summary of responses

Scale	Factors		
	Supportive supervisor relations	Perceived competence	Perceived managerial support
Number of subjects (n)	260	260	260
Mean	5.20	5.94	5.41
Standard deviation	1.33	1.07	1.26
Maximum	7	7	7
Minimum	1	1	1
Median	6	6	6
Interquartile range (Q1-Q3)	4-6	6-7	5-6

Table 4.8 Perceived managerial support – frequency of responses

Scale	Score	Factors		
		Supportive supervisor relations	Perceived competence	Perceived managerial support
Number of subjects	n	260	260	260
Strongly disagree	1	5	1	4
Disagree	2	15	2	11
Slightly disagree	3	17	11	15
Neutral	4	38	19	33
Slightly agree	5	45	25	39
Agree	6	88	114	95
Strongly agree	7	52	90	63

Of the 260 respondents, 184 (71%) slightly agreed, agreed or strongly agreed to statements that pertain to manager behaviour as being supportive and trustworthy of important work-related issues, and 228 (88%) to statements on how he/she feels about his/her work. Overall, 197 respondents (76%) perceived managers' behaviour as being supportive, trusting and contributing to competence.

Frequencies are presented graphically by question in Figure 4.10.

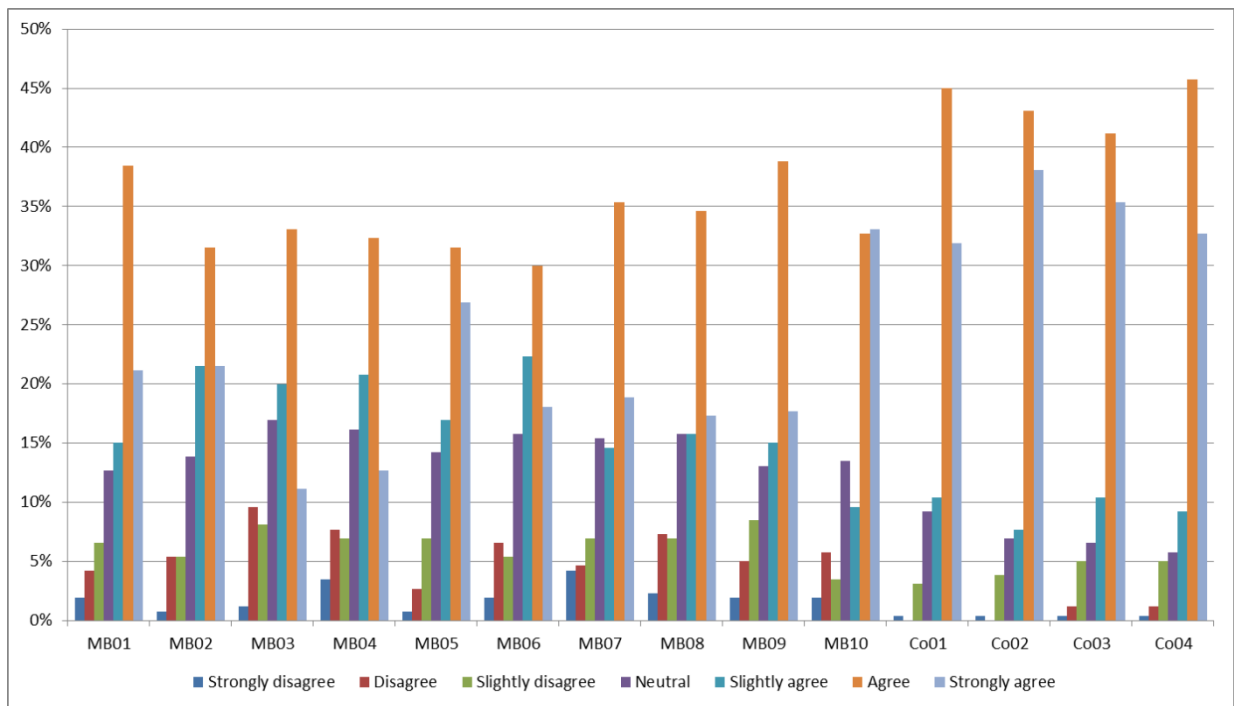


Figure 4.10 Perceived managerial support – frequency of responses by question

The statements most frequently agreed to were: *My supervisor helps me solve work-related problems* (support: 38%); and, *My supervisor does what he/she says he/she will do* (trust: 39%) for supportive management and trusting relations. The highest frequency (46%) in the questionnaire was reported for the statement *I feel able to meet the challenge of performing well at work* in the response category of agreed, for the subscale of perceived competence.

4.4.4 Emotional exhaustion

Findings for the measurement of emotional exhaustion, as measured by the subscale of the MBI, are presented descriptively in Table 4.9 and Table 4.10.

Based on median values, subjects experienced emotional exhaustion once a month or less. Responses ranged from never to every day. The middle 50% of data responses ranged from a few times a year or less to a few times a month.

Of the 260 respondents, 71 (27%) experienced emotional exhaustion at least once a week and 152 (59%) once a month or fewer to never.

Table 4.9 Emotional exhaustion assessments – summary of responses

Descriptive statistic	Emotional exhaustion
Number of subjects (n)	260
Mean	2.30
Standard deviation	1.55
Maximum	6
Minimum	0
Median	2
Interquartile range (Q1-Q3)	1-3

Table 4.10 Emotional exhaustion assessments – frequency of responses

Scale	Score	Emotional exhaustion
Number of subjects	N	260
Never	0	54
A few times a year or less	1	51
Once a month or less	2	47
A few times a month	3	37
Once a week	4	27
A few time a week	5	29
Every day	6	14

Frequencies are presented graphically by question in Figure 4.11.

The statements markedly reported in the category of never were: *Working with people all day is really a strain for me* (29%); *Working with people directly puts too much stress on me* (33%); and, *I feel like I'm at the end of my rope* (41%). The highest frequency in the questionnaire was obtained for the latter statement.

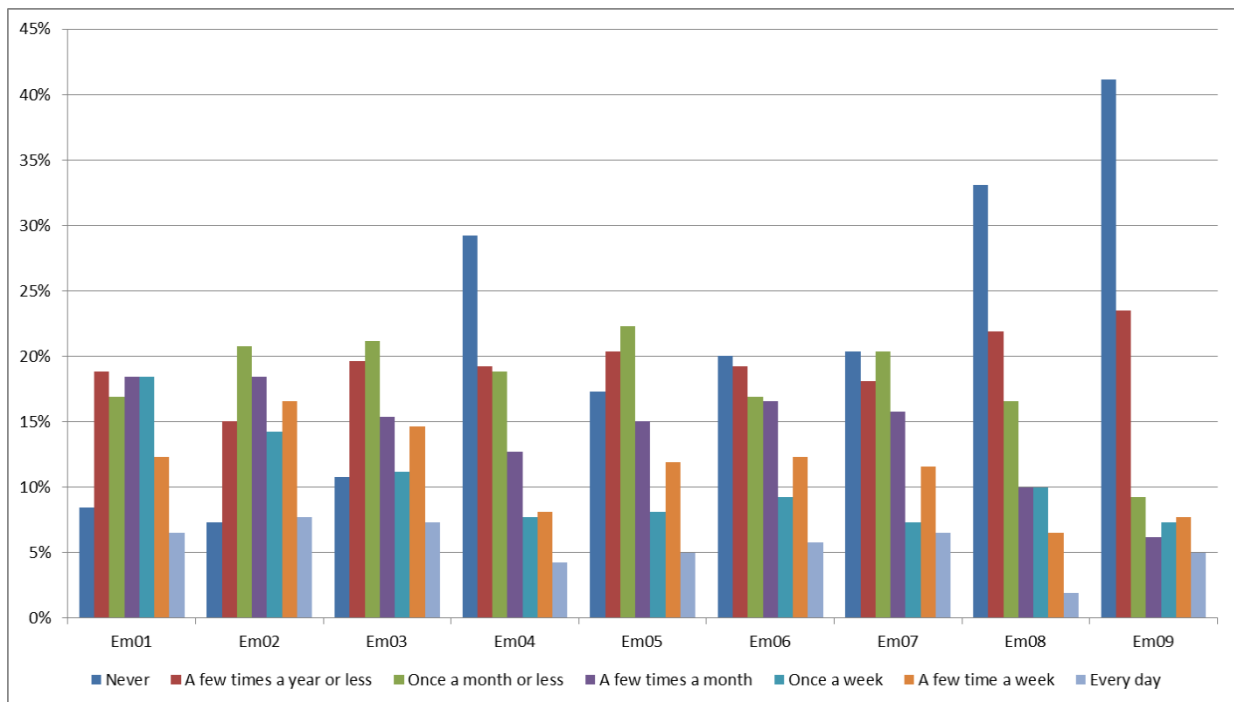


Figure 4.11 Emotional exhaustion assessments – frequency of responses by question

4.4.5 Intention to leave

Findings for the measurement of intention to leave, as measured by the TIS, are presented descriptively in Table 4.11 and Table 4.12.

Table 4.11 Intention to leave assessments – summary of responses

Descriptive statistic	Intention to leave
Number of subjects (n)	260
Mean	2.62
Standard deviation	1.23
Maximum	5
Minimum	1
Median	2
Interquartile range (Q1-Q3)	2-4

Based on median values, subjects disagreed on having intentions to leave. Responses ranged from strongly disagree to strongly agree. The middle 50% of data responses ranged from disagree to agree.

Of the 260 respondents, 141 (54%) disagreed or strongly disagreed on having intention to leave.

Table 4.12 Intention to leave assessments – frequency of responses

Scale	Score	Intention to leave
Number of subjects	N	260
Strongly disagree	1	59
Disagree	2	82
Neutral	3	50
Agree	4	36
Strongly agree	5	33

Frequencies are presented graphically by question in Figure 4.12.

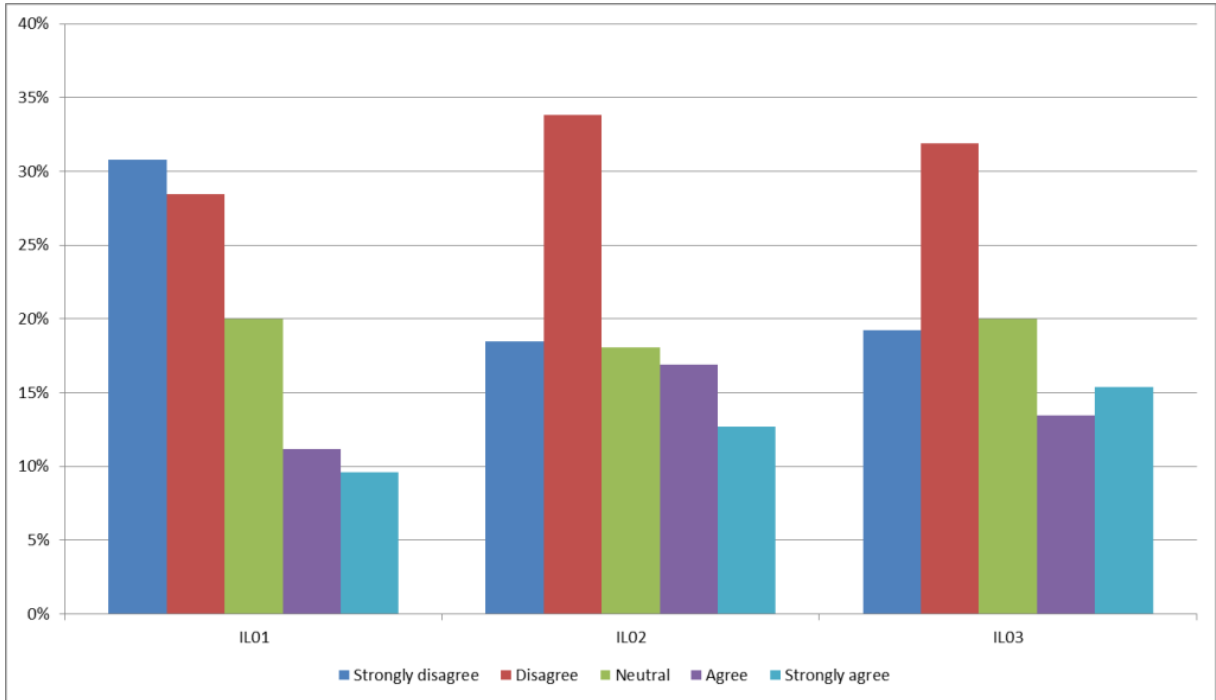


Figure 4.12 Intention to leave assessments – frequency of responses by question

The statement most frequently strongly disagreed on was: *I am actively looking for other jobs* (31%). All three statements were markedly disagreed on.

4.4.6 Summary of descriptive statistics

Of the 260 respondents included in this study, 54% agreed or strongly agreed to satisfaction of self-determination needs; 65% reported experiences of employee engagement at least once a week; 76% of respondents perceived they had supportive management, trusting relations and their managers' contributing to their competence; 27% experienced emotional exhaustion at least once a week; and, 54% disagreed or strongly disagreed on having intention to leave.

4.5 Inferential statistics

For purposes of statistical inference, variables were treated as continuous data. It was assumed that data were linearly related, normally distributed and contained no outliers.

Results of empirical relationships between various constructs are reported and discussed, using correlation coefficients. Additional statistics to investigate causality were not performed.

The main findings of the correlation coefficient analysis are summarised for construct inter-correlations in Table 4.13.

Table 4.13 Construct inter-correlations

	Satisfaction of self-determination needs	Employee engagement	Perceived managerial support	Emotional exhaustion
Employee engagement	.85*			
Perceived managerial support	.68*	.67*		
Emotional exhaustion	-.67*	-.69*	-.61*	
Intention to leave	-.65*	-.63*	-.62*	.61*

*p <.01

Observed effect: ±.1 = small effect; ±.3 = medium effect; ±.5 = large effect

Hypothesis 1 and Hypothesis 2: Satisfaction of self-determination needs is strongly positively related to employee engagement ($r = .85, p < .01$), representing a large observed effect. This means that the more staff is engaged, the higher the level of needs satisfaction. Needs satisfaction is moderately positively related to perceived managerial support ($r = .68, p < .01$), representing a large observed effect. This means that higher levels of needs satisfaction is related to higher levels of supportive manager relations and perceived competence.

The researcher accepts both Hypothesis 1 and Hypothesis 2.

Hypothesis 3 and Hypothesis 4: Needs satisfaction is moderately negatively related to both emotional exhaustion ($r = -.67, p < .01$) and intention to leave ($r = -.65, p < .01$); both correlations are of large observed effect. This means that staff who experience higher levels of needs satisfaction experience less emotional exhaustion and less intention to quit.

The researcher accepts both Hypothesis 3 and Hypothesis 4.

Hypothesis 5: Employee engagement shows a moderate, positive relationship with perceived managerial support ($r = .67, p < .01$), representing a large observed effect. This means that engaged staff experience supportive, trusting manager relations with higher levels of perceived competence.

The researcher accepts Hypothesis 5.

Hypothesis 6 and Hypothesis 7: Employee engagement is moderately negatively related to both emotional exhaustion ($r = -.69, p < .01$) and intention to leave ($r = -.63, p < .01$); both correlations are of large observed effect. This means that staff members who are more engaged have less experience of emotional exhaustion and less intention to quit.

The researcher accepts both Hypothesis 6 and Hypothesis 7.

In addition, inter-correlations revealed that perceived managerial support is moderately negatively related to both emotional exhaustion ($r = -.61, p < .01$) and intention to leave ($r = -.62, p < .01$); both correlations are of large observed effect. This means that staff who experience higher levels of supportive, trusting, competence-promoting relations with their managers also experience less emotional exhaustion and less intention to quit.

4.6 Effect size

Effect size is calculated for data obtained from convenience sampling and interpreted in terms of practical significance.

4.6.1 Gender comparisons

Evaluation of biographical data revealed that of the 260 respondents included in the study, 98 (38%) were male and 162 (62%) were female.

Cohen's d effect size results for gender comparisons are presented in Table 4.14.

Table 4.14 Cohen's d effect size calculations: Gender comparisons

Construct	Males			Females			Cohen's d
	Mean	Var	SD	Mean	Var	SD	
Satisfaction of self-determination needs	54.11	183.67	13.55	62.35	97.26	9.86	0.7
Employee engagement	57.29	634.35	25.19	73.09	310.41	17.62	0.7
Perceived managerial support	69.41	285.19	16.89	79.60	203.42	14.26	0.7
Emotional exhaustion	25.27	215.23	14.67	17.92	163.71	12.80	0.5
Intention to leave	9.29	13.18	3.63	6.99	11.83	3.44	0.6

SD = standard deviation; Var = variance

Cohen's d: ± 0.2 = small effect, not practical significant difference; ± 0.5 = medium effect, practical visible difference; ± 0.7 = large effect, practical significant difference

Large effects were observed between males and females for needs satisfaction, employee engagement and perceived managerial support. It can be argued that Cohen's d values reported indicate that, for the sample, female employees experience higher and practically significant levels of needs satisfaction, employee engagement and perceived managerial support than male employees from the participating CROs.

4.6.2 Age interval comparisons

Evaluation of biographical data revealed that of the 260 respondents included in the study, 131 (50%) were between 26 and 35 years old. Cohen's d effect sizes were determined for differences between means of respondents in the age interval of 26 – 35 years and all other age intervals.

Cohen's d effect size results for age interval comparisons are presented in Table 4.15.

Table 4.15 Cohen’s d effect size calculations: Age interval comparisons

Construct	Age interval 26 – 35 years			All other age intervals			Cohen’s d
	Mean	Var	SD	Mean	Var	SD	
Satisfaction of self-determination needs	59.52	130.93	11.44	58.97	160.78	12.68	0.0
Employee engagement	67.68	439.93	20.97	66.58	542.93	23.30	0.0
Perceived managerial support	75.94	226.09	15.04	75.57	291.84	17.08	0.0
Emotional exhaustion	20.10	164.66	12.83	21.29	226.82	15.06	0.1
Intention to leave	8.21	12.89	3.59	7.50	14.02	3.74	0.2

SD = standard deviation; Var = variance

Cohen’s d: ± 0.2 = small effect, not practical significant difference; ± 0.5 = medium effect, practical visible difference; ± 0.7 = large effect, practical significant difference

A small effect was observed for intention to leave between the age interval of 26 – 35 years and all other age intervals. Based on the results of age comparison, it can be argued that there are no practically significant differences in age group for constructs.

4.6.3 Level of education comparisons

Evaluation of biographical data revealed that of the 260 respondents included in the study, 193 (75%) had tertiary qualifications at different levels. Cohen’s d effect sizes were determined for differences between means of respondents with tertiary qualifications and all other levels of education.

Cohen’s d effect size results for level of education comparisons are presented in Table 4.16.

Table 4.16 Cohen’s d effect size calculations: Level of education comparisons

Construct	Tertiary qualifications			All other levels of education			Cohen’s d
	Mean	Var	SD	Mean	Var	SD	
Satisfaction of self-determination needs	60.10	127.26	11.28	56.78	191.45	13.84	0.3
Employee engagement	68.25	439.72	20.97	63.93	627.40	25.05	0.2

Construct	Tertiary qualifications			All other levels of education			Cohen's d
	Mean	Var	SD	Mean	Var	SD	
Perceived managerial support	77.42	207.22	14.40	70.96	377.07	19.42	0.4
Emotional exhaustion	20.28	182.07	13.49	21.87	234.06	15.30	0.1
Intention to leave	7.76	13.65	3.69	8.13	13.27	3.64	0.1

SD = standard deviation; Var = variance

Cohen's d: ± 0.2 = small effect, not practical significant difference; ± 0.5 = medium effect, practical visible difference; ± 0.7 = large effect, practical significant difference

Small effects were observed for constructs between tertiary qualifications and all other levels of education. Based on the results of level of education comparison, it can be argued that there are no practically significant differences in education group for constructs.

Of particular interest to the researcher is the comparison between the degree groups and all other education groups. Of the 260 respondents, 98 respondents (38%) held at least one degree. Cohen's d effect sizes were determined for differences between means of respondents with degrees and all other levels of education.

Cohen's d effect size results for level of education comparisons are presented in Table 4.17.

Table 4.17 Cohen's d effect size calculations: Level of education comparisons between degrees and all other levels of education

Construct	Degrees			All other levels of education			Cohen's d
	Mean	Var	SD	Mean	Var	SD	
Satisfaction of self-determination needs	59.26	101.68	10.08	59.24	172.41	-13.13	0.0
Employee engagement	65.93	349.45	18.69	67.86	575.40	-23.99	0.1
Perceived managerial support	76.70	185.78	13.63	75.19	301.83	-17.37	0.1
Emotional exhaustion	22.18	172.32	13.13	19.78	207.85	-14.42	0.2
Intention to leave	8.52	14.52	3.81	7.46	12.59	-3.55	0.3

SD = standard deviation; Var = variance

Cohen's d: ± 0.2 = small effect, not practical significant difference; ± 0.5 = medium effect, practical visible difference; ± 0.7 = large effect, practical significant difference

Small effects were observed for emotional exhaustion and intention to leave between degree holders and all other levels of education. Based on the results of this comparison, it can be argued that there are no practically significant differences in education group for constructs.

4.6.4 Work duration comparisons

Evaluation of biographical data revealed that of the 260 respondents included in the study 177 (68%) reported a work duration with their current employer of 5 or fewer years. Cohen's d effect sizes were determined for differences between means of respondents with work duration of 5 or fewer years and all other work duration levels.

Cohen's d effect size results for work duration comparisons are presented in Table 4.18.

Table 4.18 Cohen's d effect size calculations: Work duration comparisons

Construct	Work duration 5 or less years			All other work duration levels			Cohen's d
	Mean	Var	SD	Mean	Var	SD	
Satisfaction of self-determination needs	57.47	147.99	12.17	63.04	119.79	10.94	0.5
Employee engagement	63.81	508.03	22.54	74.23	380.67	19.51	0.5
Perceived managerial support	73.66	263.61	16.24	80.23	218.57	14.78	0.4
Emotional exhaustion	22.69	194.33	13.94	16.42	172.05	13.12	0.5
Intention to leave	8.52	13.40	3.66	6.45	11.01	3.32	0.6

SD = standard deviation; Var = variance

Cohen's d: ± 0.2 = small effect, not practical significant difference; ± 0.5 = medium effect, practical visible difference; ± 0.7 = large effect, practical significant difference

Medium effects of practical visible difference were observed between work duration of 5 or fewer years and all other work duration levels for needs satisfaction, employee engagement, emotional exhaustion and intention to leave. It can thus be argued that Cohen's d values reported indicate that, for the sample, the group employed for 5 years or less practically visibly differ with respect to needs satisfaction, employee engagement and negative work-related functioning for employees from the participating CROs from employees with other levels of work duration.

Based on Cohen's d values, it can be argued that gender and work duration may result in large enough differences to have an effect in practice; whereas, age and levels of education showed effects of no practical significance. Of particular concern are lower levels of needs satisfaction, employee engagement and perceived managerial support among male employees.

4.7 Chapter summary

Results of the empirical investigation were reported in this chapter. The following empirical aims have been reached:

- (i) The levels of needs satisfaction, employee engagement, emotional exhaustion and intention to leave, as well as perceived managerial support were assessed, using a compilation of documented scales and subscales
- (ii) The relationships between the constructs, together with relation to biographical data were determined

In Chapter 5, the conclusions, limitations and recommendations of the research are described.

CHAPTER 5 CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

Empirical results were presented and discussed in Chapter 4. The patterns of relationship between constructs were in line with the hypotheses stated for this study. Satisfaction of self-determination needs is strongly positively related to employee engagement, moderately positively to perceived managerial support, and moderately negatively to both emotional exhaustion and intention to leave. Employee engagement is moderately positively related to perceived managerial support and moderately negatively to both emotional exhaustion and intention to leave.

In the fifth and final chapter conclusions are drawn, limitations of the study are revealed and recommendations for future research are proposed.

5.2 Background to the research

The aim of this study was to investigate the relationship between satisfaction of self-determination needs and employee engagement in the South African contract research sector. In addition, relationships to perceived managerial support and work-related functioning concepts of emotional exhaustion and intention to leave were researched.

The study conceptualised the constructs of the satisfaction of self-determination needs, employee engagement, perceived managerial support, emotional exhaustion and intention to leave, by means of the literature review presented in Chapter 2. The literature cited for the research topic was gathered through the internet, as well as library searches into scientific journals addressing research underpinned by the theory, with an emphasis on application in the South African context. The literature search included the sourcing of validated measuring instruments. Preference was given to validated scales and subscales available in the open domain.

A non-experimental cross-sectional survey was performed for the collection of data from the target population, which comprised office-based employees from the contract research sector in the predefined geographical area. The research design and process were documented in Chapter 3. In addition, an explanation was provided of data analysis and statistical methods used in this research study.

Empirical results were presented for the assessments of levels of satisfaction of self-determination needs and employee engagement, as well as perceived managerial support,

emotional exhaustion and intention to leave. Data were summarised descriptively and presented graphically. Inferential statistics were performed to determine exploratory correlational relationships. Characteristics of the targeted sample were evaluated for practical significance.

5.3 Research questions answered

One of the biggest challenges managers face in South Africa today is attracting and retaining key talent, with the local pharmaceutical industry particularly affected by excessive demand in relation to available talent. Special effort should be made to attract and retain qualified or experienced people with attributes conducive to productivity and sustainability.

It was against this background that the research questions for the current study were formulated. Descriptive analysis of ordinal study data revealed answers to the following questions.

Do employees perceive their self-determination needs as being satisfied at work?

Overall, 54% of respondents agreed or strongly agreed to satisfaction of self-determination needs, with the highest percentage reflection on competence.

What is the prevalence and intensity of engagement among these employees?

Overall, 65% of respondents reported experiences of employee engagement at least once a week, with the elements of both vigour and dedication testing highest.

Considering the faceless world many workers in the contract research sector work in, what are employees' perceptions of managerial support at work?

Overall, 76% of respondents experienced their managers' behaviour as being supportive, trusting and contributing to competence.

What is the prevalence and intensity of work-related functioning concepts of emotional exhaustion and intention to leave among these employees?

Overall, 59% of respondents experienced emotional exhaustion once a month or less. Interestingly, 29% of respondents indicated that the statement "*Working with people all day is really a strain for me*" had never occurred to them. There were 54% of respondents who disagreed or strongly disagreed on having intention to leave.

Treating responses as continuous data, correlation coefficient analysis was performed and revealed answers to the following research question:

What are the relationships between these constructs?

The study found noticeable relationships between constructs as described previously.

Large Cohen's effect sizes were demonstrated between males and females for needs satisfaction (0.7); employee engagement (0.7); and, perceived managerial support (0.7). Differences between age intervals and between levels of education showed negligible effects. Medium effect sizes were revealed between levels of work duration for needs satisfaction (0.5); employee engagement (0.5); emotional exhaustion (0.5); and, intention to leave (0.6).

5.4 Recommendations

5.4.1 Theoretical implications

The aim of this study was to investigate the relationships between the satisfaction of self-determination needs, employee engagement, perceived managerial support, emotional exhaustion and intention to leave in the South African contract research sector. Based on inter-correlations, perceived needs satisfaction had a large effect on employee engagement and employees' perceptions of supportive manager relations and competence-promoting managerial behaviour, with a moderate effect on less experience of emotional exhaustion and less intention to quit. Similarly, employee engagement largely affected perceptions of managerial support, reduced emotional exhaustion and less intention to leave.

The results of this study confirm that needs satisfaction has positive relationships with employee engagement and perceived managerial support. Earlier research supports the findings. Van den Broeck *et al.* (2010:984) show that satisfaction of self-determination needs is related to employees' work-related well-being and supervisors' leadership styles. Baard *et al.* (2004:2016) show that perceived managerial support is significantly related to satisfying people's intrinsic needs for autonomy, competence and relatedness, with significant predicted performance evaluations. Campbell (1971:524) postulates that an important role for supervisors in needs satisfaction is that of belongingness, recognition and appreciation. In addition, May *et al.* (2004:11) show that supportive supervisor relations are positively related to psychological safety. It has been shown that trustworthy, supportive managers provide for feelings of psychological safety; therefore, subordinates experience a willingness to invest themselves at work (Deci *et al.*, 1989:581; May *et al.*, 2004:16).

5.4.2 Practical implications

Organisations and researchers should be made aware that the lack of employee engagement has financially harmful implications for business throughout the world, with loss of productivity, low retention rates and decreased profitability. Growing evidence is emerging which indicates that employee engagement significantly positively contributes to individual productivity, performance, organisational commitment and individual well-being, with a negative relationship to turnover intentions. High levels of engagement are related to improved performance and individual well-being (Truss *et al.*, 2013:2658). Besides higher customer satisfaction ratings, employees stay longer with organisations and engaged employees contribute significantly to increased sales and cost reductions (Shuck, 2010:15).

Admittedly, the results of this study may indicate that the participating organisations provide job opportunities to a younger workforce; however, investigation into the retention of staff, especially male employees, needs serious reflection. It was shown that female employees experience practically significantly more needs satisfaction, employee engagement and perceived managerial support than male employees. A possible explanation for the gender difference is that contract research is delivered in a highly regulated environment that allows for limited creativity and innovation, which may impede basic needs. Managers should be made aware that frustration of basic psychological needs impacts negatively on staff retention.

Results of this study also showed that work duration may result in large enough differences between constructs to have an effect in practice. In the event of work duration exceeding 5 years, higher levels of satisfaction of self-determination needs, employee engagement and perceived managerial support, and lower levels of emotional exhaustion and intention to leave were reported than if their tenure with the organisation was 5 years or less.

5.4.3 Recommendations for future research

From the current research, the question arose as to the sustainability of employee engagement in the targeted organisations. Results of this study revealed that 65% of respondents reported experiences of employee engagement at least once a week; yet, for 68% of respondents the work duration with their current employer was 5 or fewer years. Future research to view employee engagement in terms of sustainability is recommended. Research studies should be conducted to investigate managers' role in setting up employees for success, bringing energy to the workplace and ensuring that their employees are healthy and experience social, psychological and physical well-being. Such studies can develop knowledge toward the sustainability of engagement and potential interventions that could be rolled out in the contract

research sector's advanced learning and development programmes. Instead of collecting a view of the workforce at a single point-in-time, a longitudinal study design is recommended to evaluate employee perceptions comparatively. This will allow managers a better picture of both organisational climate and organisational culture; thus, contributing toward the identification of lead indicators that could facilitate competitive advantage and organisational growth.

5.5 Limitations

For future research, it is advised that more biographical data on the respondents be collected. In this study, the target population involved office-based employees from the contract research sector without collecting biographical data on which service functionality they provide, to which department/division they report, or whether their manager is on-site or working remotely. In view of the practically significant difference detected between male and female respondents, an indication of the nature of the services each respondent delivers will contribute to the elucidation of information and could provide guidance on potential interventions. Caution must be maintained to anonymise personal data. More extensive biographical data may help to confirm gender differences, identify influential external factors and contextualise relationships.

In this study convenience sampling was performed and the survey questionnaire provided ordinal data for the evaluation of constructs. Although this is a recognised way of collecting survey data, the researcher is interested in using visual analogue scales to obtain exact measurements that could provide for continuous data. Future research should consider random sampling in order to allow for statistical inference of data to the population.

Environmental factors may impact on the scores reported by respondents (Deci & Ryan, 2000:262). It is known that the pharmaceutical industry, and in particular the contract research sector, regularly goes through events of stringent organisational restructuring to contain costs. Although these changes are often announced and discussed in the press, individuals' perceptions of the changes to organisational structure and how they are affected by these changes could be elicited from respondents using open-ended qualitative surveys. It would be interesting to know which environmental factors, including transformations, contribute to the scores reported by the respondents when investigating self-determination and employee engagement.

5.6 Conclusions

The study provides for increased knowledge toward the efficiency and effectiveness of CRO services by exploring the elements through which employee engagement and satisfaction of

self-determination needs impact on the attraction and retention of staff, particularly of male employees, in the contract research sector.

The results of this study confirm the underpinning value of SDT for understanding the relationships between employee engagement, perceived managerial support and negative work-related functioning of emotional exhaustion and intention to leave. Supportive, competence-promoting relationships between managers and employees in the contract research sector could assist towards the attraction and retention of staff. In turn, frustration of these psychological needs could contribute to the loss of valuable talent. It is important that business should not view employee engagement as a once-off assessment only. It is advisable that management focuses on sustainable employee engagement by applying regular surveys among employees, reacting with effective interventions and hosting frequent regular instead of once-off assessments only.

5.7 Chapter summary

In the fifth and final chapter, the conclusions, limitations and recommendations of the research were described.

In the highly competitive industry of pharmaceutical, biotechnological and medical device developments, high-performance service delivery is crucial. From my readings it is evident that engaged employees identify with their work and put a lot of effort into it. Through this, they contribute significantly to increased sales and cost reductions within organisations. This study has shown a strongly positive relationship between the satisfaction of self-determination needs and employee engagement. My opinion on engagement is aligned with Kahn's (1990) needs-satisfying approach, where engagement is conceptualised in the context of task behaviour and role performance. Through involving several aspects of being – physically, cognitively, emotionally and mentally – this concept impacts on a fundamental level; needs-satisfied engagement is part of innate human nature. Satisfaction of self-determination needs has the potential to motivate employees' engagement to the benefit of both the individual and the organisation. This said, constant vigilance must be maintained if sustainable employee engagement is to be ensured.

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APPENDIX A: INFORMED CONSENT LETTER

INFORMED CONSENT

Dear Participant

I invite you to take part in this research study toward partial fulfilment of the requirements for the MBA degree for which I am registered as a final year student. Thanking you in advance for your time and willingness to help me with my research. The title of the study is:

*Employee engagement and satisfaction of self-determination needs:
An exploratory study in the contract research sector.*

The aim of the study is to investigate to what extent employees at CROs find their work meaningful, feel confident and competent to perform their jobs and experience a sense of belonging. Research has shown that these feelings may determine an employee's work performance and decision to stay in his/her current job. Research has also shown that the behaviour of a line manager or supervisor may influence how employees feel about their work.

The Ethics Committee of the North West University, Potchefstroom approved this study.

Research results will be used for academic purposes only. For your involvement in the study, you will not receive any financial or other benefits from the researcher or the CRO for which you work. If you decide not to take part in the research, you will not be disadvantaged in any way due to your choice.

Completing the questionnaire is out of free will and nobody can force you to do it. Please note that the questionnaire is anonymous. If you would like personal feedback on your responses or wish to discuss the scientific background of the study, you are welcome to contact me. Results of your individual responses will not be discussed without your written consent. Under no circumstances will your dignity be impaired.

Thank you for your time.

Elsa de Wet

Cell number: 083 630 9586

APPENDIX B: CONFIRMATORY FACTOR ANALYSIS

Model 1: CFA: Section A (Needs satisfaction)

Number of observations	260
Estimator	ML
Minimum Function Test Statistic	315.178
Degrees of freedom	116
P-value (Chi-square)	0.000
Model test baseline model:	
Minimum Function Test Statistic	3161.476
Degrees of freedom	136
P-value	0.000
User model versus baseline model:	
Comparative Fit Index (CFI)	0.934
Tucker-Lewis Index (TLI)	0.923
Loglikelihood and Information Criteria:	
Loglikelihood user model (H0)	-4580.411
Loglikelihood unrestricted model (H1)	4422.822
Number of free parameters	37
Akaike (AIC)	9234.822
Bayesian (BIC)	9366.567
Sample-size adjusted Bayesian (BIC)	9249.263
Root Mean Square Error of Approximation:	
RMSEA	0.081
90 Percent Confidence Interval	0.071 0.092
P-value RMSEA <= 0.05	0.000
Standardized Root Mean Square Residual:	
SRMR	0.044
Parameter Estimates:	
Information	Expected
Standard Errors	None
Latent Variables:	

	Estimate
Pers1 =~	
SN01	1.000
SN02	1.288
SN03	1.380
SN04	1.340
SN05	1.590
Pers2 =~	
SN06	1.000
SN07	1.528
SN08	1.452
SN09	1.486
SN10	1.278
SN11	1.323
Pers3 =~	
SN12	1.000
SN13	1.080
SN14	1.098
SN15	0.972
SN16	1.034
SN17	1.028
Covariances:	
	Estimate
Pers1 ~~	
Pers2	0.281
Pers3	0.304
Pers2 ~~	
Pers3	0.334
Variances:	
	Estimate
SN01	0.398
SN02	0.347
SN03	0.399
SN04	0.308
SN05	0.266
SN06	0.652
SN07	0.262
SN08	0.482
SN09	0.318
SN10	0.197
SN11	0.257
SN12	0.616
SN13	0.413
SN14	0.301
SN15	0.315
SN16	0.590
SN17	0.407

Pers1	0.288
Pers2	0.294
Pers3	0.449

Model 2: CFA: Section B (Employee engagement)

Number of observations	484
Estimator	ML
Minimum Function Test Statistic	1314.435
Degrees of freedom	116
P-value (Chi-square)	0.000
Model test baseline model:	
Minimum Function Test Statistic	18815.526
Degrees of freedom	136
P-value	0.000
User model versus baseline model:	
Comparative Fit Index (CFI)	0.936
Tucker-Lewis Index (TLI)	0.925
Loglikelihood and Information Criteria:	
Loglikelihood user model (H0)	NA
Loglikelihood unrestricted model (H1)	NA
Number of free parameters	
Number of free parameters	37
Akaike (AIC)	NA
Bayesian (BIC)	NA
Root Mean Square Error of Approximation:	
RMSEA	0.146
90 Percent Confidence Interval	0.139 0.153
P-value RMSEA <= 0.05	0.000
Standardized Root Mean Square Residual:	
SRMR	0.023
Parameter Estimates:	
Information	Expected
Standard Errors	None
Latent Variables:	
	Estimate
Sub1 =~	
b1	1.000
b4	1.254
b8	1.103
b12	1.092

b15	1.126
b17	0.899
Sub2 =~	
b2	1.000
b5	1.078
b7	1.059
b10	1.037
b13	0.953
Sub3 =~	
b3	1.000
b6	0.912
b9	0.915
b11	0.907
b14	0.992
b16	0.845
Covariances:	
	Estimate
Sub1 ~~	
Sub2	65.872
Sub3	73.747
Sub2 ~~	
Sub3	78.831
Variances:	
	Estimate
b1	6.405
b4	6.912
b8	3.799
b12	5.332
b15	5.620
b17	36.333
b2	34.763
b5	6.830
b7	4.892
b10	4.195
b13	10.586
b3	7.984
b6	6.347
b9	5.738
b11	5.682
b14	4.743
b16	5.580
Sub1	61.628
Sub2	70.249
Sub3	88.502

Model 3: CFA: Section CD (Perceived managerial support)

Number of observations	337
Estimator	ML
Minimum Function Test Statistic	783.708
Degrees of freedom	76
P-value (Chi-square)	0.000
Model test baseline model:	
Minimum Function Test Statistic	10684.466
Degrees of freedom	91
P-value	0.000
User model versus baseline model:	
Comparative Fit Index (CFI)	0.933
Tucker-Lewis Index (TLI)	0.920
Loglikelihood and Information Criteria:	
Loglikelihood user model (H0)	NA
Loglikelihood unrestricted model (H1)	NA
Number of free parameters	29
Akaike (AIC)	NA
Bayesian (BIC)	NA
Root Mean Square Error of Approximation:	
RMSEA	0.166
90 Percent Confidence Interval	0.156 0.177
P-value RMSEA <= 0.05	0.000
Standardized Root Mean Square Residual:	
SRMR	0.019
Parameter Estimates:	
Information	Expected
Standard Errors	None
Latent Variables:	
Sec_C =~	Estimate
c1	1.000
c2	0.817

c3	0.944
c4	0.925
c5	0.880
c6	0.944
c7	0.953
c8	0.836
c9	1.005
c10	0.603
Sec_D =~	
d1	1.000
d2	0.991
d3	1.151
d4	1.124
Covariances:	
	Estimate
Sec_C ~~	
Sec_D	54.913
Variances:	
	Estimate
c1	7.144
c2	3.800
c3	4.911
c4	5.485
c5	4.028
c6	4.909
c7	8.970
c8	3.589
c9	5.467
c10	39.482
d1	2.938
d2	2.345
d3	1.252
d4	1.462
Sec_C	71.944
Sec_D	50.130