THE EXPANSION, MODIFICATION AND EMPIRICAL TESTING OF A PSYCHOLOGICAL OWNERSHIP STRUCTURAL MODEL

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Thesis presented in partial fulfilment of the requirements for the degree of Master of Commerce (Industrial Psychology) in the Faculty of Economic and Management Sciences at Stellenbosch University

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DECEMBER 2020

DECLARATION

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Date: December 2020

ABSTRACT

No amount of financial resources, technological ingenuity or innovation will ensure the profitability of an organisation if they don't have the necessary human resources who are both able and willing to rise to the occasion. Labour represents the element that determines the efficiency with which the other factors of production are utilised and therefore ultimately determines organisational performance. Therefore, it is important for an organisation to monitor and improve its employees' performance and well-being to maintain or raise profitability. This study attempted to shed some light on the importance of extra role behaviour (non-task performance) which contributes toward the overall performance of an organisation. Subsequently, an argument was presented that introduces and supported *psychological ownership* as an important component that influences these extra role behaviours (such as *organisational citizenship behaviour*). The importance of *psychological ownership* was also linked to certain crucial work attitudes such as *job satisfaction*, and jo*b engagement.* This line of reasoning more specifically, in conjunction with the preceding discussion, warrants directing the inquiry into additional antecedents to those already identified by Lee (2017) to *psychological ownership* , towards the manner in which specific latent variables moderate and mediate the effect of *psychological ownership* on the consequences of *psychological ownership* and how these consequences directly and/or indirectly feedback on to *psychological ownership*.

This study proposed a comprehensive *Psychological Ownership* structural model. An *ex post facto* correlation design with structural equation modelling (SEM) was used as the statistical analysis technique to test the substantive research hypotheses represented by the *psychological ownership* structural model. In addition, the study tested two additional narrow-focused structural models describing the impact of congruence between the salience of the self-efficacy and self-identity needs and the perceived ability of the job to satisfy these needs on the *motivation the pursue the routes to psychological ownership* by using an *ex post facto* correlation design with polynomial regression as the statistical analysis technique. A convenience sample of 399 employees working in both the private and public sector participated in the study.

The Klopper-Lee Psychological Ownership structural model achieved reasonable fit. The beta matrix revealed that all, but one, path estimate between the endogenous latent variables were statistically significant This implies that there was insufficient evidence to conclude that a definite causal relationship exists between the *intimate knowledge* that one gains in a job and the extent to which that job is *integrated into the self-identity*. Furthermore, support was not

found for the hypothesis that *task identity* has a positive influence on the *motivation to pursue routes to psychological ownership,* that *task significance* has a positive influence on the *motivation to pursue routes to psychological ownership,* that *task variety* has a positive influence on the *motivation to pursue routes to psychological ownership,* and that *autonomy* has a positive influence on *gaining intimate knowledge*. Finally, the relationships between *perceived ability*self-investment* and *integration into the self,* and between *perceived ability of job to satisfy self-efficacy need* and *motivation to engage in self investment* had inconsistent signs compared to the direction of the hypothesised causal relationship.

The squared multiple correlations (R^2) indicated that the *psychological ownership* structural model was able to explain 45% of variance in *psychological ownership.*

OPSOMMING

Geen hoeveelheid finansiële hulpbronne, tegnologiese vindingrykheid of innovasie sal die winsgewendheid van 'n organisasie verseker as hulle nie oor die nodige menslikehulpbronne beskik wat beide in staat is en bereid is om tot die geleentheid toe te tree nie. Arbeid verteenwoordig die element wat die doeltreffendheid waarmee die ander produksiefaktore benut word bepaal en dit bepaal uiteindelik die organisasie se prestasie. Daarom is dit belangrik vir 'n organisasie om sy werknemers se prestasie en welstand te monitor en te verbeter om winsgewendheid te handhaaf of te verhoog. Hierdie studie het probeer om lig te werp op die belangrikheid van ekstra rolgedrag wat bydra tot die algehele prestasie van 'n organisasie. Daarna is 'n argument aangebied wat sielkundige eienaarskap bekendstel en ondersteun as 'n belangrike komponent wat hierdie ekstra rolgedrag (soos organisatoriese burgerskapsgedrag) beïnvloed. Die belangrikheid van sielkundige eienaarskap was ook gekoppel aan sekere deurslaggewende werkshoudinge soos werkstevredenheid en werksbetrokkenheid. Hierdie gedagtegang, meer spesifiek, in samehang met die voorafgaande bespreking, waarborg dat die ondersoek na bykomende antesedente op diegene wat reeds deur Lee (2017) geïdentifiseer is, op sielkundige eienaarskap gerig is, op die manier waarop spesifieke latente veranderlikes die effek van sielkundige eienaarskap modereer en bemiddel. oor die gevolge van sielkundige eienaarskap en hoe hierdie gevolge direk en/of indirek terugvoer gee aan sielkundige eienaarskap.

Hierdie studie het 'n omvattende strukturele model van sielkundige eienaarskap voorgestel. 'n *Ex post facto* korrelatiewe-ontwerp met strukturele vergelyking-modellering (SEM) is gebruik as die statistiese ontledingstegniek om die substantiewe navorsingshipoteses wat deur die sielkundige eienaarskap-strukturele model voorgestel word, te toets. Daarbenewens het die studie twee addisionele gefokusde strukturele modelle getoets wat die impak van die kongruensie tussen die selfkragdadigheids- en self-identiteitbehoefte en die waargenome vermoë van die pos om hierdie behoeftes te bevredig op die motivering om die roetes na sielkundige eienaarskap volg deur 'n *ex post facto* korrelasie-ontwerp met polinomiese regressie te gebruik as die statistiese ontledingstegniek. 'n Geriefssteekproef van 399 werknemers wat in die private en openbare sektor werk, het aan die studie deelgeneem.

Die Klopper-Lee sielkundige eienaarskap strukturele model vhet redelike pasgehalte behaal. Die beta-matriks het aan die lig gebring dat alle, behalwe een, skatting tussen die endogene latente veranderlikes statisties beduidend was. Dit impliseer dat daar onvoldoende bewyse was

om tot die gevolgtrekking te kom dat daar 'n definitiewe oorsaaklike verband bestaan tussen die intieme kennis wat 'n mens in 'n pos verkry en die mate waarin daardie werk geïntegreer word in die self-identiteit. Verder is daar nie ondersteuning gevind vir die hipotese dat taakidentiteit 'n positiewe invloed het op die motivering om roetes na sielkundige eienaarskap te volg nie, dat taakbelang 'n positiewe invloed het op die motivering om roetes na sielkundige eienaarskap na te streef, dat taakvariëteit 'n positiewe invloed het op die motivering om roetes na sielkundige eienaarskap te volg, en dat outonomie 'n positiewe invloed het op die verwerwing van intieme kennis. Laastens het die verwantskappe tussen waargenome vermoë*selfbelegging en integrasie in die self, en tussen waargenome vermoë van werk om selfdoeltreffendheidsbehoeftes te bevredig en motivering om die self te investeer, teenstrydige tekens gehad in vergelyking met die aard van die oorsaaklike verwantskap wat aanvanklik gepostuleer is.

Die gekwadreerde meervoudige korrelasies (R^2) het aangedui dat die strukturele model 45% van die variansie in sielkundige eienaarskap kon verklaar.

ACKNOWLEDGMENTS

I wish to record my deep sense of gratitude and profound thanks to my research supervisor *Prof Theron* for his keen interest, inspiring guidance, constant encouragement with my work during all stages, to bring this thesis into fruition.

I would like to thank my parents for untiring love and support. Thank you for always believing in me and motivating me to keep going.

Lastly, my sincere gratitude goes to those who took the time to complete my survey without whose support this thesis would not have been possible.

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CHAPTER 1

INTRODUCTION, RESEARCH INITIATING QUESTION AND OBJECTIVES OF THE STUDY

1.1. INTRODUCTORY ARGUMENT

Babbie and Mouton (2001) claim that science is an enterprise dedicated to "finding out". Mouton (2012, p. 137) proposed a "three worlds framework" to understand the interplay between the world of scientific research and real-world problems and opportunities. According to this framework the research process begins by identifying a real-world problem or opportunity in World one. This real-world problem or opportunity is translated into a research initiating question that is placed under systematic and rigorous inquiry, which is the world of theory and nomological networks. World two is grounded, at least for the positivist, in the assumption that events in World one are determined. Determinism represents the "philosophical idea that every event or state of affairs, including every human decision and action, is the *inevitable* and *necessary* consequence of antecedent states of affairs (http://www.informationphilosopher.com/freedom/determinism.html)." Therefore, a clear and valid understanding of the manner in which World two functions provides an opportunity to effectively change World one to benefit man[1].

The following argument will identify and argue the need to develop thorough insight into a specific World one problem. The argument will take on a funnel-like structure where the emphasis will initially fall on broad aspects of the need to validly understand the nomological network of latent variables that influences the dependant endogenous latent variable, *job performance*. Thereafter it will focus on the need to validly understand the nomological network of latent variables determining *psychological ownership,* under the assumption that *psychological ownership* is a prominent latent variable in the nomological net that directly and/or indirectly influences *job performance.*

This introductory argument will more specifically plead the need for cumulative explanatory research on *psychological ownership*. The current study aims to determine what other cognitive and/or non-cognitive person- centred latent variables as well as situation-centred latent

[1] The phrase working man is used here as a gender-neutral term to refer to any member of the species homo sapiens or to all the members of this species collectively.

variables, over and above those already considered in Lee's (2016) explanatory *psychological ownership* structural model, play a role within the complex nomological network of *psychological ownership*. A specific line of reasoning underpinning the current study is that *psychological ownership* results in a structurally interlinked series of leading and lagging outcomes that are psychologically interpreted and as such feed -back on specific up-stream determinants of *psychological ownership*. The current study considers j*ob performance* (or possibly *perceived satisfactoriness of performance*) an important latent outcome variable that could feed back onto the up-stream determinants of *psychological ownership.*

1.2. THE CONSTRUCT OF JOB PERFORMANCE WITHIN THE ORGANISATIONAL CONTEXT

The theory of job performance has received an increased amount of attention with the advent of globalisation and the digital revolution (Sonnentag & Frese, 2002). "Job performance is the most widely researched criterion variable in organisation behaviour literature" (Bommer, Johnson, Rich, Podsakoff &Mackenzie, 1995, p. 587). The profitability of an organisation mostly depends on its employees' productivity levels, which is why managers are always striving to find ways to improve productivity. The mistake that managers often make is to define productivity in mechanical terms, as the ratio between input and output. It is in fact an organisational challenge that encompasses the human, culture, technology, and moral aspects. Financial resources, machinery, natural resources, and methods of production surely plays an important role in the process of increasing productivity, but it is the human resources which dominates the company's success. No amount of financial resources, technological ingenuity or innovation will ensure the profitability of an organisation if they do not have the necessary human resources who are both able and willing to rise to the occasion. Labour represents the element that determines the efficiency with which the other factors of production are utilised and therefore ultimately determines organisational performance. The people and profit factor are evidently closely connected to each other. Therefore, it is important for an organisation to monitor and improve its employee's performance and well-being to maintain or raise profitability.

1.3. CONCEPTUALISING JOB PERFORMANCE

Weick (1979) claimed that the performance of any job consists of a cluster of interlocked variables, and this cluster consists of a subset of all possible behaviours necessary to successfully accomplish its broader goals. Campbell (1990, p. 704) as sited in (Lee, 2016, p.

11) stated that: "Performance is behaviour. Performance is not the consequence(s) or result(s) of action; it is the action itself." This definition of performance suggests that performance should be measured in terms of behaviour that are relevant to the organisation's goals rather than outcomes. This has also been noted by Bartram (2002, p. 1187) who referred to performance as "sets of behaviour that are instrumental in the delivery of desired results or outcomes." Similarly, Daniels and Harris (2000) conceptualised job performance as worker's behaviour, prompting the success of the organisational aims. Lee (2016) claimed that this narrow perspective limits the construct of performance to actions that people do and aspects that can be observed and therefore leaving out outcomes and results. Furthermore, a second perspective is provided by Kane (1989) and Ainsworth and Smith (1993) who urged that results or outcomes should be emphasized when defining performance. This is also a narrow definition of performance since it ignores the actions that were performed to produce the outcomes and other behavioural factors that may have played an influential role, therefore it does not capture the full complexity of the construct of job performance. Evidently it becomes clear that a more comprehensive definition of performance is required to fully capture the complexity of this construct for the purpose of this study. This need is reaffirmed by Koopmans, Bernaards, Hilderbrandt, Schaufeli, De Wet, and Van der Beek (2011) who concluded that individual employee performance, as an abstract latent variable or construct, is made up of multiple components or dimensions. This need for a more comprehensive definition of performance is addressed to some extent in contemporary theories.

Contemporary theories have a wide-ranging perception of job performance where performance is determined by behaviour, traits and skills that are interrelated in a nomological network that influences the achievement of work outcomes. Recent academics and practitioners have realised that an over-emphasis on the job may lead to omission of other important components of overall performance (Welbourne, Johnson & Erez, 1998, p. 541). Milkovich and Boudreau (1997, p. 87) claimed that organisations are replacing the notion of 'job' with 'roles' or 'competencies' that are required for the 21st century. Recent literature differentiates between the task performance domain and the citizenship/prosocial/ contextual performance domain. The word 'job' referred to traditional job descriptions which represents the construct of task performance that, according to Murphy (1989) entails the accomplishment of duties and tasks that are specified in a job description. Therefore, it is important to take into account task performance as well as non-task performance when building a structural model of job performance. Non-task performance is referred to as contextual performance (Borman &

Motowidlo, 1993, 1997; Motowidlo, Borman & Schmit, 1997; Motowidlo & Van Scotter, 1994). This contextual performance refers to discretionary behaviour that contributes to organisational effectiveness. These authors observed that contextual performance itself consists of multiple subdimensions such as teamwork and determination (Welbourne, Johnson & Erez, 1998). For example, Bateman and Organ (1983) introduced the notion of organisational citizenship behaviour (OCB), which consists of voluntary employee actions that benefit employers but are not required. This concept of citizenship behaviour can be broken down into a large number of subdivisions that have causal effects on one another. This non-task/ contextual performance and task performance represents the distinction between the social and technical systems that are postulated to make up the organisation.

1.4. USING A MODEL TO CONCEPTUALISE JOB PERFORMANCE AND TO EMPHASISE THE IMPORTANCE OF EXTRA-ROLE BEHAVIOUR

Viswesvaran and Ones (2000) provided a model of job performance which postulated specific, stand-alone dimensions which apply across different types of jobs that can be grouped into three primary broad dimensions or second-order job performance factors: task performance, organisational citizenship behaviour and counterproductive behaviour. Task performance is defined in work psychology literature as 'the proficiency with which incumbents perform activities that are formally recognised as part of their jobs' (Borman and Motowidlo, 1993, p. 73). *Organisational citizenship behaviour* was popularised by Smith et al. (1983) and Organ (1988) defined it as individual behaviour that is discretionary/extra-role or non-task related, which is not explicitly recognised by the formal reward systems, and that promotes the effective functioning of the organisation. *Counterproductive behaviour* on the other hand consists of behaviours that have a negative impact on organisational effectiveness. Deviant behaviour is voluntary behaviour that violates important organisational norms and through this, threatens the well-being of an organisation, its members, or both (Robinson & Bennett 1995, p. 556).

In order to gain competitive advantage, organisations have instituted programs such as gainsharing plans, skill-based pay, merit-based pay, job rotation, job enrichment, and the like to affect employee behaviour with the goal of improving performance. These programs generally result in employees that do more than what is included in their traditional job description. This model emphasises the importance of understanding how non-task behaviours/contextual performance also plays an important role in the nomological network of latent variables that influence the dependant latent variable, task performance. This argument

is supported by Podsakoff and Mackenzie (1997) who suggested that citizenship behaviours are associated with enhancements in organisational performance.

1.5. THE CONSTRUCT OF PSYCHOLOGICAL OWNERSHIP

There is an extensive amount of literature available on the subject of ownership in a variety of fields such as law, psychology, consumer behaviour and philosophy. For example, in literature, researchers (Rousseau & Shperling, 2003; Tannenbaum, 1983) have investigated the role of formal organisational ownership, for example, employee stock ownership plans, as well as the role of *psychological ownership* (Pierce et al., 2001, 2003). They claim that people can experience a sense of ownership for a target whether they own it legally or not. The concept of *psychological ownership* in organisations has received increasing attention in recent decades from scholars and practitioners as a potential predictor of employee attitudes and behaviours (Kostova, & Dirk, 2001; Chi, & Han 2008; Md-Sidin, Sambasivan & Muniandy, 2010; Olckers & Du Plessis, 2012; Pierce, O'Driscoll & Coghilan, 2004). It has produced rich insight into the psychological glue that binds employees to their jobs and their organisations.

This construct of possession may overlap with other well-researched constructs. For example, Olckers and Du Plessis (2012) suggested that *commitment*, identification, *psychological empowerment*, *internalisation* and *job involvement* could possibly cause construct proliferation because all these attitudes refer to some form of attachment to organisations or jobs. However, Pierce and his colleagues (2001) claimed that *psychological ownership* is different from other related constructs in its conceptual core and motivational base, namely possessiveness which trigger affect-driven behaviours. Van Dyne and Pierce (2004) found support for this argument when they compared *psychological ownership* with other related constructs such as job satisfaction and organisational commitment. They found that *psychological ownership* does indeed account for additional variance in *organisational citizenship behaviour* over and above demographic characteristics, *organisational commitment*, and *job satisfaction*.

1.5.1. CONCEPTUAL BACKGROUND

According to Pierce, O'Driscoll and Coghilan (2004) management practitioners and organisational academics have suggested that certain conditions cause members of an organisation to develop possessive feelings for their work (*job-based psychological ownership*) and for their organisation (*organisation-based psychological ownership*). Fundamentally, *psychological ownership* thus entails the development of possessive feelings that some object is 'mine' or 'ours'. It essentially answers the question: "How much do I feel this is mine?"

Pierce et al. (2001) conceptualised *psychological ownership* by highlighting three distinct features that manifest itself within this construct. Firstly, ownership involves the meaning and emotions that is associated with my, mine or ours. The individual will feel a sense of possession toward a particular target. Secondly, ownership refers to a relationship between an individual and a target on condition that the target has a close connection to the self. According to Sharp (2005, p. 12), as cited in Md-Sidin, Sambasivan, & Muniandy, (2010), stated that ownership provides the transition form "It's just a job" to "It's who I am and what I do". This characteristic especially highlights the distinction between legal ownership and *psychological ownership*. For example, a young individual can legally own a vehicle, that is generally associated with elderly people, which causes the individual to feel that the object does not truly belong to/ or fit him or her. Thirdly, the construct consists of a cognitive and affective core. The cognitive core reflects the awareness, beliefs and thoughts that is associated with the target of ownership. The affective core becomes apparent in the feelings that arise when someone lay claim on the target or object for which a person or group has a sense of ownership e.g. "that is my work!" or "that room is ours!" that causes proactive behaviour that is aimed at enhancing or protecting the target of ownership. When people experience ownership, they feel a connection to a tangible or intangible target. These targets of ownership may be something as small as a preferred desk space in an office or as large as an organisation as a whole.

1.5.2. CONSEQUENCES OF PSYCHOLOGICAL OWNERSHIP

According to Avey, Avolio, Crossley and Luthans (2009) their research findings suggest that employees who feel ownership tend to also hold more positive work attitudes such as job satisfaction, work commitment and intention to stay with the organisation. Similarly, Pierce et al. (2001) claimed that *psychological ownership* is associated with: citizenship behaviour, personal sacrifice and experienced responsibility and stewardship. Olckers and Du Plessis (2012) found that *psychological ownership* helps organisations to retain talent and it positively influences the intentions of key employees to stay with the organisation. Ownership seems to make employees committed and engaged in their work which reduces absenteeism and labour turnover.

Custodians of *psychological ownership* found that the construct did not add explanatory value to performance beyond that contributed by commitment, satisfaction and demographic characteristics (Van Dyne and Pierce, 2004). However, these researchers found that employees, who felt that they 'owned' an organisation, had positive self-identities and self-assessments because they felt that the target of ownership were an extension of their self and this made them

concerned with the outcomes of the organisation. Furthermore, Van Dyne and Pierce (2004) and Wang et al. (2011) found that *psychological ownership* is positively related to affective commitment, job satisfaction, organisational-based self-esteem, and work efforts such as citizenship behaviours. This implies that *psychological ownership* could be a possible antecedent of these major workplace attitudes that positively contributes to extra-role/ citizenship behaviours, which is associated, as mentioned earlier, to enhancements in organisational performance.

Research evidence that *psychological ownership* is correlated with these various latent outcome variables still does not clarify the nature of the psychological mechanism that produces the correlations. Lee (2016) has developed an explanatory *psychological ownership* structural model that describes the psychological mechanism that regulates the level of job ownership across employees and organisational contexts. Lee (2017) was forced to reduce her structural model due to problems associated with the operationalisation of specific latent variables in her model. She fitted the reduced model and obtained close fit (RMSEA=.0595; p>.05). She moreover found support for the majority of the path-specific substantive hypotheses that remained in the reduced structural model (Lee, 2017).

The reduced Lee (2017) *psychological ownership* structural model does not describe the full psychological mechanism that regulates the level of *psychological ownership* across individual employees and organisational contexts. Human behaviour and experiences are complexly determined (Cilliers, 1998). This *inter alia* means that a large number of richly interconnected latent variables characterising the employee and his/her work context directly and indirectly influence the level of *psychological ownership*, that this extensive nomological net contains latent interaction effects and that the nomological net is characterised by feedback loops (Cilliers, 1998). These features characterising a complexly determined phenomenon in turn means that the explanation of the phenomenon does not reside in any specific path or latent variable but rather that the explanation lies spread across the total nomological network.

HR's ability to successfully influence the level of *psychological ownership* of employees in a purposeful and rational manner depends on the extent to psychological mechanism regulating the level of this psychological state is validly understood. To further the understanding of the psychological mechanism regulating the level of *psychological ownership* therefore requires that the reduced Lee (2017) *psychological ownership* structural model should be expanded. This line of reasoning more specifically, in conjunction with the preceding discussion, warrants directing the inquiry into the further antecedents of *psychological ownership,* towards the

manner in which specific latent variables moderate and mediate the effect of *psychological ownership* on the consequences of *psychological ownership* and how these consequences directly and/or indirectly feed- back on to *psychological ownership*.

1.6. RESEARCH-INITIATING QUESTION

For the purpose of understanding how to influence *psychological ownership*, the second-generation research-initiating question arises: What other cognitive and/or non-cognitive person-centred latent variables as well as situation-centred latent variables, over and above those already considered in Lee's (2017) explanatory *psychological ownership* structural model, creates additional variance in the levels of *psychological ownership* among employees in different organisational contexts?

The research-initiating question purposefully refrained from upfront identifying the explanatory latent variables that should be added to the Lee explanatory structural model. The research-initiating question was formulated as an open-ended question as an acknowledgement that the literature study, should identify the explanatory latent variables that should be added to the Lee explanatory structural model through problem-solving theorising. Explanatory latent variables have to be built into the existing model because they have shown themselves to be logically needed to construct a mechanism capable of explaining variance in *psychological ownership*. It is the theorising in the literature study that should determine the research problem and research hypotheses; not the other way around. It is only through relentless, unrestrained cognitive grappling with the open-ended research-initiating question that man stands a chance of uncovering the cunning logic and elegant design (Ehrenreich, 1991) of the psychological mechanism regulating the level of employees' *psychological ownership*.

1.7. RESEARCH OBJECTIVE

In order to systematically address the research initiating question, this study will focus on:

(a) The expansion and modification of Lee's (2017) *psychological ownership* structural model by evaluating the merit of the current model and identifying additional latent variables that are not currently included in the model that directly and/or indirectly influence *psychological ownership*;

(b) The empirical evaluation of the validity of the explanatory Klopper-Lee *psychological ownership* structural model.

1.8. STRUCTURAL OUTLINE OF THE THESIS

Chapter one had the main purpose of providing some contextual background and to present some evidence of the importance for further studies on *psychological ownership*. Chapter two presents the literature study where possible expansions and modifications of the *psychological ownership* structural model will be developed. Chapter two will generate an array of path specific substantive research hypotheses on the identity of person-centred and situation-centred latent variables that shape the level of *psychological ownership*. These substantive research hypotheses will be combined to develop a proposed structural model that depicts how *psychological ownership* is developed and how the underlying constructs structurally relates to each other in the nomological network of variables that underpins *psychological ownership*. Chapter three will cover a detailed description of the research methodology, which includes the descriptions -, and the development of measuring instruments, selecting an appropriate sample, as well as the statistical analysis techniques that will be used to empirically test the proposed structural model. Chapter 4 will explain the ethical considerations that influenced the empirical part of the study. Chapter 5 will report on the results of the various statistical analyses performed. The last and final chapter, Chapter 6, will present conclusions, discuss the limitations of the study, and make recommendations for future research, as well as discuss managerial implications conditional on the research findings.

CHAPTER 2

LITERATURE REVIEW

2.1. INTRODUCTION

Firstly, in this section the construct of *psychological ownership* will be formally conceptualised in order to ensure academic precision and to guide the development of the structural model throughout the research study.

Secondly, the Lee (2016) *psychological ownership* structural model will briefly be explained. Subsequently, the model will be expanded on and modified by identifying additional latent variables that are not currently included in the model that directly and/or indirectly influence *psychological ownership*. Firstly, the argument presented in the Lee (2016) proposal for the Lee (2016) *psychological ownership* structural model will be discussed, which will be followed by the structural model and a summary of the results found. Secondly, additional meaningful latent variables will be proposed and comprehensively defined and discussed in order to systematically uncover the logic underlying the structure of the proposed expanded and modified Lee (2016) *psychological ownership* structural model.

2.2. CONCEPTUALISATION OF THE CONSTRUCT OF PSYCHOLOGICAL OWNERSHIP

Constructs are abstract, "in the head", thought objects (Kerlinger & Lee, 2000) shaped by the abstract thinking capacity of man. Kerlinger and Lee (2000) distinguishes between two dimensions of meaning, namely the connotative and denotative dimensions of meaning. The connotative dimension represents that which an individual has "in mind" when using the construct. The denotative dimension, on the other hand, refers to the observable behaviours and experiences in which the construct expresses itself and the situation that brings about changes in the observed levels of the construct. The denotations of the construct are utilised in the operational definition of the construct that provides the researcher with possible ways in which the construct can be measured or manipulated.

The origin of growing interest in the connotative meaning of *psychological ownership* can be found in the review of the employee ownership literature which suggests that ownership is "multidimensional in nature, existing as both formal (objective) and as a psychological experienced phenomenon" (Pierce, Rubenfeld and Morgan, 1991, p.124). Pierce and his

colleagues (2001) pioneered work surrounding *psychological ownership* within organisations in the 21st century. They were intrigued by the work of Etzioni (1991, p.466) who suggested that ownership is a "dual creation, part attitude, part object, part in mind, part real". Pierce and his colleagues (2001) consequently formally introduced the concept of *psychological ownership* defining it as a state of mind in which "individuals feel as though the target of ownership (material or immaterial in nature) or a piece of it is theirs" (i.e. "It is MINE"). Although Pierce et al. (2001) are prominent advocates of *psychological ownership*, and their work is most often cited when defining the construct, several other constitutive definitions of the construct have been presented to date (Brown, 1989; Brown, Pierce and Crossley, 2014; Furby, 1876, 1980, 1991; Olckers & Duplessis, 2012; Pierce et al. 2003; Pierce & Van Dyne, 2004). Some of these authors capture the essence of the construct of *psychological ownership* as possessive pronouns (Furby, 1991; Pierce et al. 2001), while others define the construct in terms of sentiments, a felt concern, obligation or responsibility (Brown, 1989) or a mixture of the lateral points of view (Olckers & Duplessis, 2012). The following section will investigate and evaluate the existing conceptualisations of *psychological ownership*, in an attempt to create a comprehensive constitutive definition that will guide the development of the structural model throughout the research study.

Furby (1991) operationalised the ownership construct with the word 'mine' and similarly proposed that a sense of ownership or the psychological state of ownership is based on feelings of being tied to an object. Building on Furby's research (1978), Dittmar (1992), Litwinski (1947) Pierce and his colleagues (2003) similarly viewed *psychological ownership* as the feeling of possessiveness and being psychologically tied to a target. One's possessions are felt as extensions of the self (Furby, 1978). Mann (1991) wrote, "What I own feels like a part of me" (p. 211). When people experience ownership, they feel a connection to a tangible or intangible target. However, some authors have suggested that these targets must satisfy specific needs. According to Pierce et al. (2001) the origin, the true genesis of *psychological ownership* resides in three motives or needs (the so-called roots of *psychological ownership*): the motive for (1) efficacy, (2) self- identity and (3) a place in which to dwell. These are hypothesised reasons for the development of *psychological ownership*. Therefore, it is assumed that a feeling of ownership can develop for a variety of targets as long as these targets allow these motives to be satisfied when these targets are successfully psychologically "bought". Studies on the subject of *psychological ownership* have frequently used organisations as a target for ownership (Pierce et al., 2003; Van Dyne and Pierce, 2004).

Brown, (1989, p. 15,) among others (Parker et al., 1997; Avital & Vandenbosch, 2000), emphasised that *psychological ownership* is about "people working as if they own the place". This definition seems to highlight the outcomes of *psychological* ownership whilst at the same time acknowledging the core connotative meaning of possession. Brown (1989) additionally suggested that the motivation to behave as an owner is influenced by an individual's sense of shared responsibility. Similarly, Lui, Wang, Hui and Lee (2011) viewed *psychological ownership* as a sense of shared responsibility toward success in the organisation. However, it can be argued that feeling a sense of responsibility can be a result of feeling a sense of ownership rather than a constituent of it. Responsibility and *psychological ownership* have a reciprocal relationship but responsibility is not a dimension, nor does it define *psychological ownership*. This argument is supported by Van Dyne and Pierce (2004) who argue that *psychological ownership* is fundamentally different from other related constructs in terms of its conceptual core and motivational base. In consideration of the previously mentioned motivational base of *psychological ownership,* the motive for self-identity cannot be satisfied by feeling a sense of responsibility because feeling a sense of responsibility toward a target does not necessarily imply that an individual feel that the object is an extension of their self.

Pierce et al. (2003) further added that *psychological ownership* is a complex phenomenon which is composed of a cognitive and affective core. It consists of a condition where an individual is aware through intellectual perception that reflects an individual's thoughts and beliefs regarding the target of ownership. The cognitive evaluation of a target is coupled with an affective sensation. Furby (1987) suggests that feelings of ownership are pleasure producing and accompanied by a sense of efficacy and competence which represents the affective core of *psychological ownership*.

2.3. DIMENSIONS OF PSYCHOLOGICAL OWNERSHIP

Literature on the construct of ownership have suggested that possessions could be viewed in terms of two dimensions, namely symbolic and instrumental (McIntyre, Srivastava and Fuller, 2009, p. 385). According to these authors, symbolic possessions provide individuals the opportunity to express personal values which is similar to Pierce's (2001) self-identity motive for *psychological ownership*. Instrumental possessions, on the other hand, are utilised to gain an experience of control and "and being the cause" in one's environment which satisfies the efficacy motive and possibly the "place to dwell" motive. These two dimensions are therefore fully taken into account and incorporated by Pierce and his colleagues (2001, 2003) in their description of the genesis of *psychological ownership.*

As mentioned earlier Pierce et al. (2001) proposed three motives of psychological ownership. The first motive, self-efficacy, refers to the degree of (generalised) belief a person has in himself to successfully perform tasks that increases their sense of ownership of the a target through the route of gaining control over the target. Feelings of control over the target therefore lead to feelings of self- efficacy. Secondly, Pierce et al. (2001) believes that possessions act as symbolic expressions of the self. Symbolic expressions of the self, serve to satisfy the root need for identity. Thirdly, they proposed that a sense of belonging is satisfied by the experience of *psychological ownership* that can be observed in the interaction between an individual and the environment and subsequent personalisation of the environment which in turn results in the expression of the self. It can be argued that a sense of self- efficacy and a feeling of belonging can act as antecedents that influences the degree to which individuals invest in or are motivated to pursue the routes to psychological ownership since both increases an individual's cognitive and affective evaluation of the degree to which the target is an expression of the extended self. Furby (1978) posited that the motivation for possession manifests in an individual's need for self- efficacy and the ability to the environment. As mentioned earlier the motive for belonging and self- efficacy serves an instrumental function while expression of the self serves as the symbolic function of possession. It can be argued that the symbolic function of possessiveness resembles the core of psychological ownership while the instrumental function, where possessions are used to control the environment, can be regarded as one of the causes of *psychological ownership*.

Avey et al. (2008) was inspired by Higgens' (1997, 1998) work on the regulatory focus theory, who proposed that individuals have two self-regulation systems namely: promotion and prevention. Individuals who predominately make use of the promotion-oriented approach pursue goals and reflect their hopes and aspirations. Alternately, individuals who use a prevention-oriented approach has a prevention goal focus on what to avoid for reducing punishment and sticking to the rules and obligations. Although Avey et al. (2008) refers to promotion and prevention as forms of *psychological ownership* it can be argued that these two self-regulation systems influence the outcomes of *psychological ownership.* This becomes evident when Avey et al. (2008) explains that individuals possessing different self-regulation systems will have different degrees of willingness to share information only after making the claim that individuals who are more promotion-oriented may experience different feelings toward a target of ownership than those who have a prevention orientation. One can argue that the cognitive and affective evaluation of a target that is regarded as an extension of the self

cannot be changed by an individual's self-regulation approach because Higgins' (1997) regulatory focus theory is based on the basic principles of embracing pleasure and avoiding pain and is applied to decision-making processes. Therefore, these orientations simply influence the outcomes through decisions- making processes rather than the individuals feeling of ownership toward an object (indicating different forms of *psychological ownership*). Consequently, it seems that these two dimensions should not be included in the constitutive definition of *psychological ownership*.

Building on the three recognised roots of psychological ownership (self- efficacy, self- identity, and belonging, Pierce et al. (2001), and Avey et al. (2008) suggested that *accountability* and *territoriality* should be included as additional aspects of *psychological ownership*. According to them, *accountability* should be regarded as an important component of *psychological ownership* primarily through two mechanisms namely: the anticipated right to hold others accountable, and the expectation for one's self to be held accountable. *Territoriality*, on the other hand, refers to when individuals form bonds over objects and seek to mark those possessions as belonging exclusively to themselves. Avey et al. (2008) suggests that when individuals anticipate infringement on their target of ownership, they may engage in proactive *territoriality* (like a leopard marking his area) and reactive *territoriality (such as a leopard chasing others away through attack)* to maintain levels of ownership and control. This implies that *territoriality* can also be regarded as an outcome of *psychological ownership* that reside within the individual and not a characteristic of the construct itself.

The core connotative meaning of *psychological ownership* as a construct is integrated in the cognitive and affective experience of owning or possessing a (material or immaterial) target object. Intellectual awareness/realisation/insight that the target of ownership is *mine* is inseparably intertwined with some degree of, protective affection for the target object, intertwined with the realisation that the target of ownership has to some degree become part of my understanding of who I am. The target object is *mine*, not *yours*, an extension of *me*. Lee (2016) additionally proposed that psychological ownership should also be regarded as a conative state taking into consideration the notions made by Bernhard and O'Driscoll (2011) that psychological ownership as a possessive feeling or psychological attachment to an object leads to object protection, care and nourishment as an outcome of psychological ownership. It therefore seems reasonable to argue that psychological ownership is a psychological state, in terms of which a bond, relationship or feeling, that encompasses conceptual/intellectual (cognitive), emotional (affective) and motivational (conative) processes and directs these

processes at an object, in this case the job, that is seen as an extension or expression of one's self.

Earlier foundational work by Pierce et al. (2001) and more recent publications (Pierce & Jussila, 2011) seem to argue that what is sometimes referred to as dimensions of *psychological ownershi*p (i.e., the roots and the routes of *psychological ownership*) should rather be treated as latent variables required to describe the psychological mechanism through which *psychological ownership* develops and the consequences that flow from this psychological state.

2.4. CONCLUDING REMARKS ON THE CONCEPTUALISATION OF PSYCHOLOGICAL OWNERSHIP

Grasping the connotative meaning of *psychological ownership* requires some introspective inspection to make sense of the wide variety of definitions that is currently in use in literature. The fundamental constitutive meaning of ownership is the merging of a target of ownership with the self. "To have" is to take onto oneself, this being the literal and ultimate form of control and possession (Pierce et al. 2003). The aforementioned definitions provided by Pierce et al. (2001) that focused on possessiveness as the core of *psychological ownership* seem to better describe the construct of *psychological ownership* in relation to other constitutive definitions that incorporate aspects of responsibility, obligation and accountability into the definition of the construct of *psychological ownership*. The reason that Pierce's (2001) definitions of *psychological ownership* is desired as a constitutive definition of *psychological ownership* is because the other definitions simply incorporate dimensions of *psychological ownership* into their definitions of *psychological ownership* that can (and should) be regarded as antecedents and/or outcomes of *psychological ownership*. The connotative meaning of the construct of psychological ownership specifically lies in the symbolic function of possessiveness – that is the degree to which the target of ownership is an expression of the extended self. It therefore seems reasonable to argue that psychological ownership is a psychological state, in terms of a bond, relationship or feeling, that encompasses conceptual/intellectual (cognitive), emotional (affective) and motivational (conative) processes and directs these processes at an object (or more generally a target), in this case the job, that is seen as an extension or expression of one's self. These cognitive, affective and conative aspects should, however, not be seen as distinguishable dimensions of psychological ownership but rather as inseparably entwined properties of a unitary state of psychological ownership.

Therefore, psychological ownership, in terms of this study, will be demarcated as:

> a unidimensional construct which, includes the cognitive, affective and conative experience of psychological ownership which is concerned with the intellectual awareness/ realisation/ insight that the target (material or immaterial) of ownership is mine and an extension of the self.

2.5. THE LEE (2017) PSYCHOLOGICAL *OWNERSHIP* STRUCTURAL MODEL

The proposed *psychological ownership* structural model presented by Lee (2017) was an investigation into the internal structure of the *psychological ownership* construct and the structure of the psychological mechanism that regulates the level of the *psychological ownership* experienced by employees. She defined *psychological ownership* as "a unidimensional integrated psychological (cognitive, conative, affective) state where an individual experience a connection with a target which is seen as a need satisfying expression on the self." She focussed in her research on job-based *psychological ownership*. She argued that the level/strength of the *psychological ownership* experienced by an employee is not an expression of some random event but rather the outcome of a complex psychological mechanism encompassing a set of structurally interrelated latent variables characterising the employee and his/her work environment. The state of *psychological ownership* brings specific advantages. Lee (2017) for example suggested that if employees view their organisation as an extension of themselves, or their job as an expression of who they are, they will tend to the needs of the organisation or job better. A valid understanding of this psychological mechanism is a prerequisite to rationally and purposefully increase the level/strength of the *psychological ownership* experienced by employees and to through that harvest the organisational benefits associated with *psychological ownership*.

2.5.1. JOB CHARACTERISTICS

Building on the psychological ownership-based revision of the Job Characteristics Model presented by Pierce, Jussila and Cummings (2009), Lee (2017) suggested that the model seems to fail to capture the full complexity of the manner in which the psychological state of *psychological ownership* is developed and it lacks detail surrounding the interaction between the individual needs (roots) and the target. Lee (2017) suggested that the Hackman-Oldham (1976) job characteristics are the pertinent attributes of the job that allow the satisfaction of these needs provided the job is psychologically embraced. The psychological ownership root needs in conjunction with the perceived ability of the job to satisfy these root needs through

the job characteristics motivate the pursuit of the routes to psychological ownership, as indicated by Pierce et al. (2001). She suggested that immersing the self in a job (as a target) that is characterised by certain job characteristics will satisfy individual needs in terms of *self-identity, belonging* and *self-efficacy*. Several authors (Gilbreth, 1912; Hachman & Oldham, 1975; Jaques, 1956; McCormick, Jeanneret, & Mecham, 1972) propose that job characteristics strongly correlate with motivation within the workplace. Lee (2016) proposed that job characteristics have a positive influence on motivation to invest in the routes of psychological ownership. The routes to psychological ownership whereby psychological ownership develops, include: *gaining control over the target of ownership*, *intimately knowing the target*, and *investment of the self into the target* (Pierce et al., 2001, 2003). Researchers have proposed that employees exercise control over an object, the object will increasingly become an extension of the self (Furby, 1978, Prelinger, 1959). Furthermore, Beaglehole (1932) proposed that by knowing an object intimately, the object becomes a part of the self. Additionally, Sartre (1969) and Locke (1960) provided insight into the importance of an object "flowing from the self" and the emergence of a sense of "mine" being attached to the object. Lee (2017) criticised the psychological ownership-based revision of the Job Characteristics Model for its lack of complexity, claiming that it "jumps straight from the job characteristics to their influence on the routes". Consequently, Lee (2017) proposed several other latent variables that lead to the pursuit of routes to psychological ownership.

2.5.2. EXPECTANCY THEORY AND MOTIVATION TO PURSUE THE ROUTES TO PSYCHOLOGICAL OWNERSHIP

Lee (2017) attempted to answer the question: "What stimulates an individual to psychologically attach themselves to a target, in this case the job via pursuit of the routes?" She was inspired by Victor Vroom's theory of motivation (1964) that posits that most human behaviour is voluntary and motivated. Lee (2017) subsequently argued that an individual's voluntary behaviour within the workplace would also be motivated. The core question for her was therefore what motives an employee to gain control over the target of ownership, to get to know the target intimately and to invest the self into the target? The core mental components of the expectancy theory of motivation are valence, expectancy and instrumentality and these three components interact psychologically to create a motivational force and subsequent behaviour. According to Vroom (1964) individuals hold their own preferences for certain outcomes. The value attached to an outcome is determined by the extent to which the individual believes the outcome will satisfy salient needs. In the case of *psychological ownership*, the to-

be-explained behaviour is the *pursuit of the routes to psychological ownership*. The question is what motivates the act of psychologically "buying" the job through the three routes. These salient needs include the roots to *psychological ownership* namely: the motive for *self- identity, self-efficacy* and *belongin*g. Lee (2017) used these motives collectively as *salient needs* in her structural model of *psychological ownership*. According to Lee (2017) the expected pleasure producing 'reward' of feelings of ownership would motivate the behaviour of pursuing the routes, namely *self-investment, gaining intimate knowledge* and *gaining control*. The feelings of psychological ownership would, however, only be experienced as a reward, as highly positively valanced, if the *root needs* are salient. In addition, the *pursuit of the routes* would only be seen as instrumental in attaining *psychological ownership* that has the potential to satisfy the root needs if the job that ownership is taken of has the ability to satisfy the *root needs*. The ability of the job to satisfy the *root needs* depends on the extent to which the job scores high on the job characteristics (Hachman & Oldham, 1975; Lee, 2017; Pierce et al., 2009), or is at least perceived to do so,

Furthermore, Lee (2017) argued that it seems reasonable to suggest that a positive relationship between the motivation to pursue the routes to *psychological ownership* and the congruence between these two main effects (between *perceived ability of the job to satisfy the psychological ownership root needs* and root needs) should exist. Consequently, she introduced the person- job fit variable into her theorising on the psychological mechanism underpinning *psychological ownership*, drawing on person- environment theories. This latent variable describes the extent to which the *perceived ability of the job to satisfy the psychological ownership root needs* and the *perceived salience of the root needs* are congruent or incongruent which arguably influences the *motivation to pursue the psychological ownership* routes.

Lee (2017) argued that the manner in which motivation to pursue the routes responds to changes in job characteristics and to need strength/ salience does not need to be linear but could rather be curvilinear to allow the interaction between job characteristic and needs salience to have a more complex effect on the motivation to pursue the routes. In order to create a non-linear model of the influence of the two predictor variables upon motivation, three additional terms had to be created. This constituted the second-order polynomial regression equation which allows the possibility of describing more intricate relationships and therefore the response surface (Edwards, 1994). Therefore, Lee (2017) included three phantom variables, which are artificial variables according to Bentler and Raykov (2000), to investigate the influence of congruence within the structural model. These three phantom variables are: (1)

squared salient individual root needs (2) interaction between the salient needs and perceived ability of the job characteristics to satisfy salient effect needs (3) squared perceived ability of the job characteristics to satisfy salient needs. Lee (2017) suggested that the *motivation to engage in the routes to psychological ownership* changes positively and non-linearly (convexly) along the line of congruence as congruence moves from the perception that the job does not allow the satisfaction of the needs combined with low salience of the needs (- - congruence) to the perception that the job does allow the satisfaction of the needs combined with high salience of the needs (+ + congruence) (Shanock, Baran, Gentry, Pattison & Heggestad, 2010).

2.5.3. ROUTES TO PSYCHOLOGICAL OWNERSHIP

According to Pierce and Jussila (2011) these routes, as mentioned earlier, can be regarded as the behavioural component that, after an initial introduction to a target (and subsequent motivation to pursue the route) foster the feelings of ownership within the self.

The first path (route) to psychological ownership proposed by Pierce et al. (2001) is that of *investment of the self into the target*. According to Pierce et al. (2001, p. 302) the investment of self can be performed in a variety of ways "including investment of time, ideas, psychical, psychological and intellectual energies." Lee (2017) agreed with the suggestions made by Pierce and Jussila (2011) which claimed that a target of ownership should flow from the self in order for an employee to experience feelings of ownership. Consequently, Lee (2017) suggested that the *motivation to invest in the psychological ownership routes* has a positive influence on the extent to which an employee makes a *self- investment* as a route to psychological ownership. Investing the self in a job in the ways suggested by Pierce et al. (2001) makes the employee potentially vulnerable. Drawing on the work of Kahn (1990) on employee personal engagement, Lee (2016) additionally claimed that employees who experience a sense of safety, in that they feel that they will not experience negative consequences to their self-image, will be more willing to take the risk of investing the self in the job. Therefore, she suggested that *psychological safety* could moderated the effect of *motivation to pursue* the routes, on the extent to which the employee *invest the self* in the job.

Lee (2017) additionally included the *control* route, posited by Pierce et al. (2001), as a vital component of psychological ownership. Furby (1976) anticipated that the relationship between the extent of *control* over a target and the experience of that target being a part of the self (i.e. *psychological ownership*) is highly positive. Therefore, Lee (2017) argued that, the more

control an employee has over an object or target, the more they experience that object as an extension of the self, and subsequently they will experience feelings of *psychological ownership*. However, Lee (2017) claimed that, although the control can be linked to a sense of ownership, it does not explicitly describe the psychological mechanism at play that brings about the behaviour of taking control. Subsequently Lee (2017), drawing on the work of Isaac (1933) and Ellwood (1927), suggested that employees may take the risk to *invest the self in the target*, if the they experience feelings of *psychological safety*, to commit giving the self to the target. This in turn may lead to the individual to take *control* (through further self-investment). Therefore, she proposed that *self-investment* mediates the effect of *motivation to pursue the routes* on *control* of the job.

The third and final route to *psychological ownership* is *coming to know the target intimately* (Pierce et al. 2001). Furby (1978) posited that a person can feel as though a target belongs to him or her simply because of association of familiarity. Pierce et al. (2001) mentioned that the more an individual is involved with a target (investment of self) the more and individual will know about the target (*intimate knowledge*). Therefore, it suggests that by *knowing the target intimately* it becomes an extension of the self. Lee (2017) subsequently proposed that the extent to which an investment is made in *gaining intimate knowledge* is positively influenced by *control* of the job. Additionally, she proposed that there is a reciprocal relationship between *self-investment* and *intimate knowledge*.

Lee (2017) was inspired by the work of Pierce and Jussila (2011) who proposed that, the extent to which the roots (the motives or needs) that *psychological ownership* satisfies are operative within the employee, will influence, along with the perceived extent to which the job is perceived as capable of satisfying the root needs, the employee's degree of time and energy spent on: (1) mentally and physically exploring the organisation and job (2) using the target as an expression of their self-identity (3) immersing themselves into the target of ownership. The success with which employees "travel" these three routes will, according to Lee (2017) determine the degree of psychological ownership that they will experience.

MOTIVATIONAL EFFECTS OF PSYCHOLOGICAL OWNERSHIP

Subsequently, Lee (2017) argued that it seems reasonable to argue that an employee who experiences a sense of *psychological ownership* (satisfaction of the root motives) will additionally be further motivated to pursue the routes to psychological ownership. Lee (2017) proposed psychological ownership structural model is depicted in Figure 2.1.

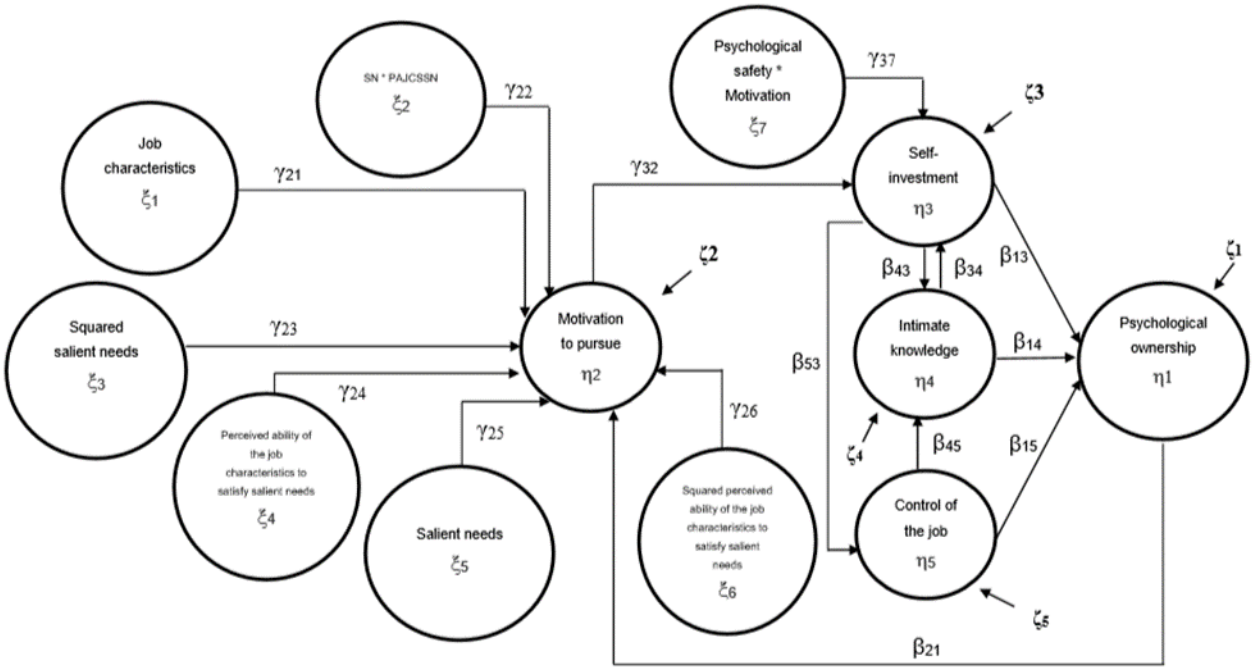

Figure 2.1. The proposed Lee *psychological ownership* structural model. Reprinted from Development and empirical evaluation of an explanatory psychological ownership structural model (p. 79) by Lee, A. (2017) Master's thesis. Stellenbosch: Stellenbosch University.

2.6. PROPOSED LEE (2017) STRUCTURAL MODEL AND RESULTS

2.6.1. EVALUATION OF THE ORIGINAL LEE (2016) PSYCHOLOGICAL OWNERSHIP MEASUREMENT MODEL

For the purpose of evaluating the validity and reliability of the measures used to measure or operationalise the latent variables comprising her proposed psychological ownership structural model, Lee (2017) used the two-indicator option because the model failed to converge using an approach in which a larger number if indicator variables were used for the job characteristics and motivation latent variables due to the higher number of parameter estimates versus the sample size available. The measurement model ran successfully, and a close fit was found. However, Lee (2017) reported that the model was plagued with inadmissible parameter estimates specifically related to the indicators of the phantom variables (the polynomial latent variables). Consequently, these variables where deleted from the model which lead to the development of a reduced psychological ownership model. After examining the goodness-of-fit statistics together with the model's standardised residuals and modification indices, it was concluded that the reduced psychological ownership measurement model fitted very well (Lee, 2017). Moreover it was concluded that the operationalisation of the latent variables was

successful in that the unstandardized factor loadings were statistically significant (p<.05), the completely standardised factor loadings were generally sufficiently large, the unstandardized measurement error variances were statistically significant (p < .05), the completely standardised measurement error variances were generally sufficiently small and the R^2 values for the indicators were sufficiently large.

2.6.2. EVALUATION OF THE REDUCED PSYCHOLOGICAL OWNERSHIP STRUCTURAL MODEL

The reduced structural model was evaluated in to determine whether the hypothesised relationships developed via theorising in her Chapter 2 can be supported by the data (Lee, 2017). The adaption of the measurement model necessitated the deletion of γ_{22} γ_{24} γ_{26} γ_{37} thus forming a reduced psychological ownership structural model. This reduced comprehensive LISREL model[2] showed reasonable fit (Lee, 2017). The exact fit null hypothesis was rejected (p < .05). The close fit null hypothesis was not rejected (p > .05). The remainder of the fit statistics indicated reasonable to good fit. The completely standardised structural error variance estimate for η_3, however, returned an inadmissible value (ψ_{33} = 1.219). The model was therefore not further interpreted. The model was subsequently modified by removing the path from intimate knowledge (η_4) on self-investment (η_3) in an attempt to remedy the inadmissible structural error variance problem.

The further modified *psychological ownership* structural model obtained a RMSEA value of .0595, indicating reasonable to good fit in the sample. The conditional probability of obtaining such a sample RMSEA value, if it is assumed that the close fit null hypothesis is true in the parameter, was sufficiently large (.0602) not to reject the close fit null hypothesis.

Only one modification indices made substantive theoretical sense for Lee (2016) to include in the structural model. This was the proposed link between *psychological ownership* and *self-investment*. The inclusion of the path between psychological ownership and self- investment did not affect the statistical significance of the hypothesised paths obtained for the initial comprehensive LISREL model, except for the path between *intimate knowledge* and *self-investment* which became nonsignificant. However, Lee (2017) left the path within the model because she felt that it would not significantly impact the fit of the overall model if deleted.

[2] The comprehensive LISREL model comprises the measurement model that describes the hypothesised relationships between the indicator variables and the latent variables and the structural model that describes the hypothesised relationships between the latent variables. The structural model *per se* cannot be empirically fitted. Only the comprehensive LISREL model and the measurement model.

The final *psychological ownership* structural model that was fitted (Lee, 2017) is shown in Figure 2.2.

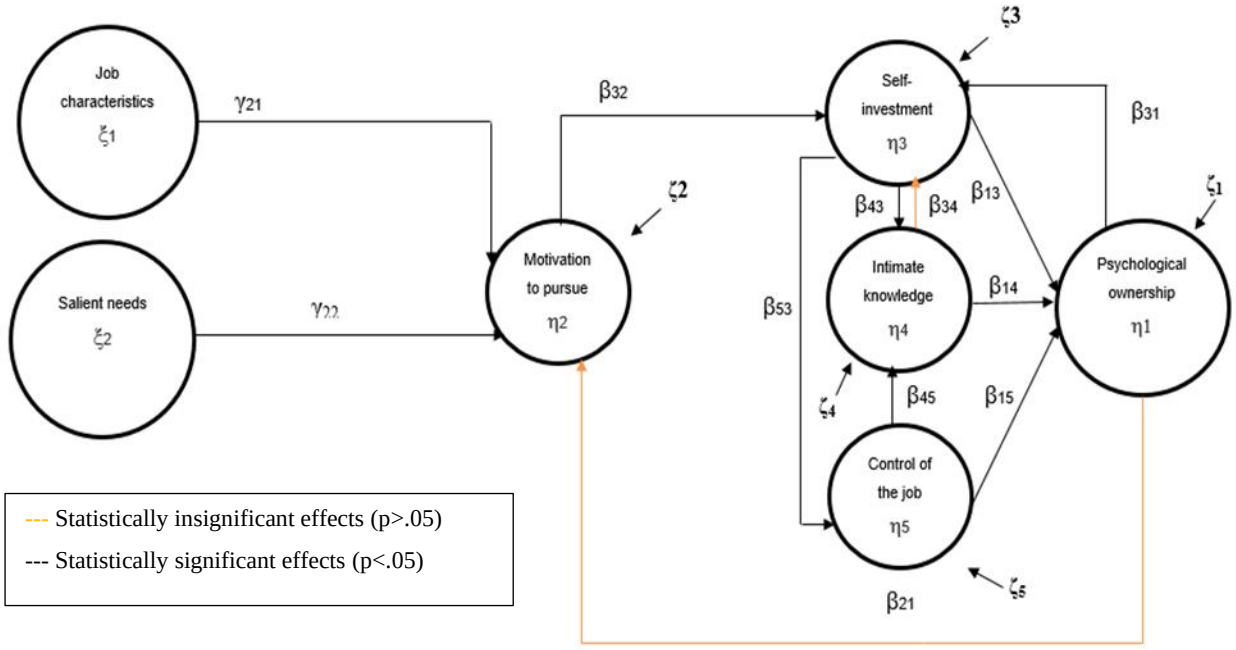

Figure 2.2. The final Lee *psychological ownership* structural model. Reprinted from Development and empirical evaluation of an explanatory psychological ownership structural model (p. 102) by Lee, A. (2017) Master's thesis. Stellenbosch: Stellenbosch University.

2.6.3. EVALUATION OF THE MODIFIED LEE (2017) PSYCHOLOGICAL OWNERSHIP STRUCTURAL MODEL

Lee (2017) concluded from the close fit of the comprehensive LISREL model, in conjunction with the close fit of the measurement model, that the interpretation of the structural model parameter estimates was acceptable. When the parameter estimates were examined it became evident that all the paths were statistically significant ($p < .05$) except for the path between the latent *psychological safety x motivation to pursue the routes to psychological ownership* interaction effect and *self-investment*, the path between *psychological ownership* and *motivation to pursue the routes to psychological ownership* and the path between *intimate knowledge* and *self-investment*.

Furthermore, the response surface was analysed via observed score polynomial regression (Edwards, 1994) to determine the reaction of *the motivation to pursue the routes* to the interaction between an individual's *salient needs* and the *ability of the job characteristics to satisfy those salient needs* (Lee, 2017). Lee (2017) concluded that the motivation to pursue the routes to psychological ownership will linearly increase as congruence between the *salience of*

root needs and the *ability of the job characteristics to satisfy those salient needs* moves from the perception that the job does not allow the satisfaction of the needs combined with low salience of the needs (i.e., - - congruence) to the perception that the job does allow the satisfaction of the needs combined with high salience of the needs (i.e. + + congruence).

2.7. THE PROPOSED EXPANDED KLOPPER- LEE PSYCHOLOGICAL OWNERSHIP STRUCTURAL MODEL

2.7.1. THE ROOTS AND ROUTES OF PSYCHOLOGICAL OWNERSHIP AND MOTIVATION TO PURSUE SELF- INVESTMENT

The answer to the question, why employees develop an experienced sense of psychological ownership, according to Pierce et al. (2001), lies (in part)[3] in the motives/needs, reasons for, or 'roots' of, *psychological ownership*. As mentioned earlier, psychological ownership (toward a target) exist because it satisfies three human needs: *self -efficacy*, *self-identity* and *having a home*. Lee (2016) referred to these needs collectively as *salient psychological ownership root needs* and proposed that they collectively influence an individual's *motivation to pursue the routes to psychological ownership*. According to Lee (2016) the expected pleasure producing 'reward' of feelings of ownership would motivate behaviour or the pursuit/" traveling" of the routes, namely *self-investment*, *gaining intimate knowledge* and *control*. This line of reasoning concurs with the work of Pierce, Jussila and Cummings (2009) who argue that these motives facilitates the development of psychological ownership, rather than being the direct cause. Therefore, it is assumed that a feeling of ownership can develop for a variety of targets as long as they are of such a nature that taking ownership of these targets allow these motives to be satisfied. This implies that these motives act as a driving force that facilitates psychological ownership, but this necessitates the satisfaction of these needs through certain behaviours and actions. Lee (2016) seems to regard these motives as causes of psychological ownership which is divergent to the views of Pierce et al. (2009). Lee (2016; 2017) argued that the anticipation of satisfying these needs/motives (because of the perceived characteristics of the target), provided they are salient, causes (but not directly) a sense of psychological ownership. The sense of ownership develops through an extended psychological "buying" process that involves investing the self, gaining intimate knowledge and taking control of the target. The psychological "buying" of the job by "travelling" the routes to psychological ownership is motivated by the expectancy that exerting effort will result is successful travel of the routes

[3] The perceived ability of the target to satisfy motives/needs, when considering "buying"it, also needs to be considered when attempting to understand why ownership for a specific target develops.

and a positive valancing/valuing of successful travel of the routes because of its perceived instrumentality in developing the feeling of psychological ownership that is positively valenced/valued if the root needs are salient. Therefore, the researcher must disagree with Lee's (2016, p. 80) line of reasoning which argues that "these routes can be seen as the transport system or behaviour component that, after initial introduction to a target (and subsequent need satisfaction), carry the feelings of ownership within the self". Lee (2016) posited that the strength of these needs or motives (in combination with job characteristics) will motivate an individual to pursue the routes to psychological ownership. However, the subsequent need satisfaction, which is regarded as a necessity for the development of psychological ownership (Pierce & Jussila, 2011), is not incorporated in her current structural model underpinning psychological ownership. This argument is supported by Lee (2016, p. 82) who contradicts herself effectively by claiming that "it seems reasonable to suggest that investing the self in a job, that is characterised by certain job characteristics, will satisfy certain individual needs, in terms of providing a sense of identity, efficacy and belonging. In contrast to Lee (2016), who proposed that the routes to psychological ownership has a direct influence on psychological ownership, it could be prudent to rather regard the *satisfaction of the root motives* as having a direct influence on an employee's level of experienced *psychological ownership* and the motives themselves as a driving force that motivates behaviour (routes) toward the *satisfaction of root needs*. This suggestion is supported by Pierce et al. (2001) who proposed that psychological ownership has its roots in this set of motives, which implies that satisfying these needs (through actions or routes) will lead to psychological ownership.

Lee (2016) acknowledges the importance of the three motives of psychological ownership, describing it as the conative engine that motivates an individual to act upon, or engage with, a target. However, she collectively added these needs in the structural model as *salient needs*, which refers to the strength of an individual's needs that influences the person's level of motivation to specifically *invest their self*. James (1980) and Beaglehole (1932) claimed that feelings of ownership emerge through a living relationship with the target. Consequently, Lee (2016) regarded salient needs as motivating forces that drive an individual to invest their time, energy, and effort in a target, in other words, invest their self into the target. Lee (2016) additionally argued that the process of investing the self into a target will increase the extent to which the individual attempts to gain control over the target and the extent to which the individual attempts to gain intimate knowledge about the target. Therefore, it can be argued that the act of investing the self into a target will bring about the additional routes gaining

(intimate knowledge and gaining control) to psychological ownership and this act of investing the self into a target is influenced by the root motives (efficacy motive, self-identity motive and belonging motive) of psychological ownership. Therefore, self- investment is regarded as a crucial behavioural conduit[4] towards psychological ownership, which suggests that this variable should viewed as the cornerstone of the development of psychological ownership. These motives will be included as separate latent variables, as opposed to Lee (2016) who used them collectively, in order to grasp the full complexity of the nomological network underpinning psychological ownership. Similar to Lee (2016), who posited that these motives directly influence an individual's motivation to invest in the routes to psychological ownership, specifically *self-investment*, the researcher suggest that these motives will individually influence an individual's level of *motivation to pursue self-investment*. However, only the *efficacy* motive and *self-identity* motive will be included in the model since the researcher believes that the need for self-identity and belonging are closely related. This belief is supported by McIntyre et al. (2009) who argued that, targets of ownership or objects in which individuals find a strong sense of self-identification come to be psychologically regarded as home and those possessions that are experienced as home are those objects in which the individual have substantial investment of themselves. However, it should be noted that other researchers like Avey et al. (2009) propose that individuals can feel a sense of belongingness in a place or group and not necessarily identify with that place or group. This actually strongly suggests that belongingness is not a critical variable to include in the structural model, because *psychological ownership* per definition entails the process where a target becomes an extension of the self, which would imply that if a person feels a sense of belonging in a place without identifying with that target it will not contribute to feelings of psychological ownership.

The following hypotheses are presented deriving from the discussion above:

> **Hypotheses 2[5]: In the proposed psychological ownership structural model[6] it is hypothesised that the salience of the *self-identity* motive has a positive influence on the *motivation to engage in the routes towards psychological ownership*.**

[4] In her data-driven recommendations for future research Lee (2017) recommended that a path from motivation to pursue the routes to control should be considered.

[5] Hypothesis 1 was reserved to refer to the overarching substantive research hypothesis that will emerge from the integration of all the path-specific substantive research hypotheses derived through theorising.

[6] The phrase : "in the proposed psychological ownership structural model" has been used on purpose in all the path-specific substantive hypotheses to acknowledge that each hypothesis posits that a specific ξ_j or η_j produces variance in η_i when controlling for the effect of other latent variables hypothesised to affect η_i in the proposed structural model.

Hypotheses 3: In the proposed psychological ownership structural model it is hypothesised that the salience of the *self-efficacy* motive has a positive influence on the *motivation to engage in the routes towards psychological ownership*.

2.7.2. EXPECTANCY THEORY AND MOTIVATION TO PURSUE SELF- INVESTMENT

As mentioned earlier Lee (2016) relied on Victor Vroom's theory of motivation (1964) that posits that most human behaviour is voluntary, in order to understand what motivates an employee to gain control over the target of ownership, to get to know the target intimately and to invest the self into the target? The core mental components of Vroom's (1964) expectancy theory of motivation are: valence, expectancy and instrumentality and these three components interact psychologically to create a motivational force and subsequent behaviour.

Vroom's understanding of the term valence relates this aspect to the affective orientations that an individual could hold for a certain outcome, or the emotions an individual feel for a particular outcome. Valence does, however, not refer to the actual value of an outcome. Rather, valence refers to the anticipated satisfaction, or expected pleasurable emotion, produced via an outcome. When relating this to psychological ownership one could argue that psychological ownership of a specific job would be *positively valenced* if the job characteristics are perceived to satisfy salient psychological ownership roots (that is if the job characteristics are perceived to be high in features that satisfy psychological ownership needs and the individual possesses salient psychological ownership root needs). The expected pleasure producing 'reward' of feelings of ownership would in turn motivate the psychological "purchasing" behaviour or the traveling of the routes, namely *self-investment, control* and *gaining intimate knowledge*.

Vroom (1960 additionally posited that behaviour is influenced by not only the valence of an outcome, but additionally by the degree to which an individual believes that outcome is attainable or probable. Expectancies are regarded as action-outcome relations. If an employee feels, perceives or thinks he or she can achieve an outcome through his or her actions, he or she will be more motivated to aim for it. In relation to psychological ownership the actions could be seen as the routes and specifically *investing the self* in the target and the outcome is *psychological ownership*. It can therefore be argued that an employee will be motivated to invest him-/herself in a job if doing so is perceived to result in the experience of *psychological ownership* which is positively valenced because this psychological state satisfies the individuals need for *self-identity*, to *belong* and to experience *efficacy*.

As discussed above, a crucial element in the nomological network of latent variables that underpin feelings of *psychological ownership* is the anticipated satisfaction of the motives namely, the *effectance motive*, the *need for self-identity* (and the *need to find a place* or experience *a sense of belonging*) conditional on investment in the ownership routes. In addition, it has been argued that satisfaction of the three needs that form the roots of *psychological ownership* will not be anticipated unless the job is characterised by the Hackman-Oldham job characteristics.

The argument presented above implies that a certain fit, specifically person-job fit should exist in order for an employee to be motivated to invest himself or herself. More specifically, the extent to which the *perceived ability of the job to satisfy the psychological ownership root needs* and the *perceived salience of the psychological ownership root needs* are congruent or incongruent could be argued to affect the *motivation to pursue the psychological ownership routes*. Therefore, if congruency between the individual's needs (an attribute of the employee) and the perception that the job is able to satisfy those needs (perceived attributes of the job) is perceived then the individual could experience a job as an element of self- expression and therefore be more motivated to pursue the routes towards feelings of ownership.

The argument presented thus far implies that *motivation to engage in self- investment* is influenced by two groups of variables, namely the two root motives for developing *psychological ownership* and the nature of the job (these job characteristics will be discussed in the next section). It can be argued that the manner in which *motivation to pursue the routes to psychological ownership* changes, to changes in the perceptions of the *job's ability to satisfy root needs* and to the *strength of the two root needs*, is captured by a response surface or regression plane that describes the expected *motivation to pursue the routes to psychological ownership* given specific *job characteristics* and *salience of root needs*. Additionally, this study concurs with Lee's (2016) proposal that the manner in which *motivation to pursue the routes to psychological ownership* responds to changes in perceptions of the *job's ability to satisfy root needs* and the *strength of the root needs* should be curvilinear, as opposed to linear, so as to allow the interaction between perceptions of the *job's ability to satisfy root needs* and *need strengths* to have a more complex effect on the *motivation to engage in self-investment.*

Consequently, the question arises: how do we evaluate the influence of fit (congruence) between two (or more) paired predictors (X_1 and X_2) on the endogenous outcome variable

(Y_1)[7]? Developments in the data analysis field have led to the introduction of polynomial regression, and response surface analysis (Edward, 2008). This analysis technique allows researchers to determine how an endogenous latent variable, such as *motivation*, responds to changes in the relationship between two (or more) additional latent variables falling within a common conceptual domain. It is important to register that a polynomial regression approach to studying person-job fit or congruence between person and job (or the lack of it) does not treat person-job fit as a bipolar variable that is described by either a measured or a derived score obtained from measures of the person and the job but rather as the position on a (potentially curvilinear) response surface.

In order to allow the response surface (of the manner in which two predictor latent variables affect motivation to pursue the routes) to be non-linear, three additional terms had to be created in the Lee (2016) model. This led to the inclusion of five phantom variables in the Lee (2017) study with the intention to explain unique variance in motivation to engage in the routes to psychological ownership.

However, she removed the polynomial phantom effects from the model because it was plagued with inadmissible parameter estimates (Lee, 2017). It can be argued that this polynomial phantom effect should be reintegrated in the structural model proposed in the current study because it does make theoretical sense that the perceived fit between the job and the salient needs of an individual should influence the extent to which an individual invests their self into a target. Arthur, Bell, Villado, and Doverspike (2006, p. 787) mentioned that "… when there is fit, the environment affords individuals the opportunity to fulfil their needs… Need fulfilment results in favourable attitudes, such as job satisfaction and organisation commitment". Furthermore, Lee (2016) argued that if congruency between the individual's needs and the job characteristics is perceived then the individual could be motivated to pursue the routes to feelings of ownership. Therefore, the supplementary fit between the salience of an employee's root motives/ needs and the job characteristics is regarded as crucial for development of motivation to pursue self- investment.

The current study, however, attempted to understand the individual effects of the subscales of the *root needs* (self-identity motive, self-efficacy motive) and *job characteristics* (identity,

[7] The current study differs from Lee (2017) that treated the root needs as a composite variable in that it will use two sets of paired variables. The first pair will refer to the salience of the efficacy root need and the perceived ability of the job to satisfy the efficacy root need and the second pair will refer to the salience of the self-identity root need and the perceived ability of the job to satisfy the self-identity root need

significance, variety, autonomy, excluding the feedback characteristic). This would, however, require the inclusion of at least 5 more latent variables of which three would again be phantom variables that could explain unique variance in *motivation to engage in self-investment*, which would probably exacerbate the inadmissible parameter estimates that Lee (2017) experienced and also create the need for a larger sample due to the increased number of freed parameters to be estimated. Despite these concerns the researcher decided to re-introduce the polynomial interaction terms.

The subscales of the root needs, namely *self-identity* need and *self-efficacy* need will be treated as separate construct which will significantly contribute to the complexity and understanding of the manner in which motivation is created in the psychological ownership structural model. *The perceived ability of the job to satisfy each of the two needs*, in contrast to Lee's operationalisation of this term, which included the job characteristics collectively, is represented by two unique measures that combine aspects of participants' perceptions of the perceived ability that certain job characteristics have to satisfy their specific need. This implies that 10 (5 x 2) additional terms have to be created in order to allow for the response surface to be non-linear. This constitutes the second-order polynomial regression equation which is depicted below as Equation 1.

$$E[\eta_2 \mid \xi_1, \xi_2] = b_0 + b_1\xi_1 + b_2\xi_2 + b_3\xi_1^2 + b_4\xi_1*\xi_2 + b_5\xi_2^2 + b_6\xi_3 + b_7\xi_4 + b_8\xi_3^2 + b_9\xi_3*\xi_4 + b_{10}\xi_3^2 \qquad [1]$$

where:

- η_2 represents *motivation* to pursue the routes to *psychological ownership;*
- ξ_1 represents the *level (or salience) of the self-identity need* (root to *psychological ownership*).
- ξ_2 represents the *perceived ability of the job characteristics to satisfy the self-identity need;*
- ξ_3 represents the *level (or salience) of the self-efficacy need* (root to *psychological ownership*).
- ξ_4 represents the *perceived ability of the job characteristics to satisfy the self-efficacy need;*

The following hypotheses are derived from the discussion above:

> **Hypotheses 4: In the proposed psychological ownership structural model it is hypothesised that the squared salience of the *self-efficacy* motive has a positive influence on the *motivation to pursue the routes towards psychological ownership*.**

Hypotheses 5: In the proposed psychological ownership structural model it is hypothesised that the squared salience of the *self-identity* motive has a positive influence on the *motivation to pursue self-investment.*

Hypothesis 6: In the proposed psychological ownership structural model it is hypothesised that the *perceived ability of the job to satisfy the self-identity need* positively influences *motivation to engage in the routes towards psychological ownership*.

Hypothesis 7: In the proposed psychological ownership structural model it is hypothesised that the *squared perceived ability of the job to satisfy the self-identity need* positively influences *motivation to pursue the routes towards psychological ownership.*

Hypothesis 8: In the proposed psychological ownership structural model it is hypothesised that the *perceived ability of the job characteristics to satisfy the self-efficacy* need positively influences *motivation to engage in the routes towards psychological ownership*.

Hypothesis 9: In the proposed psychological ownership structural model it is hypothesised that *squared perceived ability of the job to satisfy the self-efficacy need* positively influences *motivation to engage in the routes towards psychological ownership*.

Hypothesis 10: In the proposed psychological ownership structural model it is hypothesised that the *self-identity need * perceived ability of the job to satisfy the self-identity need* positively influences *motivation to engage in the routes towards psychological ownership*.

Hypothesis 11: In the proposed psychological ownership structural model it is hypothesised that the *self-efficacy need * perceived ability of the job to satisfy the self-efficacy need* positively influences *motivation to engage in the routes towards psychological ownership*.

Theron (2014) states that polynomial regression offers the opportunity to describe more complex response surfaces and thereby the possibility of more accurately describing the behaviour of a response variable to changes in two predictor variables. Therefore, this statistical technique has more explanatory value than difference scores or traditional moderated regression analyses.

This technique allows for theorising in terms of a three-dimensional space and not a single congruence latent variable[8]. In this three-dimensional space congruence and incongruence can vary in nature (the employee experiences a root need as salient and the job characteristics are such that they provide satisfaction of these needs [+ +] or the employee does not experience a root need as salient and the job characteristics are such that they cannot satisfy the need [- -] and either the employee experiences a root need as salient but the job cannot satisfy the need [+ -] or the employee does not experience a root need as salient but the job characteristics can satisfy the need [- +).

Considering the argument above applied to the three dimensional surface it seems reasonable to suggest that *motivation to pursue* the routes to *psychological ownership* will increase as congruence moves along the line of congruence to non-salient needs (low needs levels)(including the self-identity need and self-efficacy need) and low perceived ability of the job to meet these salient needs (- -) to high salient needs and high perceived ability of job to meet salient needs (+ +). The slope of the response surface along the line of congruence is therefore positive. In terms of the proposed curvature of the response surface, it seems logical to concur with Lee (2017, p. 66) who argued that:

> initial increases in employee need salience and the perceived ability of the job to satisfy these needs would result in only modest increases in the *motivation to pursue* the routes to *psychological ownership*. As further increases in need salience and the perceived ability of the job to satisfy these needs occur, it seems plausible that the increase in the *motivation to pursue* the routes to *psychological ownership* will gradually accelerate.

This implies that the response surface will display a skateboard ramp-like structure with *motivation to pursue* the routes to *psychological ownership* at its highest when the two salient needs are experienced and the job is perceived to be able to satisfy these needs due to its job characteristics [+ +].

In cases of incongruence Lee's (2017) line of reasoning again seems to make perfect theoretical sense. She argued that a scenario reflecting incongruency, namely a situation where the employee possesses certain salient needs and the job is not characterised by features that satisfy these salient needs (+ -), will lead to low levels of *motivation to pursue* the routes to *psychological ownership*.

[8] In the current study the response surface describing the manner in which the *motivation to pursue the routes* change as the congruence/incongruence between the salience of the efficacy need and the perceived ability of the job to satisfy the need changes and as the congruence/incongruence between the salience of the self-identity need and the perceived ability of the job to satisfy the need changes, should be conceptualised as a hyperplane. Moreover in this description of the manner in which the response surface chances n(non-linearly) under the influence of the congruence/incongruence between the salience of the efficacy need and the perceived ability of the job to satisfy the need, the congruence/incongruence between the salience of the self-identity need and the perceived ability of the job to satisfy the need is controlled for and *vice versa*.

Additionally, it seems reasonable to suggest that, should the job be characterised by features that are perceived to satisfy *psychological ownership* needs but these needs are not salient for the employee because of low root need strength, (- +), then *motivation to pursue* the routes to *psychological ownership* will also be low. Lee (2017) proposed that the former scenario will pose slightly higher levels of motivation than the lateral scenario. She argued that high root need strength might still move an employee invest the self into the job despite the unappealing ability of the job characteristics to satisfy root needs. She mentioned the analogy; "a hungry man might still be moved to nibble at an unappetising plate of food" (Lee, 2017, p.66). Therefore, it seems reasonable to hypothesise that *motivation to pursue* the routes to *psychological ownership* could increase as incongruence moves along the line of incongruence from low employee needs and high perceived ability of the job to satisfy needs (- +) to high employee salient needs and low perceived ability of the job to satisfy needs (+ -). The slope of the response surface along the line of incongruence is therefore positive. The following hypotheses are derived from the foregoing theorising:

Hypothesis 12: In the proposed psychological ownership structural model it is hypothesised that a) *motivation to engage in the routes to psychological ownership* changes positively as congruence moves from the perception that the job does not allow the satisfaction of the self-identity need combined with low salience of the self-identity need (- -) to the perception that the job does allow the satisfaction of the self-identity need combined with high salience of the self-identity need (+ +); b) *motivation to engage in the routes to psychological ownership* changes convexly (along the line of congruence) as congruence moves from the perception that the job does not allow the satisfaction of the self-identity need combined with low salience of the self-identity need to the perception that the job does allow the satisfaction of the self-identity need combined with high salience of the self-identity need (while holding constant the congruence/incongruence between salience of self-efficacy need and the perceived ability of the job to satisfy the need).

Hypothesis 13: In the proposed psychological ownership structural model it is hypothesised that a) *motivation to engage in the routes to psychological ownership* changes positively as incongruence changes from the perception that the job does allow the satisfaction of the self-identity need combined with low salience of the self-identity need (- +) to the perception that the job does not allow the satisfaction of the self-identity need combined with high salience of the self-identity need; b) motivation to engage in the routes to psychological

ownership changes linearly as incongruence changes from the perception that the job does allow the satisfaction of the self-identity need combined with low salience of the self-identity need to the perception that the job does not allow the satisfaction of the self-identity need combined with high salience of the self-identity need (while holding constant the congruence/incongruence between salience of self-efficacy need and the perceived ability of the job to satisfy the need).

Hypothesis 14: In the proposed psychological ownership structural model it is hypothesised that a) *motivation to engage in the routes to psychological ownership* changes positively as congruence moves from the perception that the job does not allow the satisfaction of the self-efficacy need combined with low salience of the self-efficacy need (- -) to the perception that the job does allow the satisfaction of the needs combined with high salience of the self-efficacy need (+ +); b) *motivation to engage in the routes to psychological ownership* changes convexly (along the line of congruence) as congruence moves from the perception that the job does not allow the satisfaction of the self-efficacy need combined with low salience of the self-efficacy need to the perception that the job does allow the satisfaction of the self-efficacy need combined with high salience of the self-efficacy need (while holding constant the congruence/incongruence between salience of self-identity need and the perceived ability of the job to satisfy the need).

Hypothesis 15: In the proposed psychological ownership structural model it is hypothesised that a) *motivation to engage in the routes to psychological ownership* changes positively as incongruence changes from the perception that the job does allow the satisfaction of the needs combined with low salience of the self-efficacy need (- +) to the perception that the job does not allow the satisfaction of the needs combined with high salience of the self-efficacy need; b) *motivation to engage in the routes to psychological ownership* changes linearly as incongruence changes from the perception that the job does allow the satisfaction of the needs combined with low salience of the self-efficacy need to the perception that the job does not allow the satisfaction of the needs combined with high salience of the self-efficacy need (while holding constant

the congruence/incongruence between salience of self-identity need and the perceived ability of the job to satisfy the need).

2.7.3. JOB CHARACTERISTICS AND MOTIVATION TO PURSUE SELF- INVESTMENT

Hackman and Oldham (1975) was the biggest advocates of the idea that job complexity (i.e., stimulating and challenging jobs) result in increases in the job's motivating potential. Through the job characteristics model, Hackman and Oldham (1975) found that a positive relationship exists between the job design and three critical psychological states – experienced meaningfulness of the work, experienced responsibility for work outcomes and knowledge of results. Hackman and Oldham (1975) described the experienced meaningfulness as the "degree to which the employee experiences the job as one which is generally meaningful, valuable, and worthwhile" (p. 162). Additionally, the responsibility that is experienced for work outcomes addresses the degree to which employee feels personally accountable for the results of the work he or she does (Hackman & Oldham, 1975). Finally, knowledge of results, according to Hackman and Oldham (1975) relates to the extent to which the employee knows how effectively he or she is performing on a continuous basis.

The Lee (2016) psychological ownership structural model include all five of the job characteristics as a possible influence on *the motivation to pursue the routes to psychological ownership*. However, Pierce et al. (2009), delineated the relationship between the core job characteristics and *psychological ownership*, relating each job design characteristic to one or more of the routes to psychological ownership.

Pierce et al. (2009) claimed that four job design dimensions can be regarded as factors that affect the extent to which an individual invest themselves (i.e., invest their time, energy, skills and abilities) into the job. Firstly, *task identity* involves the extent to which the job involves completing a 'whole' and identifiable piece of work. Pierce et al. (2009) argue that the self is subsequently placed into a larger portion of the final product. Therefore, increasing the degree to which an employee creates or produces a final product, or increasing their awareness of their contribution to the final product, may increase an individual's motivation to invest their self into the job. Secondly, Pierce et al. (2009) proposed that *skill variety* is also a job dimension that will possibly contribute to the degree to which an employee invest their self into the job. They argue that an increase in skill variety requires that individuals perform a broader array of skill, task and talents. Subsequently, these employees are called upon to use more of themselves in the process of carrying out the job. Thirdly, they proposed that job design *autonomy* requires

employees to invest thought and decisions into the job rather than simply their physical energy toward job performance. Therefore, autonomy requires an individual to think about the work, and devise plans and procedures that can be employed in performing the job. Finally, Pierce et al. (2009, p 15) suggested that : "*task significance* will not have a systematic, nor meaningful relationship with control or intimate knowledge, but rather a weak and positive relationship with investment of the self, especially for people who has a positive regard for others, because task significance refers to the degree to which the job has a substantial impact upon the lives or well-being of others".

The discussion above suggests that certain job characteristics can be linked to certain routes to psychological ownership which is in disagreement with Lee's (2016) proposal that all the job dimensions work collectively to influence an individual's level of *motivation to pursue the routes to psychological ownership*. This study concurs with the work of Pierce et al. (2009), because it does make theoretical sense that some job dimensions such as *feedback* will not have a meaningful impact on an employee's motivation to invest their self into the job, since the satisfaction of the other four dimensions will arguably cause and employee to disregard the feedback, negative or positive, from co-workers or managers.

The following hypotheses are derived from the discussion above:

Hypotheses 16: In the proposed psychological ownership structural model it is hypothesised that the level of *task identity* has a positive influence on *the motivation to pursue self-investment*.

Hypotheses 17: In the proposed psychological ownership structural model it is hypothesised that the level of *task significance* has a positive influence on the *motivation to pursue self-investment*.

Hypotheses 18: In the proposed psychological ownership structural model it is hypothesised that the level of *task/skill variety* has a positive influence on the motivation to pursue self-investment.

Hypotheses 19: In the proposed psychological ownership structural model it is hypothesised that the level of *autonomy* that a job offers has a positive influence on the motivation to pursue *self-investment*.

Hypotheses 20: In the proposed psychological ownership structural model it is hypothesised that the level of *motivation to pursue self-investment* has a positive influence on *self-investment*.

Pierce, O'Driscoll, and Coghlan (2004) mentioned that *autonomy* may be the main job design dimension that is most likely to affect an employee's experience of gained job-related control. Pierce et al. (2004) suggested that *autonomy* offers individuals the luxury to have freedom, independence and discretion to make job-related decisions (e.g., scheduling of work and procedures used to perform the work). They argue that the creation of autonomy will offer employees the opportunity to satisfy important self-related needs, specifically the efficacy motivation and the associated development of the sense that "I am the cause". The relationship between autonomy and control, autonomy and psychological ownership is supported by empirical evidence (Brass, 1985; Pierce et al., 2004; Tanaka & Yamauchi, 2000). Therefore, it seems reasonable to suggest that increasing an employee's level of autonomy will have a positive impact on an employee's propensity to gain control over the job thus increasing their sense of "being the cause".

Hypotheses 21: In the proposed psychological ownership structural model it is hypothesised that the level of *autonomy* that a job offers has a positive influence on *gaining control* over the job.

According to Pierce et al. (2009) mentioned that the job design characteristics, task identity, is also an important attribute that provides the underpinnings for the intimate knowledge proposition. Pierce et al., (2001) mentioned that individuals find themselves tied to objects as a result of active participation or association with those objects. They propose that the opportunity to do a whole and identifiable piece of work affords employees the opportunity to become familiar with each of the tasks that are associated with completing a piece of work. Therefore, increasing an employee's task identity will possibly increase their intimate knowledge of the job or target of ownership.

Additionally, Pierce et al. (2009) posited that increased levels of autonomy will improve the level as well as the depth of an employee's understanding of his or her job, because they will be obligated to make more job- related decisions which, in effect, requires that they gather and process more relevant job information. This implies that certain conditions where work scheduling, determination of work procedures and problem-solving are managed by others, one can expect that an employee will be less intimately connected to his/her job.

The following hypotheses are derived from the discussion above:

Hypotheses 22: In the proposed psychological ownership structural model it is hypothesised that the level of task identity that a job offers has a positive influence on gaining intimate knowledge."

Hypotheses 23: In the proposed psychological ownership structural model it is hypothesised that the level of autonomy that a job offers has a positive influence on gaining intimate knowledge.

2.7.4. ROUTES TO FEELINGS OF OWNERSHIP

As mentioned earlier, Pierce et al. (2001) argued that *psychological ownership* can be observed as a state that develops through certain routes, paths or experiences. Pierce et al. (2001) propose that the opportunity to invest one's self into a target, the opportunity to have control over a target and the opportunity to gain knowledge about the target, leads to feelings of ownership.

Lee (2016) proposed that *motivation to pursue the routes to psychological ownership* mainly influences the *self-investment* route. Subsequently, she argued that self-investment mediates the effect of motivation to pursue the routes, on the extent to which the employee gain *control* over the job, as well as the extent to which the employee *gains intimate knowledge*.

According to Pierce et al. (2001, 2003) work, an object as a target of ownership, should flow from the self in order for an employee to develop feelings of ownership. Kahn (1990), as cited in Lee (2016), states that the more immersed an employee becomes with his/her job, the more they draw on their selves. As mentioned earlier, the investment of self refers to a behavioural dimension that bring about the other two routes to psychological ownership. These behaviours, that are directed to investing the self into a target, can be observed in various forms including "investment of one's time, ideas, skills and psychical and psychological intellectual energies" (Pierce et al., 2001, p. 302). This study concurs with the work of Lee (2016) who suggested that this *self-investment* route to psychological ownership incurs investment in the other two routes. Therefore, similarly to Lee (2016), the researcher proposes that the investment of the self into a target will increase the employee's actions to *gain knowledge* as well as their attempts to *gain control* over their jobs.

Pierce, Kostova, and Dirks (2001) theorized that *control of a target* can be observed as a vital prerequisite for the ownership phenomenon. Drawing on the work of Ellwood (1927) and Furby (1976) who claimed that an individual is driven by the desire to influence outcomes through *investing the self* and in turn being the "cause" of the outcome, Lee (2016) proposed that only when the employee has immersed the self into the job will he/she start taking control

of their job. Consequently, she suggested that *self-investment* mediates the effect of *motivation to pursue the routes* on *gaining control of the job*. This study therefore regards the act of *investing the self* into a job as having a direct influence on an employee's attempts to *gain control*. Therefore, it seems reasonable to argue that *gaining control* over a job is not directly influenced by the *root needs of psychological ownership* or certain *job characteristics* such as task identity, significance and task variety, but rather a product of the act of *investing the self* into the job.

The final route to psychological ownership is *coming to know the target intimately* (Pierce et al. 2001). Pierce et al. (2001) suggested that the more involved an individual is with a target (through spending time, energy and skills), the more and individual will know about the target. Similarly, James (1980) and Beaglehole (1932) suggest that feelings of ownership emerge through a living relationship with the target. This study concurs to some extent with the propositions made by Lee (2016) who hypothesised that *self-investment* will mediate the relationship between *motivation to pursue the routes to psychological ownership* and *gaining intimate knowledge*. Therefore, similar to the argument above, this study proposes that the act of investing the self is solely influenced by the root motivational forces of psychological ownership and certain job characteristics and *gaining intimate knowledge* is simply a product of this act of spending time, energy and effort.

The following hypotheses are derived from the discussion above:

> **Hypotheses 24: In the proposed psychological ownership structural model it is hypothesised that the level of *self-investment* has a positive influence on *gaining control* over the job.**
>
> **Hypotheses 25: In the proposed psychological ownership structural model it is hypothesised that the level of *self-investment* has a positive influence on *gaining intimate knowledge*.**

2.7.5. ROUTES TO PSYCHOLOGICAL OWNERSHIP AND THE SATISFACTION OF ROOT NEEDS

Pierce et al. (2003, p. 11) propose that "possessions serve as a symbolic expression of the self". They claim that possessions play a crucial part in the development of self-identity. This process is characterised by an interactive, cyclical, and reinforcing nature, where individuals come to find self-understanding in their relationship with certain objects (Pierce et al., 2003). Put differently, targets of ownership are brought into the realm of the extended self as an individual interacts (invest their self into the target) with them in search of self-knowledge and meaning

(intimate knowledge). Furthermore, Furby (1978) emphasised the instrumental function of psychological ownership which enables an individual to control desired outcomes in one's environment. Pierce et al. (2001;2003) mentioned that exploration of, and the ability to control, one's environment gives rise to feelings of efficacy and pleasure, which stem from "being the cause" and having altered the environment through one's control actions. Beggan (1991) agreed with Pierce et al. (2001) who claimed that research provides further evidence that possessions serve to satisfy individual's control motivation. Therefore, it seems reasonable to suggest that gaining control over a target is motivated by the efficacy motive which is why individuals invest themselves into a target or job. However, gaining control over a target will not necessarily directly influence the experienced level of psychological ownership since gaining control over some target causes feelings of efficacy which can arguably be mediated by other variables which will be discussed in the following section.

Therefore, it can be argued that certain motives or roots to psychological ownership compels an individual to invest their self into a target which promotes the traveling of the two other routes (intimate knowledge and control) to psychological ownership, and in turn these routes satisfy the need for self-identity or individuality and self- efficacy. Subsequently, in contrast to the Lee (2016) psychological ownership structural model, this study suggests that following the three routes to psychological ownership will not directly influence an individual's experienced level of *psychological ownership*, but rather act as a function for satisfying the three (two in this study) motives for psychological ownership, namely the degree to which an individual has integrated the object into his or her self-identity with regards to the target of possession and a sense of efficacy that is gained from experiencing control over the target of ownership. This modification is predominantly motivated by the work of White (1959) who focused on the motives for environmental exploration, control, and subsequent feelings of efficacy.

Woodworth (1958) conducted a survey that revealed a certain agreement that exists in terms of the kinds of behaviour that cannot be successfully conceptualised in terms of primary drives. These behaviours all form part of the process whereby "the animal or child" learns to interact effectively with the environment. White (1959) referred to this property as *competence*. White (1959) further postulated that competence cannot be fully attained simply through behaviour instigated by drives. According to White (1959, p. 32), "it receives substantial contributions from activities which, though playful and exploratory in character, at the same time show direction, selectivity, and persistence in interacting with the environment". Therefore, White

(1959) suggested that such activities, in the ultimate service of competence, must be conceived to be motivated in their own right. Subsequently he proposed to label this motivation by the term *effectance*, and to characterise the experience produced as a *feeling of efficacy*. Therefore, effectance motivation must be conceived to involve satisfaction (a feeling of efficacy) in transactions in which behaviour has an exploratory, varying experimental character which allows an organism to find out how the environment can be changed and what consequences flow from these changes. Additionally, White (1959, p.35) claimed that "higher animals and especially man, where little is innately provided and so much must be learned about dealing with the environment, effectance motivation, independent of primary drives, can be seen as an arrangement having high adaptive value". Drawing on the work of Freud (1925), White (1959) suggested that the instinct to master is mainly aimed at exercising and developing the ego, and it follows a hedonic happiness principle by yielding "primary pleasure" when efficient action allows an individual to control and alter his environment. Hendrick (1943) claimed that there is a "pleasure of enjoying one's abilities". This process pertains motivation, *effectance* in this case, that drives certain behaviour such as self-investment that in turn influences a person's *feeling of efficacy* when a person learns about the consequences of the specific behaviour. This degree of feelings of efficacy arguably feed back into the degree to which a person experiences the efficacy motivation, since a person who has high *feelings of efficacy* possibly has high levels of *efficacy motivation* in order to *maintain* that feelings of efficacy, whereas a person with low feelings of *efficacy* will have an increased effectance need. Similarly, the degree to which the target of ownership is integrated into the self-identity, due to learning the consequences of investing the self and gaining control of, and intimate knowledge about the target, arguably entails a cyclical proses. As Dittmar (1992: 86) put it "our sense of identity, our self-definitions, are established, maintained, reproduced and transformed". This implies that the degree to which an object is *integrated into the self-identity* will influence an individual's *self-identity motive*. When an object is integrated into the self, the person will be motivated to maintain that sense of identity. On the other hand, when the object is not integrated into the self, the person will be motivated to establish or transform his identity which will also increase his or her self-identity motivation. However, the researcher believes that the only difference in consequences between having lower levels of integration into self-identity of an object than high levels will be that the person will look for another object to invest him/herself in.

The following hypotheses are derived from the discussion above:

Hypotheses 26: In the proposed psychological ownership structural model it is hypothesised that the degree of integration into the self-identity has a positive influence on the self-identity motive.

Hypotheses 27: In the proposed psychological ownership structural model it is hypothesised that the level of feelings of efficacy has a positive influence on the effectance motive.

According to Pierce et al. (2003) individuals develop psychological ties to objects as a result of their active, continuous participation or association with those things. Furthermore, they provided the example of a gardener who comes to regard the garden as his or her own as a result of working the garden and becoming familiar with it. Through this proses the gardener becomes one with the garden (grounded in and with it). Therefore, they argued that the more things are felt thoroughly and deeply, the more the self becomes attached to the object. Beaglehole (1932) similarly claimed that when an object comes to be known intimately by an individual, it becomes part of the extended self. As a result, it can be argued that knowing an object intimately contributes to the degree to which the target is integrated into the self-identity.

The following hypothesis is derived from the discussion above:

Hypotheses 28: In the proposed psychological ownership structural model it is hypothesised that *intimate knowledge* has a positive influence on the level of *integration into the self-identity*.

As mentioned earlier, individuals who invest themselves (their energy, time, effort and attention) into a target causes the individual to become one with object (Pierce et al. 2001). Consequently, the individual may start to feel that the target of ownership flows from the self. Hence it can be argued that the degree to which a person invests themselves into a target will positively influence the degree to which the target of ownership is integrated into the self. Therefore, from this point on, the satisfaction of the self-identity motive will be captured in the variable namely *integration into the self-identity*. *Integration into the self* is defined in this study as the extent to which an individual identifies with a possible target of ownership and excepts the target as an extension of the self.

The following hypothesis is derived from the discussion above:

Hypotheses 29: In the proposed psychological ownership structural model it is hypothesised that the degree of *self-investment* has a positive influence on the *integration into the self-identity*.

According to Furby (1991) feelings of ownership develop even in young children because of the primal motive to control objects and "to be efficient with their application." The freedom to control one's environment and opportunity to 'be the cause of things' is a psychological mechanism that results in feelings of self-efficacy (Bandura, 1977; Beggan, 1991). Similarly, Isaacs (1933), claimed that the underlying motivation to possess objects is, in large, part to be in control. This implies that being the cause of favoured outcomes in one's environment, through one's actions, result in feelings of efficacy and pleasure and also creates extrinsic satisfaction as certain desirable outcomes are acquired (Pierce et al. 2001). Therefore, it seems reasonable to suggest that *gaining control* over an object will eventually lead to increased *feeling of efficacy*.

The following hypothesis is derived from the discussion above:

Hypotheses 30: In the proposed psychological ownership structural model it is hypothesised that the extent to which *control* is gained has a positive influence on *feelings of efficacy*.

2.7.6. MODERATING EFFECT OF INTERNAL LOCUS OF CONTROL

According to Rotter (1966) the belief that one has control over the environment is predominantly captured by the personality trait, named locus of control. McIntyre, Srivastava and Fuller (2009) proposed that individuals with an *internal locus of control* will most likely have an increased tendency to experience the effectance motive (or higher levels of the motive). According to McIntyre et al. (2009) individuals who have an *internal locus of control* will attribute the cause of events to something inside of themselves while individuals who have an external locus of control believe that they are not in control of their environment and outcomes are caused by destiny, luck or other people. Although, McIntyre et al. (2009) suggested that locus of control influences an individual's experience of the effectance motive, it can be argued that having an *internal locus of control* could possibly moderate the relationship between the amount of *experienced control* and *feelings of efficacy*. Certain levels of provided autonomy and self-investment influences an individual's level of control which can be regarded as an objective measure of actually being the cause, while *feelings of efficacy* should be regarded as the subjective emotional response of having control. For example, a person can have control

over his or her job especially in a group context, while simultaneously having low feelings of efficacy, possibly due to a lack of experience, training or a belief that other teammates or colleagues (or destiny or luck) are responsible for their collective success. Therefore, it seems reasonable to suggest that an internal locus of control will moderate the relationship between experienced control and feelings of efficacy.

Hypotheses 31: In the proposed psychological ownership structural model it is hypothesised that the degree to which an individual has an *internal locus of control* will moderate the effect that *control* has on the extent to which the individual experiences *feelings of efficacy*.

2.7.7. MODERATING EFFECT OF SUBJECTIVELY PERCEIVED ABILITY

Nicholls (1984, p. 113) defined achievement behaviour as "behaviour directed at developing or demonstrating high rather than low ability." According to Nicholls (1984) ability can be conceived in mainly two ways. First, an individual's ability can be evaluated high or low with reference to the individual's past performance or knowledge. Second, ability can be judged as capacity relative to that of others. Therefore, in order for an individual to evaluate his or her capacity he/she must compare the effort and attainment of the self or others. According to Nicholls (1984) we must adopt either a relatively external or a self-evaluative perspective. This is why he introduced the term *ego involvement* which implies the process where an individual seeks to demonstrate ability or competence by differentiating themselves from others. Additionally. Nicholls (1984) also proposed a less differentiated conception which involves a less social self-evaluative perspective. This self-evaluative process is concerned with improving one's mastery of tasks rather than with one's performance relative to others. Nicholls (1984) referred to *task involvement* as the state where individuals attempt to demonstrate ability by differentiating one's current performance from earlier performance.

Nicholls (1984) asserted that individuals who are *ego-involved* would assess at what level they will perform and whether this implies higher capacity than that of other. Therefore, they must determine whether their performance level will serve their end. It can be argued that investing the self into a target of possible ownership also implies a sense of ego -involvement where an individual wish to form a self-identity that will distinguish himself/herself from others. Nicholls (1984) introduced an index of *perceived ability* which includes an individual's evaluation of their ability relative to that of others. Subsequently, it can be argued that the relationship between *self-investment* and *integration into the self* should be moderated by the

perceived ability that the individual experiences that is gained from the process of *investing the self*. It is assumed, and therefore hypothesised that the extent to which an employee has an *perceives high ability* will moderate the effect of *Self-investment* on the extent to which an employee *integrates the target into the self (*i.e. the *perceived ability* * *self-investment* influences *integration into the self*).

The following hypothesis are derived from the discussion above:

> **Hypotheses 32: In the proposed psychological ownership structural model it is hypothesised that the degree to which an individual has a high perceived ability will moderate the effect that self-investment has on the extent to which the individual integrates the target into the self.**

2.7.8. THE SATISFACTION OF THE ROOT MOTIVES AND THE EMERGENCE OF PSYCHOLOGICAL OWNERSHIP

Albert, Ashforth, and Dutton (2000) claimed that when individuals internalise the organisational identity as a definition of the extended self, they will gain a sense of meaningfulness and connectedness. Therefore, they suggest that individuals may develop a sense of psychological ownership over a target at multiple levels to the extent that it appeals to and affirms their values and self-identity. Dittmar (1992) claimed that objects can objectify the self. Furthermore, Dittmar (1992) explained that through our interaction with the environment we learn something about it, as well as something about ourselves. This has important implications for the development of *psychological ownership* especially when considering the constitutive definition of *psychological ownership* which is defined as a cognitive experience that is concerned with the intellectual awareness/realisation/ insight that the target (material or immaterial) of ownership is mine and an extension of the self. Taking into account the important work of White (1959) it seems reasonable to suggest that the satisfaction of the self-identity motive, defined as *integration into the self*, will positively influence an individual's experienced levels of *psychological ownership*. Therefore, in contrast to Lee (2016) who regarded the *routes to psychological ownershi*p as having a direct impact on experienced levels of psychological ownership, this study suggests that these routes (*self-investment*, *intimate knowledge*, *control*) simply act as the behavioural domain of the construct *psychological ownership* through which an individual learns about the consequences of that behaviour, and in turn evaluates the target either as an extension of the self or not. Therefore, this study postulates that when a target of ownership is integrated into the self, the person will develop feelings of ownership.

The following hypothesis is derived from the discussion above:

> **Hypotheses 33: In the proposed psychological ownership structural model it is hypothesised that the degree to which the individual *integrates the target into the self* will positively influence experienced levels of *psychological ownership*.**

Following the same line of reasoning as above, this study also suggests that *feelings of efficacy* should be regarded as the satisfaction of the efficacy motive. According to Pierce et al. (2003) "exploration of, and the ability to control one's environment gives rise to feelings of efficacy, which arises from being the cause". The efficacy motive refers to an individual's need for effectance and ability to manipulate the environment in one's favour. Pierce et al. (2003) also suggested that motivation for and the meaning of ownership are embedded in an effectance motive. Additionally, they posited that person-environment interactions may result in feelings of control and subsequent feelings of efficacy. This implies that Pierce et al. (2003) contradicts themselves in a sense since they directly link control to psychological ownership, after suggesting that control leads to subsequent feelings of efficacy. This study concurs with Pierce et al. (2003) who suggested that efficacy is embedded in the motivation of and meaning of psychological ownership. Therefore, this study suggests that experiencing positive feelings of efficacy will positively influence a person's experienced levels of *psychological ownership*.

Hypotheses 34: In the proposed psychological ownership structural model it is hypothesised that the degree to which an individual *experiences feelings of efficacy* will positively influence experienced levels of *psychological ownership*.

The proposed Klopper-Lee *psychological ownership* structural model is shown in Figure 2.3. Figure 2.3 depicts the overarching substantive research hypothesis that was derived via theorising in response to the research initiating question.

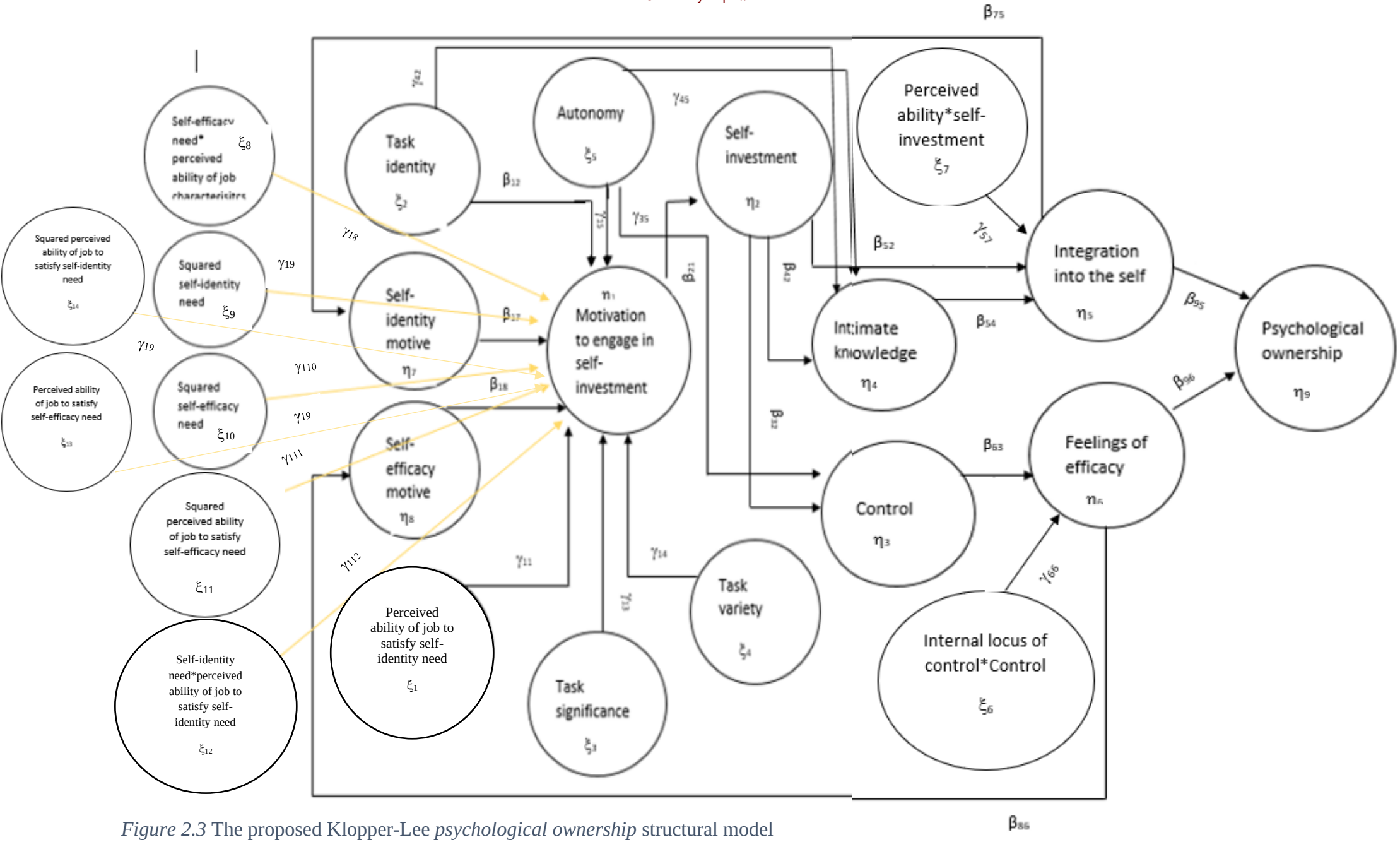

Figure 2.3 The proposed Klopper-Lee *psychological ownership* structural model

CHAPTER 3

RESEARCH METHODOLOGY

3.1. INTRODUCTION

Researchers attempt to produce truthful, valid and plausible descriptions and/or explanations of a particular phenomenon that is able to withstand rigorous testing (Babbie & Mouton, 2014). The credibility of the claims made in this study on the verdict regarding the validity of the explanatory *psychological ownership* structural model depends on the methodology that was used to reach at the verdict (Burger, 2012). This commitment to generate true, valid and credible knowledge and to serve the epistemic ideal is accomplished by subjecting all hypotheses to rigorous testing, allowing sufficient opportunities for disconfirmation.

Babbie and Mouton (2001) explained that research methodology functions as the core elements of science through two features of the scientific method: namely, objectivity and rationality. *Objectivity* signifies the efforts to minimise errors or external non-relevant factors. Rationality, on the other hand, refers to the degree to which knowledgeable peers have the opportunity to critically evaluate the research findings by assessing the methodological rigour used to come to the conclusions of the study. Therefore, it is important to present a comprehensive and adequately detailed description of the methodological choices that were made as well as clear motivation of these choices to ensure clarity for knowledgeable peers.

This chapter will present a detailed explanation of, and motivation for, the methodological choices that were made to test the overarching substantive research hypotheses and the path-specific substantive research hypotheses that were depicted in the expanded Klopper-Lee *psychological ownership* structural model. The method for testing the overarching substantive research hypotheses and the path-specific substantive research hypotheses is initiated by the presentation of the substantive research hypotheses, which is followed by a decision made regarding the research design, development of statistical hypotheses, a description of the sampling method, and concludes with a description of the statistical methods used to test the statistical hypotheses. Strong emphasis was placed on these phases of the explanatory research process where the epistemic ideal of science had a higher risk of derailing.

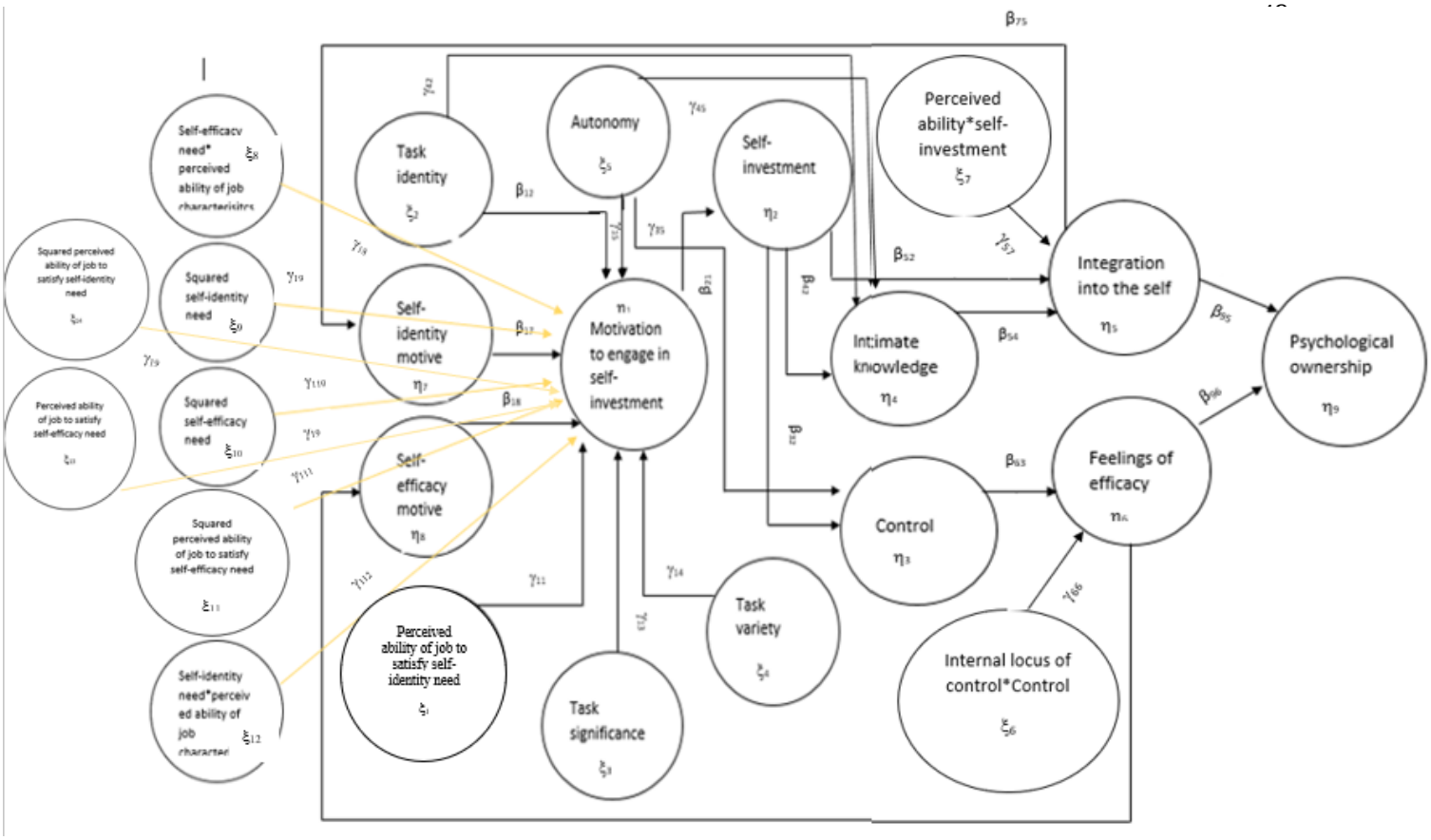

Figure 3.1 The proposed Klopper-Lee *psychological ownership* structural model

3.2. SUBSTANTIVE RESEARCH HYPOTHESES

Kerlinger and Lee (2000) explained that hypotheses serve the function of providing a link between existing literature, researchers beliefs and empirical testing. Lee (2016) explained that hypotheses clearly describe the researchers' beliefs in terms of the tentative relationships that are hypothesised to exist between latent variables. These relational descriptions allow for hypotheses to be tested in order to determine whether these assumptions are valid.

The literature review and theorising in Chapter 2 culminated in a modified and expanded *psychological ownership* structural model which is a schematic representation of the overarching substantive hypothesis. The argument presented in the literature review resulted in the inclusion of non-cognitive psychological ownership latent variables and the modification and expansion of some of the causal paths presented by Lee (2016). Some latent variables that were identified by Lee (2016) such as root needs and job characteristics were expanded to determine their influence on the levels of psychological ownership. As suggested by Lee (2016), the subsequent satisfaction of psychological ownership needs and its reciprocal effects on the salient needs is included in this study. Finally, two additional moderating variables where added to the psychological ownership structural model. These variables include the

moderating variable, *perceived ability*, which effects the relationship between *self-investment* and degree to which a target is *integrated into the self;* and internal locus of control, which moderates the effect that control has over experienced feelings of efficacy.

The following hypotheses serve as declarative statements of the nature and direction of the relations between the variables underpinning the construct, psychological ownership. According to Kerlinger and Lee (2000) these hypotheses allow for statistical hypothesis to be generated and empirically tested.

The overarching substantive hypothesis, namely, that the psychological ownership model provides a valid account of the mechanism underpinning the construct of *psychological ownership* (**Hypothesis 1**), can be dismembered and organised into the following more detailed, path-specific substantive research hypotheses:

Hypotheses 2: In the proposed psychological ownership structural model it is hypothesised that the *salience of the self-identity motive* has a positive influence on the *motivation to engage in the routes towards psychological ownership*.

Hypotheses 3: In the proposed psychological ownership structural model it is hypothesised that the *salience of the self-efficacy motive* has a positive influence on the *motivation to engage in the routes towards psychological ownership*.

Hypotheses 4: In the proposed psychological ownership structural model it is hypothesised that the *squared salience of the self-efficacy motive* has a positive influence on the *motivation to engage in the routes towards psychological ownership*.

Hypotheses 5: In the proposed psychological ownership structural model it is hypothesised that the *squared salience of the self-identity motive* has a positive influence on the *motivation to pursue the routes to psychological ownership*.

Hypothesis 6: In the proposed psychological ownership structural model it is hypothesised that *perceived ability of the job characteristics to satisfy self-identity need* positively influences the *motivation to engage in the routes towards psychological ownership*.

Hypothesis 7: In the proposed psychological ownership structural model it is hypothesised that *squared perceived ability of the job characteristics to satisfy the self-identity need* positively influences the *motivation to engage in the routes towards psychological ownership*.

Hypothesis 8: In the proposed psychological ownership structural model it is hypothesised that the *perceived ability of the job characteristics to satisfy the self-efficacy need* positively influences the *motivation to engage in the routes towards psychological ownership*.

Hypothesis 9: In the proposed psychological ownership structural model it is hypothesised that *squared perceived ability of the job characteristics to satisfy the self-efficacy need* positively influences the *motivation to engage in the routes towards psychological ownership*.

Hypothesis 10: In the proposed psychological ownership structural model it is hypothesised that the s*elf-identity need * perceived ability of the job characteristics to satisfy self-identity interaction* need positively influences the *motivation to engage in the routes towards psychological ownership*.

Hypothesis 11: In the proposed psychological ownership structural model it is hypothesised that the *self-efficacy need * perceived ability of the job characteristics to satisfy self-efficacy need interaction* positively influences the *motivation to engage in the routes towards psychological ownership*.

Hypothesis 12: In the proposed psychological ownership structural model it is hypothesised that a) *motivation to engage in the routes to psychological ownership* changes positively as congruence moves from the perception that the job does not allow the satisfaction of the self-identity need combined with low salience of the self-identity need (- -) to the perception that the job does allow the satisfaction of the self-identity need combined with high salience of the self-identity need (+ +); b) *motivation to engage in the routes to psychological ownership* changes convexly (along the line of congruence) as congruence moves from the perception that the job does not allow the satisfaction of the self-identity need combined with low salience of the self-identity need to the perception that the job does allow the satisfaction of the self-identity need combined with high salience of the self-identity need.

Hypothesis 13: In the proposed psychological ownership structural model it is hypothesised that a) *motivation to engage in the routes to psychological ownership* changes positively as incongruence changes from the perception that the job does allow the satisfaction of the self-identity need combined with low salience of the self-identity need (- +) to the perception that the job does not allow the satisfaction of the self-identity need combined with high salience of the self-identity need; b) *motivation to engage in the routes to psychological ownership* changes linearly as incongruence changes from the perception that the job does allow the satisfaction of the self-identity need combined with low salience of the self-identity need to the

perception that the job does not allow the satisfaction of the self-identity need combined with high salience of the self-identity need.

Hypothesis 14: In the proposed psychological ownership structural model it is hypothesised that a) *motivation to engage in the routes to psychological ownership* changes positively as congruence moves from the perception that the job does not allow the satisfaction of the self-efficacy need combined with low salience of the self-efficacy need (- -) to the perception that the job does allow the satisfaction of the needs combined with high salience of the self-efficacy need (+ +); b) *motivation to engage in the routes to psychological ownership* changes convexly (along the line of congruence) as congruence moves from the perception that the job does not allow the satisfaction of the self- efficacy need combined with low salience of the self-efficacy need to the perception that the job does allow the satisfaction of the self-efficacy need combined with high salience of the self-efficacy need.

Hypothesis 15: In the proposed psychological ownership structural model it is hypothesised that a) *motivation to engage in the routes to psychological ownership* changes positively as incongruence changes from the perception that the job does allow the satisfaction of the needs combined with low salience of the self-efficacy need (- +) to the perception that the job does not allow the satisfaction of the needs combined with high salience of the self-efficacy need; b) *motivation to engage in the routes to psychological ownership* changes linearly as incongruence changes from the perception that the job does allow the satisfaction of the needs combined with low salience of the self-efficacy need to the perception that the job does not allow the satisfaction of the needs combined with high salience of the self-efficacy need.

Hypotheses 16: In the proposed psychological ownership structural model it is hypothesised that the level of *task identity* has a positive influence on the *motivation to pursue the routes to psychological ownership*.

Hypotheses 17: In the proposed psychological ownership structural model it is hypothesised that the level of *task significance* has a positive influence on the *motivation to pursue the routes to psychological ownership*.

Hypotheses 18: In the proposed psychological ownership structural model it is hypothesised that the level of *task variety* has a positive influence on the *motivation to pursue the routes to psychological ownership*

Hypotheses 19: In the proposed psychological ownership structural model it is hypothesised that the level of *autonomy* that a job offers has a positive influence on the *motivation to pursue the routes to psychological ownership*.

Hypotheses 20: In the proposed psychological ownership structural model it is hypothesised that the level of *motivation to pursue the routes to psychological ownership* has a positive influence on *self-investment*.

Hypotheses 21: In the proposed psychological ownership structural model it is hypothesised that the level of *autonomy* that a job offers has a positive influence on the level of *gaining control*.

Hypotheses 22: In the proposed psychological ownership structural model it is hypothesised that the level of *task identity* that a job offers has a positive influence on *gaining intimate knowledge*.

Hypotheses 23: In the proposed psychological ownership structural model it is hypothesised that the level of *autonomy* that a job offers has a positive influence on *gaining intimate knowledge*.

Hypotheses 24: In the proposed psychological ownership structural model it is hypothesised that the level of *self- investment* has a positive influence on *gaining control*.

Hypotheses 25: In the proposed psychological ownership structural model it is hypothesised that the level of *self-investment* has a positive influence on gaining intimate knowledge.

Hypotheses 26: In the proposed psychological ownership structural model it is hypothesised that the degree of *integration of the job into the self-identity* has a positive influence on the *self-identity motive*.

Hypotheses 27: In the proposed psychological ownership structural model it is hypothesised that the level of *feelings of efficacy* has a positive influence on the *self-efficacy motive*.

Hypotheses 28: In the proposed psychological ownership structural model it is hypothesised that the level of *intimate knowledge* has a positive influence on the level of *integration of the job into the self-identity*.

Hypotheses 29: In the proposed psychological ownership structural model it is hypothesised that the level of *self-investment* has a positive influence on the *integration of the job into the self-identity*.

Hypotheses 30: In the proposed psychological ownership structural model it is hypothesised that the level of *gaining control* has a positive influence on *feelings of efficacy*.

Hypotheses 31: In the proposed psychological ownership structural model it is hypothesised that the degree to which an individual has an *internal locus of control* will moderate the effect that *gaining control* has on the extent to which the individual experiences *feelings of efficacy*.

Hypotheses 32: In the proposed psychological ownership structural model it is hypothesised that the *perceived ability* will moderate the effect that *self-investment* has on the extent to which the individual *integrates the target into the self.*

Hypotheses 33: In the proposed psychological ownership structural model it is hypothesised that the degree to which the individual *integrates the target into the self* will positively influence experienced levels of *psychological ownership*.

Hypotheses 34: In the proposed psychological ownership structural model it is hypothesised that the degree to which an individual experiences *feelings of efficacy* will positively influence experienced levels of *psychological ownership*.

3.3. RESEARCH DESIGN

The merit of the overarching research hypothesis and the path-specific substantive hypotheses needs to be empirically evaluated through the means of a specific strategy that will guide the process of gathering the evidence necessary to test the operational hypotheses (Smuts, 2011). This strategy is referred to as the research design, which functions as a blueprint for the manner in which the research will be conducted (Babbie & Mouton, 2001). The research design will mainly depend on the nature of the research problem and the type of evidence required to address this problem.

According to De Vaus (2001) researchers ask two types of questions: ‘What is going on?’ and ‘Why is it happening?’ These questions are linked to the three most common research purposes, including: exploration, description and explanation.

Exploratory research is aimed at exploring a relatively new topic or area of interest on which there is no well-developed body of knowledge available. The aim of exploratory research is to develop (descriptive, diagnostic or explanatory) hypotheses. Descriptive research is used when the aim of the research is to define. This type of research provides an accurate description of a specific phenomenon and is often extended to examine (diagnostically) why the observed patterns exist as well as the implications of these patterns (Babbie & Mouton, 2014). This

implicit 'why' question is answered by explanatory research, which aims at indicating causality between latent variables or constructs.

Various factors should be taken into account to decide upon a design that is appropriate to explain variance in *psychological ownership*. Firstly, the choice regarding appropriate research design relies on whether the exogenous latent variable within the structural model can be manipulated by the researcher. Secondly, the number of exogenous and endogenous latent variables captured in the structural model should be considered. Thought should also be given to whether or not the hypothesised relationships between exogenous and endogenous variables are causally linked. Finally, the question whether causal relations are hypothesised between endogenous latent variables should be considered.

Since the underlying purpose of this study is to answer a "why" question, the purpose of the research is therefore explanatory in nature, i.e. designed to identify causality (Durrheim, 2011). Two approaches could be applicable for the purpose of explaining the causal relationships between variables within the *psychological ownership* structural model, namely: experimental and non-experimental. These two approaches can be distinguished in terms of the possibility that the researcher has to manipulate or control the independent variables. Experimental research allows the researcher to control or manipulate the independent variables in order to determine the effects that different assigned conditions have on the dependent variables. On the other hand, non-experimental research does not allow for control over the independent variables or random assignment of subjects to levels of the independent variables (i.e. treatments), "because the nature of the variable precludes manipulation" (Kerlinger, 1986, p. 293).

The abovementioned factors which should be considered when deciding on an appropriate research design will now be investigated as they pertain to the *psychological ownership* structural model.

3.3.1. IDENTIFYING APPROPRIATE RESEARCH DESIGN FOR THE PSYCHOLOGICAL OWNERSHIP STRUCTURAL MODEL

Firstly, considering that the fourteen exogenous latent variables (*perceived ability*self-investment, internal locus of control*control, task identity, task significance, task variety, autonomy, perceived ability of job to satisfy self-efficacy need, perceived ability of job to satisfy self-identity need , squared perceived ability of job to satisfy self-identity need, squared perceived ability of job to satisfy self-efficacy need, squared salience of self-identity need,*

*squared salience of self-efficacy need, self-identity need*perceived ability of job to satisfy self-identity need, self-efficacy need*perceived ability of job to satisfy self-identity need*) depicted in the model, cannot easily be experimentally manipulated, the use of a non-experimental design seems appropriate.

In terms of the second consideration for choosing an appropriate research design, researchers need to take into account the number of endogenous and exogenous latent variables in contained in the model and whether the overarching substantive hypothesis posits structural relationships between the endogenous latent variables. Research design rule of thumb simply states that if the explanatory structural model comprises of more than one endogenous latent variable that are effected by more than one exogenous latent variables and causal, path-specific relationships are hypothesised between endogenous latent variables, then an *ex post facto* correlation design should be used with two or more indicators per latent variable (Theron, 2017c). This study focuses on the investigation of the cause and effect of latent variables that influence *psychological ownership*, after the fact, at a single point in time, without manipulation of the independent variables. Therefore, the use of a non-experimental *ex post facto* correlation design is applicable in this study to test the overarching and specific direct effect substantive research hypotheses.

Although an *ex post facto* design is useful for analysing causality when the independent variable is outside the researcher's control, this approach is not without its limitations. This approach, as mentioned above, does not allow control or manipulation of the independent variable. Furthermore, this approach makes random assignment unreasonable, since it is impossible to manipulate or control the independent variables. Finally, it does not permit causal interpretations, due to the lack of manipulation (Kerlinger & Lee, 2000). The drawing of casual inferences from significant path coefficients is not permitted, as correlations do not necessarily suggest causal relationships (Burger, 2011). However, in behavioural sciences a non-experimental design could provide a truer sense of reality, where situations are more real rather than contrived. According to Theron (2017a; 2017b) this type of design can still maximise systematic error variance, minimise error variance and control for extraneous variance, by selecting diverse samples, the use of reliable indicator variables and the use of control variables.

The *ex post facto* correlational design as it applies to the current research study is shown in Figure 3.2. The depiction assumes two indicator variables per latent variable for the 14

exogenous latent variables (expect for the four job characteristics, which has 3 indicator variables) and for the 9 endogenous latent variables.

$[X_{11}]$	$[X_{1j}]$	. .	$[X_{1,44}]$	$[Y_{11}]$	. .	$[Y_{1j}]$	$[Y_{1,18}]$
$[X_{21}]$	$[X_{2j}]$	. .	$[X_{2,44}]$	$[Y_{21}]$	. .	$[Y_{2j}]$	$[Y_{2,18}]$
:	:	. .	:	:	. .	:	:
$[Xj_1]$	[Xij]	. .	$[Xj_{44}]$	$[Yi_1]$	. .	[Yij]	[Yi,$_{18}$]
:	:	. .	:	:	. .	:	:
$[Xn_1]$	[Xnj]	. .	$[Xn_{44}]$	$[Yn_1]$	. .	[Ynj]	[Xn,$_{18}$]

Figure 3.2 Ex post facto correlation design used to empirically test the *psychological ownership* structural model

3.3.2. LOGIC UNDERLYING THE DESIGN

The *ex post facto* correlation design requests the researcher to collect data on the two or more indicator variables per latent variable from n research participants, and to calculate the observed variance-covariance matrix. The challenge is then to iteratively find estimates for the freed comprehensive LISREL model parameters that minimise the discrepancy between the observed and estimated variance - covariance matrices using the structural equation modelling programme (LISREL 8.8). The logic underlying the design is that the model will be seen as valid (i.e. permissible) if parameter estimates were obtained for the freed model parameters that can accurately reproduce the observed variance – covariance matrix. This comprehensive LISREL model then fits the data. Model fit implies that the model, and its parameter estimates, provide a plausible description of the process that produced the observed variance -covariance matrix. If the parameter estimates in addition correspond to the hypothesised relationships in terms of statistical significance and sign, support has been obtained for the overarching and path-specific substantive hypotheses. However, the model will be seen as invalid if parameter estimates cannot be found that accurately reproduce the observed variance – covariance matrix.

3.4. STATISTICAL HYPOTHESES

3.4.1. EXACT AND CLOSE MODEL FIT STATISTICAL HYPOTHESES

Given the choice of research design and its underlying logic, structural equation modelling (SEM) should be the statistical analysis technique of choice.

If the overarching substantive research hypothesis would be interpreted to provide a flawless explanation for the underlying dynamics underpinning psychological ownership, then the overarching substantive research hypothesis could be expressed in terms of the following exact fit null hypothesis, given the choice of research design and analysis technique:

$$H_{01a}: \text{RMSEA} = 0$$

$$H_{a1a}: RMSEA > 0$$

However, the likelihood of attaining an exact fit is highly improbable. Subsequently, the researcher should consider the close fit null hypothesis, since it takes into consideration the error of approximation which allows the researcher to gain a more realistic picture of reality. If the approximation error in the population is equal to or less than .05, then it can be deduced that the model has a close fit. This implies that if the structural model only provides an approximate display of the psychological dynamics underlying the construct psychological ownership then the overarching substantive research hypothesis could be expressed in terms of the following close fit null hypothesis, given the choice of research design and analysis technique:

$$H_{01b}: RMSEA \leq .05$$

$$Ha_{1b}: RMSEA >.05$$

3.4.2. PATH-SPECIFIC STATISTICAL HYPOTHESES

Additionally, the following, more detailed, path-specific statistical hypotheses will be tested if at least close fit is obtained:

Hypotheses 2: In the proposed psychological ownership structural model it is hypothesised that the *salience of the self- identity motive* (η_7) has a positive influence on the *motivation to pursue the routes to psychological ownership* (η_1).

$$H_{02}: \beta_{17} = 0$$

$$Ha_2: \beta_{17} > 0$$

Hypotheses 3: In the proposed psychological ownership structural model it is hypothesised that the *salience of the self-efficacy* motive (η_8) has a positive influence on the *motivation to pursue the routes to psychological ownership* (η_1).

$$H_{03}: \beta_{18} = 0$$

$$Ha_3: \beta_{18} > 0$$

Hypotheses 4: In the proposed psychological ownership structural model it is hypothesised that the *squared salience of the self-efficacy motive* (ξ_{10}) has a positive influence on the *motivation to engage in the routes towards psychological ownership* (η_1).

$$H_{04}: \gamma_{1,10} = 0$$

$$Ha_4: \gamma_{1,10} > 0$$

Hypotheses 5: In the proposed psychological ownership structural model it is hypothesised that the *squared salience of the self-identity motive* (ξ_9) has a positive influence on the *motivation to pursue the routes to psychological ownership* (η_1).

$$H_{05}: \gamma_{19} = 0$$

$$Ha_5: \gamma_{19} > 0$$

Hypothesis 6: In the proposed psychological ownership structural model it is hypothesised that the *perceived ability of the job characteristics to satisfy self-identity need* (ξ_1) positively influences the *motivation to engage in the routes towards psychological ownership* (η_1).

$$H_{06}: \gamma_{11} = 0$$

$$Ha_6: \gamma_{11} > 0$$

Hypothesis 7: In the proposed psychological ownership structural model it is hypothesised that the *squared perceived ability of the job characteristics to satisfy the self-identity need* (ξ_{14})

positively influences the *motivation to engage in the routes towards psychological ownership* (η_1).

$$H_{07}: \gamma_{1,14} = 0$$

$$Ha_{7}: \gamma_{1,14} > 0$$

Hypothesis 8: In the proposed psychological ownership structural model it is hypothesised that the *perceived ability of the job characteristics to satisfy the self-efficacy need* (ξ_{13}) positively influences the *motivation to engage in the routes towards psychological ownership* (η_1).

$$H_{08}: \gamma_{1,13} = 0$$

$$Ha_{8}: \gamma_{1,13} > 0$$

Hypothesis 9: In the proposed psychological ownership structural model it is hypothesised that the *squared perceived ability of the job characteristics to satisfy the self-efficacy need* (ξ_{11}) positively influences the *motivation to engage in the routes towards psychological ownership* (η_1).

$$H_{09}: \gamma_{1,11} = 0$$

$$Ha_{9}: \gamma_{1,11} > 0$$

Hypothesis 10: In the proposed psychological ownership structural model it is hypothesised that the *self-identity need * perceived ability of the job characteristics to satisfy self-identity need interaction* (ξ_{12}) positively influences the *motivation to engage in the routes towards psychological ownership* (η_1).

$$H_{010}: \gamma_{1,12} = 0$$

$$Ha_{10}: \gamma_{1,12} > 0$$

Hypothesis 11: In the proposed psychological ownership structural model it is hypothesised that the *self-efficacy need * perceived ability of the job characteristics to satisfy self-efficacy need interaction* (ξ_{8}) positively influences the *motivation to engage in the routes towards psychological ownership* (η_1).

$$H_{011}: \gamma_{18} = 0$$

$$Ha_{11}: \gamma_{18} > 0$$

Hypothesis 12: In the proposed psychological ownership structural model it is hypothesised that a) *motivation to engage in the routes to psychological ownership* changes positively as congruence moves from the perception that the job does not allow the satisfaction of the self-identity need combined with low salience of the self-identity need (- -) to the perception that the job does allow the satisfaction of the self-identity need combined with high salience of the self-identity need (+ +); b) *motivation to engage in the routes to psychological ownership* changes convexly (along the line of congruence) as congruence moves from the perception that the job does not allow the satisfaction of the self-identity need combined with low salience of the self-identity need to the perception that the job does allow the satisfaction of the self-identity need combined with high salience of the self-identity need.

$$H_{012a:}\ a_1 = 0$$

$$H_{a12a:}\ a_1 > 0$$

$$H_{012b:}\ a_2 = 0$$

$$H_{a12b:}\ a_2 > 0$$

Hypothesis 13: In the proposed psychological ownership structural model it is hypothesised that a) *motivation to engage in the routes to psychological ownership* changes positively as incongruence changes from the perception that the job does allow the satisfaction of the self-identity need combined with low salience of the self-identity need (- +) to the perception that the job does not allow the satisfaction of the self-identity need combined with high salience of the self-identity need; b) motivation to engage in the routes to psychological ownership changes linearly as incongruence changes from the perception that the job does allow the satisfaction of the self-identity need combined with low salience of the self-identity need to the perception that the job does not allow the satisfaction of the self-identity need combined with high salience of the self-identity need.

$$H_{013a:}\ a_3 = 0$$

$$H_{a13a:}\ a_3 < 0$$

$$H_{013b:}\ a_4 = 0$$

$$H_{a13b:}\ a_4 \neq 0$$

Hypothesis 14: In the proposed psychological ownership structural model it is hypothesised that a) *motivation to engage in the routes to psychological ownership* changes positively as

congruence moves from the perception that the job does not allow the satisfaction of the self-efficacy need combined with low salience of the self-efficacy need (- -) to the perception that the job does allow the satisfaction of the needs combined with high salience of the self-efficacy need (+ +); b) *motivation to engage in the routes to psychological ownership* changes convexly (along the line of congruence) as congruence moves from the perception that the job does not allow the satisfaction of the self- efficacy need combined with low salience of the self-efficacy need to the perception that the job does allow the satisfaction of the self-efficacy need combined with high salience of the self-efficacy need.

$$H_{014a}: a_1 = 0$$

$$H_{a14a}: a_1 > 0$$

$$H_{014b}: a_2 = 0$$

$$H_{a14b}: a_2 > 0$$

Hypothesis 15: In the proposed psychological ownership structural model it is hypothesised that a) *motivation to engage in the routes to psychological ownership* changes positively as incongruence changes from the perception that the job does allow the satisfaction of the needs combined with low salience of the self-efficacy need (- +) to the perception that the job does not allow the satisfaction of the needs combined with high salience of the self-efficacy need; b) *motivation to engage in the routes to psychological ownership* changes linearly as incongruence changes from the perception that the job does allow the satisfaction of the needs combined with low salience of the self-efficacy need to the perception that the job does not allow the satisfaction of the needs combined with high salience of the self-efficacy need.

$$H_{015a}: a_3 = 0$$

$$H_{a15a}: a_3 < 0$$

$$H_{015b}: a_4 = 0$$

$$H_{a15b}: a_4 \neq 0$$

Hypotheses 16: In the proposed psychological ownership structural model it is hypothesised that the level of *task identity* (ξ_2) has a positive influence on the *motivation to pursue the routes to psychological ownership*. (η_1)

$$H_{016}: \gamma_{12} = 0$$

$$Ha_{16}: \gamma_{12} > 0$$

Hypotheses 17: In the proposed psychological ownership structural model it is hypothesised that the level of *task significance* (ξ_3) has a positive influence on the *motivation to pursue the routes to psychological ownership* (η_1).

$$H_{017}: \gamma_{13} = 0$$

$$Ha_{17}: \gamma_{13} > 0$$

Hypotheses 18: In the proposed psychological ownership structural model it is hypothesised that the level of *task variety* (ξ_4) has a positive influence on the *motivation to pursue the routes to psychological ownership* (η_1).

$$H_{018}: \gamma_{14} = 0$$

$$Ha_{18}: \gamma_{14} > 0$$

Hypotheses 19: In the proposed psychological ownership structural model it is hypothesised that the level of *autonomy* (ξ_5) that a job offers has a positive influence on the *motivation to pursue the routes to psychological ownership* (η_1).

$$H_{019}: \gamma_{15} = 0$$

$$Ha_{19}: \gamma_{15} > 0$$

Hypotheses 20: In the proposed psychological ownership structural model it is hypothesised that the level of *motivation to pursue the routes to psychological ownership* (η_1) has a positive influence on *self-investment* (η_2).

$$H_{020}: \beta_{21} = 0$$

$$Ha_{20}: \beta_{21} > 0$$

Hypotheses 21: In the proposed psychological ownership structural model it is hypothesised that the level of *autonomy* (η_5) that a job offers has a positive influence on the level of *gaining control* (η_3)

$$H_{021}: \gamma_{35} = 0$$

$$Ha_{21}: \gamma_{35} > 0$$

Hypotheses 22: In the proposed psychological ownership structural model it is hypothesised that the level of *task identity* (ξ_2) that a job offers has a positive influence on *gaining intimate knowledge* (η_4).

$$H_{022}: \gamma_{42} = 0$$

$$H_{a22}: \gamma_{42} > 0$$

Hypotheses 23: In the proposed psychological ownership structural model it is hypothesised that the level of *autonomy* (ξ_5) that a job offers has a positive influence on *gaining intimate knowledge* (η_4).

$$H_{023}: \beta_{45} = 0$$

$$H_{a23}: \beta_{45} > 0$$

Hypotheses 24: In the proposed psychological ownership structural model it is hypothesised that the level of *self- investment* (η_2) has a positive influence on *gaining control* (η_3).

$$H_{024}: \beta_{32} = 0$$

$$H_{a24}: \beta_{32} > 0$$

Hypotheses 25: In the proposed psychological ownership structural model it is hypothesised that the level of *self-investment* (η_2) has a positive influence on *gaining intimate knowledge* (η_4).

$$H_{025}: \beta_{42} = 0$$

$$H_{a25}: \beta_{42} > 0$$

Hypotheses 26: In the proposed psychological ownership structural model it is hypothesised that the degree of *integration of the job into the self-identity* (η_5) has a positive influence on the *self-identity motive* (η_7).

$$H_{o26}: \beta_{75} = 0$$

$$H_{a26}: \beta_{75} > 0$$

Hypotheses 27: In the proposed psychological ownership structural model it is hypothesised that the level of *feelings of efficacy* has a positive influence on the *efficacy motive*.

$$H_{o27}: \beta_{86} = 0$$

$$H_{a27}: \beta_{86} > 0$$

Hypotheses 28: In the proposed psychological ownership structural model it is hypothesised that the level of *gaining intimate knowledge* (η_4) has a positive influence on the level of *integration of the job into the self-identity* (η_5).

$$H_{028}: \beta_{54} = 0$$

$$H_{a28}: \beta_{54} > 0$$

Hypotheses 29: In the proposed psychological ownership structural model it is hypothesised that the level of *self-investment* (η_2) has a positive influence on the *integration of the job into the self-identity* (η_5).

$$H_{029}: \beta_{52} = 0$$

$$H_{a29}: \beta_{52} > 0$$

Hypotheses 30: In the proposed psychological ownership structural model it is hypothesised that the level of *gaining control* (η_3) has a positive influence on *feelings of efficacy* (η_6).

$$H_{030}: \beta_{63} = 0$$

$$H_{a30}: \beta_{63} > 0$$

Hypotheses 31: In the proposed psychological ownership structural model it is hypothesised that the degree to which an individual has an *internal locus of control* will moderate the effect that *gaining control* (*internal locus of control x gaining control interaction* = $\xi_{6)}$ has on the extent to which the individual experiences *feelings of efficacy* (η_6).

$$H_{031}: \gamma_{66} = 0$$

$$H_{a31}: \gamma_{66} > 0$$

Hypotheses 32: In the proposed psychological ownership structural model it is hypothesised that the *perceived ability* will moderate the effect that *self-investment* (*perceived ability x self-investment* = ξ_7) has on the extent to which the individual *integrates the target into the self* (η_5).

$$H_{032}: \gamma_{98} = 0$$

$$H_{a32}: \gamma_{98} > 0$$

Hypotheses 33: In the proposed psychological ownership structural model it is hypothesised that the degree to which the individual *integrates the target into the self* (η_5) will positively influence experienced levels of *psychological ownership* (η_9).

$$H_{033}: \beta_{95} = 0$$

$$H_{a33}: \beta_{95} > 0$$

Hypotheses 34: In the proposed psychological ownership structural model it is hypothesised that the degree to which an individual experiences *feelings of efficacy* (η_6) will positively influence experienced levels of *psychological ownership* (η_9).

$$H_{034}: \beta_{96} = 0$$

$$H_{a34}: \beta_{96} > 0$$

3.5. SAMPLING

To attain measurements for all subjects in a given target population (containing N final sampling units (FSU) is not always possible), due to a lack of required resources. Subsequently, the more reasonable decision will be to concentrate on gaining a representative sample, containing a subset of the FSU of the target population. The purpose of sampling, therefore, is to select a portion of individuals for the population as representatives of the target population (Kerlinger & Lee, 2000). This allows the researcher to make inferences about the target population without collecting data from each and every population member.

A sample is representative to the extent to which it sufficiently reflects those characteristics in the target population being studied that are of interest to the study (Salkind, 2010). Since this study is aimed at investigating "why variance exist on levels of *psychological ownership* among employees in different organisational contexts?" it is important to clarify the specific

population under study, by defining the target population and sampling population, as well as the sampling procedures and sample size that will be appropriate to the aims of this study.

3.5.1. TARGET POPULATION AND SAMPLING POPULATION

Similarly, to Lee's (2016) research, this study is particularly interested in a target population that could be classified as full-time permanent employees, of differing skills levels, working in profit and non-profit organisations, in both the public and private sector, within the borders of South Africa.

3.5.2. SAMPLING PROCEDURE

As mentioned previously, maximising systematic variance, can in partially be achieved by selecting diverse samples while using an *ex post facto* correlation design. In the current study, non-probability sampling will be used, more specifically, a technique of non-probability sampling called convenience sampling. Kerlinger and Lee (2000) referred to this procedure as "accidental sampling", stating this technique involves selecting available FSU at hand into the samples. According to Kerlinger (1986) this technique is particularly popular in social sciences, however, it is not without its drawbacks and these authors caution against its haphazard use. This form of sampling does not share the virtues of probability sampling due to the discretion that is afforded to the participant in the sampling process. The participants have the right to decide whether they will accept the invitation of the research to participate in the research. If the sample is not chosen randomly, some factor(s) unknown to the researcher might predispose the specific participants to agree to accept the invitation to participate in the study. These limitations can, however, be mitigated by using extreme circumspection in the analysis and interpretation in the data.

It was in principle possible to select a probability sample (e.g. a stratified random sample) from the sampling population. The researcher can inform these selected employees that they had been selected in a random sample but cannot force them to complete the questionnaire. The researcher can only invite selected employees to complete the research questionnaire. The eventual sample would then effectively be a non-probability sample because employees would select themselves into the sample. The researcher approached various companies like Distell as well as public entities such as De Kuilen High school to obtain permission to randomly select various employees within those organisations to participate in the current study. Furthermore, social media platforms such as Instagram and Facebook were used to randomly reach the target population.

The fact that participants selected themselves into the eventual sample further compromised the extent to which the sample could be claimed to be representative of the target population. This was acknowledged as a methodological weakness of the study.

3.5.3. SAMPLE SIZE

Determining the appropriate sample size is another important consideration when selecting a sample. Saunders, Lewis and Thornhill (2003) among other authors (Burger, 2012; Smuts, 2011) identified three important considerations when choosing the appropriate sample size.

Firstly, the researcher needs to consider the number of freed parameters in relation to the size of the sample. According to Diamantopoulos and Siguaw (2000) it is undesirable to be in a situation where there are a larger number of freed parameters to be estimated than there are observations in the sample. This implies that complex measurement and structural models which contains more variables than simpler models, have more freed parameters that must be estimated, which requires larger sample sizes. Bentler and Chou (1987) suggests that a ratio of sample size to freed parameters should be 10:1, but a ratio of 5:1 can also be sufficient. This implies that a minimum of 1185[9] participants will be required to participate in this study according to the Bentler and Chou (1987) rule of thumb.

Secondly, researchers should consider the level of confidence (statistical power) that he/she need to have in the data, which in the application of structural equation modelling, refers to the probability of rejecting the null hypothesis of close fit (H_{01b}: RMSEA $\leq$ .05) when it should be rejected (i.e. the model fit is mediocre; H_{a1b}: RMSEA = .08). When excessively high statistical power exists in the SEM context it would make attempts to empirically verify the validity of the model pointless because small deviations from close fit would result in a rejection of the close fit null hypothesis (Burger, 2011; Theron, 2017d). Alternatively, if the statistical power is excessively low, it would lead to a situation where the close fit null hypothesis would remain unrejected despite the model fitting poorly in the parameters. Burger (2011) warned that situations where excessively low statistical power conditions leads to the close fit null hypothesis not being rejected will not provide very convincing evidence on the validity of the model.

Preacher and Coffman (2006) developed software in R that can be used to calculate the required sample size to ensure adequate power for the test of close fit. The calculation for the current

[9] The are 44 lambda_X, 9 lambda_Y, 18 theta-epsilon, 44 theta-delta, 9 psi, 89 phi and 24 theta-delta covariance terms that have to be estimated which adds up to 237 freed parameters

study is based on an effect size of .08, a significance level (α) of .05, a power level of .80 and degrees of freedom (df):

df = (½[p+q] [p+q+1]-t) = (1/2[44+18] [44+18+1] – 237) = 1953-237 = 1716

t= number of freed parameters
p= number of indicators for exogenous latent variables
q= number of indicators for endogenous latent variables

The Preacher and Coffman (2006) software returned a minimum required sample size value of 25 924.85352).

Thirdly, researchers should consider the practical implications, including the costs that are involved, availability of appropriate respondents, as well as the willingness of employers to commit a large number of employees to this study.

When taking into account all of the above-mentioned considerations it was suggested that a sample of 500 – 600 research participants had to be selected for the purpose of testing the proposed psychological ownership structural model.

3.6. MEASURING INSTRUMENTS/ OPERATIONALISATION

The fit of the proposed Klopper-Lee psychological ownership structural model, containing the path-specific substantive hypotheses can only be evaluated if appropriate, construct valid and reliable measuring instruments exist which operationalise the latent variables via indicator variables. Therefore, the researcher made decisions with regards to the measurement instruments with careful circumspection. Due to the number of variables contained within the structural model, sixteen instruments were selected and adapted for the purpose of this study. Subsequently, these instruments will be discussed briefly, and psychometric evidence of the validity and reliability of the measures will be presented to justify the choice of these instruments.

An additional operationalisation consideration was to decide whether the use of item parcels would be beneficial to represent the latent variables as indicator variables. According to Theron 2015 (as cited in Lee, 2016) there are four methods to derive indicator variables for latent variables within the model from the measuring instruments used. Firstly, the researcher can use the individual items to represent the latent variables Secondly one can calculate the mean of the even and uneven items for every subscale (latent variable), subsequently, forming item parcels to form composite indicator variables. Thirdly, the total score for each subs-dimension

comprising the latent variable can be used where applicable. Finally, the researcher can calculate a single score that will represent the latent variable from more than one instrument measuring the same latent variable.

Holt (2004) suggested that it is imperative that the researcher consider the dimensionality (unidimensional or multidimensional) of the latent variable before deciding on an appropriate parcelling strategy. According to Holt (2004) unidimensional latent variables should be coupled with random methods of combining items (i.e. determining the mean of the even and uneven items for every subscale). Conversely, if the latent variable under investigation is multidimensional, then isolated parcelling strategies should be used to determine the appropriate item parcels, which enable the different facets of the latent variable to be combined within the same item parcel. Little, Rhemtulla, Gibson, and Schoemann (2013). However, also propose the use of a domain representative parcelling approach that allows the combination of items that load on different factors. These indicator decisions will also be discussed in the section below.

3.6.1. SELF- IDENTITY MOTIVE

The *need for self-identity* will be measured by using the Lee (2016) revised version of the *root needs to psychological ownership* measure that was developed by Avey et al. (2009). This subscale is preferred due to its emphasis on job in itself as an object that can become an extension of the self. This subscale consists of 5 items. Examples of items on this subscale include: “I have a desire for my job to be an extension of me” and “I need to understand who I am within my job role”. The psychometric quality of these items will be assessed within this research study.

The *self-identity motive* latent variable will be operationalised via two item parcels calculated by considering the mean of the even and uneven numbered items respectively in the self-identity subscale.

3.6.2. SELF-EFFICACY MOTIVE

The *need for self-efficacy and effectance* will be operationalised by making use of the Lee (2016) revised version of the self-efficacy motive, borrowing from the work of Avey et al. (2009). This *need for self-efficacy* subscale is specifically added due to its specific focus on employee’s need to be the cause of outcomes within their job. A pool of items was generated, and subject matter experts (Lee, 2017) were tasked with determining the appropriateness of each item depending on the supplied definition of the dimension.

The *self-efficacy* motive latent variable will be operationalised via two item parcels calculated by taking the mean of the even numbered items and the mean of the uneven numbered items in the self-efficacy subscale.

3.6.3. JOB CHARACTERISTICS (TASK IDENTITY, TASK SIGNIFICANCE, AUTONOMY, TASK VARIETY)

Hackman and Oldham (1975), developed the Job Diagnostic survey (JDS), based on their Job Characteristics Model. This survey measures the five job characteristics, namely, task identity, task significance, task variety, feedback and autonomy. Since then, a revised version to the original JDS has been developed by Idaszak and Drasgow (1987), the JDS-R, where certain reverse ordered items were rewritten. Olchers and Schaap (2007), in their study of the construct validity of the JDS-R, reported an alpha coefficient ranging between 0.67 and 0.79 for the various subscales confirming that the measure is reasonably reliable. The JSD-R consists of a 30 -item scale that elicits responses on a 7-point Likert scale, ranging from disagree strongly (1) to agree strongly (7). Section one and two of the JDS-R will be used to measure the four job characteristics (*task identity, task significance, task variety, autonomy)* included in the structural model. This section consists of 15 items that measures the five subscales. For obvious reasons, this study will only measure the four subscales as mentioned above, which adds up to a total of 12 items. The scale reliability for the task variety, task identity, and task significance and autonomy subscales are .74, .67 and .70 respectively.

The four job characteristic latent variables will be operationalised via the three items comprising each of the four job characteristic subscales.

3.6.4. FEELINGS OF EFFICACY

Feelings of efficacy will be operationalised by utilising a 10-item scale developed by Schwarzer and Jerusalem (1995). Participants will respond to items such as “I can always manage to solve difficult problems if I try hard enough,”. They will indicate their responses on a 6-point scale ranging from 1 (strongly disagree) to 6 (strongly agree). Cronbach’s alpha for the 10 items was .93 (Schwarzer & Jerusalem, 1995).

The *self-efficacy* latent variable will be operationalised via two item parcels calculated by taking the mean of the even numbered items and the mean of the uneven numbered items in the self-efficacy subscale.

3.6.5. INTEGRATION INTO THE SELF

Avey et al. (2009) developed psychological ownership measurement tool by generating 55 items that represent their so called "five-theory driven component" that constitutes the construct of psychological ownership. These components include *self-efficacy, accountability, sense of belonging, self-identity and feelings of territoriality*. From these 55 items, 33 were identified by a group of research associates, blind to the aims of the particular study, as best capturing the proposed content domains. Finally, the 33 items used in their study were reduced to 16 items (3 items for each of the 4 components). For the purpose of measuring integration into the self, this study is specifically interested in the *self-identity* and *sense of belonging* components of the test. *Sense of belonging* is included in the conceptualisation of the construct, *integration into the self.* Internal reliabilities for the self-identity and sense of belonging component were (α=.73) and (α=.92) respectively (Avey et al., 2009). Subsequently, this study will only make use of the above -mentioned subscales which will include 3 items for each subscale. An example of these items includes: "I feel I belong to this organisation" and "I feel this organisation's success is my success".

The *integration into the self* latent variable will be operationalised via two item parcels calculated by taking the mean of the even numbered items and the mean of the uneven numbered items in the self-efficacy subscale.

3.6.6. ROUTES TO PSYCHOLOGICAL OWNERSHIP- SELF- INVESTMENT, JOB CONTROL AND GAINING INTIMATE KNOWLEDGE

The routes to *psychological ownership* were measured using items developed and adapted by Brown, Pierce, and Crossley, (2014). Brown et al. combined six control items from a study by Tetrick and LaRocco (1987) (Cronbach alpha .83) as well as self-developed items pertaining to intimate knowledge (four items) and self-investment (five items; endorsed on a seven-point Likert-scale where 1=strongly agree and 7= strongly disagree). Example items for the Control subscale include "*To what extent do you influence job-related decisions that will affect you"* and *"To what extent do you set your own work deadlines?"* (Brown, Pierce, & Crossley, 2014, p. 331). The Control subscale items are endorsed on a seven-point Likert scale, with 1 = Not at all and 7=To an extremely great extent.

Brown et al. tested the psychometric properties of this composite Routes to Psychological Ownership Scale and the items showed good reliability. They reported a .86 coefficient for the six control items, originally developed by Tetrick and LaRocco (1987) and further coefficients for intimate knowing .83 and investment of the self .86.

Item parcels will be calculated for each of these three routes to *psychological ownership*. This will be done by calculating the mean of the even and uneven numbered items to form two composite indicator variables per each route.

3.6.7. MOTIVATION TO PURSUE THE ROUTES TO PSYCHOLOGICAL OWNERSHIP

The researcher concurs with Lee (2016) who mentioned that finding measurement for assessing levels of motivation, specifically to the *motivation to pursue the routes to psychological ownership* can be challenging. Lee (2016) subsequently developed new items to operationalise the construct of *motivation to pursue the routes to psychological ownership*. The researcher acknowledges that this construct differs from the one used in this study (*motivation to engage in self-investment)*. It seems reasonable to use this measurement tool in this study because Lee (2016) similarly to this study directly linked the motivational aspect of *psychological ownership* to the process of *self-investment*. 18 items were suggested and presented to subject matter experts. The psychometric quality of the items will be evaluated in the current study. An example of the items includes: "I feel I have the ability to attain ownership of my job with the energy and effort I put in" (Lee, 2016).

The operationalisation of the *motivation to pursue the routes to psychological ownership* was grounded in the expectancy theory of motivation posited by Victor Vroom (Vroom, 1964). According to this theory of motivation, motivational effort is determined by the multiplicative combination of the *expectancy* that some action will result in an outcome and the valence of that outcome is summed over the set of salient outcomes (Theron, 2015). Specific items were designed to measure the expectancies (9 items) associated with routes to psychological ownership and certain items were designed to measure the valence (9 items) associated with the same outcomes

Two item parcels were calculated for *motivation to pursue* the routes to *psychological ownership,* using the mean of the sum of the even and uneven numbered valence and expectancy items of the *motivation* subscale. This led to two indicator variables for this construct.

3.6.8. PSYCHOLOGICAL OWNERSHIP

Lee (2016) argued that the conceptualisation of *psychological ownership* varies in terms of its dimensionality, with some authors supporting its uni-dimensionality and other advocating its multidimensionality. Additionally, Lee (2016) contended that some measures of *psychological ownership* focus on organisational-based *psychological ownership* while other measure job-based *psychological ownership* (the focus of this study). Consequently, Lee (2016) suggested

a measure of job-based *psychological ownership* developed by Brown, which is based on the patterned organisational- based *psychological ownership* measure developed by Van Dyne and Pierce (2004). Brown et al.'s (2011) job-based psychological ownership scale is a six-item instrument, which uses a seven-point Likert type scale where responses will range from strongly disagree to strongly agree. Cronbach alpha values of 0.96 and 0.93 are reported for this instrument (Pierce and Jussila, 2011). The current study will also use the Brown et al.'s (2011) job-based psychological ownership scale

Two item parcels were used as an aggregate level indicator (Little, Cunningham, Shahar, & Widaman, 2002) of psychological ownership. This was done by taking the mean of the even and uneven items to create two indicator variables.

3.6.9. LOCUS OF CONTROL

This study will make use of the 24-item Internality, Powerful Others, and Chance Scale, developed by Levenson (1981) to measure employees' levels of *internal locus of control*. Participants will be asked to indicate their level of agreement with items on a five- point Likert-type scale where a higher score will indicate a greater level of internal locus of control. Examples of items on this scale include: "Whether or not I get to be a leader depends on my ability" and "My life is controlled by accidental happenings to a great extent" (reverse scored). The Internality, Powerful Others, and Chance Scale obtained a reliability of .81 (McIntyre et al., 2009).

The *internal locus of control* latent variable will be operationalised via two item parcels calculated by taking the mean of the even numbered items and the mean of the uneven numbered items in the internal locus of control subscale.

3.6.10. PERCEIVED ABILITY

According to Nicholls (1984) self-esteem or self-concept scales adequately serve the purpose of indicating individuals' evaluations of their ability relative to that of others and predicted expectations of success. Such a scale refers primarily to the adequacy of one's competence (Crandall, 1973). Many authors (Brockner, 1979; Shraauger,1975; Mcfarlin & Blascovich, 1981) commonly employ and describe them as competency measures.

The Rosenberg Self-Esteem Scale (RSE) will be used to measure employees' levels of self-esteem. The RSE scale consists of 10 items which is scored through a method of combining ratings. Low self-esteem responses are "disagree or "strongly disagree" on items 1,3,4,7,10 and "strongly agree" or "agree" on items 2,5,6,8,9. An example of these items include: "At times I

think I am no good at all." The RSE demonstrates a Guttman Scale coefficient of reproducibility of .92, indicating excellent internal consistency (Rosenberg, 1979). Additionally, the RSE correlates significantly with other measures of self-esteem, including the Coopersmith Self-Esteem Inventory (Ciarrochi & Bilich, 2006).

The *perceived ability* latent variable will be operationalised via two item parcels calculated by taking the mean of the even numbered items and the mean of the uneven numbered items in the self-efficacy subscale.

3.6.11. LATENT INTERACTION EFFECTS AND POWERED TERMS IN THE PSYCHOLOGICAL OWNERSHIP STRUCTURAL MODEL

3.6.11.1. Root needs and perceptions of the ability of the job to satisfy those needs

Theron (2014) states that polynomial regression offers the opportunity to describe more complex response surfaces and thereby the possibility of more accurately describing the behaviour of a response variable to changes in two predictor variables. Therefore, this technique has more explanatory value than difference scores or traditional moderated regression analyses.

This technique allows for theorising in terms of a multidimensional space and not a single congruence latent variable. In this multidimensional space congruence and incongruence can vary in nature (the employee experiences a root need as salient and the job characteristics are such that they provide satisfaction of these needs [+ +] or the employee does not experience a root need as salient and the job characteristics are such that they cannot satisfy the need [- -] and either the employee experiences a root need as salient but the job characteristics cannot satisfy the need [+ -] or the employee does not experience a root need as salient but the job characteristics can satisfy the need [- +). The effect of the degree and nature of the congruence/incongruence on a response variable is captured by a response surface depicted as a hyperplane in the multidimensional perceptual space.

Analysing the response surface positioned in this multidimensional space allows one to attain more meaningful insight into the effect of congruence/incongruence between one or more pairs of independent variables[10] and its subsequent influence on a third dependent variable. This increase in meaningfulness within the model is attained by making provision for curvilinearity in the response surface depicting the reaction of *motivation to pursue the routes to psychological ownership* to the congruence/incongruence between the salience of an *employee's efficacy root*

[10] Two pairs in the current study.

need and the *perceived ability of the job to satisfy an employee's efficacy root n*eed (first pair of independent variables) and the congruence/incongruence between the salience of an *employee's self-identity root need* and the *perceived ability of the job to satisfy an employee's self-identity root n*eed (second pair of independent variables).

A unique contribution that this study poses to the understanding of the construct psychological ownership resides in the new understanding that one gains when the root needs of psychological ownership as well as the job characteristics are broken apart from their original multidimensional state (as used in Lee, 2017) to see the affect that these unidimensional constructs have on motivation to *pursue the routes to psychological ownership* as well as other routes to psychological ownership. Consequently, *perceived ability of the job to satisfy needs* will be measured by two unique assessments that measure the perception that an employee holds toward the perceived ability of the job to satisfy the respective needs (i.e. need for self-identity and need for self-efficacy).

Items were developed to operationalise the two constructs- *perceived ability of the job to satisfy self-identity needs* and *perceived ability of job to satisfy self-efficacy need*- for the purposes of the current research study.

Six items for each of the constructs were suggested and presented to subject matter experts. The psychometric quality of the items was evaluated in the current research study. Two item parcels were calculated for *each* of the latent variables, using the mean of the sum of the even and uneven numbers. This led to two indicator variables for each construct. An example of the above-mentioned two measures is included in *Appendix 2* of this document.

To include the latent polynomial effects in the *psychological ownership* structural model 6 latent phantom variable had to be included in the model (in addition to the 4 latent independent/predictor variables), namely;

- The latent squared *salience of the efficacy root need*.
- The latent squared *salience of the self-identity root need*.
- The latent squared *perceived ability of the job to satisfy an employee's efficacy root n*eed
- The latent squared *perceived ability of the job to satisfy an employee's self-identity root n*eed.
- The latent interaction between (or product of) the *salience of the efficacy root need* and *perceived ability of the job to satisfy an employee's efficacy root n*eed.
- The latent interaction between (or product of) the *salience of the self-identity root need* and *perceived ability of the job to satisfy an employee's self-identity root n*eed.

The latent phantom variable in turn also needed to be operationalised. Their indicators were, however, not obtained from measuring instrument specifically designed and developed to measure these latent variables. rather their indicators were calculated from the indicators of the 4 main effects (i.e. the 4 latent independent/predictor variables).

Several approaches for addressing latent variable interactions and latent squared effects have been proposed (Mahembe,2013) including the Kenny and Judd (1984) technique, the constrained approach, mean centring (both constrained; Algina & Moulder, 2001) and unconstrained; (Marsh, Wen, & Hau, 2004). More recently, a technique called orthogonalising, or residual centring, suggested by Little, Bovaird, and Widaman (2006) has been adopted for dealing with latent interaction and latent squared effects. Residual centering in observed score multiple regression involves the calculation of the product term involving the interaction effect and then regressing the interaction effect on the first-order effects involved in the product term. The residuals are then calculated and used to represent the interaction effect not containing any first-order main effects.

For example: assume *salience of the efficacy root need* is represented by Y_1 and Y_2 and *perceived ability of the job to satisfy an employee's efficacy root n*eed is represented by X_3 and X_4. The four product terms Y_1X_3; Y_1X_4; Y_2X_3 and Y_2X_4 are calculated and each of these four product terms are then regressed on the four indicator variable, e.g.:

$$E[Y_1X_3|Y_j;X_j] = a + b_1Y_1 + b_2Y_2 + b_3X_3 + b_4X_4$$

The residual $RESID\_X_1X_3$ is calculated and used as the first of four indicators to represent the latent interaction between (or product of) the *salience of the efficacy root need* and *perceived ability of the job to satisfy an employee's efficacy root n*eed in the structural model. This is repeated for the other three product terms to derive four indicators for the latent interaction effect. The same procedure is used to calculate indicators for the latent interaction between (or product of) the *salience of the self-identity root need* and *perceived ability of the job to satisfy an employee's self-identity root n*eed. A total of 8 indicators will be calculated for the two latent interaction effects in the polynomial regression model.

A similar procedure is used to calculate indicator variables for the latent squared effects. For example, to calculate the indicators for the latent squared *perceived ability of the job to satisfy an employee's self-identity root n*eed the products X_3*X_3, X_4*X_4 and X_3*X_4 will be calculated, regressed on X_3 and X_4 and the unstandardised residual $RESID\_X_3X_3$ calculated. A total of 9 indicators will be calculated for the two latent interaction effects in the polynomial regression model.

3.6.11.2. Interaction effect: Perceived ability * self-investment

The proposed psychological ownership structural model hypothesised that the extent to which an employee has an *perceives high ability* will moderate the effect of *self-investment* on the extent to which an employee *integrates the target into the self (*i.e. the *perceived ability * self-investment* influences *integration into the self*). The indicators for this latent interaction effect were calculated via residual centring as described in paragraph 3.6.11.1.

*3.6.11.3. Interaction effect: Internal locus of control *gaining control*

The proposed psychological ownership structural model hypothesised that the extent to which an employee has an *internal locus of control* will moderate the effect of *gaining control* on the extent to which an employee experiences *feelings of efficacy* (i.e. the *internal locus of control * gaining control* influences experienced efficacy).

Similar to the *perceived ability * self-investment* interaction effect, orthogonalising, or residual centring, suggested by Little, et al. (2006), will also be used to deal with this latent interaction.

3.6.12. SUMMARY OF THE NUMBER OF INDICATOR VARIABLES PER LATENT VARIABLE

The number of indicator variables that represented each of the 23 latent variables in the proposed psychological ownership structural model in the structural model is summarised in Table 3.1.

Table 3.1

Summary of the number of indicator variables per latent variable

Latent effect	Number of indicators
Psychological ownership	2
Self-investment	2
Gaining control	2
Gaining intimate knowledge	2

Table 3.1

Summary of the number of indicator variables per latent variable (continued)

Salience of the self-identity need	2
Salience of the self-efficacy need	2
Motivation to engage in self-investment	2
Internal locus of control*control	4
Perceived ability*self-investment	4
Task identity	3
Task significance	3
Task variety	3
Autonomy	3
Feelings of efficacy	2
Integration into the self	2
Perceived ability of job to satisfy self-efficacy need	2
Perceived ability of job to satisfy self-identity need	2

Squared perceived ability of job to satisfy self-identity need	3
Squared perceived ability of job to satisfy self-efficacy need	3
Squared salience of self-identity need	3
Squared salience of self-efficacy need	3
Self-identity need * perceived ability of the job to satisfy salient self-identity need	4
Self-efficacy need * perceived ability of the job to satisfy salient self-efficacy need	4
Total number of indicator variables	62

3.7. STATISTICAL ANALYSIS

Item analysis, exploratory factor analysis, confirmatory factor analysis, structural equation modelling with response surface analysis was used to analyse the data obtained from the various measuring instruments.

3.7.1. MISSING VALUES

It would be ideal for researchers to have complete data sets in order to interpret them comprehensively, however, this is usually not the case. The seriousness of this problem depends on the pattern of the missing data, the reason behind the missing data, as well as the number of missing values.

A pattern could exist in the missing values which can communicate a message to the researcher regarding the reason for the missing values. Patterns in which missing values emerge can be classified as either missing completely at random (MCAR), missing at random (MAR) or missing not at random (MNAR) (Tabachnick & Fidell, 2014). If missing data is random (MCAR or MAR) it is ignorable (it has statistical power implications in terms of sample size but will not bias results). Missing data classified as "missing not at random" (MNAR) can have a biasing influence on results and it therefore not ignorable.

The appropriate method that should be used to effectively manage missing data depends on the number of missing values as well as the nature of the data, especially whether the data follows a multivariate normal distribution (Theron, 2017c). There are several techniques available with which the problem of missing values can be treated. These techniques will briefly be discussed, where after, the justification for using a specific method will be provided.

Deletion method is often the default method used to modern statistical packages. List-wise deletion of cases involves identifying and deleting complete cases where there are missing values for one or more item (Dunbar-Isaacson, 2006). This method is attractive due to its simplicity and comparability across analysis. However, excluding a large portion of the sample can significantly reduce the study's statistical power. Pair-wise deletion, sometimes referred to as available case analysis, is a method where cases that relate to each pair of variables with

missing data involved in an analysis is deleted. This permits the inclusion of as many cases as possible, however comparison is complicated as the sample could be different each time. The problem with these two techniques is that they result in a large loss of data.

Model-based methods, such as full information maximum likelihood estimation and multiple imputation have become more popular recently.

Full information maximum likelihood estimation utilises an iterative approach in order to compute a case-wise likelihood function using only those variables that are observed for specific cases. According to Enders and Bandalos (as cited in Dunbar- Isaacson, 2006) this allows estimates to be obtained of missing values based on incomplete observed data to maximise the observed data likelihood. However, this method does not permit item analysis, dimensionality analysis and the calculation of the item parcels, due to the fact that full information maximum likelihood estimation directly returns a covariance matrix calculated from imputed date (Smuts, 2011). Furthermore, this estimation method assumes that observed data follows a multivariate distribution and can therefore only be applied to data that meets this assumption (Smuts, 2011).

The multiple imputation method involves conducting several imputations for each missing value. This method is a complex process involving several steps to estimate missing data, however it does have the advantage of maintaining sampling variability (Schafer & Graham, 2002). Model-based methods does require a substantial investment of time. However, they have computational practicality in that both maximum likelihood and multiple imputation "have statistical properties that are about as good as we can reasonably hope to achieve" (Allison, 2001, p.4).

According to Schafer and Graham (2002) deciding on an appropriate method for the management of missing values cannot be made in isolation, but must be evaluated in terms of the modelling, estimation or testing procedure in which it is embedded. Given the above-mentioned methods for dealing with missing values, it seems fitting to choose a model-based method. This study will specifically make use of the multiple imputation procedure due to the fact that this method makes less stringed assumptions than full information maximum likelihood estimation, and unlike imputation by matching, retains all cases in the imputed data set.

3.7.2. ITEM ANALYSIS

Measurement instruments identified in section 3.6 contains specific items that have been developed to indicate the standing of respondents on these specific latent variables. These items are intended to function as stimulus sets that evokes a response that is a fairly uncontaminated expression of the specific underlying latent variable. In the process of evaluating the psychometric integrity of the scale, the question arises, did the items succeed their intentions?

There is a variety of classical measurement theory item statistics that were calculated to provide the basket of evidence needed to determine if the items comprising each subscale sufficiently describe the underlying latent variable that it is supposed to. This analysis demined whether the items elicited consistent responses and identified differences across people that differ in their standing on the latent variables that underpin the construct, *psychological ownership* and that differ in their standing on the construct, *psychological ownership* itself. These item statistics include; item-total correlations, the squared multiple correlation, the change in subscale reliability and subscale variance when the item is deleted, the inter-item correlations and the item means and standard deviations. No single statistic was permitted to influence the decision surrounding inclusion or exclusion of an item, rather the integrated basket of evidence informed the treatment of poor items. The scale/subscale reliability was described via Cronbach's alpha and McDonald's omega (ω). The Cronbach alpha was calculated as part of the item statistics via the SPSS 26 Reliability procedure, its value was noted, but was not definitively interpreted. This was because both these reliability coefficients assume the scale/subscale for which it is calculated to be unidimensional (Graham, 2006). Hence Cronbach's alpha and McDonald's omega were only definitively interpreted after the dimensionality analysis had corroborated the unidimensionality of the scale/subscale. McDonald's omega was only calculated after the dimensionality analysis. McDonald's omega was calculated via JASP (). McDonald's omega was calculated in addition to Cronbach's alpha because the later makes the rather stringent assumption that the slope of the regression of the items on the single underlying latent variable is the same across items, whereas the former does not. If the univariate assumption was not corroborated (i.e. factor fission occurred) the Stratified alpha or the multidimensional omega was calculated (Kamata, Turhan & Darandari, 2003; Widhiarso & Ravand, 2014). The latter was calculated when factor fission resulted in a bifactor model (Reise, 2012).

3.7.3. DIMENSIONALITY ANALYSIS USING EXPLORATORY FACTOR ANALYSIS

The construction of the items that are utilised to operationalise the latent variables contained in the Klopper-Lee psychological ownership structural model reflects the intention to construct fundamentally one-dimensional sets of items. The items of these scales are intended to function as stimulus sets that arouse a response that is a fairly uncontaminated representation of the specific underlying unidimensional latent variable or unidimensional latent dimensions of a multidimensional latent variable. However, the responses to items of these scales and subscales are never completely a true reflection of the latent variable that is intended to be measured. because systematic, non-relevant latent variables and random influences will always impact the purity of the representation of a given latent variable (Guion, 1998). The assumption of unidimensionality is that only the relevant latent variable is a common source of variance across all the items comprising a scale or a subscale. This implies that the partial correlations between the items will approach zero if they were statistically controlled (Hulin, Drasgow, Parson, 1983, as cited in Smuts, 2011). This will confirm the presence of a single common factor underlying the given scale. In sum, the ideal is to obtain a relatively uncontaminated measure of the specific underlying latent variable via the items comprising the scale.

The assumption of unidimensionality associated with the subscales within a scale was examined by conducting a restricted exploratory factor analysis on each of the scales or subscales[11] that claimed unidimensionality in their design. The extraction of a single factor was therefore specified upfront. The adequacy of the extracted single-factor factor structure was then subsequently evaluated by inspecting the percentage of large (i.e. > .05) residual correlations. The unidimensionality assumption was considered corroborated if less than 30% of the residual correlations were larger than .05. Furthermore, principle axis factor analysis was used as an extraction technique (Tabachnick & Fidell, 2001). Principle axis factoring only analyses common variance shared between the items comprising a subscale, whereas principle component analysis examines all variance (Tabachnick & Fidell, 2014). The objective of principle axis factor analysis (with oblique rotation) was to corroborate the unidimensionality of the scale/subscale, to remove items with inadequate factor loadings and/or split heterogenous sub-scales into two or more homogenous subsets of items if necessary (Theron, 2015, as cited in Lee, 2016).

[11] An alternative strategy would be to fit the measurement models implied by the design of the questionnaire for each sub-scale separately via confirmatory factor analysis using SEM.

An alternative strategy would be to fit the single factor measurement models implied by the design of the questionnaire for of the scales/subscales that claimed unidimensionality in their design separately via confirmatory factor analysis using SEM. The decision to rather use the restricted EFA approach was motivated by the ease of the calculations involved.

Measurement models were fitted for all multidimensional scales via covariance structure analysis.

In the case of factor fission, a second-order factor model based on the loading pattern shown in the pattern matrix and/or a bifactor model was fitted via confirmatory factor analysis to evaluate the extent to which the items of a scale or subscale statistically significantly reflect the second-order construct capturing the shared variance in the extracted first-order factors by fitting a second-order measurement model. When the second-order factor model showed at least close fit, the statistical significance of the indirect effects of the second-order factor on the items were tested. The indirect effects were calculated by translating the SIMPLIS syntax to LISREL syntax and the use of the CO command.

SPSS 26 was utilised to assess the unidimensionality of the scales (EFA) with oblique rotation to operationalise the latent variables included in the proposed Klopper-Lee psychological ownership structural model. LISREL 8.8 (Du Toit and Du Toit, 2001) was used to perform the confirmatory factor analysis in the case of factor fission.

3.7.4. STRUCTURAL EQUATION MODELLING

According to Hair et al. (2010) structural equation modelling (SEM) is the only analysis technique which permits the complete and simultaneous testing of multiple and interrelated dependent relationships within a structural model. This technique involves several statistical procedures that are discussed in greater depth in the following section.

3.7.4.1. Variable Type

The correct moment matrix that needs to be analysed, and appropriate procedure to estimate the freed parameters of the model, depend on the level of measurement at which the indicator variables are measured. Two or more linear combinations of items of individual scales will be created, as indicated in section 3.6, to represent each of the latent variables when evaluating the fit of the proposed structural model. In some cases, where the construct is multi-dimensional, it was decided that dimension scores would more applicable.

Items responses observed on a Likert scale strictly speaking represented discrete variables measured on an ordinal scale. However, variables observed in SEM are typically continuous,

as continuous variables have certain desirable properties compared to discrete data. These desirable properties include a distribution that is approximately normal and a range of scores that are adequately spread to reasonably distinguish among individual cases (Kline, 1998). According to Muthén and Kaplan (1985) Likert scale- type responses may be assumed to be continuous if the Likert scale consists of 5 or more scale points. The current study utilised composite indicator variables calculated from items measured on five-point Likert scales to seven -point Likert scales. Therefore, the current study assumes that the composite indicator variables are continuous in nature and is measured on an interval level.

The maximum likelihood estimation technique used in LISREL also assumes that variables are continuous, and they follow a multivariate normal distribution (Kline, 1998). Based on this assumption, maximum likelihood estimation will be used to analyse the covariance matrix provided that the assumption of multivariate normality is met.

4.7.4.2. Multivariate Normality

Prior to commencing with analysis procedures, it is crucial to evaluate univariate values of skewness and kurtosis but also to assess the multivariate normality of the indicator variable distribution (before and after normalisation). As mentioned above, the maximum likelihood estimation technique LISREL used by default in the case of continuous indicator variables, assumes that the indicator variables used to measure the latent variables in the proposed psychological ownership structural model follow a multivariate normal distribution. The univariate and multivariate normality of the composite indicator variables were therefore assessed using PRELIS (Jöreskog & Sörbom, 1996; Theron, 2014). In the case where the null hypothesis for the multivariate normality assumption is not rejected, the maximum likelihood estimation technique can be used. However, if the null hypothesis of multivariate normality is rejected, normalisation of the data will be performed. If the attempt to normalise the data is successful, the maximum likelihood estimation technique can be used. However, if the attempt at normalisation of the data fails, robust maximum likelihood would be used either on the normalised data or the original data, depending on whether the normalisation improved the deviation indicator variable distribution from the multivariate normal distribution.

4.7.4.3. Confirmatory factor analysis

The *psychological ownership* comprehensive LISREL[12] model fit indices can only be interpreted if the constructs within the measurement model have been operationalised

[12] The comprehensive LISREL model comprises of the structural model defining the structural relations that have been hypothesised to exist between the latent variables and the measurement model defining the structural

successfully and are validly represented by the indicator variables designated to represent them. Confirmatory factor analysis is a process that involves examining whether the *psychological ownership* structural model is validly operationalised by the measurement model (Diamantopoulos & Siquaw, 2009) by examining the statistical significance of the measurement model parameter estimates. One can conclude that the constructs have been successfully operationalised if the measurement model obtains close fit, all of the estimated factor loading are statistically significant ($p < .05$), the completely standardised factor loadings are large ($\lambda_{ij} \geq .71$) and the measurement error variances are statistically insignificant ($p < .05$) (Burger, 2012, as cited in Lee, 2016). According to Kline (2998) it is imperative that researchers first test the measurement model, underlying a comprehensive LISREL model when using SEM. If it is found that the measurement model fit is acceptable then the SEM process can proceed to the next step, namely testing the structural model by fitting the comprehensive LISREL model. LISREL 8.8 (Du Toit & Du Toit, 2001) was utilised to perform the confirmatory factor analysis by considering the complete range of indices provided by LISREL.

The covariance matrix was analysed during the process of fitting the measurement model. As mentioned in section 3.8.4.1 the covariance matrix will be analysed using maximum likelihood estimation provided that the multivariate normality assumption has been met. Otherwise, if the attempt to normalise the data fails, then the robust maximum likelihood estimation technique would be used.

4.7.4.4. Interpreting the psychological ownership measurement model fit and parameter estimates

When one analyses the quality of the measurement model, the focus is placed on the relationship(s) between the latent variables and their indicator variables with the aim to determine their validity and reliability. The goodness of fit obtained by the measurement model describes the ability of the model to reproduce the covariance matrix (Theron, 2017c; 2017e). If the measurement model fits this implies that the covariance matrix is closely associated with the observed covariance matrix.

The exact fit null hypothesis (H_{035a}) was tested via the Satorra-Bentler chi square (χ^2) statistic (assuming that the multivariate assumption was not met). A chi square that is statistically

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relations that have been hypothesised to exist between the latent variables and their composite indicator variables. The structural model in and by itself cannot be fitted to data. Only the measurement model and the comprehensive LISREL model can be fitted to data.

significant would result in the rejection of the null hypothesis (H_{035a}). However, the likelihood of an exact fit is highly improbable. Subsequently, the close fit null hypothesis (H_{035b}) will be considered because it takes the error of approximation into account and, therefore, displays a more realistic picture of reality. In the event where the error of approximation in the population, is equal to or less than .05, the model can be said to fit closely.

H_{035a}: RMSEA=0

H_{a35a}: RMSEA=0

H_{035b}: RMSEA≤.05

H_{a35b}: RMSEA>.05

Additionally, to investigating the fit statistics, the size and distribution of the standardised residuals (when each indicator only reflects a single latent variable) and the size of the model modification indices calculated for $\mathbf{\Lambda^X}$ and $\mathbf{\Theta_\delta}$, will be considered. According to Diamantopoulos & Siguaw (2000) the standardised residuals can be interpreted as z-scores (standard deviations from the mean). Modification indices that are relatively large would indicate that those parameters contained in the measurement model, if set free, would improve fit. If there are a great number of large and significant modification indices it would comment negatively on the fit of the model, because it suggests that there are numerous possibilities that exist that could improve the fit of the model.

In the event where the close model fit or at least reasonable fit is obtained (i.e. H_{035b} failed to be rejected), the significance of the 62 estimated factor loadings will be estimated by testing:

H_{0i}: $\lambda_{jk} = 0$; i = 36, 37, ... 97; j = 1, 2, ... 62; k= 1, 2 ... 23

H_{ai}: $\lambda_{jk} = 0$; i = 36, 37, ... 97; j = 1, 2, ... 62; k = 1, 2 ... 23

If close model fit (i.e. H_{035b} failed to be rejected), or at least reasonable model fit is obtained, the following 62 null hypotheses would be tested with regards to the freed variance elements in the variance covariance matrix $\mathbf{\Theta_\delta}$:

H_{0i}: $\theta_{\delta jj} = 0$; i = 98, 99, ... 159; j = 1, 2 ...62

H_{ai}: $\theta_{\delta jj} > 0$; i = 98, 99, ... 159; j = 1, 2 ...62

If close model fit (i.e. H_{035b} failed to be rejected), or at least reasonable model fit is obtained, the following 24 null hypotheses would be tested with regards to the freed covariance elements in the variance covariance matrix $\mathbf{\Theta_\delta}$:

H_{0i}: $\theta_{\delta ij} = 0$; i = 160, 161, ... 183; i = 15, 16, …, 22, … 43, 44, 62; j = 15, 16, …, 22, … 43, 44, 62; i $\neq$ j

H_{ai}: $\theta_{\delta ij} > 0$; i = 160, 161, ... 183; i = 15, 16, …, 22, … 43, 44, 62; j = 15, 16, …, 22, … 43, 44, 62; i $\neq$ j

If close model fit is obtained or if at least reasonable fit is attained, the following 243 null hypotheses[13] would be tested with regards to the freed covariance elements in the variance covariance matrix **Φ**:

H_{0i}: $\phi_{pk} = 0$; i = 184, 185, ...426; p = 1, 2 ...23; k= 1, 2, ... 23; p $\neq$ k

H_{ai}: $\phi_{pk} > 0$; i = 184, 185, ... 426; p = 1, 2 …23; k= 1, 2, ... 23; p $\neq$ k

If $H_{0\,i}$: $\lambda_{jk} = 0$; i = 36, 37, ... 97; j = 1, 2, ...62; k=1, 2 ... 23 were all rejected and the completely standardised factor loading estimates exceeded .71, then the factor loadings were considered satisfactory (Hair et al., 2006). If they are acceptable then it would suggest that at least half of the variance observed in the indicator variables will be explained by the latent variables assigned to them.

If H_{0i}: $\theta_{\delta jj} = 0$; i = 98, 99, ... 159; j = 1, 2 ...62 were all rejected and the completely standardised error variance estimates fell below .50, then the error variances were considered satisfactory (Hair et al., 2006). The decisions on H_{0i}: $\theta_{\delta ij} = 0$; i = 160, 161, ... 183; i = 15, 16, …, 22, … 43, 44, 62; j = 15, 16, …, 22, … 43, 44, 62; i $\neq$ j did not materially affect the verdict on the success of the operationalisation of the latent variables comprising the structural model. Additionally, the squared multiple correlations (R^2) for indicator variables were interpreted. The squared multiple correlations demonstrate the proportion of variance in and indicator that is explained by the underlying latent variable. Higher ($R^{2)}$ are ideal. R^2 values of .50 or higher were considered satisfactory.

If some or all of H_{0i}: $\phi_{pk} = 0$; i = 184, 185, ...426; p = 1, 2 ...23; k= 1, 2, ... 23; p $\neq$ k were rejected and the ϕ_{pk} were not excessively large ($\phi_{pk} < 90$), the discriminant validity with which the indicator variables measure the latent variables comprising the structural model was considered satisfactory.

If close fit or reasonable fit was at least achieved for the proposed *psychological ownership* measurement model and if the abovementioned desired conditions for parameter estimates

[13] There were (6 3x 22)/2 = 253 unique covariance terms in **Φ**. Ten (10) of these covariances were fixed to zero because of the orthogonalising procedure used to create the indicator variables for the product and powered latent variables in the model.

were satisfied, then the *psychological ownership* structural model was tested by fitting the comprehensive LISREL model.

3.7.4.5. Fitting the psychological ownership structural model

The comprehensive *psychological ownership* LISREL model was fitted to assess the validity of the overarching substantive research hypothesis, and the subsequent array of path-specific substantive research hypotheses by investigating the extent to which the estimated covariance matrix, derived from the comprehensive *psychological ownership* LISREL model, approximated the observed sample covariance matrix. In the case where the multivariate normality assumption is satisfied (before or after attempts at normalization) then the maximum likelihood estimation technique will be used. If the attempt to normalise the data failed to realize multivariate normality in the observed data, then robust maximum likelihood estimation will be utilized. LISREL 8.8 was utilised to conduct the structural equation analysis (Du Toit & Du Toit, 2001).

3.7.4.6. Interpretation of the structural model fit and parameter estimates

The comprehensive LISREL model fit was tested by investigating the full range of goodness of fit statistics provided by LISREL. The exact fit null hypothesis (H_{01a}) was also tested with the Satorra-Bentler chi square (χ^2) statistic (assuming that the multivariate assumption was not met). The exact fit null hypothesis (H_{01a}), was rejected if the chi square statistic was statistically significant ($p < .05$), thereby implying that the model does not fit perfectly. In the likely event that H_{01a} would be rejected, the close fit null hypothesis (H_{01b}) was assessed by examining the probability of observing the sample root mean square error of approximation (RMSEA) estimate under the close fit null hypothesis (H_{01b}).

Additionally, the magnitude and distribution of the standard residuals and the magnitude of the model modification indices calculated for **Γ, B** and **Ψ**, were also be investigated. The standardised variance-covariance residuals may be considered significantly ($p < .01$) large if they exceed 2.58 or -2.58. Positive residuals indicate underrepresentation which suggests that additional explanatory paths should be included within the structural model. Negative residuals, on the other hand, indicate overestimation which suggests that some paths should be pruned away. Large modification indices indicate that, if specific structural model parameters were set free, then the overall fit of the model would be improved. A modification index value equal to or greater than 6.64 identifies those currently fixed parameters that would improve the model fit significantly ($p < .01$) if set free. The percentage statistically significant modification

indices for **Γ, B** and **Ψ** and the percentage large standardised residuals were used to comment on the fit of the comprehensive LISREL model.

Based on the verdict of the fit of the comprehensive LISREL model taken in conjunction with the verdict on the fit of the measurement model a decision will be made on the level of fit of the structural model. An inference of at least reasonable structural model fit warranted the interpretation of the structural model parameter estimates.

The estimates obtained for the freed structural model parameters were interpreted by firstly testing H_{02}, H_{03}, …, H_{011}, …., H_{016}, H_{017}, …, H_{342}. The magnitude of the statistically significant ($p < .05$) γ_{ij}, β_{ij} and ψ_{jj} estimates (i.e. where H_{0i}: i=2, 3, 4, …, 11, …, 16, 17, …, 34 were rejected) will also be interpreted.

The squared multiple correlations (R^2) that reflects the proportion of variance in each endogenous latent variable that can be explained by the weighted linear composite of effects linked to it in the model, was also be inspected. Higher squared multiple correlations are ideal, since this would imply that the combined explanatory power of the hypothesised relationships would be greater.

Path-specific substantive hypotheses 12, 13 14 and 15 were tested by testing H_{012a}, $H0_{12b}$, H_{013a}, H_{013b}, H_{014a}, H_{014b}, H_{015a} and H_{015b}. Path-specific substantive hypotheses 12 and 13 posited the slope and curvature of the *motivation to pursue the routes to psychological ownership* response surface along the lines of congruence and incongruence, as a function of the *salience of the self-identity need* and the *perceived ability of the job to satisfy the self-identity need*. Path-specific substantive hypotheses 14 and 15 posited the slope and curvature of the *motivation to pursue the routes to psychological ownership* response surface along the lines of congruence and incongruence, as a function of the *salience of the self-efficacy need* and the *perceived ability of the job to satisfy the self-efficacy need.*

The response surface test statistics $a_1 - a_4$ that describe the slope and curvature of the two *motivation to pursue the routes to psychological ownership* response surfaces were calculated from the partial regression coefficients of the two polynomial regression models that formed part of the psychological ownership structural model.

The two fitted latent variable polynomial regression models are specified through equations 1 and 2:

$$E[\eta_1 | \eta_7; \xi_1; \xi_9; \xi_{12}; \xi_{14}] = \beta_{17}\eta_7 + \gamma_{11}\xi_1 + \gamma_{19}\xi_9^2 + \gamma\beta_{1,12}\xi_{12} + \gamma_{1,14}\xi_{14}^2 \quad [1]$$

$$E[\eta_1|\eta_8; \xi_{13}, \xi_{10}; \xi_8; \xi_{11}] = \beta_{18}\eta_8 + \gamma_{1,13}\xi_{13} + \gamma_{1,10}\xi_{10} + \gamma_{18}\xi_8 + \gamma_{1,11}\xi_{11} \quad [2]$$

Where:

- η_1 represents the *motivation to pursue the routes to psychological ownership* total latent variable;
- η_7 represents the *salience of the self-identity need* latent variable;
- ξ_1 represents the *perceived ability of the job to satisfy the self-identity need* latent variable;
- ξ_9 represents squared *salience of the self-identity need* latent variable;
- ξ_{12} represents the product of the *salience of the self-identity need* and the *perceived ability of the job to satisfy the self-identity need* latent variable
- ξ_{14} represents the squared *perceived ability of the job to satisfy the self-identity need* latent variable;η_8 represents the *salience of the self-efficacy need* latent variable;
- η_8 represents the *salience of the self-efficacy need* latent variable;
- ξ_{13} represents the *perceived ability of the job to satisfy the self-efficacy need* latent variable;
- ξ_{10} represents the squared *salience of the self-efficacy need* latent variable;
- ξ_8 represents the product of the *salience of the self-efficacy need* total score and the *perceived ability of the job to satisfy the self-efficacy need* latent variable;
- ξ_{11} represents the squared *perceived ability of the job to satisfy the self-efficacy need* latent variable.

The sample estimates of the partial regression coefficients and their standard errors were obtained from the LISREL 8.8 output for the structural model. To calculate the response surface test values the partial regression coefficients and their standard errors were fed into the Cunningham Excel macro (Shanock et al., 2010)[14]. The macro also requires the covariance between of the partial regression coefficients. Estimates of these were obtained by inserting the EC=filename.TXT command on the LISREL OUTPUT line[15]. The Excel macro (Shanock et al., 2010) was subsequently used to plot the two response surfaces in the three-dimensional space defined by the two predictors and the response variable.

[14] The constant/intercept was set to zero due to the fact that the latent intercepts have not been estimated in the structural model.
[15] A special LISREL syntax file had to be compiled with the help of SSI to read the covariance estimates for the partial regression coefficients from the text file that was created via the EC command.

CHAPTER 4

ETHICAL CONSIDERATIONS AND RISK EVALUATION

4.1. INTRODUCTION

Research has the potential to improve the value of human life, however, it can also threaten it. Therefore, researchers should always respect human dignity in their relations to and interactions with their research subjects, and in reporting research results. Researchers are consequently obligated to consider, prior to conducting research, any potential ethical red flags that could arise. According to Kerlinger and Lee (2000), a searcher who is armed with ethical guidelines, can uphold ethical standards and ensure an ethical sound research process. The Research Ethics guidelines have been compiled to help researchers and the research community to promote good judgment and enhance their ability to make well-founded decisions in the face of conflicting considerations. Conceptually, research ethics refers to a complex set of morals, values, or standards that help constitute and regulate scientific activity (UMB, 2009). These guidelines will briefly be outlined in this chapter. Furthermore, this chapter will discuss and possible ethical risk factors that may be cause for concern throughout the research study.

4.2. ETHICAL GUIDING PRINCIPLES AND LEGISLATIVE COMPLIANCE

The Stellenbosch University Research Ethics Committee (2012, p. 41) requires that:

> "Researchers, supervisors and departmental chairs have the primary responsibility to ensure that research conducted in their respective disciplines is characterised by methodological rigour and comply with the guidelines of relevant professional bodies and scientific organisations, as well as relevant legislation, institutional, national and international ethics guidelines".

There are numerous legislative documents relating to ethical research, which vary contingently to the nature of the research. The National Health Act, 2003 (Act no 61 of 2003) is of particular interest due the focus in places on regulations relating to research involving human participants.

This legislation outlines certain duties for the researcher, who is conducting research that involves humans, namely, that ethical approval must be attained, funding must be declared including the sources thereof of, the safety of participant must be monitored and possible risks or harm that might occur should be minimised and that research results be timeously

disseminated to all relevant parties or stakeholders (Department of Health, 2013). The subsequent rights of participants involved in social research are outlined in section six (Department of Health, 2013, p. 9):

Additional to these obligations, the Ethical Rules of Conduct for Practitioners Registered under the Health Professions Act (Act no.55 of 1974) (Republic of South Africa, 2006) which, under Annexure 12, states that:

4.3. POTENTIAL ETHICAL RISK FACTORS

Researcher have the responsibility for ensuring that their research subjects are not exposed to grief or suffering (Nesh Guidelines, 2006). Therefore, the risk of causing even minor suffering must be weighed against research's quest for the truth and its potential benefits. This section will shed some light on possible risk factors that poses a threat to individuals' health and safety.

The *research process* and the *products of research* are identified as two broad areas that could be a potential cause of concern pertaining to research ethics (Shrader-Frechette, 1994) (as cited in Lee, 2016). Shrader-Frechette (1994) explains that the *process* is harmful if participants are not provided relevant and sufficient information to allow them to provide informed consent, and if they are deceived in any way throughout the entire research process. The *product of research* is said to be problematic, and subsequently unethical, in cases where the end result of the research study leads to a harmful environment for anyone in contact with it (Shrader-Frechette, 1994). Moreover, the *product of research* can be said to be problematic, and subsequently unethical, in cases where the end result of the research study does not serve some demonstrable positive purpose. Research involving human participants require some sacrifice in terms of time, energy and psychological discomfort. Such an investment can be ethically justified if the research holds the promise of unlocking some benefit. If not the expectation that participants should be willing to make such a sacrifice becomes ethically questionable.

Furthermore, Horn *et al*. (2015) mentioned that, prior to starting research, all participants should be mindful that their participation is on a voluntary basis, free from any form of coercion and they are free to withdraw at any stage throughout the research process, without penalty or negative consequences. Therefore, participants decision to become involved in the research study should be taken from a full informed standpoint, which refers to informed consent. According to Horn *et al.* (2015) informed consent is not a mere formality, in terms of filling in a mandatory consent from. But rather, a *process* that must be undertaken. Horn *et al.* (2015) summaries the important aspects of this process below:

Furthermore, institutional approval is another important consideration that is outlined in legislation, when conducting research within organisational contexts. The Department of Health (2013, p. 93) requires researchers to abide to the following rules:

A copy of the institutional consent form is available in Appendix 1.

Additionally, protection extends to the area of confidentiality. It is important that the information that has been collected from participants should not be disclosed to outside parties in a manner that could leave participants vulnerable to detection.

Stellenbosch University endorses the Singapore Statement on Research Integrity, which promotes four core principles and 14 responsibilities (see Appendix 2). In addition, Stellenbosch University endorses the principles listed in Table 4.1 as well (Stellenbosch University, Division for Research Development, 2013, pp. 3-4):

Moreover, since this research study particularly involves interaction with human participants, the seven principles, stipulated in the Stellenbosch Research Ethics Policy, and listed in Table 4.1, will briefly be mentioned, where after a description will be provided of the method which will be followed to adhere to these principles.

Table 4.1

Ethical principles and how they are upheld

Ethical principle	Method to uphold principles
Be relevant to the needs and interests of the broader community	The relevance of this study for serving the needs and interests of organisations as well as the broader community have been outlined in Chapter one of this study.
Have a valid scientific methodology	The methodology used in this study have been identified, described and justified in chapter three, where the focus was on achieving the epistemic ideal of science.
Ensure research participants are well informed about the purpose of the research and how the research results will be disseminated and have consented to participate, where applicable	Please see Appendix 1 for a detailed informed consent that will precede the administration of questionnaires. This will require the participant to acknowledge that he or she understands their rights and responsibilities, and also their agreement before their participation can continue in the questionnaires.
Ensure research participants' rights to privacy and confidentiality are protected	Employee names will not be requested in the biographical data section. Summary of information supplied to organisations will be aggregated, therefore individual participants will not be identifiable.
Ensure the fair selection of research participants	The selection of participants was outlined in Chapter three.

Table 4.1

Ethical principles and how they are upheld (continued)

Thorough care must be taken to ensure that research in communities is effectively coordinated and does not place an unwarranted burden on such communities	This research was conducted within an organisational context. However, measures were as short as possible so as to maintain their psychometric quality while at the same time minimising the time consumed on completing them.
Be preceded by a thorough risk-benefit analysis	See risk-befit analysis below in section 5.4

4.4. RISK-BENEFIT ANALYSIS

As stipulated in the Stellenbosch Research Ethics Policy (2012, p. 33), ethical risk is defined as "an action, procedure or method used in the research and in its reporting, that can compromise the dignity, rights, safety and well-being of participants in research, or those affected by that research". Furthermore, this Stellenbosch Research Ethics Policy (2014, p. 33) defines benefit as "that which positively affects the interest or welfare of an individual or group, or the public generally". The purpose of the risk-benefit analysis is to determine whether the end justifies the means. Although no generic formula exists determine the cost-benefit relationship of behavioural science research, researchers must still be conscious of possible consequences of participation and safeguard as much as possible any predictable negative repercussions that might occur.

The Stellenbosch Research Ethics Policy (2012, p. 49) defines different kinds of risk in research projects, including classifications such as minimal risk, low risk, medium risk and high risk. As highlighted in Chapter one, this study aims to contribute to the wellbeing and productivity of the working man. Therefore, the target population of this study is mainly focused on employees within an organisational context. Based on the descriptions provided by the Stellenbosch Research Ethics Policy (2012, p. 49), this study appears to have a low risk as it is defined as "research in which the investigation involves uncontroversial topics, through interviews, surveys and participant observation". According to the policy low risk studies involve participants that are typically adults or children who are unremarkable in term of their social status, health status and/or development. Therefore, there is little potential for discomfort or inconvenience on the part of participants, and if potential discomfort would exist, it would be minor.

With regards to the benefit of this study (that which positively affects the interest or welfare of an individual or group, or the public generally), it is envisaged that this study will afford

organisations the luxury of having a better understanding of how *psychological ownership* is created and in turn leverage the benefits of feelings of *psychological ownership*, for the benefit of both organisations and employees. Therefore, the contributions and overall benefits that this study provides to the body of knowledge available surrounding ownership and specifically *psychological ownership* will outweigh the low amount of risk involved in the research process and the product of the research.

CHAPTER 5

RESEARCH RESULTS

5.1. INTRODUCTION

Chapter 3 presented a detailed explanation of, and motivation for the methodological choices that were made to test the overarching substantive research hypothesis and the path-specific substantive research hypotheses that were depicted in the expanded Klopper-Lee psychological ownership structural model. The aim of this chapter is to present and investigate the research results that were obtained through the methodology that was discussed in Chapter 3.

Firstly, this chapter will briefly deal with the data collection procedure that was used; the demographic characteristics of the sample will be described; and the treatment of missing data will be discussed.

Secondly, the results obtained on the item analyses that were be performed in order to determine the psychometric integrity of the indicator variables that were used to represent the various latent variables will be reported. Subsequently, the extent to which the data satisfied the univariate assumption required to proceed with the calculation of the Cronbach alpha and the McDonald omega will be reported and discussed.

Thirdly, the fit of the measurement model will be evaluated and discussed by investigating the fit statistics, the percentage large standardised residuals and the percentage of large statistically significant modification indices for Λ and Θ_{δ}. Conditional on acceptable measurement model fit the statistical significance of the measurement model parameter estimates will be evaluated. On condition that latent variables have been successfully operationalised, the structural model fit will be evaluated along with the statistical significance and magnitude of the structural model parameter estimates.

Fourthly, this chapter will also discuss the response surface analyses that were performed.

5.2. DATA COLLECTION PROCEDURE

The target population for the current study comprised full-time permanent employees, of differing skills levels, working in profit and non-profit organisations, in both the public and private sector, within the borders of South Africa. The researcher obtained institutional

permission from Distell as well as De Kuilen High school[16] to invite employees within those organisations to participate in the current study. Furthermore, social media platforms such as Instagram and Facebook were used to invite members of the target population that were friends of the researcher or friends of friends of the researcher. The social media platform route was initiated after the invitation to employees within the two organisations was met with less enthusiasm than was hoped for. A non-probability, convenience sampling method was used by inviting employees to participate in the study via email and social media posts. Although random sampling was in principle possible both in Distell and in De Kuilen, the researcher did not have the authority to compel randomly selected participants to participate in the study. The random sample would then have effectively become a non-probability sample in which individuals decided whether they wish to take up the request to participate and most likely would have resulted in a too small sample. Hence it was decided to invite all employees at Distell and all teachers at De Kuilen to participate in the research.

The method of sampling that was used prohibits any claim that the study sample was representative of the target population or even the sampling population. This precluded the confident generalisation of the findings to the target population. This is acknowledged as a methodological limitation in the study.

The winner of the lucky draw was determined through means of an algorithm for random selection on Microsoft Excel. The winner was awarded with a 32-inch Samsung LED television.

5.3. DEMOGRAPHIC CHARACTERISTICS OF SAMPLE GROUP

At the closure of the data collection 400 completed surveys were available. Prior to the closure of the data collection 20 cases were deleted because they took less than 6 minutes to complete the questionnaire. One more case was deleted after the closure of the data collection based on the same criterion. The convenience sampling procedure therefore resulted in eventual sample of 399 usable cases.

Table 5.1 below presents a summary of the sample's age, field of work, job level, tenure and qualification. It indicates that that the majority of respondents fell in the age category of 40-50 years (28.57%). Moreover, age seems to be reasonably uniformly distributed (excluding the age range of 61-70 years). Furthermore, the sample group was spread across a wide range of industries, with the majority of respondents occupying jobs in the mining and manufacturing

[16] Institutional permission was obtained from the Western Cape Department of Education as well.

industry (13.78%), the finance sector (13.53%) as well as other unspecified industries (25.06%) that could include categories such as logistics, human resources, tourism, and information technology. It is also evident that almost half of the sample group were employed in middle management (41.60%) which is followed by a large number of junior manager respondents (24.52%). Table 5.1 also shows that most respondents have been in their current job for one to two years (20.73%). tenure again seems to be distributed relatively uniformly (with the natural exception of more than 25 years). Finally, it is clear that the majority of respondents either had an undergraduate degree (31.08%) or a post-graduate degree (34.09%).

Table 5.1

Demographic characteristics of the sample

Description	Frequency	Percent
Age		
20-24	44	11.08%
25-29	56	14.11%
30-34	65	16.29%
35-39	59	14.79%
40-50	114	28.57%
51-60	56	14.04%
61-70	2	0.50%
Missing	3	0.75%
Field of work		
Agriculture	29	7.27%
Communications- Marketing/Advertising	18	4.51%
Construction	5	1.53%
Education	43	10.78%
Engineering	33	8.27%
Finance	54	13.53%
Government	2	0.50%
Health and Fitness	1	0.25%
Across industries	8	2.01%
Mining and Manufacturing	55	13.87%
Retail	13	3.26%
Transport	2	0.50%
Sales	27	6.77%
Other	100	25.06%
Missing	9	2.26%
Job Level		
Entry level	70	17.54%
Junior Management	98	24.56%
Middle Management	166	41.60%
Senior Management	36	9.02%
Specialist	27	6.77%
Missing	2	.50%
Tenure		
Less than one year	56	14.04%
1-2 years	81	20.730%
3-5 years	69	17.29%
6-10 years	66	16.54%
11-15 years	42	10.52%
16-25 years	52	13.03%
More than 25 years	32	8.02%
Missing	1	0.25%

Table 5.1

Demographic characteristics of the sample (continued)

Description	Frequency	Percent
Qualification		
Matric	19	4.76%
Diploma or Certificate	91	22.81%
Undergraduate degree	124	31.08%
Post-graduate diploma	23	5.76%
Post-graduate degree	136	34.09%
Doctorate	1	0.25%
Other	4	1.00%

The target population for the current study comprised full-time employees, of differing skills levels, working in profit and non-profit organisations, in both the public and private sector, within the borders of South Africa. It is acknowledged that a non-ignorable sampling gap existed and the method of sampling also precluded any claim of representativeness, however, it was nonetheless concluded that the sample group was sufficient in terms of relevance and diversity to warrant further analyses.

The sample size considerations presented in Chapter 3 led to the rather liberal conclusion that a sample of 500 – 600 research participants had to be selected for the purpose of testing the proposed psychological ownership structural model. Based on the Bentler and Chou (1987) rule of thumb the ratio of observations to freed parameters should be between 10: 1 and 5: 1 which translated to a sample size requirement of anything between 2370 and1185[17]. The current study failed to achieve even the liberal sampling target. If the initially hypothesised *psychological ownership* structural model would have been tested on the current sample the ratio of observations to freed parameters would have been 1.68: 1. This created the problem that the sample size was insufficiently large to reliably estimate the parameters in the original *psychological ownership* structural model. Therefore, it was decided to remove the six phantom variables (used in the polynomial regression with response surface analysis) from the original structural model and rather create two additional narrow-focused structural models to more accurately describe the changes of *motivation to pursue the routes to psychological ownership* to changes in *root needs* and *perceptions of job characteristics to satisfy those needs*. The latter two narrow-focused structural models were then empirically tested via observed score polynomial regression analysis with response surface analysis. It was also decided to create item parcels from the 4 residualised indicators for the single remaining latent interaction effect in the structural model. This reduced the number of freed model parameters by 123 to 114 and

[17] There were 237 freed parameters in the hypothesised comprehensive LISREL model.

improved the ratio of observations to freed parameters to 3.48: 1, which, although still not satisfactory, was slightly better than the ratio for the full model.

5.4 MISSING VALUES

Missing values present a problem that had to be addressed before analysis could proceed. Table 5.2 shows the number of missing values per observed variable (i.e. per item)

Table 5.2

Number of missing values per observed variable

Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15
0	0	0	0	0	0	1	1
Q16	Q17	Q18	Q19	Q20	Q21	Q22	Q23
3	1	0	4	1	1	2	2
Q24	Q25	Q26	Q27	Q28	Q29	Q30	Q31
0	2	4	2	0	0	1	3
Q32	Q33	Q34	Q35	Q36	Q37	Q38	Q39
0	1	2	2	2	1	2	5
Q40	Q41	Q42	Q43	Q44	Q45	Q46	Q47
3	4	3	3	2	3	2	3
Q48	Q49	Q50	Q51	Q52	Q53	Q54	Q55
2	4	1	2	1	2	1	1
Q56	Q57	Q58	Q59	Q60	Q61	Q62	Q63
2	4	2	4	2	2	2	4
Q64	Q65	Q66	Q67	Q68	Q69	Q70	Q71
1	2	2	2	3	2	4	3
Q72	Q73	Q74	Q75	Q76	Q77	Q78	Q79
2	5	3	2	4	4	2	2
Q80	Q81	Q82	Q83	Q84	Q85	Q86	Q87
3	4	2	5	6	5	5	2
Q88	Q89	Q90	Q91	Q92	Q93	Q94	Q95
3	2	6	2	2	2	3	2
Q96	Q97	Q98	Q99	Q100	Q101	Q102	Q103
3	2	3	3	7	5	3	4
Q104	Q105	Q106	Q107	Q108	Q109	Q110	
4	2	3	2	5	3	4	

The most satisfactory solution probably would have been to use a multiple imputation procedure (Du Toit & Du Toit, 2001; Mels, 2003). Imputation by matching normally appears to be the most conservative, safe procedure to solve the missing value problem (Theron, 2017c).

The advantage of both the two multiple imputation procedures available in LISREL 8.8 is that the estimates of missing values are derived for all the cases in the initial sample (i.e., no cases with missing values are deleted) and the data set is available for subsequent item and dimensionality analyses, and the formation of item parcels. The multiple imputation procedures available in LISREL 8.8 [EM and MCMC], however assume that the values are missing at random and that the observed variables are continuous and follow a multivariate normal distribution. Mels (2009) provided the more lenient criteria for the use of multiple imputation.

that no more than 30% of the total number of possible data points should be missing and the item distributions should not be excessively skewed (Mels, 2009). The majority of the items were statistically significantly ($p < .05$) negatively skewed. The descriptive statistics calculated for the scale and subscale items are shown in Appendix 4[18]. Consequently, it was decided to rather follow the prudent option and use imputation by matching rather than the preferred multiple imputation procedure (Jöreskog & Sörbom, 1996).

Imputation by matching refers to a process of substituting real values for missing values. The substitute values replaced for a case are derived from one or more other cases that have a similar response pattern over a set of matching variables. Cases with missing values that could not be imputed are eliminated from the data set (Jöreskog & Sörbom, 1996). There were only three cases that had missing values that could not be imputed, which meant that the sample size retained was n = 397.

5.5. ITEM ANALYSIS APPROACH

Item analysis was performed via the SPSS reliability procedure to detect and remove poor items. Poor items were characterised as being insensitive to relatively small changes on the latent dimension and/or not responding in unison with other items assigned to a specific scale or subscale. In addition to identifying poor items, the SPSS reliability procedure also suggests ways in which reliability can be improved, for example, by indicating which items should be deleted or rephrased. Item analysis was performed with SPSS version 26 software (http://www.ibm.com/za/en/).

Item analysis was performed for each of the latent variables included in the Klopper-Lee psychological ownership structural model. The aim was to examine: 1) the reliability of the indicators for each latent variable, 3) the homogeneity of each subscale, and 3) poor items before they are included in the composite indicator variables representing the latent variable (Burger, 2012).

The Cronbach alpha and a number of relevant item statistics (i.e., item means, item standard deviations, inter-item correlations, item-total correlations, squared multiple correlation, the change in the scale mean, scale variance and the change in the scale Cronbach's alpha if an item would be deleted) were obtained and interpreted. These statistics will briefly be discussed.

[18] The descriptive statistics shown in Appendix 3 are those calculated after the imputation of missing values

According to Zedeck (2014) the Cronbach's alpha is a measure of the average strength of association between all possible pairs of items contained within a subscale. A Cronbach alpha of .80 was considered to be satisfactory for internal consistency (Theron, 2014). Cronbach alpha if deleted was also considered as it refers to the increase or decrease in the internal consistency of the scale or subscale if the item were deleted. In cases where the Cronbach alfa would increase upon deletion of an item, it would indicate that the item is not aligned to the rest of the items contained in the subscale and, therefore, does not reflect the same latent variable. The Cronbach alpha, however, assumes that the scale or subscale in question is unidimensional. Evidence on the unidimensionality of the scale or subscale was as yet not available at the time of the item analysis[19]. The Cronbach alpha as measure of the reliability of the scale or subscale was therefore not interpreted as part of the item analysis output[20]. The Cronbach alpha in addition assumes that the magnitude of the loadings of the items comprising the scale or subscale on the latent variable being measured are the same across all items (i.e. the assumption that the scale or subscale is essentially tau equivalent[21] (Graham, 2006)). The McDonald ω (McDonald, 1999) that makes the assumption that the magnitude of the loadings of the items comprising the scale or subscale on the latent variable being measured can vary across items (i.e. the assumption that the scale or subscale is congeneric[22] (Graham, 2006)) was consequently also calculated[23]. These reliability statistics were, however, only reported and interpreted after completion of the dimensionality analysis, provided the unidimensionality assumption had been corroborated.

If the scale or subscale failed the test for unidimensionality the Stratified alpha was calculated (Kamata et al., 2003; Widhiarso & Ravand, 2014) if the multi-factor first-order measurement

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[19] It is acknowledged that this raises the question why the dimensionality analysis was not performed prior to the item analysis. Although this undeniably would have had disadvantages it carried the risk of artefact fact factors due to the presence of poor items.

[20] Sijtsma (2009) and Raykov (2001) have demonstrated that α may be overestimated if the assumption of unidimensionality is not met

[21] Essential tau-equivalence assumes that the elements of $\boldsymbol{\Lambda}^{X}$ are equal across the items of each subscale but that the elements of $\boldsymbol{\tau}$ and $\boldsymbol{\Theta}_{\delta}$ may vary. "Essential tau-equivalence assumes that each item measures the same latent variable, on the same scale, but with possibly different degrees of precision (Raykov, 1997a). Again, as with the tau-equivalent model, the essentially tau-equivalent model allows for possibly different error variances" (Graham, 2006, p. 934). The essentially tau-equivalent measurement model therefore fixes the regression slopes of item X_i to be equal across the items of the scale or subscale but allows the intercepts and error variances to be freely estimated across the items of the on the (unidimensional) latent variable ξ_j

[22] The congeneric measurement model allows the elements of $\boldsymbol{\tau}$, $\boldsymbol{\Lambda}^{X}$ and $\boldsymbol{\Theta}_{\boldsymbol{\delta}}$ to be freely estimated across the items of the scale or subscale. "The congeneric model assumes that each individual item measures the same latent variable, with possibly different scales, with possibly different degrees of precision, and with possibly different amounts of error (Raykov, 1997a). Whereas the essentially tau-equivalent model allows item true scores to differ by only an additive constant, the congeneric model assumes a linear relationship between item true scores, allowing for both an additive and a multiplicative constant between each pair of item true scores" (Graham, 2006, p. 935). The congeneric measurement model therefore assumes that the regression of item X_i on the (unidimensional) latent variable ξ_j differs in terms of intercept, slope and error variance.

[23] Raykov (1997) and Graham (2006) indicate that α may be underestimated if the assumption of tau-equivalence is not met.

model implied by the pattern matric showed acceptable fit. If the multi-factor first-order measurement model implied by the pattern matric showed poor fit but a bifactor measurement model showed acceptable fit, McDonald's multidimensional omega was calculated (Widhiarso & Ravand, 2014).

Dunn, Baguley and Brunsden (2014) also warn against the danger of using of the *alpha if item deleted* statistic produced by the SPSS reliability procedure since this interpretation is rooted in the very strict assumption that the scale or subscale is classically parallel with equal error variances. Dunn et al. (2014, p. 408) describe the risks associated with strong reliance on the *alpha if item deleted* as follow:

> During scale development psychologists will often cite „alpha when items deleted" as a means of determining a preference for variants of the initial measure. This method allows one to observe any changes in alpha (i.e., reliability for remaining items) when certain items are excluded. It is also employed in the re-evaluation of a measure for the purpose of shortening it. Raykov (1997) criticises the sample specificity of alpha and argues that any changes in alpha resulting from the „item deleted" process are really only a consequence of the characteristics of the sample at hand and thus any implied population inferences cannot be carried over to uses with alternative samples. Secondly, the population estimate of alpha can easily be overestimated or underestimated due to the deletion of an item (see Raykov, 2007). That is, „alpha if item deleted" (which is a sample statistic) may go up with the removal of an item whereas the level of true score remaining in the test has gone down (or vice versa). Hence, any reported gains in the reliability of alpha by deleting an item, are not representative of the effect this will have on the „true" or population reliability of a scale.

Although the Cronbach alpha and the *alpha if item deleted* statistics were not altogether ignored in the item analysis, no definitive interpretation of the scale or subscale reliability was attched to the Cronbach alpha and no definitive decision on the deletion of an item was based on the *alpha if item deleted* statistic.

In terms of item mean statistics and item standard deviation, Theron (2014) states that the absence of extreme item means and small item standard deviations provides evidence of the absence of questionable items. The mean refers to the typical response of respondents. An extreme high or extreme low mean would indicate a potentially problematic item in that the item score distribution would be truncated at the upper or lower end and thus curtailing the dispersion of the distribution. An extreme high or extreme low item mean would therefore result in a reduced item standard deviation. A low item standard deviation need, however, not

necessarily result from extreme item means. However, a low standard deviation[24] could be problematic because it provides some evidence that an item lacks sensitivity and does not discriminate between relatively small differences on the latent variable that it is meant to reflect.

Inter-item correlations reflect the degree to which the items in the scale or subscale share a common source of systematic variance and, therefore, by implication it reflects the degree of internal consistency in the items responses obtained from the same test taker. However, it is worth noting that moderate to high inter-item correlations do not necessarily mean that the items measure a unidimensional latent variable, nor does it prove that the common source of variance originates from the latent variable of interest. The same caution should be placed on interpretations of high Cronbach alphas. A guideline proposed by Guilford was adopted for the interpretation of inter-item correlation coefficients (Tredoux & Durrheim, 2002, p. 184). More specifically, correlations were interpreted as being low (.20 to .39; definite but small relationship), moderate (.40 to .69; substantial relationship) or high (.70 to .89; strong relationship). A poor item that does not reflect the same source of systematic variance would tend to correlate substantially lower with the remaining items of the scale or subscale. The current study flagged items as problematic when they consistently correlated lower than the mean inter-item correlation with the remaining items of the scale or subscale.

Item-total correlations refer to the "extent to which any one item is correlated with the remaining items in a set of items under consideration" (Netemeyer, Bearden, & Sharma, 2003, p. 144). A low item-total correlation means that an item is out of step with the remaining items of the scale or subscale. Low item-total correlations could suggest that the item fails to measure the same construct as the other items (or that it does but that it fails to discriminate between small differences on the underlying latent variable). Closely aligned to this statistic is the squared multiple correlation when regressing each item on a weighted linear composite of the remaining items. The squared multiple correlation indicates the proportion of variance in the item that is explained by the weighted composite. A small R^2 for any specific item would therefore indicate that the responses of the item are substantially less predictable to the remaining items of the scale or subscale because it does not to the same degree reflect the same source of systematic variance as the remaining items.

[24] No specific critical cut-off value can be set for item standard deviations because the magnitude depends on the number of options available on the response scale as well the nature of the latent variable being measured. A standard deviation was therefore interpreted as low if it showed itself as a distinct outlier in the scale/subscale distribution of standard deviations to the lower end of the distribution.

The above statistics provided the basket of evidence needed to determine if the items comprising each subscale described behavioural denotations of the various latent variables. The results of the item analysis will, however, not allow a definite positive conclusion that the items validly and reliably reflect the latent variable or latent dimension they were designated to reflect. If the items are valid behavioural denotations of the latent variable or latent dimension they were developed to denote, and research participants' response to them validly and reliably reflect these latent variables or latent dimensions, then the item statistics will necessarily be characterised by the absence of extreme item means, the absence of small item standard deviations, moderately large inter-item correlations, high item-total correlations, high squared multiple correlations, no increase in the scale/subscale alpha if item deleted, and high scale/subscale alpha. The converse is, however, not true. The absence of extreme item means, the absence of small item standard deviations, moderately large inter-item correlations, high item-total correlations, high squared multiple correlations, no increase in the scale/subscale alpha if item deleted, and high scale/subscale alpha does not necessarily mean that the target latent variable had been reliably and validly measured. What can be claimed is that the position that the target latent variable has been validly and reliably measured could not be refuted.

No single item statistic alone influenced the decision to delete or retain any individual item. Item statistics were rather combined to form a basket of statistical evidence that informed this decision.

5.6. ITEM ANALYSES RESULTS

The results and analyses for each of the individual subscales are presented in the following section.

5.6.1. JOB CHARACTERISTIC: AUTONOMY

The *autonomy* subscale is made up of three items. These items were analysed, as discussed above, and the results are displayed in Table 5.1 and Table 5.2 respectively.

Table 5.1

Cronbach alpha, item means and item standard deviations for autonomy subscale

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.777	.776	3

	Mean	Std. Deviation	N
AUT_1	5.85894	1.130501	397
AUT_2	5.22670	1.292555	397
AUT_3	4.66751	1.410737	397

From Table 5.1 note was taken that the *autonomy* subscale's Cronbach alpha was .777 and that it fell just short of the stipulated critical cut-off of .80. However, as argued earlier no definitive interpretation on the subscale reliability would be attched to the Cronbach alpha during the item analysis. Further investigation of Table 5.1 shows that there were no extreme means (means ranged from 4.66 to 5.22 on a 7-point Likert scale) nor were there small standard deviations (1.13 to 1.41). None of the items therefore had difficulty in discriminating between relatively small differences on the latent variable being measured.

Table 5.2

Inter-item correlation matrix, item-total statistics, summary item statistics and scale statistics

	AUT_1	AUT_2	AUT_3
AUT_1	1.000	.407	.566
AUT_2	.407	1.000	.634
AUT_3	.566	.634	1.000

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
AUT_1	9.89421	5.974	.542	.324	.774
AUT_2	9.52645	5.073	.602	.406	.712
AUT_3	10.08564	4.139	.717	.516	.575

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	4.918	4.668	5.227	.559	1.120	.081	3
Item Variances	1.646	1.278	1.990	.712	1.557	.127	3
Inter-Item Correlations	.536	.407	.634	.227	1.557	.011	3

Mean	Variance	Std. Deviation	N of Items
14.75315	10.247	3.201092	3

From Table 5.2 above it is evident that AUT_1 correlated marginally lower with the other two items, with a correlation of .407 between AUT_2 and AUT_1. AUT_1, however, did not consistently correlate below the mean inter-item correlation (.536) with the remaining items of the subscale. No item showed itself as a clear outlier in the distribution of corrected item-total correlations. Furthermore, AUT_1 obtained the lowest squared multiple correlation of .324, but this was not sufficient to establish it as a clear outlier in the squared multiple correlation distribution. These item statistics suggest that item AUT_1 responded somewhat out of step with the remaining items of the subscale but not to a degree that would allow the claim that it did not measure the same latent variable as the remaining two items. Although this raised a red flag at first, the problems associated with AUT_1 were not serious enough to earnestly consider deleting this item from the subscale. Moreover, this subscale was quite short and the Cronbach

alpha would decrease if AUT_1 were to be removed (.777 to .774). Therefore, it seemed prudent to retain all of the items.

5.6.2. JOB CHARACTERISTIC: TASK IDENTITY

The *task identity* subscale is made up of three items. These items were analysed, as discussed above, and the results are displayed in Table 5.3 and Table 5.4 respectively.

Table 5.3

Cronbach alpha, item means and item standard deviations for task identity subscale

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.826	.826	3

	Mean	Std. Deviation	N
TSK_IDENT_1	5.01008	1.361409	397
TSK_IDENT_2	4.81864	1.484722	397
TSK_IDENT_3	5.19647	1.387785	397

Note is taken that Table 5.3 indicates that the *task identity* subscale obtained a Cronbach alpha of .826. The Cronbach alpha value was above the critical cut-off value of .80. Additionally, the absence of extreme means (means ranged from 4.81 to 5.19 on a 7-point Likert scale) and the absence of small standard deviations (1.361 to 1.484) suggest that there were no insensitive items in the *task identity* subscale. None of the items therefore had difficulty in discriminating between relatively small differences on the latent variable being measured.

Table 5.4

Inter-item correlation matrix, item-total statistics, summary item statistics and scale statistics

	TSK_IDENT_1	TSK_IDENT_2	TSK_IDENT_3
TSK_IDENT_1	1.000	.578	.596
TSK_IDENT_2	.578	1.000	.663
TSK_IDENT_3	.596	.663	1.000

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
TSK_IDENT_1	10.01511	6.863	.644	.415	.796
TSK_IDENT_2	10.20655	6.033	.695	.492	.747
TSK_IDENT_3	9.82872	6.395	.710	.508	.731

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	5.008	4.819	5.196	.378	1.078	.036	3
Item Variances	1.995	1.853	2.204	.351	1.189	.034	3
Inter-Item Correlations	.613	.578	.663	.085	1.147	.002	3

Mean	Variance	Std. Deviation	N of Items
15.02519	13.307	3.647937	3

The squared multiple correlations were all above .415 and no outliers were evident toward the lower end of the distribution of values. Furthermore, Table 5.4 indicates that the Cronbach alpha will decrease if any one of the items were to be removed. The corrected item-total correlations were all above .50 and no outliers were evident towards the lower end of the distribution values. Finally, the inter-item correlations corroborate the assumptions made thus far in that all items display similar moderate to high correlations (all above .50). None of the items correlated consistently below the mean inter-item correlation (.613) with the remaining items of the subscale. These item statistics therefore indicate that all the items tended to respond reasonably in step to different respondents. All items therefore tapped into the same (but not necessarily unidimensional, nor necessarily the intended) source of systematic variance. Therefore, the decision was made to retain all of the items contained in the *task identity* subscale.

5.6.3. JOB CHARACTERISTIC: TASK VARIETY

The t*ask variety* subscale is made up of three items. These items were analysed, as discussed above, and the results are displayed in Table 5.5 and Table 5.6, respectively.

Table 5.5

Cronbach alpha, item means and item standard deviations for task variety subscale

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.826	.826	3

	Mean	Std. Deviation	N
TSK_VAR_1	5.32494	1.313376	397
TSK_VAR_2	5.30227	1.269025	397
TSK_VAR_3	5.17128	1.367325	397

Note is taken that Table 5.5 indicates that the *task variety* subscale obtained a Cronbach alpha of .826. This value was above the critical cut-off value of .80. Furthermore, there were no extreme means evident (means ranged from 5.17 to 5.32 on a 7-point Likert scale). None of the item distributions were therefore truncated at the upper or lower end There were no small standard deviations observed for this subscale (1.26 to 1.36). This suggest that none of the items of the *task variety* subscale had difficulty in discriminating between relatively small differences on the latent variable being measured.

Table 5.6

Inter-item correlation matrix, item-total statistics, summary item statistics and scale statistics

	TSK_VAR_1	TSK_VAR_2	TSK_VAR_3
TSK_VAR_1	1.000	.476	.519
TSK_VAR_2	.476	1.000	.845
TSK_VAR_3	.519	.845	1.000

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
TSK_VAR_1	10.47355	6.412	.519	.274	.914
TSK_VAR_2	10.49622	5.458	.762	.716	.683
TSK_VAR_3	10.62720	4.921	.790	.731	.645

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	5.266	5.171	5.325	.154	1.030	.007	3
Item Variances	1.735	1.610	1.870	.259	1.161	.017	3
Inter-Item Correlations	.613	.476	.845	.369	1.776	.033	3

Mean	Variance	Std. Deviation	N of Items
15.79849	11.586	3.403756	3

From the Table 5.6 above it is evident that TSK_VAR_1 correlated slightly lower with the other two items, with a correlation of .476 between TSK_VAR_2 and TSK_VAR_1. Item TSK_VAR_1 consistently correlated below the mean inter-item correlation (.613) with the remaining items of the subscale, although not dramatically so. This suggests that item TSK_VAR_1 to a somewhat lesser degree tapped into the source of systematic variance that the other items of the subscale reflected. In line with this trend item TSK_VAR_1 showed itself as somewhat of an outlier in the corrected item-total correlation distribution. Furthermore, the fact that the squared multiple correlation value is lower for the TSK_VAR_1 and the increased Cronbach alpha if the item would be deleted confirmed that this item was somewhat out of unison with the responses of the other two items. However, the subscale is very short and the evidence against TSK_VAR_1 was not overwhelmingly negative. It was therefore decided that all three items should be retained in the *task variety* subscale.

5.6.4. JOB CHARACTERISTIC: TASK SIGNIFICANCE

The *task significance* subscale is made up of three items. These items were analysed, as discussed above, and the results are displayed in Table 5.7 and Table 5.8 respectively.

Table 5.7

Cronbach alpha, item means and item standard deviations for task significance subscale

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.784	.786	3

	Mean	Std. Deviation	N
TSK_SIG_1	5.16121	1.490443	397
TSK_SIG_2	5.53149	1.268157	397
TSK_SIG_3	5.33249	1.453063	397

Note is taken that Table 5.7 indicates a Cronbach Alpha of .784 for the *task significance* subscale. This fell just short of the .80 critical cut-off value. There were clear extreme means (means ranged from 5.16 to 5.53 on a 7-point Likert scale) nor were there small standard deviations (1.268 to 1.490).

Table 5.8

Inter-item correlation matrix, item-total statistics, summary item statistics and scale statistics

	TSK_SIG_1	TSK_SIG_2	TSK_SIG_3
TSK_SIG_1	1.000	.478	.584
TSK_SIG_2	.478	1.000	.588
TSK_SIG_3	.584	.588	1.000

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
TSK_SIG_1	10.86398	5.885	.600	.369	.736
TSK_SIG_2	10.49370	6.862	.598	.373	.737
TSK_SIG_3	10.69270	5.638	.680	.464	.641

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	5.342	5.161	5.531	.370	1.072	.034	3
Item Variances	1.980	1.608	2.221	.613	1.381	.107	3
Inter-Item Correlations	.550	.478	.588	.109	1.229	.003	3

Mean	Variance	Std. Deviation	N of Items
16.02519	12.444	3.527578	3

Table 5.8 indicates satisfactory intern-item correlations. None of the items consistently correlated below the mean inter-item correlation (.550) with the remaining items of the subscale. Furthermore, the corrected item-total correlations were all above .50 with no outliers evident towards the lower end of the distribution of values. Similarly, the squared multiple correlations were all above .30 with no outliers evident. These item statistics indicate that all items more or less to the same degree responded to the same source of systematic variance, although not necessarily a univariate source of variance nor necessarily the intended source of variance. Finally, in line with these findings, the deletion of any item would negatively impact

the internal consistency of the *task significance* subscale. Therefore, taking into account all of the above-mentioned findings, it was decided that none of the items should be removed.

5.6.5. GAINING INTIMATE KNOWLEDGE

The *gaining intimate knowledge* subscale is considered to be unidimensional and consists of four items. The item analysis results are depicted in Table 5.9 and 5.10 respectively.

Table 5.9

Cronbach alpha, item means and item standard deviations for gaining intimate knowledge

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.898	.899	4

	Mean	Std. Deviation	N
INT_KNOW_1	5.75819	.978024	397
INT_KNOW_2	5.66247	1.047810	397
INT_KNOW_3	5.84131	.980881	397
INT_KNOW_4	6.02015	.969013	397

Note is taken that Table 5.9 indicates a Cronbach alpha of .898. In terms of the item statistics, there seems to be no extreme means (ranging from 5.66to 6.02 on a 7-point Likert scale) and no small standard deviations (.969 to 1.047). Therefore, there seems to be no evidence that any of the items were insensitive items that failed to discriminate between relatively small differences on the latent variable of interest.

Table 5.10

Inter-item correlation matrix, item-total statistics, summary item statistics and scale statistics

	INT_KNOW_1	INT_KNOW_2	INT_KNOW_3	INT_KNOW_4
INT_KNOW_1	1.000	.640	.689	.594
INT_KNOW_2	.640	1.000	.741	.743
INT_KNOW_3	.689	.741	1.000	.726
INT_KNOW_4	.594	.743	.726	1.000

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
INT_KNOW_1	17.52393	7.412	.706	.515	.893
INT_KNOW_2	17.61965	6.686	.802	.654	.859
INT_KNOW_3	17.44081	6.939	.818	.669	.853
INT_KNOW_4	17.26196	7.174	.773	.623	.869

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	5.821	5.662	6.020	.358	1.063	.023	4
Item Variances	.989	.939	1.098	.159	1.169	.005	4
Inter-Item Correlations	.689	.594	.743	.149	1.251	.003	4

Mean	Variance	Std. Deviation	N of Items
23.28212	12.127	3.482424	4

The inter-item correlation matrix indicate that all the items have moderate to high correlations with each other. None of the items consistently correlated lower than the mean inter-item correlation (.689) with the remaining items, although item INT_KNOW_1 came quite close to satisfying this criterion. This implies that all the items reflect to a reasonable degree the same source of systematic variance. This finding is corroborated by the decreases in internal consistency that will occur if any one of the items should be deleted. Furthermore, both the item-total correlations and the squared multiple correlations were all above .50 and there were no clear-cut outliers evident. Item INT_KNOW_1 approached outlier status but not sufficiently so to be yellow-carded. Taking all of the item statistics of the *gaining intimate knowledge* subscale into account it was decided to retain all of the items included in the subscale.

5.6.6. SELF-INVESTMENT

The *self-investment* subscale is considered to measure a unidimensional construct and it consists of four items. Table 5.11 and Table 5.12 outline the item analysis results for the *self-investment* subscale.

Table 5.11

Cronbach alpha, item means and item standard deviations for task variety subscale

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.886	.887	4

	Mean	Std. Deviation	N
SLF_INVST_1	5.78841	1.059143	397
SLF_INVST_2	5.36398	1.201488	397
SLF_INVST_3	5.62217	1.156148	397
SLF_INVST_4	5.61209	1.231184	397

Note is taken that Table 5.11 indicates a Cronbach alpha of .886 for the *self-investment* subscale which fell above the critical cut-off value of .80. Upon inspection of the item statistics it becomes evident that there was no evidence for the existence of insensitive items. There were no extreme means (ranging from 5.36 to 5.78 on a 7-point Likert scale) that caused the truncation of any of the item response distribution and there were no small standard deviations amongst the four items (1.059 to 1.231). None of the items failed to discriminate between relatively small differences in the latent variable being measured.

Table 5.12

Inter-item correlation matrix, item-total statistics, summary item statistics and scale statistics

	SLF_INVST_1	SLF_INVST_2	SLF_INVST_3	SLF_INVST_4
SLF_INVST_1	1.000	.630	.669	.702
SLF_INVST_2	.630	1.000	.742	.620
SLF_INVST_3	.669	.742	1.000	.613
SLF_INVST_4	.702	.620	.613	1.000

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
SLF_INVST_1	16.59824	9.937	.760	.592	.852
SLF_INVST_2	17.02267	9.189	.755	.602	.851
SLF_INVST_3	16.76448	9.349	.770	.623	.845
SLF_INVST_4	16.77456	9.205	.724	.551	.864

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	5.597	5.364	5.788	.424	1.079	.031	4
Item Variances	1.354	1.122	1.516	.394	1.351	.029	4
Inter-Item Correlations	.663	.613	.742	.128	1.209	.002	4

Mean	Variance	Std. Deviation	N of Items
22.38665	16.131	4.016349	4

The inter-item correlations indicate that all the items correlate satisfactory with each other which implies that the items in the subscale shared a common source of systematic variance and, therefore, it reflects good levels of internal consistency. Moreover, none of the items consistently correlated below the mean inter-item correlation (.663) with the remaining items of the subscale. Furthermore, the Cronbach alpha did not increase if any of the items were deleted from this subscale. Finally, the item-total correlations were all above .50 as were the squared multiple correlations. Considering that the standard deviations, item-total correlations and squared multiple correlations indicated that there were no outliers evident toward the lower end of the distributions, it was decided to retain all of the items in the *self-investment* subscale.

5.6.7. GAINING CONTROL

The *gaining control* subscale is considered to measure a unidimensional construct and the subscale consists of six items. Table 5.13 and Table 5.14 outline the item analysis results for the *gaining control* subscale.

Table 5.13

Cronbach alpha, item means and item standard deviations for gaining control subscale

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.900	.903	6

Table 5.13

Cronbach alpha, item means and item standard deviations for gaining control subscale (continued)

	Mean	Std. Deviation	N
CONTROL_1	4.62720	1.258131	397
CONTROL_2	4.52645	1.481342	397
CONTROL_3	4.60705	1.465685	397
CONTROL_4	4.13854	1.623206	397
CONTROL_5	4.59194	1.333233	397
CONTROL_6	4.42065	1.596042	397

From the Table 5.13 it is clear that there were no extreme means (ranging from 4.13 to 4.62 on a 7-point Likert scale) nor were there any small standard deviations (1.258 to 1.623). none of the items therefore showed themselves as insensitive items that failed to discriminate between relatively small differences on the latent variable being measured. Note is taken of the Cronbach Alpha of .900 that was reported which fell well above the critical cut-off of .80.

Table 5.14

Inter-item correlation matrix, item-total statistics, summary item statistics and scale statistics

	CONTROL_1	CONTROL_2	CONTROL_3	CONTROL_4	CONTROL_5	CONTROL_6
CONTROL_1	1.000	.676	.658	.446	.594	.476
CONTROL_2	.676	1.000	.711	.517	.692	.564
CONTROL_3	.658	.711	1.000	.500	.709	.522
CONTROL_4	.446	.517	.500	1.000	.626	.720
CONTROL_5	.594	.692	.709	.626	1.000	.698
CONTROL_6	.476	.564	.522	.720	.698	1.000

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
CONTROL_1	22.28463	39.275	.677	.528	.890
CONTROL_2	22.38539	35.844	.761	.631	.877
CONTROL_3	22.30479	36.278	.742	.627	.880
CONTROL_4	22.77330	35.772	.676	.553	.892
CONTROL_5	22.31990	36.577	.817	.681	.870
CONTROL_6	22.49118	35.261	.724	.623	.884

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	4.485	4.139	4.627	.489	1.118	.034	6
Item Variances	2.148	1.583	2.635	1.052	1.665	.171	6
Inter-Item Correlations	.607	.446	.720	.274	1.616	.009	6

Mean	Variance	Std. Deviation	N of Items
26.91184	51.530	7.178446	6

The inter-item correlations in Table 5.14 indicate that all six of the items in die scale correlated moderately with each other. None of the items consistently correlated below the mean inter-item correlation (.607) with the remaining items of the subscale. Therefore, responses to the six items tended to be reasonably in unison because they all more or less to the same degree tapped into the same source of systematic variance. Furthermore, all the corrected item-total correlations and the squared multiple correlations were above .50 with none of the items presenting themselves as potential outliers, indicating that items seem to be measuring the same underlying latent variable. Finally, the fact that the Cronbach alpha decreased when any of the items were deleted indicated that the internal consistency would only be negatively influenced if any items were to be removed corroborating the conclusion derived from the foregoing item statistics. Therefore, it was decided to retain all of the items in the *gaining control* subscale.

5.6.8. PERCEIVED ABILITY OF JOB TO SATISFY NEED FOR SELF- EFFICACY

The *perceived ability of job to satisfy self-efficacy need* scale is considered to measure a unidimensional construct and it consists of six items. Table 5.15 and Table 5.16 outline the results of the item analysis of the scale.

Table 5.15

Cronbach alpha, item means and item standard deviations for perceived ability of job to satisfy self-efficacy need scale

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.874	.875	6

	Mean	Std. Deviation	N
PERC_EFF_1	3.63728	.849492	397
PERC_EFF_2	3.38035	1.034221	397
PERC_EFF_3	3.47859	.928053	397
PERC_EFF_4	3.89924	.898891	397
PERC_EFF_5	3.53149	.954596	397
PERC_EFF_6	3.32746	.928547	397

Note is taken that Table: 5.15 shows a Cronbach alfa of .874. Furthermore, the item statistics show that there were no extreme means (ranging from 3.27 to 3.89 on a 5-point Likert scale) and there were no noteworthy small standard deviations (.898 to 1.034) which implies an absence of insensitive items. At first glance, it could seem as if PERC_EFF_1 might be somewhat insensitive compared to the other items but this item does not really deserve to be yellow-carded as an outlier. Moreover, it is apparent from Table 5.16 that its slightly smaller

standard deviation was inconsequential in its effect on the ability of the item to covary with the remaining items of the scale.

Table 5.16

Inter-item correlation matrix, item-total statistics, summary item statistics and scale statistics

	PERC_EFF_1	PERC_EFF_2	PERC_EFF_3	PERC_EFF_4	PERC_EFF_5
PERC_EFF_1	1.000	.626	.528	.465	.631
PERC_EFF_2	.626	1.000	.591	.403	.606
PERC_EFF_3	.528	.591	1.000	.448	.513
PERC_EFF_4	.465	.403	.448	1.000	.619
PERC_EFF_5	.631	.606	.513	.619	1.000
PERC_EFF_6	.622	.527	.512	.451	.544

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
PERC_EFF_1	17.61713	13.924	.733	.561	.845
PERC_EFF_2	17.87406	13.030	.695	.530	.850
PERC_EFF_3	17.77582	13.922	.651	.440	.857
PERC_EFF_4	17.35516	14.462	.588	.418	.867
PERC_EFF_5	17.72292	13.226	.742	.585	.841
PERC_EFF_6	17.92695	13.836	.665	.464	.855

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	3.542	3.327	3.899	.572	1.172	.043	6
Item Variances	.872	.722	1.070	.348	1.482	.014	6
Inter-Item Correlations	.539	.403	.631	.228	1.567	.005	6

Mean	Variance	Std. Deviation	N of Items
21.25441	19.291	4.392172	6

Table 5.16 does suggest that PERC_EFF_4 might be a cause for concern as it has the lowest correlations with the other items (ranging from .403 to .619). Item PERC_EFF_4, however, it does not consistently correlate below the mean inter-item correlation (.539) with the remaining items of the scale, and where they were lower, they were not dramatically lower. The corrected item-total correlation tended to fall somewhat away from the typical value returned by the other items but not to a degree that justified it being yellow-carded as an outlier. A similar trend revealed itself with regards to the squared multiple correlation associated with item PERC_EFF_4. Moreover, this interpretation was supported by the finding that the Cronbach alfa would in fact slightly decrease (.874 to 867) if this item were to be deleted. In fact, the deletion of any one of the items would negatively impact the internal consistency of the scale. Therefore, it was decided to retain all the items.

5.6.9. PERCEIVED ABILITY OF JOB TO SATISFY NEED FOR IDENTITY

The *perceived ability of job to satisfy self-identity need* scale is considered to measure a unidimensional construct and it consists of four items. Table 5.17 and Table 5.18 outline the results of the item analysis of the scale.

Table 5.17

Cronbach alpha, item means and item standard deviations for perceived ability of job to satisfy self-identity need scale

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.854	.857	6

	Mean	Std. Deviation	N
PERC_IDENT_1	3.59194	.939985	397
PERC_IDENT_2	3.62720	.922264	397
PERC_IDENT_3	3.65743	.933943	397
PERC_IDENT_4	3.46348	1.069221	397
PERC_IDENT_5	3.41814	1.000744	397
PERC_IDENT_6	3.13350	1.061165	397

Note is taken that Table 5.17 indicates a Cronbach alpha of .854. Additionally, there seems to be no extreme means (3.13 to 3.66) nor were there any small standard deviations present (.9222 to 1.069). Therefore, there seems to be no evidence for the possible existence of insensitive items that failed to discriminate between relatively small differences on the latent variable being measured.

Table 5.18

Inter-item correlation matrix, item-total statistics, summary item statistics and scale statistics

	PERC_IDENT_1	PERC_IDENT_2	PERC_IDENT_3	PERC_IDENT_4	PERC_IDENT_5	PERC_IDENT_6
PERC_IDENT_1	1.000	.643	.574	.500	.458	.353
PERC_IDENT_2	.643	1.000	.646	.491	.509	.425
PERC_IDENT_3	.574	.646	1.000	.516	.437	.418
PERC_IDENT_4	.500	.491	.516	1.000	.689	.402
PERC_IDENT_5	.458	.509	.437	.689	1.000	.421
PERC_IDENT_6	.353	.425	.418	.402	.421	1.000

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
PERC_IDENT_1	17.29975	14.801	.649	.482	.828
PERC_IDENT_2	17.26448	14.564	.705	.561	.819
PERC_IDENT_3	17.23426	14.710	.670	.502	.825
PERC_IDENT_4	17.42821	13.846	.677	.546	.823
PERC_IDENT_5	17.47355	14.391	.657	.526	.827
PERC_IDENT_6	17.75819	15.083	.506	.264	.856

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	3.482	3.134	3.657	.524	1.167	.038	6
Item Variances	.980	.851	1.143	.293	1.344	.017	6
Inter-Item Correlations	.499	.353	.689	.336	1.950	.010	6

Mean	Variance	Std. Deviation	N of Items
20.89169	20.380	4.514383	6

Table 5.18 does however indicate that PERC_IDENT_6 may be problematic due to the lower inter-item correlations of this item. Item PERC_IDENT_6 consistently correlated lower than the mean inter-item correlation (.499) with the remaining items of the scale. Furthermore, the corrected item-total correlation for PERC_IDENT_6 also fell somewhat away from the values returned by the other items. Also, worth noting is that the squared multiple correlation for PERC_IDENT_6 seems to be a clear outlier toward the lower end of the distribution of values. Finally, this evidence is corroborated by the Cronbach alpha which slightly increases upon deletion of PERC_IDENT_6. However, this increase is marginal (.854 to .856) and further investigation was necessary to determine if this item should in fact be deleted. The researcher therefore bore the problematic item in mind during the factor analysis procedure. Therefore, it was decided to provisionally retain all of the items, including PERC_IDENT_6, until after completion of the dimensionality analysis.

5.6.10. INTERNAL LOCUS OF CONTROL

The *internal locus of control* scale measures a unidimensional construct and the scale consists of eight items. Table 5.19 and Table 5.20 outline the results of the item analysis of the scale.

Table 5.19

Cronbach alpha, item means and item standard deviations for internal locus of control scale

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.614	.635	8

	Mean	Std. Deviation	N
LOC_1	3.71788	.868069	397
LOC_2	2.91940	1.167122	397
LOC_3	3.92947	.735165	397
LOC_4	2.94710	1.222567	397
LOC_5	3.15365	1.017061	397
LOC_6	3.62217	.764300	397
LOC_7	3.97481	.787766	397
LOC_8	3.97229	.701181	397

Note is taken of the fact that the Cronbach coefficient of internal consistency for the scale (.614) fell substantially below the critical cut-off value of .80. The McDonald ω was likewise disappointingly low at .641. This result did not correspond to the reported reliability coefficient of .81 by McIntyre et al (2009). There were no extreme means (2.91 to 3.97), however, the

scale seemed to be somewhat plagued with insensitive items which is indicated by the four rather small standard deviations (ranging from .701 to .787).

Table 5.20

Inter-item correlation matrix, item-total statistics, summary item statistics and scale statistics

	LOC_1	LOC_2	LOC_3	LOC_4	LOC_5	LOC_6	LOC_7	LOC_8
LOC_1	1.000	.070	.024	.183	.041	.094	.193	.178
LOC_2	.070	1.000	.199	.204	.274	.048	.152	.084
LOC_3	.024	.199	1.000	.122	.204	.258	.280	.339
LOC_4	.183	.204	.122	1.000	.315	.214	.033	-.028
LOC_5	.041	.274	.204	.315	1.000	.432	.055	.204
LOC_6	.094	.048	.258	.214	.432	1.000	.244	.235
LOC_7	.193	.152	.280	.033	.055	.244	1.000	.355
LOC_8	.178	.084	.339	-.028	.204	.235	.355	1.000

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
LOC_1	24.51889	12.882	.199	.095	.612
LOC_2	25.31738	11.293	.283	.141	.596
LOC_3	24.30730	12.471	.359	.202	.573
LOC_4	25.28967	10.989	.295	.173	.595
LOC_5	25.08312	10.975	.425	.312	.545
LOC_6	24.61461	12.172	.397	.275	.563
LOC_7	24.26196	12.547	.306	.215	.585
LOC_8	24.26448	12.791	.317	.244	.584

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	3.530	2.919	3.975	1.055	1.362	.207	8
Item Variances	.860	.492	1.495	1.003	3.040	.153	8
Inter-Item Correlations	.179	-.028	.432	.460	-15.313	.013	8

Mean	Variance	Std. Deviation	N of Items
28.23678	14.873	3.856564	8

From Table 5.20 above the inter-item correlations display several weak correlations between multiple sets of items. LOC_1 and LOC_2 was flagged as especially problematic due to their excessively low inter-item correlations. Nonetheless, none of the items consistently correlated below the mean inter-item correlation (.179) with the remaining items of the scale. This supposition is corroborated by the low squared multiple correlations of the two problematic items (.095 and .141) which implies that these two items share insufficient variance with the remainder of the items. This is, however, generally true for all the items. Items LOC_1 and LOC_2 could not be flagged as convincing outliers in either the distribution of corrected item-total correlations or in the distribution of squared multiple correlations. The deletion of these two items did not improve the internal consistency of the subscale which will remain unacceptably lower than the critical cut-off value of .80. Furthermore, no items, if deleted, would improve the Cronbach alpha.

Given the disappointing item statistics a restricted exploratory factor analysis was ran on the *internal local of control* data in which the solution was constrained to a single factor given that the *internal locus of control* construct was conceptualised as a unidimensional construct. The single-factor model fitted poorly with 19 (67%) of the residual correlations exceeding .05. The Kaiser-rule suggested the extraction of three factors. The scree plot provided no clear guidance on the number of factors to extract showing almost a linear trend between the eigenvalues and the factor number. The 3-factor pattern matrix made no conceptual sense although it fitted the data reasonably well with 4 (14%) of the residual correlations greater than .05.

Therefore, it was decided that the scale could not be included in further analyses of the structural model. The *internal locus of control* latent variable was therefore removed from the structural model.

5.6.11. FEELINGS OF EFFICACY

The *feelings of efficacy* scale measures a unidimensional construct and the scale consists of ten items. Tables 5.21 and 5.22 outline the results of the item analysis of the scale.

Table 5.21

Cronbach alpha, item means and item standard deviations for feelings of efficacy scale

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.826	.831	10

	Mean	Std. Deviation	N
FEEL_EFF_1	4.03526	.713340	397
FEEL_EFF_2	3.26196	.882998	397
FEEL_EFF_3	3.65491	.774797	397
FEEL_EFF_4	3.89421	.764682	397
FEEL_EFF_5	3.77078	.772215	397
FEEL_EFF_6	3.97985	.651026	397
FEEL_EFF_7	3.73300	.781248	397
FEEL_EFF_8	3.77834	.686253	397
FEEL_EFF_9	3.88413	.697525	397
FEEL_EFF_10	3.84887	.668429	397

Note is taken that Table 5.21 indicates a Cronbach alpha of .826 which fell above the critical cut-off value of .80. Furthermore, the absence of extreme means (means range from 3.261 to 4.035 on a 5-point Likert scale) and the absence of small standard deviations (.668 to .883) suggest that there were no insensitive items that failed to discriminate between relatively small differences in the latent variable being measured in the *feelings of efficacy* scale.

The squared multiple correlations shown in Table 5.22 were all above .22 and no outliers were evident towards the lower end of the distributions of values. Table 5.22 also indicates that the Cronbach alpha would not improve if any one of the items were to be removed. Furthermore, the corrected item-total correlations were all above .3 and no outliers were evident towards the lower end of the distribution of values. No clear outliers were evident in the distribution of squared multiple correlations either. Therefore, it was decided that all the items should be retained for the *feelings of efficacy* subscale.

Table 5.22

Inter-item correlation matrix, item-total statistics, summary item statistics and scale statistics

	FEEL_EFF_1	FEEL_EFF_2	FEEL_EFF_3	FEEL_EFF_4	FEEL_EFF_5	FEEL_EFF_6	FEEL_EFF_7	FEEL_EFF_8	FEEL_EFF_9	FEEL_EFF_10
FEEL_EFF_1	1.000	.330	.200	.053	.111	.426	.203	.305	.450	.265
FEEL_EFF_2	.330	1.000	.332	.322	.255	.255	.281	.250	.345	.294
FEEL_EFF_3	.200	.332	1.000	.364	.247	.226	.310	.188	.253	.211
FEEL_EFF_4	.053	.322	.364	1.000	.442	.315	.341	.311	.242	.413
FEEL_EFF_5	.111	.255	.247	.442	1.000	.383	.359	.276	.283	.353
FEEL_EFF_6	.426	.255	.226	.315	.383	1.000	.397	.533	.468	.359
FEEL_EFF_7	.203	.281	.310	.341	.359	.397	1.000	.393	.457	.469
FEEL_EFF_8	.305	.250	.188	.311	.276	.533	.393	1.000	.516	.472
FEEL_EFF_9	.450	.345	.253	.242	.283	.468	.457	.516	1.000	.564
FEEL_EFF_10	.265	.294	.211	.413	.353	.359	.469	.472	.564	1.000

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
FEEL_EFF_1	33.80605	18.525	.397	.326	.821
FEEL_EFF_2	34.57935	17.285	.464	.256	.817
FEEL_EFF_3	34.18640	18.172	.409	.224	.821
FEEL_EFF_4	33.94710	17.712	.493	.371	.812
FEEL_EFF_5	34.07053	17.808	.471	.297	.815
FEEL_EFF_6	33.86146	17.817	.588	.442	.804
FEEL_EFF_7	34.10831	17.218	.562	.354	.805
FEEL_EFF_8	34.06297	17.756	.561	.414	.806
FEEL_EFF_9	33.95718	17.334	.629	.501	.799
FEEL_EFF_10	33.99244	17.659	.599	.452	.803

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	3.784	3.262	4.035	.773	1.237	.047	10
Item Variances	.551	.424	.780	.356	1.840	.011	10
Inter-Item Correlations	.329	.053	.564	.510	10.603	.012	10

Mean	Variance	Std. Deviation	N of Items
37.84131	21.472	4.633814	10

5.6.12. INTEGRATION WITH JOB

The construct measured by the *integration with job* scale is considered a unidimensional construct and the scale consists of five items. Table 5.23 and Table 5.24 outline the results of the item analysis of the subscale.

Table 5.23

Cronbach alpha, item means and item standard deviations for integration with job scale

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.852	.853	5

	Mean	Std. Deviation	N
INTEGR_1	3.68766	.903514	397
INTEGR_2	3.55416	.899053	397
INTEGR_3	3.19647	1.030685	397
INTEGR_4	3.63980	.917687	397
INTEGR_5	3.37783	1.074645	397

Note is taken that a Cronbach alpha of .852 was reported for the *integration with job* scale, which was above the critical cut-off of .80. There were no extreme means (ranging from 3.196 to 3.688 on a 5-point Likert scale) and no substantially small standard deviations (ranging from .899 to 1.075) implying the absence of insensitive items.

Table 5.24

Inter-item correlation matrix, item-total statistics, summary item statistics and scale statistics

	INTEGR_1	INTEGR_2	INTEGR_3	INTEGR_4	INTEGR_5
INTEGR_1	1.000	.574	.505	.339	.426
INTEGR_2	.574	1.000	.626	.634	.593
INTEGR_3	.505	.626	1.000	.486	.605
INTEGR_4	.339	.634	.486	1.000	.579
INTEGR_5	.426	.593	.605	.579	1.000

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
INTEGR_1	13.76826	10.623	.554	.372	.848
INTEGR_2	13.90176	9.609	.769	.607	.796
INTEGR_3	14.25945	9.278	.695	.498	.813
INTEGR_4	13.81612	10.191	.626	.471	.831
INTEGR_5	14.07809	9.092	.688	.493	.816

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	3.491	3.196	3.688	.491	1.154	.041	5
Item Variances	.937	.808	1.155	.347	1.429	.026	5
Inter-Item Correlations	.537	.339	.634	.295	1.871	.009	5

Table 5.24

Inter-item correlation matrix, item-total statistics, summary item statistics and scale statistics (continued)

Mean	Variance	Std. Deviation	N of Items
17.45592	14.703	3.834479	5

The inter-item correlations presented in Table 5.24 indicate that all the items correlated reasonably well with each other. Only INTEGR_1 and INEGR_4 correlated slightly lower with each other compared to the rest of the items in the scale. None of the items consistently correlated below the mean inter-item correlation (.537) with the remaining items of the scale. Furthermore, all of the squared multiple correlations and corrected item-total correlations were above .30 and .50 respectively. Only INTEGR_1 had a squared multiple correlation (.372) that fell slightly to the lower end of the distribution of the values. However, this was not considered sufficient evidence to flag item INTEGR_1 as an outlier. Upon consideration of the basket of item statistic evidence, it became evident that all of the items should be retained. This decision was supported by the negative Cronbach alpha change associated with the deletion of any of the items, including INTEGR_1.

5.6.13. MOTIVATION TO PURSUE THE ROUTES TO PSYCHOLOGICAL OWNERSHIP

Motivation to pursue the routes to psychological ownership consists of two subscales containing nine items each. These subscales were analysed separately in the following section.

5.6.13.1. Motivation to Pursue the Routes to Psychological Ownership – Valence subscale

This subscale consists of nine items and the results of the item analysis are depicted in Table 5.25 and Table 5.26 below.

Table 5.25

Cronbach alpha, item means and item standard deviations for the valence subscale

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.840	.859	9

	Mean	Std. Deviation	N
MOT_VAL_1	5.73300	.837411	397
MOT_VAL_2	5.29219	1.089558	397
MOT_VAL_3	5.50126	.973447	397
MOT_VAL_4	5.78338	.914764	397

Table 5.25

Cronbach alpha, item means and item standard deviations for the valence subscale (continued)

	Mean	Std. Deviation	N
MOT_VAL_5	4.59446	1.606260	397
MOT_VAL_6	5.47607	1.104425	397
MOT_VAL_7	5.94207	.831312	397
MOT_VAL_8	5.95466	.854554	397
MOT_VAL_9	5.71537	.925012	397

Note is taken that Table 5.25 indicates a satisfactory Cronbach alpha of .840. Furthermore, it is evident that there were no extreme means (ranging from 4.59 to 5.95 on a 7-point Likert scale) nor were there any small standard deviations (ranging from .831 to 1.606) which implies that there were no insensitive items present in this subscale.

The inter-item correlation matrix presented in Table 5.26 indicated several items that correlated below .30. However, none of the items consistently correlated below the mean inter-item correlation (.404) with the remaining items of the subscale, although item MOT_Val_5 came dangerously close to meeting this criterion. These findings suggest probable factor fission. Moreover, none of the items (also not MOT_VAL_5, although it returned the lowest values) showed themselves as convincing outliers in the distribution of corrected item-total correlations or in the distribution of squared multiple correlations. Only the deletion of MOT_VAL_5 would have a positive, albeit rather marginal, impact on the internal consistency (increase in Cronbach alpha from .840 to .859). Given that this increase will be small, that the internal consistency was already acceptable and, most importantly, given the previously referred to dangers associated with this item statistic (Dunn et al., 2014) it was decided that all of the items should be retained. Exploratory factor analysis will additionally be used to validate this preliminary decision.

Table 5.26

Inter-item correlation matrix, item-total statistics, summary item statistics and scale statistics

	MOT_VAL_1	MOT_VAL_2	MOT_VAL_3	MOT_VAL_4	MOT_VAL_5	MOT_VAL_6	MOT_VAL_7	MOT_VAL_8	MOT_VAL_9
MOT_VAL_1	1.000	.418	.549	.524	**.190**	.405	.467	.442	.475
MOT_VAL_2	.418	1.000	.364	.320	.551	.396	.320	**.229**	.398
MOT_VAL_3	.549	.364	1.000	.465	.314	.529	.463	.501	.532
MOT_VAL_4	.524	.320	.465	1.000	**.234**	.402	.598	.491	.357
MOT_VAL_5	**.190**	.551	.314	**.234**	1.000	.401	**.139**	**.080**	.311
MOT_VAL_6	.405	.396	.529	.402	.401	1.000	.467	.323	.578
MOT_VAL_7	.467	.320	.463	.598	**.139**	.467	1.000	.519	.320
MOT_VAL_8	.442	**.229**	.501	.491	.080	.323	.519	1.000	.485
MOT_VAL_9	.475	.398	.532	.357	.311	.578	.320	.485	1.000

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
MOT_VAL_1	44.25945	32.006	.606	.466	.820
MOT_VAL_2	44.70025	30.397	.571	.429	.821
MOT_VAL_3	44.49118	30.341	.667	.495	.811
MOT_VAL_4	44.20907	31.560	.589	.471	.820
MOT_VAL_5	45.39798	28.816	.409	.389	.859
MOT_VAL_6	44.51637	29.503	.644	.497	.812
MOT_VAL_7	44.05038	32.407	.565	.502	.823
MOT_VAL_8	44.03778	32.723	.511	.454	.828
MOT_VAL_9	44.27708	31.125	.626	.502	.816

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	5.555	4.594	5.955	1.360	1.296	.177	9
Item Variances	1.083	.691	2.580	1.889	3.733	.353	9
Inter-Item Correlations	.404	.080	.598	.517	7.436	.015	9

Mean	Variance	Std. Deviation	N of Items
49.99244	38.447	6.200557	9

The items of the *motivation to pursue the routes to psychological ownership (valence)* subscale tapped into three distinct routes[25]. It therefore makes sense to expect that a 1-factor factor structure would fit the data of the valence items developed to tap into each of the three routes. Items MOT_VAL_1, MOT_VAL_4 and MOT_VAL_7 were written to reflect the *gaining knowledge route*. Items MOT_VAL_2, MOT_VAL_5 and MOT_VAL_8 were written to reflect the *self-investment route.* Items MOT_VAL_3, MOT_VAL_6 and MOT_VAL_9 were written to reflect the *gaining control route.* These three sub-subscales were subsequently item analysed separately. The item analysis results for the *self-investment*, *gaining knowledge* and the *gaining control* valence items are shown in Table 5.27 and Table 5.28.

Table 5.27

Cronbach alpha, item means and item standard deviations for the self-investment, gaining knowledge and the gaining control valence *sub-subscales*

Sub-subscale	Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
Self-investment	.546	.547	3
Gaining knowledge	.772	.772	3
Gaining control	.780	.783	3

Sub-subscale	Item	Mean	Std. Deviation	N
Gaining knowledge	MOT_VAL_1	5.73300	.837411	397
	MOT_VAL_4	5.78338	.914764	397
	MOT_VAL_7	5.94207	.831312	397
Self-investment	MOT_VAL_2	5.29219	1.089558	397
	MOT_VAL_5	4.59446	1.606260	397
	MOT_VAL_8	5.95466	.854554	397
Gaining control	MOT_VAL_3	5.50126	.973447	397
	MOT_VAL_6	5.47607	1.104425	397
	MOT_VAL_9	5.71537	.925012	397

Note is taken of the rather modest Cronbach alpha values that were obtained for the three valence sub-subscales[26]. The lower half of Table 5.27 indicates the identical results reported in Table 5.25 and consequently also the same conclusion.

[25] This implies that the valence subscale cannot be considered unidimensional. The Cronbach alpha estimate reported in Table 4.26 therefore to some degree provided an underestimate of the subscale reliability.

[26] If the subsequent dimensionality analysis would confirm the unidimensionality of the three valence sub-subscales the reliability of the valence subscale would be calculated via the Stratified alpha. This should return a more acceptable reliability coefficient for the subscale.

Table 5.28

Inter-item correlation matrix, item-total statistics, summary item statistics and scale statistics

	MOT_VAL_1	MOT_VAL_4	MOT_VAL_7
MOT_VAL_1	1.000	.524	.467
MOT_VAL_4	.524	1.000	.598
MOT_VAL_7	.467	.598	1.000
	MOT_VAL_2	MOT_VAL_5	MOT_VAL_8
MOT_VAL_2	1.000	.551	.229
MOT_VAL_5	.551	1.000	.080
MOT_VAL_8	.229	.080	1.000
	MOT_VAL_3	MOT_VAL_6	MOT_VAL_9
MOT_VAL_3	1.000	.529	.532
MOT_VAL_6	.529	1.000	.578
MOT_VAL_9	.532	.578	1.000

Sub-subscale	Item	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
	MOT_VAL_1	11.72544	2.437	.556	.312	.746
Gaining knowledge	MOT_VAL_4	11.67506	2.043	.655	.434	.637
	MOT_VAL_7	11.51637	2.341	.613	.390	.686
	MOT_VAL_2	10.54912	3.531	.575	.338	.125
Self-investment	MOT_VAL_5	11.24685	2.343	.437	.306	.363
	MOT_VAL_8	9.88665	5.697	.158	.055	.677
	MOT_VAL_3	11.19144	3.256	.596	.357	.725
Gaining control	MOT_VAL_6	11.21662	2.761	.632	.403	.694
	MOT_VAL_9	10.97733	3.305	.636	.405	.688

Sub-subscale		Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
	Item Means	5.819	5.733	5.942	.209	1.036	.012	3
Gaining knowledge	Item Variances	.743	.691	.837	.146	1.211	.007	3
	Inter-Item Correlations	.530	.467	.598	.130	1.279	.003	3
	Item Means	5.280	4.594	5.955	1.360	1.296	.463	3
Self-investment	Item Variances	1.499	.730	2.580	1.850	3.533	.928	3
	Inter-Item Correlations	.287	.080	.551	.471	6.857	.046	3
	Item Means	5.564	5.476	5.715	.239	1.044	.017	3
Gaining control	Item Variances	1.008	.856	1.220	.364	1.426	.036	3
	Inter-Item Correlations	.546	.529	.578	.049	1.092	.001	3

Sub-subscale	Mean	Variance	Std. Deviation	N of Items
Gaining knowledge	17.45844	4.592	2.142973	3
Self-investment	15.84131	7.073	2.659556	3
Gaining control	16.69270	6.299	2.509834	3

Within each valence sub-subscale, the items correlated moderately high with each other but for MOT_VAL_8 in the *self-investment* valence sub-subscale, that consistently correlated below the mean inter-item correlation (.287) with the remaining items of the sub-subscale. Item MOT_VAL_8's problematic nature also expressed itself in the clear outlier status of this item in the correlated item-total correlation distribution as well as the squared multiple correlation distribution. Item MOT_VAL_8 therefore did not to the same extent respond to the same source of systematic variance as the remaining items of the *self-investment* valence sub-subscale. This inference was further supported by the substantial increase in the Cronbach alpha when this item is deleted from its sub-subscale.

Despite the compelling item statistic evidence against item MOT_VAL_8, the decision whether to delete this item was nonetheless postponed until after completion of the dimensionality analysis. This decision was motivated by the concern that the two motivation to pursue the routes to psychological ownership subscales could, in addition to the narrow factors they were developed to reflect also reflect a broad, general, motivation factor. If this was the case an item like MOT_VAL_8 could still redeem itself by loading strongly on the broad, general, factor.

5.6.13.2.Motivation to Pursue the Routes to Psychological Ownership – Expectancy subscale

This subscale also consists of nine items and the item analysis results are depicted in Table 5.29 and Table 5.30 below.

Table 5.29

Cronbach alpha, item means and item standard deviations for the expectancy subscale

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.870	.878	9

	Mean	Std. Deviation	N
MOT_EXP_1	5.78589	.811535	397
MOT_EXP_2	5.19899	1.192654	397
MOT_EXP_3	5.35013	1.099050	397
MOT_EXP_4	5.77330	.931488	397
MOT_EXP_5	4.81108	1.430928	397
MOT_EXP_6	5.28967	1.132272	397
MOT_EXP_7	5.89924	.840830	397
MOT_EXP_8	5.81360	.984997	397
MOT_EXP_9	5.40302	1.072518	397

Note is taken that this subscale obtained a Cronbach alpha of .870 which fell above the critical cut-off value of .80. The absence of extreme means (4.811 to 5.899) and the absence of small standard deviations (.812 to 1.430) bear testimony to the claim that there were no insensitive items included in this subscale.

Table 5.30

Inter-item correlation matrix, item-total statistics, summary item statistics and scale statistics

	MOT_EXP_1	MOT_EXP_2	MOT_EXP_3	MOT_EXP_4	MOT_EXP_5	MOT_EXP_6	MOT_EXP_7	MOT_EXP_8	MOT_EXP_9
MOT_EXP_1	1.000	.451	.421	.540	.304	.348	.575	.541	.392
MOT_EXP_2	.451	1.000	.569	.357	.620	.436	.365	.322	.417
MOT_EXP_3	.421	.569	1.000	.485	.463	.562	.448	.487	.606
MOT_EXP_4	.540	.357	.485	1.000	.326	**.299**	.606	.502	.329
MOT_EXP_5	.304	.620	.463	.326	1.000	.434	.320	**.220**	.400
MOT_EXP_6	.348	.436	.562	**.299**	.434	1.000	.447	.345	.661
MOT_EXP_7	.575	.365	.448	.606	.320	.447	1.000	.584	.356
MOT_EXP_8	.541	.322	.487	.502	**.220**	.345	.584	1.000	.439
MOT_EXP_9	.392	.417	.606	.329	.400	.661	.356	.439	1.000

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
MOT_EXP_1	43.53904	38.764	.606	.477	.858
MOT_EXP_2	44.12594	35.115	.637	.521	.853
MOT_EXP_3	43.97481	34.934	.724	.568	.845
MOT_EXP_4	43.55164	38.046	.577	.476	.859
MOT_EXP_5	44.51385	34.321	.547	.436	.868
MOT_EXP_6	44.03526	35.782	.626	.533	.854
MOT_EXP_7	43.42569	38.311	.627	.550	.856
MOT_EXP_8	43.51134	37.690	.569	.475	.860
MOT_EXP_9	43.92191	36.153	.639	.548	.853

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	5.481	4.811	5.899	1.088	1.226	.132	9
Item Variances	1.146	.659	2.048	1.389	3.109	.181	9
Inter-Item Correlations	.444	.220	.661	.440	2.997	.012	9

Mean	Variance	Std. Deviation	N of Items
49.32494	45.543	6.748566	9

None of the items consistently correlated below the mean inter-item correlation (.444) with the remaining items of the subscale. The correlations presented in Table 5.30 show clusters of moderately high and moderately low correlations. This does present a cause for concern in as far as it suggests factor fission. As argued with regards to the valence subscale, factor fission is logically to be expected given the manner in which the items for both subscales of the *motivation to pursue the routes to psychological ownership* scale were written. More specifically the two subscales assessed the valence attached to each of the routes to psychological ownership (*gaining intimate knowledge, self-investment* and *gaining control*) and the expectancy that effort will result in the successful travelling of each route. The Cronbach alpha shown in Table 5.29 therefore should provide an underestimate of the reliability of the expectancy subscale. No item showed itself as an outlier in the corrected item-total correlation distribution or in the squared multiple correlation distribution.

The *motivation to pursue the routes to psychological ownership (expectancy)* subscale tapped into the same three distinct routes than the *motivation to pursue the routes to psychological ownership (valence)* subscale. It therefore makes sense to expect that a 1-factor factor structure would also fit the data of the expectancy items developed to tap into each of the three routes. The numbering of the items that were assigned to each route in the *motivation to pursue the routes to psychological ownership (expectancy)* subscale corresponds to the assignment in the *motivation to pursue the routes to psychological ownership (valence)* subscale. These three sub-subscales were subsequently item analysed separately. The item analysis results for the *self-investment, gaining knowledge* and the *gaining control* expectancy items are shown in Table 5.31 and Table 5.32.

Table: 5.31

Cronbach alpha, item means and item standard deviations for the self-investment, gaining knowledge and the gaining control expectancy *sub-subscales*

Sub-subscale	Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
Self-investment	.660	.655	3
Gaining knowledge	.800	.802	3
Gaining control	.823	.824	3

Table 5.31

Cronbach alpha, item means and item standard deviations for the self-investment, gaining knowledge and the gaining control expectancy *sub-subscales (continued)*

Sub-subscale	Item	Mean	Std. Deviation	N
	MOT_EXP_1	5.78589	.811535	397
	MOT_EXP_4	5.77330	.931488	397
Gaining knowledge	MOT_EXP_7	5.89924	.840830	397
	MOT_EXP_2	5.19899	1.192654	397
	MOT_EXP_5	4.81108	1.430928	397
Self-investment	MOT_EXP_8	5.81360	.984997	397
	MOT_EXP_3	5.35013	1.099050	397
	MOT_EXP_6	5.28967	1.132272	397
Gaining control	MOT_EXP_9	5.40302	1.072518	397

Table 5.31 indicates the absence of extreme means in all three sub-subscales. No item presented itself as an outlier in the item standard deviation distributions. Note is taken of the moderately high Cronbach alphas obtained for the *gaining intimate knowledg*e and the *gaining control* expectancy sub-subscales. The *self-investment* expectancy sub-subscale, similar to the *self-investment* valence sub-subscale, returned a disappointingly low Cronbach alpha. Table 5.32 suggests that it is again item MOT_EXP_8 that is the culprit. Item MOT_EXP_8 consistently correlated below the mean inter-item correlation (.387) with the remaining items of the *self-investment* expectancy sub-subscale.

Table 5.32

Inter-item correlation matrix, item-total statistics, summary item statistics and scale statistics

	MOT_EXP_1	MOT_EXP_4	MOT_EXP_7
MOT_EXP_1	1.000	.540	.575
MOT_EXP_4	.540	1.000	.606
MOT_EXP_7	.575	.606	1.000
	MOT_EXP_2	MOT_EXP_5	MOT_EXP_8
MOT_EXP_2	1.000	.620	.322
MOT_EXP_5	.620	1.000	.220
MOT_EXP_8	.322	.220	1.000
	MOT_EXP_3	MOT_EXP_6	MOT_EXP_9
MOT_EXP_3	1.000	.562	.606
MOT_EXP_6	.562	1.000	.661
MOT_EXP_9	.606	.661	1.000

Sub-subscale		Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
	MOT_EXP_1	11.67254	2.524	.621	.389	.752
Gaining knowledge	MOT_EXP_4	11.68514	2.151	.646	.422	.730
	MOT_EXP_7	11.55919	2.343	.674	.454	.697
	MOT_EXP_2	10.62469	3.639	.631	.420	.341
Self-investment	MOT_EXP_5	11.01259	3.149	.539	.385	.480
	MOT_EXP_8	10.01008	5.586	.296	.104	.758
	MOT_EXP_3	10.69270	4.037	.640	.414	.795
Gaining control	MOT_EXP_6	10.75315	3.787	.681	.477	.755
	MOT_EXP_9	10.63980	3.888	.717	.517	.719

Table 5.32

Cronbach alpha, item means and item standard deviations for the self-investment, gaining knowledge and the gaining control expectancy *sub-subscales (continued)*

Sub-subscale		Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Gaining knowledge	Item Means	5.819	5.773	5.899	.126	1.022	.005	3
	Item Variances	.744	.659	.868	.209	1.317	.012	3
	Inter-Item Correlations	.574	.540	.606	.066	1.122	.001	3
Self-investment	Item Means	5.275	4.811	5.814	1.003	1.208	.256	3
	Item Variances	1.480	.970	2.048	1.077	2.110	.293	3
	Inter-Item Correlations	.387	.220	.620	.399	2.812	.034	3
Gaining control	Item Means	5.348	5.290	5.403	.113	1.021	.003	3
	Item Variances	1.213	1.150	1.282	.132	1.115	.004	3
	Inter-Item Correlations	.609	.562	.661	.099	1.176	.002	3

Sub-subscale	Mean	Variance	Std. Deviation	N of Items
Gaining knowledge	17.45844	4.784	2.187294	3
Self-investment	15.82368	7.933	2.816643	3
Gaining control	16.04282	8.071	2.841020	3

Item MOT_EXP_8 also showed itself as an outlier in the distribution of corrected item-total correlations and in the distribution of squared multiple correlations for the *self-investment* expectancy sub-subscale. Despite the rather damning evidence against item MOT_EXP__8 it was decided to postpone the decision on the deletion of this item until after the dimensionality analysis. This decision was based on the same argument that was mobilised to justify a similar decision on item MOT_VAL_8. The foregoing basket of item statistic evidence, coupled with the expected factor fission during the dimensionality analysis, lead to the decision not to remove any of the items within this subscale at this stage.

5.6.14 SELF-IDENTITY NEED

The *self-identity need* scale is considered to measure a unidimensional construct and the scale consists of four items. Table 5.33 and Table 5.34 outline the results of the item analysis of the scale.

Table 5.33

Cronbach alpha, item means and item standard deviations for self-identity scale

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.860	.862	4

	Mean	Std. Deviation	N
SELF_IDENT_1	4.94458	1.489679	397
SELF_IDENT_2	5.33753	1.349121	397
SELF_IDENT_3	5.06549	1.409113	397
SELF_IDENT_4	5.40554	1.180340	397

Note is taken that Table 5.33 indicates a Cronbach alpha of .860 which fell above the critical cut-off value of .80. In terms of the item statistics, the means ranged from 4.94 to 5.40 (on a 7-point scale) and the standard deviations from 1.180 to 1.409. No extreme means or small standard deviations were therefore present in this scale.

Table 5.34

Inter-item correlation matrix, item-total statistics, summary item statistics and scale statistics

	SELF_IDENT_1	SELF_IDENT_2	SELF_IDENT_3	SELF_IDENT_4
SELF_IDENT_1	1.000	.513	.734	.584
SELF_IDENT_2	.513	1.000	.618	.531
SELF_IDENT_3	.734	.618	1.000	.673
SELF_IDENT_4	.584	.531	.673	1.000

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
SELF_IDENT_1	15.80856	11.478	.713	.557	.821
SELF_IDENT_2	15.41562	12.976	.628	.410	.853
SELF_IDENT_3	15.68766	11.241	.812	.667	.775
SELF_IDENT_4	15.34761	13.520	.690	.488	.832

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	5.188	4.945	5.406	.461	1.093	.048	4
Item Variances	1.855	1.393	2.219	.826	1.593	.121	4
Inter-Item Correlations	.609	.513	.734	.221	1.431	.007	4

Mean	Variance	Std. Deviation	N of Items
20.75315	20.899	4.571488	4

The inter-item correlation matrix revealed that all the items correlated adequately (above .50) with the other items in the subscale. None of the items consistently correlated below the mean inter-item correlation (.609) with the remaining items of the scale. The corrected item-total correlations for all the items were above .60. The squared multiple correlations were above .50 for all the items which implies that all of the items seem to be measuring the same underlying construct. Furthermore, Table 5.34 showed that none of the items, if removed, would increase the internal consistency. Consequently, all of the items were retained.

5.6.15. SELF-EFFICACY NEED

The *self-efficacy need* scale is considered to measure a unidimensional construct and the scale consists of four items. Table 5.35 and Table 5.36 outline the results of the item analysis of the scale.

Table 5.35

Cronbach alpha, item means and item standard deviations for the self-efficacy scale

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.886	.888	4

	Mean	Std. Deviation	N
SELF_EFF_1	5.67003	.987003	397
SELF_EFF_2	5.78589	.988317	397
SELF_EFF_3	5.86146	.892421	397
SELF_EFF_4	6.05038	.848338	397

Note is taken of the that Table 5.35 indicates that the *self-efficacy need* scale obtained an alpha coefficient of .889. There were no extreme means (ranging from 5.67 to 6.05) nor were there any small standard deviations (.848 to .988). None of the items therefore had problems discriminating between relatively small differences in the latent variable being measured.

Table 5.36

Inter-item correlation matrix, item-total statistics, summary item statistics and scale statistics

	SELF_EFF_1	SELF_EFF_2	SELF_EFF_3	SELF_EFF_4
SELF_EFF_1	1.000	.686	.650	.659
SELF_EFF_2	.686	1.000	.633	.633
SELF_EFF_3	.650	.633	1.000	.720
SELF_EFF_4	.659	.633	.720	1.000

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
SELF_EFF_1	17.69773	5.762	.757	.576	.851
SELF_EFF_2	17.58186	5.830	.737	.549	.859
SELF_EFF_3	17.50630	6.175	.756	.591	.851
SELF_EFF_4	17.31738	6.349	.762	.597	.851

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	5.842	5.670	6.050	.380	1.067	.026	4
Item Variances	.867	.720	.977	.257	1.357	.017	4
Inter-Item Correlations	.664	.633	.720	.086	1.136	.001	4

Mean	Variance	Std. Deviation	N of Items
23.36776	10.324	3.213099	4

The inter-item correlation matrix revealed that all the items correlated above .60. None of the items correlated consistently below the mean inter-item correlation (.664) with the remaining items of the scale. The corrected item-total correlations for all the items were above .70. The squared multiple correlations were all larger than .50. none of the items showed themselves as outliers in the distribution of corrected item-total correlations or in the distribution of squared multiple correlations. None of the items, if removed, would improve the internal consistency of the scale. All the items were therefore retained.

5.6.16. PERCEIVED ABILITY

The construct measured by the *perceived ability* scale is considered a unidimensional construct and the scale consists of ten items. Table 5.37 and 5.38 outlines the item analysis results obtained for the scale.

Table 5.37

Cronbach alpha, item means and item standard deviations for perceived ability scale

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.784	.794	10

	Mean	Std. Deviation	N
PERC_ABLTY_1	3.28715	.597268	397
PERC_ABLTY_2R	3.02015	.945268	397
PERC_ABLTY_3	3.32494	.641737	397
PERC_ABLTY_4	3.29471	.620604	397
PERC_ABLTY_5R	3.32242	.874340	397
PERC_ABLTY_6R	3.19647	.838883	397
PERC_ABLTY_7	3.38035	.602115	397
PERC_ABLTY_8R	2.96725	.935515	397
PERC_ABLTY_9R	3.49622	.824567	397
PERC_ABLTY_10	3.27708	.634690	397

Note is taken that Table 5.37 indicates a Cronbach's alpha of .784. This falls slightly short of the critical cut-off value of .80 for this study. There were no extreme means present (ranging from 2.967 to 3.496), however, there were a few items that seems to be slightly insensitive compared to the rest of the items as indicated by their relatively smaller standard deviations. These items include PERC_ABLTY_1 (.597), PERC_ABLTY_3 (.641), PERC_ABLTY_4 (.620), PERC_ABLTY_7 (.602) and PERC_ABLTY_10 (.634).

The inter-item correlation matrix shown in Table 5.38 revealed several items that correlated weakly with each other (<.30). None of the items, however, consistently correlated below the mean inter-item correlation with the remaining items of the scale. The clusters of higher correlating items signalled probable factor fission. However, the corrected item-total correlations for all the items were above .30, though it is worth noting that PERC_ABLTY_4

did have a correlation that fell slightly to the lower end of the distribution of the values. Furthermore, PERC_ABLTY_8R had a squared multiple correlation that fell to the lower end of the distribution of values, indicating that this item does not seem to measure the same latent variable as the remaining items. However, upon consideration of the Cronbach alpha changes that will occur with the deletion of any one of the items, it became evident that all of the items should be retained because the internal consistency will suffer if any one of the items, including PERC_ABLTY_4, were to be deleted. However, the slightly weak Cronbach alfa and some possible problematic items were further analysed during the exploratory factor analysis process.

Table 5.38

Inter-item correlation matrix, item-total statistics, summary item statistics and scale statistics

	PERC_ABLTY_1	PERC_ABLTY_2R	PERC_ABLTY_3	PERC_ABLTY_4	PERC_ABLTY_5R	PERC_ABLTY_6R	PERC_ABLTY_7	PERC_ABLTY_8R	PERC_ABLTY_9R	PERC_ABLTY_10
PERC_ABLTY_1	1.000	.218	.230	.377	.141	.371	.377	.161	.223	.502
PERC_ABLTY_2R	.218	1.000	.027	.089	.334	.530	.137	.306	.405	.075
PERC_ABLTY_3	.230	.027	1.000	.425	.281	.205	.398	.152	.215	.454
PERC_ABLTY_4	.377	.089	.425	1.000	.039	.170	.422	.043	.182	.305
PERC_ABLTY_5R	.141	.334	.281	.039	1.000	.354	.251	.278	.369	.194
PERC_ABLTY_6R	.371	.530	.205	.170	.354	1.000	.287	.362	.461	.310
PERC_ABLTY_7	.377	.137	.398	.422	.251	.287	1.000	.152	.265	.510
PERC_ABLTY_8R	.161	.306	.152	.043	.278	.362	.152	1.000	.371	.245
PERC_ABLTY_9R	.223	.405	.215	.182	.369	.461	.265	.371	1.000	.301
PERC_ABLTY_10	.502	.075	.454	.305	.194	.310	.510	.245	.301	1.000

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
PERC_ABLTY_1	29.27960	17.217	.459	.367	.767
PERC_ABLTY_2R	29.54660	15.759	.426	.368	.772
PERC_ABLTY_3	29.24181	17.265	.407	.361	.772
PERC_ABLTY_4	29.27204	17.729	.332	.333	.779
PERC_ABLTY_5R	29.24433	16.039	.435	.272	.769
PERC_ABLTY_6R	29.37028	15.188	.605	.438	.745
PERC_ABLTY_7	29.18640	17.056	.488	.376	.764
PERC_ABLTY_8R	29.59950	15.958	.403	.219	.775
PERC_ABLTY_9R	29.07053	15.581	.551	.341	.753
PERC_ABLTY_10	29.28967	16.822	.504	.466	.762

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	3.257	2.967	3.496	.529	1.178	.025	10
Item Variances	.584	.357	.894	.537	2.505	.049	10
Inter-Item Correlations	.278	.027	.530	.503	19.892	.017	10

Mean	Variance	Std. Deviation	N of Items
32.56675	19.847	4.455017	10

5.6.17. PSYCHOLOGICAL OWNERSHIP

The *psychological ownership* scale is considered to measure a unidimensional construct and the scale consists of ten items. Table 5.39 and 5.40 outlines the results of the item analysis of the scale.

Table 5.39

Cronbach alpha, item means and item standard deviations for psychological ownership scale

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.930	.931	6

	Mean	Std. Deviation	N
PO_1	5.36776	1.193741	397
PO_2	5.42317	1.246112	397
PO_3	5.24181	1.190011	397
PO_4	5.41814	1.159708	397
PO_5	5.57935	1.198432	397
PO_6	5.17506	1.344727	397

Note is taken that Table 5.39 showed that the *psychological ownership* scale reached a Cronbach alpha of .930. This is a very satisfactory coefficient of internal consistency (>.80). When considering the items statistics, the means ranged from 5.241 to 5.579 (on a 7-point Likert scale) and standard deviations from 1.159 to 1.198. Therefore, no extreme means and small standard deviations were evident. None of the items showed themselves as unable to discriminate between relatively small differences in the latent variable being measured.

Table 5.40

Inter-item correlation matrix, item-total statistics, summary item statistics and scale statistics

	PO_1	PO_2	PO_3	PO_4	PO_5	PO_6
PO_1	1.000	.727	.826	.609	.624	.592
PO_2	.727	1.000	.728	.690	.831	.654
PO_3	.826	.728	1.000	.649	.672	.623
PO_4	.609	.690	.649	1.000	.730	.737
PO_5	.624	.831	.672	.730	1.000	.684
PO_6	.592	.654	.623	.737	.684	1.000

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
PO_1	26.83753	28.623	.774	.720	.920
PO_2	26.78212	27.387	.843	.767	.911
PO_3	26.96348	28.307	.806	.735	.916
PO_4	26.78715	28.783	.788	.656	.918
PO_5	26.62594	28.075	.820	.749	.914
PO_6	27.03023	27.529	.751	.606	.924

Table 5.39

Inter-item correlation matrix, item-total statistics, summary item statistics and scale statistics (continued)

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	5.368	5.175	5.579	.404	1.078	.021	6
Item Variances	1.497	1.345	1.808	.463	1.345	.028	6
Inter-Item Correlations	.692	.592	.831	.239	1.404	.005	6

Mean	Variance	Std. Deviation	N of Items
32.20529	39.931	6.319067	6

The inter-item correlation matrix revealed that all the items correlated adequately with each other. None of the items consistently correlated below the mean inter-item correlation with the remaining items of the scale. The squared multiple correlations were all greater than .60. The corrected item-total correlations were all above .70. None of the items showed themselves as outliers in either the corrected item-total correlation distribution or the squared multiple correlation distribution. Furthermore, none of the items, if deleted, would improve the internal consistency of the *psychological ownership* scale. All the items therefore responded to the same source of systematic variance. Therefore, it was decided that all six items should be retained.

5.6.18. ARGUMENT FOR THE USE OF CFA

A number of scales and subscales have been chosen or developed in the current research study to measure latent variables included in the proposed psychological ownership structural model that have been conceptualised as unidimensional latent variables or unidimensional latent dimensions of multidimensional constructs. These scales and subscales comprise item stimuli that were designed to elicit behavioural responses from respondents that reflect their standing, albeit not completely without systematic and random measurement error, on a single, undifferentiated, source of systematic variance. An important question to answer before using the measures to test the validity of the hypothesised structural relations is whether this design intention succeeded. Factor analysis represents a valuable class of statistical analysis techniques to examine this question.

Exploratory factor analysis is used to explore data to determine the number and the nature of factors that account for the covariations between variables when the researcher does not have sufficient priori evidence to form a hypothesis about the number of factors underlying the data and the loading of variables on the factors. Therefore, exploratory factor analysis should

generally be thought of as more of a theory-generating procedure as opposed to a theory-testing procedure (Stevens, 1996).

On the other hand, confirmatory factor analysis (CFA) is generally used to test theory when the researcher has sufficiently strong rationale regarding what factors should be in the data and what variables should define each factor. In confirmatory factor analysis, the researcher begins with a hypothesis prior to the analysis. The measurement model, or measurement hypotheses, specifies which variables will be correlated with which factors and which factors are correlated. These hypotheses are based on a strong theoretical and/or empirical foundation (Steven, 1996). CFA allows the researcher to explicitly test these hypotheses concerning the factor structure of the data due to having the predetermined model specifying the number and composition of factors. Therefore, the utility of EFA or CFA depends, in large part, on the strength of the prior theory, which of course is more of a continuum than an absolute.

Given that the scales and subscales used in the current study have been developed to measure constructs carrying a specific connotative meaning and that scale items have been designated to reflect specific latent dimension of (multidimensional) constructs a confirmatory, hypothesis testing, approach to the dimensionality analysis is the preferred method given its ability to falsify theoretical expectations.. This is true irrespective of whether existing scales or subscales are at stake or scales/subscales that have been developed as part of the current study. In all cases a specific claim is made that the scale or subscale measures a specific (multi- or unidimensional) construct carrying a specific connotative meaning (which inter alias implies a specific internal structure of latent dimensions). A confirmatory, hypothesis testing, approach to the dimensionality analysis, however, need not necessarily use covariance structure analysis.

A distinction was made though in the manner in which the dimensionality of scales or subscales that were developed to measure latent variables that were conceptualised as unidimensional constructs or unidimensional latent dimensions of multidimensional constructs was evaluated, and scales that were developed to measure constructs that were conceptualised as multidimensional constructs. In the case of the scales and subscales that have been chosen or developed in the current research study to measure latent variables included in the proposed psychological ownership structural model that have been conceptualised as unidimensional latent variables or unidimensional latent dimensions of multidimensional constructs the researcher used the SPSS factor analysis algorithm in a CFA mode. Rather than allowing the default eigenvalue-greater-than-unity rule to determine the number of factors to extract, the researcher forced the extraction of a single factor. The validity (i.e. permissibility) of the

extracted factor structure was subsequently evaluated by examining the correlation residuals. A large percentage (i.e. larger than 30%) of large correlation residuals (i.e. larger than .05) commented negatively on the plausibility of the single-factor factor structure as an explanation of the observed inter-item correlation matrix. A large percentage of large correlation residuals therefore meant that the unidimensionality assumption was not corroborated.

In cases where factor fission occurred on scale or subscales that were intended to measure unidimensional constructs or latent dimensions of constructs, and in those cases where a multidimensional factor structure were hypothesised, the researcher performed a CFA via covariance structure analysis utilising LISREL 8.8 to fit the first-order multifactor measurement model described in the pattern matrix or implied by the design intention underpinning the multidimensional scale. In the case of factor fission CFA via LISREL 8.8 was, moreover, used evaluate the fit of either a second-order measurement model or a bi-factor measurement model.

5.6.19. METHODOLOGY USED IN CFA PROCESS

In the case of the scales and subscales that have been chosen or developed in the current research study to measure latent variables included in the proposed psychological ownership structural model that have been conceptualised as unidimensional latent variables or unidimensional latent dimensions of multidimensional constructs restricted principal axis factor analysis was used as the extraction technique to test whether the hypothesised single-factor factor structures does indeed provide credible explanations for the observed inter-item correlation matrix. The correlation matrix was considered for each scale/subscale in order to establish whether the correlation matrix was factor analysable. The matrix should contain numerous statistically significant ($p < .05$) correlations larger than .30. In addition, the Kaiser-Meyer-Olkin (KMO) statistic for each scale/subscale should approach unity (> .60) for the correlation matrix to be deemed factor analysable (Tabachnick & Fidell, 2007). The KMO represents a measure of the sampling adequacy and reflects the ratio of the sum of the squared inter-item correlations to the sum of the squared inter-item correlations plus the sum of the squared partial inter-item correlations, summed across all correlations. The decision on the null hypothesis, tested via Bartlett's test of sphericity, represented an additional criterion that was considered to determine the factor analysability of each scale/subscale. The Bartlett's test of sphericity tests the null hypothesis that the correlation matrix is an identity matrix in the parameter (Tabachnick & Fidell, 2007).

The SPSS 26 principal factor analysis algorithm was used in a CFA mode by fixing the number of factors to be extracted to one. The number of factors with eigenvalues greater than one and on the location of the elbow in the scree plot (Tabachnick & Fidell, 2007) were not considered. The extracted single-factor factor structure was considered valid and credible (i.e. to provide a permissible explanation of the observed inter-item correlation matrix) if the percentage of large residual correlations (i.e. $(rij - \widehat{rij} \geq .05)$ were less than or equal to 30%. The unidimensionality assumption was considered supported if the percentage large residual correlations were less than 30%. Furthermore, the factor loadings of a single item on the single extracted factor was considered acceptable if a λ_{ij}-value of >.50 was obtained. If the unidimensionality hypothesis was not supported the principal factor analysis was reran but as an unrestricted analysis where the eigenvalue-greater-than-one rule determined the number of factors to extract. If the resultant factor structure was considered questionable as judged by the percentage large residual correlations the extraction of an additional factor was requested. Once the extracted factor structure was considered valid and credible based on the percentage large residual correlations, the first-order multifactor measurement model implied by the pattern matrix was fitted via covariance structure analysis. If this first-order model fitted at least reasonably well a second-order measurement model in which the first-order factors loaded onto single second-order factor was fitted so as to test the statistical significance of the indirect effects of the single second-order factor on the scale/subscale items. If the first-order model fitted poorly the possibility of a bifactor model was examined. The results obtained for each scale/subscale will be discussed in greater detail in the subsequent sections.

5.6.20. JOB CHARACTERISTICS SCALE

The *job characteristic* scale comprised four subscales measuring *autonomy*, *task identity*, *task variety* and *task significance*. Feedback was not measured. Each subscale comprised of three items.

5.6.20.1. Autonomy

The correlations matrix for the *autonomy* subscale was factor analysable as all the correlations were larger than .40 and all were statistically significant ($p < .05$). In addition, the Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO) was .648 and the Bartlett test of sphericity indicated that the identity matrix null hypothesis could be rejected ($p < .05$). This served as evidence that the subscale was factor analysable.

The reproduced correlations matrix revealed that there were no nonredundant residuals with absolute values greater than .05 which suggests that the requested 1-factor extraction provided a highly credible explanation for the observed inter-item correlations matrix. Evidence for the 1-factor solution was corroborated by the eigenvalue-greater-than-one rule and the location of the elbow in the scree plot, both which suggested that only one factor should be extracted. The unidimensionality assumption for this subscale was thus supported. Furthermore, the factor matrix (Table 5.41) indicated that all of the items loaded satisfactory on the single extracted factor ($\lambda_{ij} > .50$).

The proportion of systematic variance in the *autonomy* total scores accounted for by a general factor (coefficient omega) was estimated using JASP software which provides a McDonald' coefficient omega (.79). The general factor was estimated to account for 79% of the variance in *autonomy* total scores based on the one-factor model according to McDonald's ω. The Cronbach alpha obtained for this subscale was .777 (see Table 5.1). The reliability of the *autonomy* subscale was border-line satisfactory as judged by the .80 critical cut-off value.

Table 5.41

Factor structure for the autonomy subscale

	Factor 1
AUT_3	.936
AUT_2	.677
AUT_1	.604

5.6.20.2. Task-identity

The *task-identity* subscale contained item pair correlations that were all larger than .30 and that were statistically significant ($p < .05$). Furthermore, the subscale obtained a KMO-value of .715 and Bartlett's test of sphericity indicated that the identity matrix null hypothesis could be rejected ($p < .05$). Therefore, the correlation matrix was factor analysable.

The reproduced correlation matrix indicated there were no nonredundant residuals which had absolute values greater than .05. Therefore, the 1-factor solution provides a highly valid and credible explanation for the observed inter-item correlation matrix. The unidimensionality assumption was therefore verified. In line with what was hypothesised in Chapter 3, the eigenvalue-greater-than-one rule and the scree plot both suggested the extraction of one factor. The factor matrix, shown in Table 5.42, indicated that all the items loaded satisfactory on one factor ($\lambda_{ij} > .50$).

McDonald's coefficient omega demonstrated that the general factor was estimated to account for 83% of the variance in *task identity* total scores based on the one-factor model. The Cronbach alpha obtained for this subscale was .826 (see Table 5.3). This *task identity* subscale demonstrated adequate internal consistency.

Table 5.42

Factor structure for the task-identity subscale

	Factor 1
TSK_IDENT_3	.826
TSK_IDENT_2	.802
TSK_IDENT_1	.722

5.6.20.3. Task variety

All item pairs in the correlation matrix attained correlations that were larger than .30 and that were statistically significant ($p < .50$). The subscale obtained a satisfactory KMO-value of .633 (> .60) and the Bartlett test of sphericity indicated that the identity matrix null hypothesis could be rejected ($p < .50$). Based on the basket of evidence mentioned, it was decided that the subscale was factor analysable.

The reproduced correlation matrix indicated the absence of nonredundant residuals with absolute values greater than .05. This indicated that the 1-factor solution provides a sound explanation for the observed inter-item correlation matrix. The eigenvalue-greater-than-one-rule and the location of the elbow in the scree plot both suggested that only one factor should be extracted. Therefore, the unidimensionality assumption for this subscale was corroborated. Furthermore, the factor matrix, as indicated in Table 5.43, revealed that all of the items loaded satisfactory on the extracted factor ($\lambda_{ij} > .50$).

McDonald's coefficient omega demonstrated that the general factor was estimated to account for 85% of the variance in *task variety* total scores based on the one-factor model. The Cronbach alpha obtained for this subscale was .826 (see Table 5.5). This *task variety* subscale demonstrated adequate internal consistency as judged by the .80 critical cut-off value.

Table 5.43

Factor structure for the task variety subscale

	Factor 1
TSK_VAR_3	.957
TSK_VAR_2	.883
TSK_VAR_1	.541

5.6.20.4. Task significance

All the it item pairs in the correlation matrix obtained correlations that were larger than .30 and all were statistically significant ($p < .05$). The *task significance* subscale obtained a sufficiently large KMO-value of .690 and the Bartlett's Test of sphericity indicated that the identity matrix null hypothesis could be rejected ($p < .05$). Therefore, the correlation matrix was factor analysable.

The residual correlation matrix indicated that no nonredundant residual correlations had an absolute value greater than .05. This implies that the 1-factor solution provides a valid explanation for the observed inter-item correlation matrix. The eigenvalue-greater-than-one rule and the scree plot, moreover, both suggested the extraction of one factor. The unidimensionality assumption for this subscale was therefore corroborated. The factor matrix, shown in Table 5.44, revealed that all of the items loaded satisfactory on the extracted factor ($\lambda_{ij} > .50$).

McDonald's coefficient omega demonstrated that the general factor was estimated to account for 79% of the variance in *task significance* total scores based on the one-factor model. The Cronbach alpha obtained for this subscale was .784 (see Table 5.7). This estimate demonstrates borderline satisfactory internal consistency reliability as judged by the .80 critical cut-off value.

Table 5.44

Factor structure for the task significance subscale

	Factor 1
TSK_SIG_3	.845
TSK_SIG_2	.695
TSK_SIG_1	.690

5.6.20.5. The Multidimensional Job Characteristics Scale

Job characteristics formed a single multidimensional latent variable in the proposed psychological ownership structural model. The construct validity of the job characteristic measures were therefore further evaluated by evaluating the fit of the job characteristics scale measurement model, and by evaluating the statistical significance and magnitude of the measurement model parameter estimates, provided adequate fit was obtained.

The default estimation method (maximum likelihood (ML) estimation when fitting measurement models to continuous data assumes multivariate normality. Violation of this assumption can cause the chi-square fit statistic and parameter estimate standard errors to be

biased (Diamantopoulos & Siguaw, 2000). Table 5.45 indicates that the skewness and kurtosis chi-square statistic was statistically significant ($p < .05$) and that the null hypothesis that the multi-indicator job characteristic item distribution follows a multivariate normal distribution in the parameter, consequently had to be rejected.

Table 5.45

Test of multivariate normality of the job characteristic scale before normalisation

Skewness			Kurtosis			Skewness and Kurtosis	
Value	z-score	p-value	Value	z-score	p-value	Chi-square	p- value
24.902	26.502	0.000	203.726	11.998	0.000	846.297	0.000

Normalisation of the multi-indicator job characteristic item distribution was attempted. Table 5.46 indicates that the procedure reduced the deviation of the normalised item distribution from a multivariate normal distribution but not to such a degree that the discrepancy could be explained in terms of sampling error only. The multivariate normality null hypothesis still had to be rejected.

Table 5.46

Test of multivariate normality of the job characteristic scale after normalisation

Skewness			Kurtosis			Skewness and Kurtosis	
Value	z-score	p-value	Value	z-score	p-value	Chi-square	p-value
20.550	22.350	0.000	193.839	9.764	0.000	594.828	0.000

Because of the smaller skewness and kurtosis chi-square statistic of the normalised distribution the normalised data was analyses. Because the skewness and kurtosis chi-square statistic was still statistically significant ($p < .05$) robust maximum likelihood (RML) estimation was used to obtain estimates for the freed measurement model parameters.

The fitted job characteristic measurement model showed poor fit. (RMSEA .099; $p < .05$). Both the exact fit and close fit null hypotheses had to be rejected ($p < .05$). Figure 5.1 shows the statistically significant ($p < .01$) modification index values for the fitted model. The relatively large number of statistically significant ($p < .01$) modification index values for the off-diagonal of the measurement error variance-covariance matrix suggested that the model failed to model a source of common systematic variance that affects the response to the majority of the scale items.

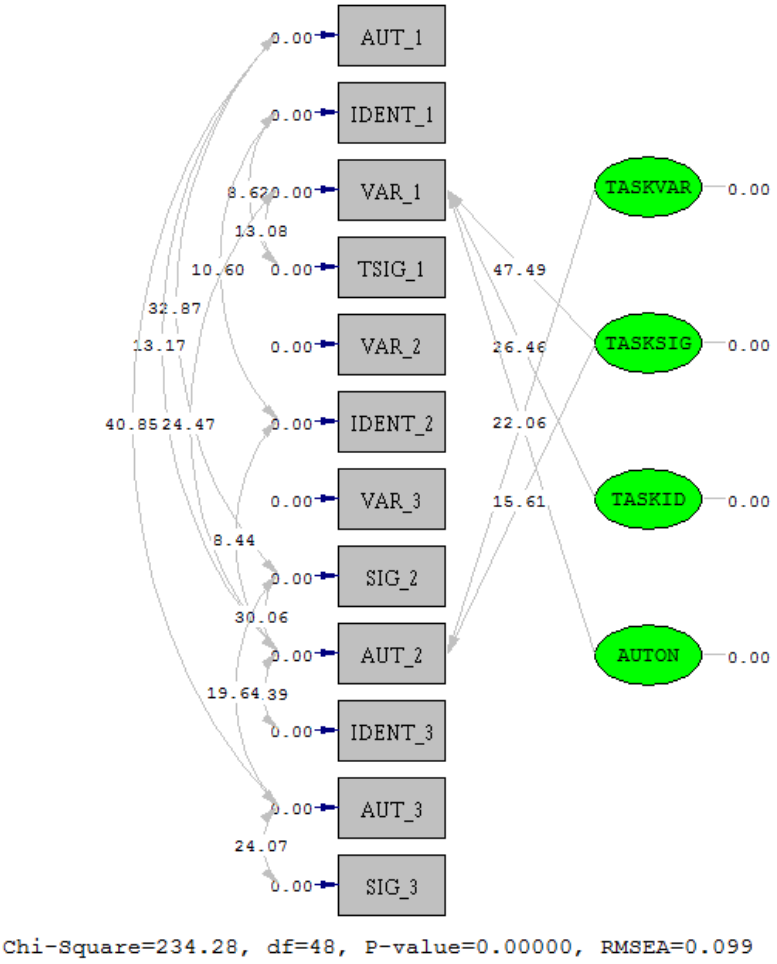

Figure 5.1. statistically significant (p < .01) modification index values for the first-order 4-factor *job characteristics* measurement model

A bifactor model (Reise, 2012) in which all items loaded on a broad, general *job characteristic* factor in addition to a specific, narrow, latent *job characteristic* dimension was subsequently fitted to the *job characteristic* scale data[27]. Although the job characteristic construct was not conceptualised or operationalised at the outset to allow for a broad, general, job characteristics factor, such a factor does make conceptual sense, even when introduced *post hoc*[28]. It represents in essence a broad, general sense of the extent to which the job is enriched with intrinsic motivational value. The bifactor model converged in 111 iterations with a close fitting

[27] The model was specified so that the four narrow, more specific, latent job characteristic dimensions are uncorrelated with the broad, general factor.

[28] It is acknowledged that it would have been preferable to have conceptualised and operationalised the *job characteristics* construct from the outset in a manner that makes provision for a broad, general factor, independent of the correlated group factors. The fact is, however, that the initial first-order four-factor *job characteristics* measurement model fitted poorly and that allowing for a broad, general, factor improved the fit to a degree that made the measurement model a plausible depiction of the mechanism that produced the observed inter-item correlation matrix.

(RMSEA=.065; p > .05), but inadmissible solution. The measurement error variance estimates for two items (AUT_3 and SIG_3) were negative. These two measurement error variances were subsequently constrained to .05 in the parameter. The fitted model (completely standardised solution) is shown in Figure 5.2.

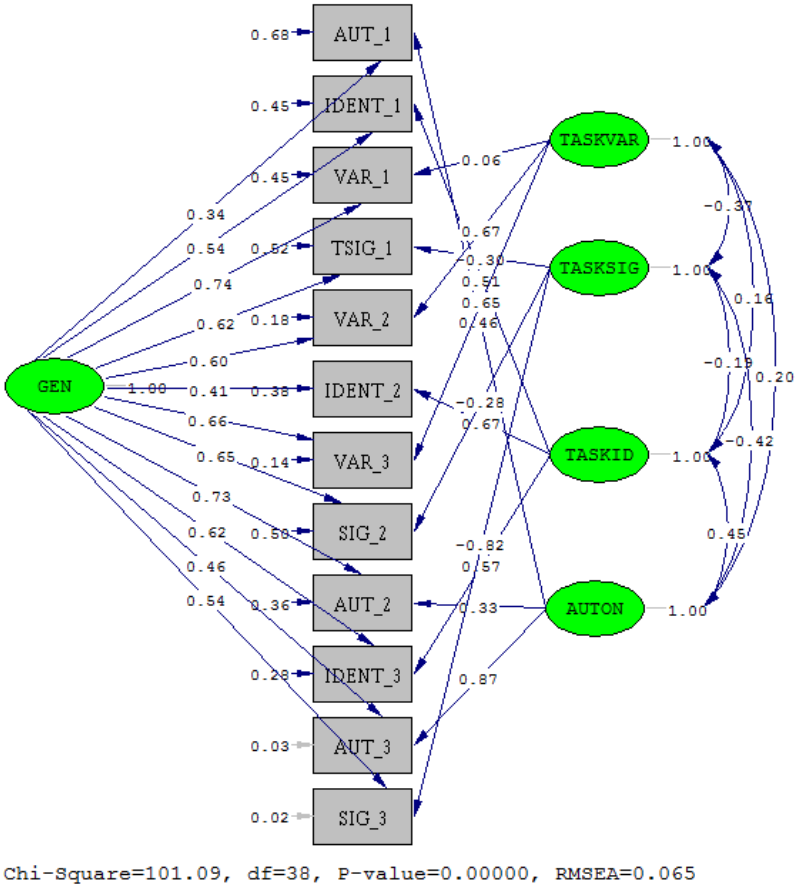

Figure 5.2. Bifactor job characteristic measurement model (completely standardised solution) with $\theta_{\delta 11}$ and $\theta_{\delta 12}$ constrained to .05.

Although the exact fit null hypothesis had to be rejected the probability of observing the sample RMSEA estimate (.065) under the close fit null hypothesis was sufficiently large (p > .05) not to reject the close fit null hypothesis. The close fit of the model warranted the interpretation of the measurement model parameter estimates. Table 5.47 shows that all the items loaded statistically significantly (p < .05) on the broad, general, job characteristics factor as well as on the narrower, more specific, latent job characteristics dimensions, with the exception of the first task variety item (VAR_1).

Table 5.47

Unstandardised factor loading matrix (Λ^X) for the bifactor job characteristic measurement model

	TASKVAR	TASKSIG	TASKID	AUTON	GEN
AUT_1	- -	- -	- -	0.5173*	0.3803*
				(0.0565)	(0.0727)
				9.1560	5.2328
IDENT_1	- -	- -	0.6924*	- -	0.7330*
			(0.0781)		(0.0681)
			8.8600		10.7684
VAR_1	0.0746	- -	- -	- -	0.9684*
	(0.0843)				(0.0609)
	0.8850				15.9035
TSIG_1	- -	-0.4508*	- -	- -	0.9254*
		(0.0757)			(0.0715)
		-5.9553			12.9453
VAR_2	0.8544*	- -	- -	- -	0.7674*
	(0.0763)				(0.0739)
	11.1974				10.3889
IDENT_2	- -	- -	1.0008*	- -	0.6038*
			(0.0917)		(0.0905)
			10.9105		6.6705
VAR_3	0.8925*	- -	- -	- -	0.8970*
	(0.0814)				(0.0751)
	10.9689				11.9468
SIG_2	- -	-0.3576*	- -	- -	0.8238*
		(0.0716)			(0.0617)
		-4.9973			13.3471
AUT_2	- -	- -	- -	0.4238*	0.9437*
				(0.0600)	(0.0635)
				7.0622	14.8497
IDENT_3	- -	- -	0.7920*	- -	0.8662*
			(0.0685)		(0.0757)
			11.5638		11.4472
AUT_3	- -	- -	- -	1.2304*	0.6529*
				(0.0586)	(0.0876)
				21.0063	7.4533
SIG_3	- -	-1.1984*	- -	- -	0.7907*
		(0.0501)			(0.0866)
		-23.9150			9.131

Note: TASKVAR represents *task variety*, TASKSIG represents *task significance*, TASKID represents *task identity*, AUTON represents *autonomy* and GEN represents the broad, general *job characteristic* factor. AUT_i, IDENT_i, VAR_i and TSIG_i refers to the i^{th} item; i=1, 2, 3 of the *autonomy*, *task identity*, *task variety* and *task significance* subscales. The first row in each cell represents the unstandardised factor loading estimate, the second row the standard error of the estimate and the third row the z-value.
* p<.05

The proportion of variance that the broad, general, job characteristic factor and the narrow, more specific latent job characteristic dimension that the item has been designated to reflect explain in each item is shown in Table 5.48. Table 5.48 shows that, but for the first item of the *autonomy* subscale (AUT_1) and the first item of the *task significance* subscale (TSIG_1), in excess of 50% of the variance in the item responses could be explained by the two factors that each item represents.

Table 5.48

Squared multiple correlations for the bifactor job characteristic measurement model

AUT_1	IDENT_1	VAR_1	TSIG_1	VAR_2	IDENT_2
.3225	.5486	.5469	.4770	.8190	.6198
VAR_3	SIG_2	AUT_2	IDENT_3	AUT_3	SIG_3
.8564	.5015	.6405	.7153	.9749	.9763

Note: AUT_i, IDENT_i, VAR_i and TSIG_i refers to the i^{th} item; i=1, 2, 3 of the *autonomy*, *task identity*, *task variety* and *task significance* subscales.

McDonald's multidimensional omega (Widhiarso & Ravand, 2014) was calculated from the completely standardised factor loadings and measurement error variances as a highly satisfactory .94.

The results depicted in Table 5.47 and Table 5.48, along with the subscale item analysis and dimensionality analysis results, justified the use of all the items in the calculation of two item parcels to represent the job characteristics latent variable in the proposed structural model.

5.6.21 ROUTES TO PSYCHOLOGICAL OWNERSHIP SCALE

The *routes to psychological ownership* scale measured three dimensions, namely *gaining intimate knowledge*, *self-investment* and *gaining control*. The *gaining knowledge* and *self-investment* subscale each comprised four items whereas the *control* subscale comprised six items.

5.6.21.1 Gaining intimate knowledge

All of the item pairs in the inter-item correlation matrix obtained correlations that were larger than .30 and that were statistically significant ($p < .05$). The KMO-value for the subscale suggested that the subscale was indeed factor analysable (> .60). Bartlett's test of sphericity indicated that the identity matrix null hypothesis could be rejected ($p < .05$), which corroborated the evidence that the correlation matrix was indeed factor analysable.

Consistent with what was hypothesised, the results suggested that one factor should be extracted. The residual correlation matrix indicated that none of the nonredundant residual correlations had absolute values greater than .05. Moreover, the position of the elbow in the scree plot as well as the number of factors with eigenvalues bigger than one indicated the extraction of a single factor This basket of evidence implies that 1-factor solution provides a highly valid and credible explanation for the observed inter-item correlation matrix. Therefore, the unidimensionality assumption was met for the *gaining intimate knowledge* subscale. The

factor matrix, shown in Table 5.49, revealed that all subscale items loaded satisfactory on a single extracted factor ($\lambda_{ij} > .50$).

McDonald's coefficient omega demonstrated that the general factor was estimated to account for 90% of the variance in *gaining intimate knowledge* total scores based on the one-factor model. The Cronbach alpha obtained for this subscale was .898 (see Table 5.9). The marginal difference between the two estimates can be explained by the similarity in the factor loadings as shown in Table 5.49. This estimate demonstrates adequate internal consistency reliability as judged by the .80 critical cut-off value.

Table 5.49

Factor structure for the gaining intimate knowledge subscale

	Factor 1
INT_KNOW_3	.882
INT_KNOW_2	.864
INT_KNOW_4	.829
INT_KNOW_1	.748

5.6.21.2. Self-investment

For the *self-investment* subscale all of the item pairs in the inter-item correlation matrix obtained correlations that were larger than .30 and that were statistically significant ($p < .05$). The subscale obtained a KMO-value of .808 and Bartlett's test of sphericity revealed that the identity matrix null hypothesis could be rejected ($p <. 05$). The correlation matrix was therefore factor analysable.

The residual correlation matrix showed that none of the nonredundant residual correlations had absolute values greater than .05. The restricted 1-factor model therefore provided a highly plausible explanation for the observed inter-item correlation matrix. Moreover, in accordance with the measurement hypothesis, the eigenvalue-greater-than-one rule and the scree plot both suggested the extraction of only one factor. The unidimensionality assumption was therefore supported. The factor matrix, displayed in Table 5.50, indicated that all of the items loaded satisfactory on one factor ($\lambda_{ij} > .50$).

McDonald's coefficient omega demonstrated that the general factor was estimated to account for 89% of the variance in *self-investment* total scores based on the one-factor model. The Cronbach alpha obtained for this subscale was .886 (see Table 5.11). The marginal difference between the two estimates can be explained by the relatively small violation of the tau-

equivalence assumption as shown in Table 5.50. These estimates demonstrate adequate internal consistency reliability as judged by the .80 critical cut-off value.

Table 5.50

Factor structure for the self-investment scale

	Factor 1
SLF_INVST_3	.837
SLF_INVST_1	.820
SLF_INVST_2	.818
SLF_INVST_4	.782

5.6.21.3. Gaining Control

The inter-item correlation matrix for the *control* scale was factor analysable as all the obtained correlations were larger than .30 and all were statistically significant ($p < .05$). In addition, the scale obtained a KMO- value of .872 and the Bartlett test of sphericity indicated that the identity matrix null hypothesis could be rejected ($p < .05$).

The residual correlation matrix showed that 10 (66%) of the nonredundant residuals had an absolute value greater than .05. The substantially large percentage of sizable residual correlations demonstrated that the single-factor solution did not provide a credible explanation of the observed inter-item correlation matrix since such a large percentage of the correlation estimates deviate markedly from the observed inter-item correlations. The unidimensionality assumption was therefore not corroborated. The eigenvalue-greater-than-one rule suggested the extraction of a single factor. The scree plot, however, was somewhat ambiguous and suggested the extraction of either one or two factors. The large percentage of sizeable residuals clearly suggest the presence of a second or even perhaps third factor. Therefore, the decision was made to force the extraction of two factors. The pattern matrix[29] is depicted in Table 5.51.

Table 5.51

Rotated two-factor structure for the gaining control scale (pattern matrix)

	Factor 1	Factor 2
CONTROL_3	**.861**	-.013
CONTROL_2	**.818**	.046
CONTROL_1	**.809**	-.046
CONTROL_5	**.512**	.410
CONTROL_6	-.042	**.940**
CONTROL_4	.048	**.757**

Note: Figures in bold indicate the factor on which each item predominantly loaded.

[29] The pattern matrix shows the slope of the regression of the items on the two (correlated) extracted factors. The slope coefficients reflect the influence of each factor on the item when controlling for the influence of the other factor..

The residual correlation matrix showed that none of the nonredundant residual correlations had absolute values greater than .05. The 2-factor model therefore provided a highly plausible explanation for the observed inter-item correlation matrix. The rotated pattern matrix indicates that item CONTROL_6 and CONTROL_4 loaded on factor 2. Inspection of the item wording of the items suggests that factor 2 could be interpreted as a *control over time, pace and scheduling of work* factor. The items that loaded on factor 1 seem to have more to do with decision-making power and freedom to adjust the nature of the job (excluding facets that has to do with scheduling or pace of the work). Factor 1 was therefore interpreted as a *control over the nature of the job* factor. Both factors represent meaningful facets of the control dimension. The factor correlation matrix indicated a moderately strong positive correlation of .718 between the two factors.

Unidimensionality could have been restored for the control subscale by deleting CONTROL_6 and CONTROL_4. This would, however, have unnecessary restricted the connotative meaning of the specific routes dimension. The item analysis for the *control* scale returned a satisfactory Cronbach's alpha of .900. Furthermore, the item analysis indicated that if CONTROL_6 or CONTROL_4 were deleted, the Cronbach alpha would decrease marginally. The Cronbach alpha estimate, however, provided an inappropriate estimate of the subscale reliability given the factor fission. A Stratified alpha of .923 was obtained for the composite reliability of the 2-dimensional *control sub*scale.

In an attempt to determine whether the items of the *control* subscale could still be used to operationalise the *control* latent variable the measurement model implied by the pattern matrix shown in Table 5.47 was fitted. If the first-order 2-factor *control* measurement model fitted at least reasonably well this would allow the fitting of a second-order *control* measurement model in which the two first-order *control* factors loaded on a single second-order *control* factor. This in turn, would allow the testing of the statistical significance of the indirect effects of the second-order *control* factor on the *control* subscale items.

The multivariate normality null hypothesis had to be rejected ($p < .05$) (Table 5.52). The attempt at normalisation marginally reduced the deviation from multivariate normality but failed to fully rectify the problem (Table 5.53).

Table 5.52

Test of multivariate normality of the control subscale before normalisation

Skewness			Kurtosis			Skewness and Kurtosis	
Value	z-score	p-value	Value	z-score	p-value	Chi-square	p-value
4.941	12.773	.000	57.939	7.150	.000	214.281	.000

Table 5.53

Test of multivariate normality of the control subscale after normalisation

Skewness			Kurtosis			Skewness and Kurtosis	
Value	z-score	p-value	Value	z-score	p-value	Chi-square	p-value
4.497	11.889	.000	59.775	8.003	.000	205.399	.000

The first-order 2-factor *control* measurement model was consequently fitted to the normalised data using robust maximum likelihood estimation. The fitted model returned an admissible solution but poor fit (RMSEA = .113; $p < .05$). Inspection of the modification indices calculated for the fixed parameters of the fitted first-order 2-factor *control* measurement model (Figure 4.3) indicated that a bifactor model (Reise, 2012) might be appropriate due to the heavy presence of statistically significant ($p < .01$) modification index values for the off-diagonal of the measurement error variance-covariance matrix ($\boldsymbol{\Theta}_{\boldsymbol{\delta}}$). Although the conceptualisation and operationalisation of the *gaining control* latent dimension of the *routes to psychological ownership* construct did not originally make provision for two narrow (group) factors and a general *gaining control* factor, both the two narrow factors and the broad, general, factor do make conceptual sense.

The control bifactor model initially returned an inadmissible solution with a negative measurement error variance estimate for $\theta_{\delta 55}$. The measurement error variance for CONTR_5 was subsequently fixed to .1 and diagonally weighted least squares was specified as the method of estimation. The constrained bifactor model converged and showed good fit. The exact fit null hypothesis was not rejected ($p > .05$)[30]. In contrast to the first-order 2-factor model, the bifactor control measurement model provides a highly plausible explanation for the observed inter-item covariance matrix.

[30] It is acknowledged that the small degrees of freedom lowered the statistical power of the test of exact fit and the test of close fit.

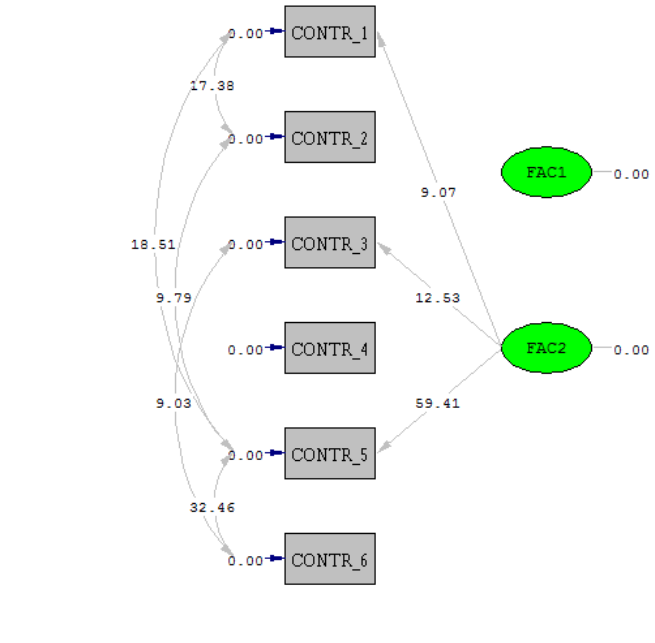

Figure 5.3. Statistically significant (p < .01) modification index values for the first-order 2-factor *control* measurement model

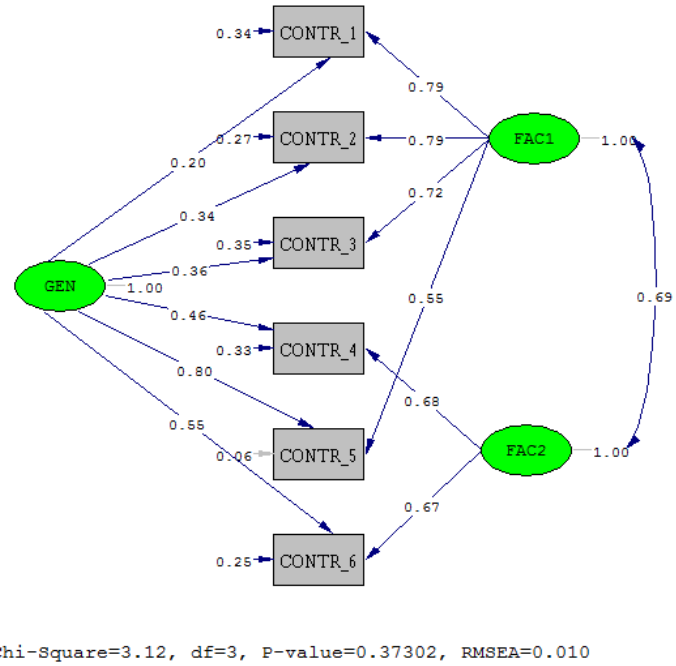

Figure 5.4. Bifactor *control* measurement model (completely standardised solution) with $\theta_{\delta 11}$ constrained to .01.

The good fit of the constrained bifactor control measurement model justified the interpretation of the measurement model parameter estimates. The unstandardised factor loadings are shown in Table 5.54. Table 5.54 shows that all the items loaded statistically significantly (p <. 05) on

both the broad, general *control* factor as well as the narrow, more specific, *control* factor that it was assigned to, based on the pattern matrix loadings shown in Table 5.51

The proportion of item variance explained by the two factors that each item reflects in the bifactor measurement model is shown in Table 5.55.

Table 5.54

Unstandardised factor loadings for the bifactor control measurement model

	FAC1	FAC2	GEN
CONTR_1	0.9881*	- -	0.2481*
	(0.0633)		(0.0717)
	15.6050		3.4606
CONTR_2	1.1632*	- -	0.5013*
	(0.0725)		(0.0580)
	16.0474		8.6423
CONTR_3	1.0580*	- -	0.5240*
	(0.0671)		(0.0676)
	15.7588		7.7505
CONTR_4	- -	1.1002*	0.7445*
		(0.0896)	(0.0780)
		12.2855	9.5480
CONTR_5	0.7377*	- -	1.0665*
	(0.0308)		(0.1098)
	23.9580		9.7166
CONTR_6	- -	1.0757*	0.8717*
		(0.0803)	(0.0726)
		13.3931	12.0005

Note: FAC1 refers to the *control over the nature of the job* factor and FAC2 refers to the *control over time, pace and scheduling of work* factor. CONTR_i refers to the control subscale items i=1, 2, …, 6. The first row in each cell represents the unstandardised factor loading estimate, the second row the standard error of the estimate and the third row the z-value.
* p<.05

Table 5.55 shows that the two factors that each item were designated to reflect by the bifactor model explain *circa* 65% or more of the variance in each item. This finding, taken in conjunction with the good fit of the bifactor model, the statistically significant factor loadings and the reliability of the *control* subscale scores warranted using all the subscale items in the calculation of two item parcels to operationalise the *control* latent variable in the psychological ownership structural model.

Table 5.55

R^2 for the bifactor control measurement model

CONTR_1	CONTR_2	CONTR_3	CONTR_4	CONTR_5	CONTR_6
.6556	.7311	.6489	.6698	.9439	.7525

McDonald's multidimensional omega (Widhiarso & Ravand, 2014) was calculated for the *control* subscale from the completely standardised factor loadings and measurement error variances. A satisfactory value of .88 was obtained.

5.6.21.4. The Multidimensional Routes to Psychological Ownership Scale

Routes to psychological ownership did not form a single multidimensional latent variable in the proposed psychological ownership structural model. *Self-investment*, *gaining knowledge* and *gaining control* were modelled as separate latent variables. The construct validity of the *routes to psychological ownership* measures were nonetheless further evaluated by evaluating the fit of the *routes to psychological ownership* scale measurement model, and by evaluating the statistical significance and magnitude of the measurement model parameter estimates, provided adequate fit was obtained.

Table 5.56 shows that the assumption of multivariate normality was not supported for the *routes to psychological ownership* item distribution. The skewness and kurtosis chi-square statistic was statistically significant ($p < .05$) and the multivariate normality null hypothesis was consequently rejected.

Table 5.56

Test of multivariate normality of the routes to psychological ownership scale before normalisation

Skewness			Kurtosis			Skewness and Kurtosis	
Value	z-score	p-value	Value	z-score	p-value	Chi-Square	p-value
39.965	34.040	.000	261.647	11.559	.000	1292.315	.000

Normalisation of the multi-indicator *routes to psychological ownership* item distribution was attempted. The skewness and kurtosis chi-square statistic in Table 5.57 shows that although the normalisation reduced the deviation from a theoretically multivariate normal distribution, the multivariate normality null hypothesis still had to be rejected ($p < .05$).

Table 5.57

Test of multivariate normality of the routes to psychological ownership scale after normalisation

Skewness			Kurtosis			Skewness and Kurtosis	
Value	z-score	p-value	Value	z-score	p-value	Chi-square	p-value
34.593	30.083	.000	253.305	9.821	.000	1001.431	.000

The *routes to psychological ownership* measurement model was consequently fitted to the normalised data. The fitted model formally acknowledged the factor fission obtained in the *control* subscale. The first-order 4-factor *routes to psychological ownership* measurement model showed poor fit (RMSEA = .091; $p < .05$). Both the exact fit and close fit null hypotheses were rejected ($p < .05$). Inspection of the modification indices calculated for the fitted first-

order 4-factor *routes to psychological ownership* measurement model (Figure 5.5) showed numerous statistically significant (p <. 01) values for the off-diagonal of the measurement error variance-covariance matrix (Θ_δ). These imply an additional source of systematic variance that affect most, if not all, of the scale items, but that the current measurement model fails to acknowledge. A bifactor model (Reise, 2012) is therefore implied in which a broad, general, routes factor is assumed that is uncorrelated with the more, specific, narrow, latent route dimensions. Although the *routes to psychological ownership* construct was not conceptualised or operationalised in a manner that made provision for such a broad factor, such a general factor nonetheless *post hoc* makes conceptual sense. It seems to represent a broad, general, personal engagement factor (Kahn, 1990).

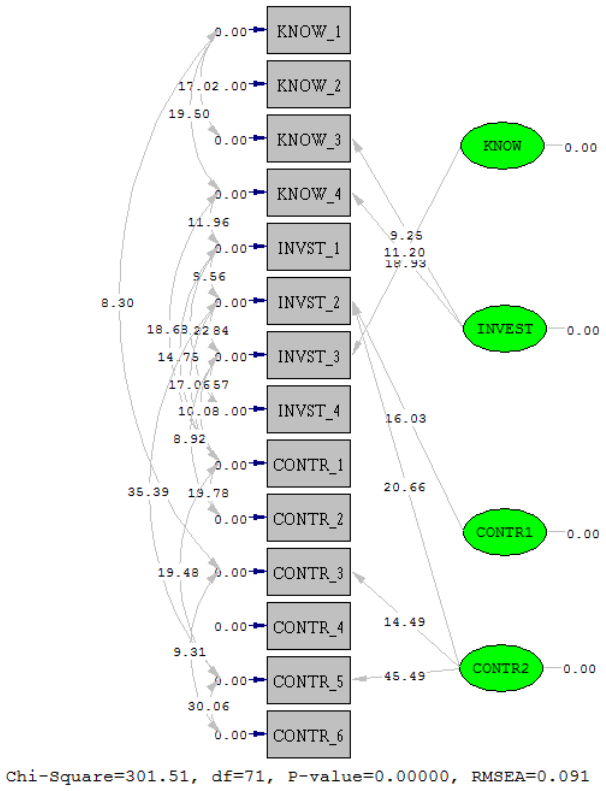

Figure 5.5. Statistically significant (p < .01) modification index values for the first-order 4-factor *routes to psychological ownership* measurement model

A broad, general, *routes* factor was consequently added to the first-order 4-factor *routes to psychological ownership* measurement model on which all scale items load. The correlations between the broad, general, *routes* factor and the four more specific, narrow, routes factors were constrained to zero. The broad, general, factor was therefore meant to explain variance in

the scale items that were not explained by the more specific, narrow, group factors. The fitted bifactor *routes to psychological ownership* measurement model are shown in Figure 5.6.

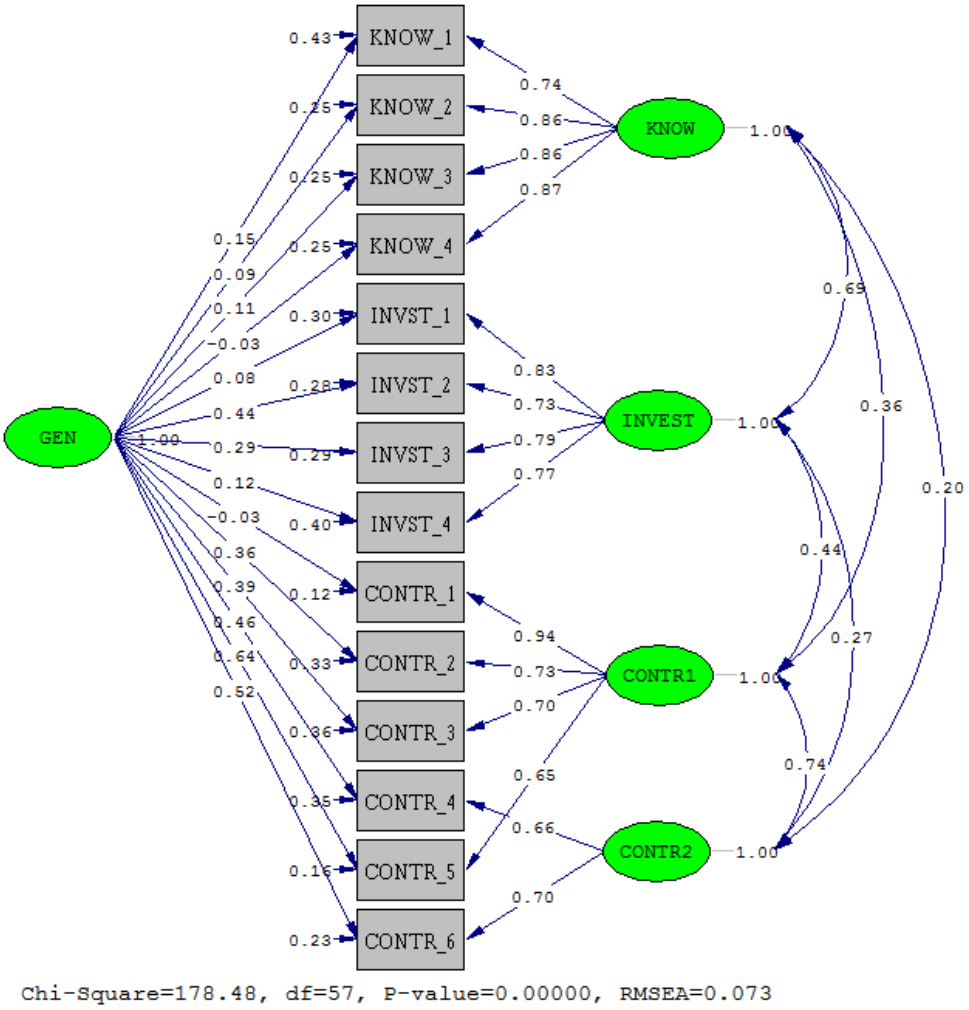

Figure 5.6. Bifactor *routes to psychological ownership* measurement model (completely standardised solution).

Both the exact fit and the close fit null hypotheses had to be rejected ($p<.05$) for the fitted bifactor *routes to psychological ownership* measurement model. The model, nonetheless, fitted reasonable to good in the sample. The RMSEA of .073 indicated reasonable model fit in the sample. The comparative fit index (CFI=.983), the normed fit index (NFI = .9753) and the standardised root mean square residual (SRMR=.03395) all indicated good model fit in the sample. The reasonable to good model fit in the sample was judged sufficient to warrant the

interpretation of the bifactor measurement model parameter estimates. The unstandardised factor loading matrix (Λ^{X}) is shown in Table 5.58.

Table 5.58

Unstandardised factor loadings for the bifactor routes to psychological ownership measurement model

	INVEST	KNOW	CONTR1	CONTR2	GEN
KNOW_1	- -	0.7210*	- -	- -	0.1466*
		(0.0424)			(0.0755)
		17.0125			1.9423
KNOW_2	- -	0.9000*	- -	- -	0.0896
		(0.0404)			(0.0762)
		22.2571			1.1765
KNOW_3	- -	0.8394*	- -	- -	0.1109
		(0.0377)			(0.0681)
		22.2682			1.6281
KNOW_4	- -	0.8404*	- -	- -	-0.0338
		(0.0394)			(0.0709)
		21.3527			-0.4760
INVST_1	0.8822*	- -	- -	- -	0.0883
	(0.0418)				(0.0860)
	21.0991				1.0272
INVST_2	0.8728*	- -	- -	- -	0.5260*
	(0.0567)				(0.0819)
	15.4004				6.4238
INVST_3	0.9154*	- -	- -	- -	0.3352*
	(0.0492)				(0.0819)
	18.5898*				4.0905
INVST_4	0.9449	- -	- -	- -	0.1493
	(0.0528)				(0.0922)
	17.9123				1.6202
CONTR_1	- -	- -	1.1812*	- -	-0.0337
			(0.0626)		(0.1421)
			18.8652		-0.2373
CONTR_2	- -	- -	1.0874*	- -	0.5276*
			(0.0866)		(0.1623)
			12.5565		3.2500
CONTR_3	- -	- -	1.0233*	- -	0.5684*
			(0.0929)		(0.1649)
			11.0112		3.4480
CONTR_4	- -	- -	- -	1.0770*	0.7492*
				(0.1088)	(0.1381)
				9.8947	5.4235
CONTR_5	- -	- -	0.8651*	- -	0.8582*
			(0.1102)		(0.1220)
			7.8533		7.0335
CONTR_6	- -	- -	- -	1.1229*	0.8317*
				(0.1114)	(0.1289)
				10.0795	6.4507

Note: INVEST refers to *self-investment*, KNOW refers to *gaining knowledge*, CONTR1 represents the *control over the nature of the job* factor, CONTR2 refers to the *control over time, pace and scheduling of work* factor and GEN represents the broad, general, *routes* factor. KNOW_i, INVST_i, and CONTR_i represents the routes to psychological ownership scale items. The first row in each cell represents the unstandardised factor loading estimate, the second row the standard error of the estimate and the third row the z-value.

* p<.05

Table 5.58 shows that all the items of the *routes to psychological ownership* scale loaded statistically significantly ($p < .05$) on the more specific, narrow, latent route dimension it was designated to represent. However, only eight of the fourteen items loaded statistically

significantly ($p < .05$) on the broad, general, *routes* factor. This suggests that the broad, general, factor is less influential in determining item responses than the more specific, narrow, latent *routes* dimensions. The completely standardised factor loading matrix (not shown) confirms this. The assumption of a broad, general, *routes* factor was nonetheless necessary to achieve a level of model fit that warranted the interpretation of the model parameter estimates.

Table 5.59 shows the proportion of variance that the fitted bifactor model explains in each of the scale items. Table 5.59 shows that, but for KNOW_1, more than 60% of the variance in the remaining scale items were explained by the bifactor measurement model.

Table 5.59

R^2 for the bifactor routes to psychological ownership measurement model

KNOW_1	KNOW_2	KNOW_3	KNOW_4	INVST_1	INVST_2
.5659	.7450	.7452	.7534	.7007	.7194
INVST_3	INVST_4	CONTR_1	CONTR_2	CONTR_3	CONTR_4
.7110	.6037	.8822	.6658	.6378	.6533
CONTR_5	CONTR_6				
.8354	.7666				

Self-investment, gaining knowledge and gaining control have been modelled as three separate latent variables in the proposed psychological ownership structural model. The finding that a broad, general, *routes* factor needed to be assumed to achieve a level of model fit that warranted the interpretation of the model parameter estimates to some degree erodes confidence in the validity of the item parcels calculated from the subscale items as indicators of the three latent *routes* in the structural model. The fact that six items loaded statistically insignificantly ($p > .05$) on the general factor combined with the lower completely standardised factor loadings on the general factor to some degree mitigated this shortcoming.

McDonald's multidimensional omega (Widhiarso & Ravand, 2014) was calculated for the *psychological ownership* scale from the completely standardised factor loadings and measurement error variances. A highly satisfactory value of .92 was obtained.

5.6.22. PERCEIVED ABILITY OF JOB TO SATISFY NEED FOR SELF-EFFICACY

The results of the dimensionality analysis of this scale revealed that the correlation matrix was factor analysable as all the inter-item correlations were larger than .30 and were statistically significant ($p<.05$). Also, the KMO was .868 and the Bartlett test of sphericity indicated that the identity matrix null hypothesis could be rejected ($p<.05$).

A slightly larger percentage of nonredundant residual correlations (20%) had an absolute value greater than .05. However, 20% could still be regarded as a sufficiently small portion of large nonredundant residual correlations to conclude that the 1-factor solution does provide a credible explanation for the observed inter-item correlation matrix. The eigenvalue-greater-than-one rule and the position of the elbow in the scree plot suggested the extraction of one factor. The unidimensionality assumption for this scale was therefore supported. The factor matrix, shown in Table 5.60, indicated that all the items loaded satisfactory on the single extracted factor ($\lambda_{ij} > .50$).

McDonald's coefficient omega demonstrated that the general factor was estimated to account for 88% of the variance in this scale's total scores based on the one-factor model. This estimate demonstrates adequate internal consistency reliability for the *perceived ability of job to satisfy efficacy need* scale when judged against the .80 critical cut-off value. The Cronbach alpha obtained earlier during the item analysis was .874.

Table 5.60

Factor structure for the perceived ability of job to satisfy efficacy need scale

	Factor 1
PERC_EFF_5	.804
PERC_EFF_1	.796
PERC_EFF_2	.756
PERC_EFF_6	.720
PERC_EFF_3	.697
PERC_EFF_4	.633

5.6.23. PERCEIVED ABILITY OF JOB TO SATISFY NEED FOR SELF- IDENTITY SCALE

The preliminary analysis for this 6-item scale indicated that the inter-item correlation matrix was factor analysable. All of the obtained correlations were larger than .30 and statistically significant ($p < .05$). In addition, the KMO was .836 and Bartlett's test of sphericity indicated that the identity matrix null hypothesis could be rejected ($p < .05$).

The residual correlation matrix indicated that 6 (40%) of nonredundant residual correlations had an absolute value greater than .05. This indicated that the 1-factor solution provided a rather tenuous explanation of the observed inter-item correlation matrix. The moderately high percentage of large residual correlations suggest the presence of a second factor. The analysis was consequently reran with the request to extract two factors. The rotated pattern matrix is shown in Table 5.61. For the 2-factor structure none (0%) of the nonredundant residuals had absolute values greater than .05, which indicated that the 2-factor solution clearly provided a more valid explanation of the observed correlation matrix.

Table 5.61

Rotated two-factor structure (pattern matrix) for the perceived ability to satisfy self-identity need scale

	Factor	
	1	2
PERC_IDENT_2	**.880**	-.049
PERC_IDENT_3	**.776**	-.001
PERC_IDENT_1	**.722**	.034
PERC_IDENT_6	**.317**	.259
PERC_IDENT_5	-.056	**.894**
PERC_IDENT_4	.088	**.746**

Note: Figures in bold indicate the factor on which each item predominantly loaded.

Item PERC_IDENT_4 and PERC_IDENT_5 loaded onto factor 2, while the remaining items loaded onto factor 1. Item PERC_IDENT_ 6 showed itself as somewhat of a complex item with modest loadings on both factors. It is clearly evident that the manner in which the items are worded that there is a difference in terms of the job characteristics that the items tap into as a source of the satisfaction of the self-identity need. The first three items, which loaded strongly onto factor 1, relate to the meaningfulness dimension of the job characteristics (including *job identity, job variety, job significance).* Factor 1 was therefore interpreted as a *satisfaction of the need for self-identity through meaningful work* factor. The items that loaded onto factor 2 has to do with the autonomy (to personalise the workspace and work methods) dimension of the job characteristic construct. Factor 2 was therefore interpreted as a *satisfaction of the need*

for self-identity through work autonomy factor. Item PERC_IDENT_6 tapped into both these facets albeit slightly more so in the first factor. Both factors can be seen as facets of perceived ability of job characteristics to satisfy the self-identity need as both of these factors contribute to the major five job characteristics as proposed by Hackman and Oldham (1976).

Despite the fact that the proposed structural model conceptualised *perceived ability of job to satisfy the self-identity need* as a unidimensional latent variable, the realisation of the existence of a second factor was not really disconcerting because the factor fission was found to present a meaningful division of the factor that was originally conceptualised as indivisible.

This estimate demonstrates adequate internal consistency. A satisfactory Stratified alpha of .876 was reported for the two-factor model solution.

In an attempt to determine whether the items of the *perceived ability of job to satisfy the self-identity need* scale could still be used to operationalise the *perceived ability of job to satisfy the self-identity need* latent variable the measurement model implied by the pattern matrix shown in Table 5.61 was fitted. If the first-order 2-factor *perceived ability of job to satisfy the self-identity need* measurement model fitted at least reasonably well this would allow the fitting of a second-order *perceived ability of job to satisfy the self-identity need* measurement model in which the two first-order *perceived ability of job to satisfy the self-identity need* factors loaded on a single second-order *perceived ability of job to satisfy the self-identity need* factor. This in turn, would allow the testing of the statistical significance of the indirect effects of the second-order *perceived ability of job to satisfy the self-identity need* factor on the *perceived ability of job to satisfy the self-identity need* scale items.

The multivariate normality null hypothesis had to be rejected (Table 5.62). The attempt at normalisation moderately reduced the deviation from multivariate normality but nonetheless failed to fully rectify the problem (Table 5.63).

Table 5.62

Test of multivariate normality of the perceived ability of job to satisfy the self-identity need scale before normalisation

Skewness			Kurtosis			Skewness and Kurtosis	
Value	z-score	p-value	Value	z-score	p-value	Chi-square	p-value
3.586	9.876	.000	55.446	5.842	.000	131.665	.000

Table 5.63

Test of multivariate normality of the perceived ability of job to satisfy the self-identity need scale after normalisation

Skewness			Kurtosis			Skewness and Kurtosis	
Value	z-score	p-value	Value	z-score	p-value	Chi-square	p-value
3.159	8.812	.000	55.652	5.957	.000	113.135	.000

The first-order 2-factor *perceived ability of job to satisfy the self-identity need* measurement model reflecting the loading pattern shown in the pattern matrix (Table 5.61) was consequently fitted to the normalised data using robust maximum likelihood estimation. The fitted model (Figure 5.7) returned an admissible solution and close fit (RMSEA = .062; p > .05). The close fit of the model warranted the interpretation of the measurement model parameter estimates. Table 5.64 shows the unstandardised factor loading matrix (Λ^{X}).

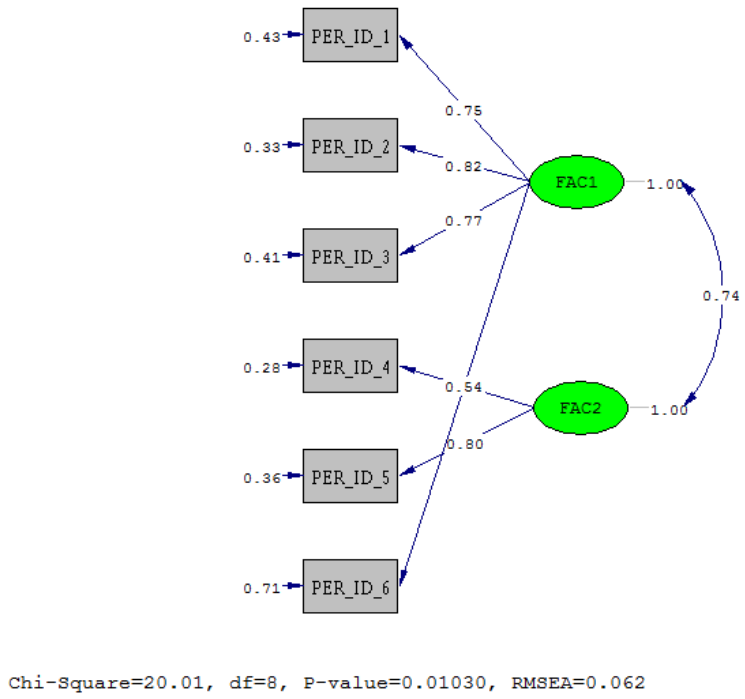

Figure 5.7. First-order 2-factor *perceived ability of job to satisfy the self-identity need* measurement model (completely standardised solution).

Table 5.64

Unstandardised factor loadings for the first-order 2-factor perceived ability of job to satisfy the self-identity need measurement model

	FAC1	FAC2
PER_ID_1	0.7092*	- -
	(0.0415)	
	17.0791	
PER_ID_2	0.7542*	- -
	(0.0362)	
	20.8621	
PER_ID_3	0.7171*	- -
	(0.0424)	
	16.9295	

PER_ID_4	- -	0.9082*
		(0.0521)
		17.4270
PER_ID_5	- -	0.8017*
		(0.0446)
		17.9807
PER_ID_6	0.5685*	- -
	(0.0588)	
	9.6649	

Note: FAC1 refers to the *satisfaction of the need for self-identity through meaningful work* factor and FAC2 refers to the *satisfaction of the need for self-identity through work autonomy* factor. PER_ID_i refers to the items of the *perceived ability of job to satisfy the self-identity need* scale; i=1, 2, …, 6. The first row in each cell represents the unstandardised factor loading estimate, the second row the standard error of the estimate and the third row the z-value.
* p<.05

Table 5.64 shows that all the items of the *perceived ability of job to satisfy the self-identity need* scale loaded statistically significantly on the factor it was assigned to, based on the pattern matrix loadings. Table 5.65 shows the proportion of variance in each item explained by its designated factor. A quite satisfactory proportion of variance is explained in all items, but for item PER_ID_6 that just barely satisfies the critical factor loading cut-off value of .50 (see Figure 5.7).

Table 5.65

R^2 for the first-order 2-factor perceived ability of job to satisfy the self-identity need measurement model

PER_ID_1	PER_ID_2	PER_ID_3	PER_ID_4	PER_ID_5	PER_ID_6
.5692	.6688	.5896	.7215	.6417	.2870

The close fit of the *perceived ability of job to satisfy the self-identity need* model in addition warranted the fitting of the second-order measurement model in which the two first-order *perceived ability of job to satisfy the self-identity need* factors load on a single second-order factor.

The fitted second-order *perceived ability of job to satisfy the self-identity need* measurement model is shown in Figure 5.8. The second-order *perceived ability of job to satisfy the self-identity need* measurement model showed close fit (RMSEA =. 059; p > .05). This warranted the calculation of the indirect effects of the second-order *perceived ability of job to satisfy the self-identity need* factor on the *perceived ability of job to satisfy the self-identity need* scale items and the evaluation their statistical significance. The SIMPLIS syntax used to fit the second-order measurement model was subsequently translated to LISREL syntax. This allowed the AP and CO commands to be used to calculate the indirect effects[31] and to have their statistical significance evaluated. Table 5.66 shows the unstandardised indirect effects.

[31] CO PAR1 = LY(1,1)*GA(1,1)

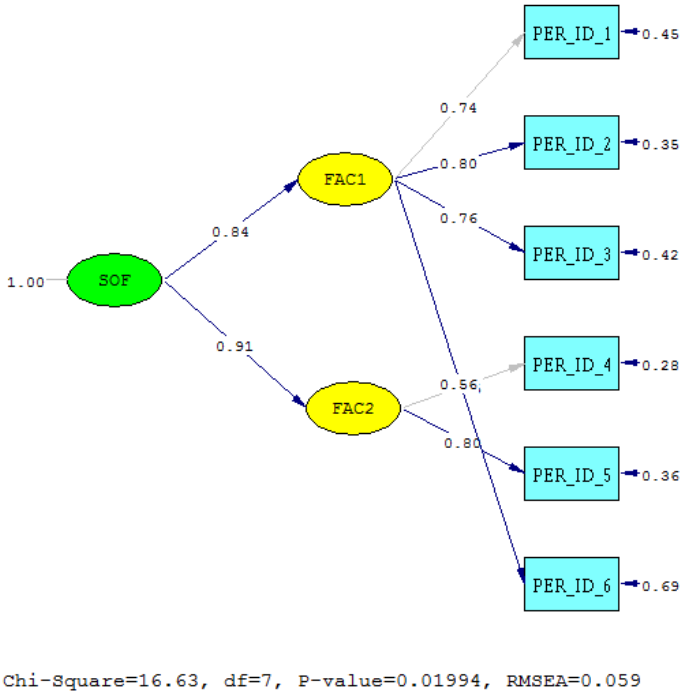

Figure 5.8. Second-order 2-factor *perceived ability of job to satisfy the self-identity need* measurement model (completely standardised solution).

Table 5.66 shows that the effect of the second-order *perceived ability of job to satisfy the self-identity need* factor on the scale items, mediated by the two first-order factors are all statistically significant ($p < .05$). This, along with the statistical significance ($p < .05$) of the loading of the items on the first-order factors, justifies the use of the *perceived ability of job to satisfy the self-identity need* scale items in the calculation of two item parcels as indicators of the *perceived ability of job to satisfy the self-identity need* latent variable.

Table 5.66

Unstandardised indirect effects of for the second-order 2-factor perceived ability of job to satisfy the self-identity need measurement model

PA(1)	PA(2)	PA(3)	PA(4)	PA(5)	PA(6)
0.59*	0.62*	0.60*	0.83*	0.73*	0.50*
(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)
11.68	12.43	11.89	16.42	14.43	9.92

Note: PA(i) refers to the indirect effect of the second-order *perceived ability of job to satisfy the self-identity need* factor on the i^{th} item of the scale.
* p<.05

CO PAR2 = LY(2,1)*GA(1,1)
CO PAR3 = LY(3,1)*GA(1,1)
CO PAR4 = LY(4,2)*GA(2,1)
CO PAR5 = LY(5,2)*GA(2,1)
CO PAR6 = LY(6,1)*GA(1,1)

5.5.24. FEELINGS OF EFFICACY

The *feelings of efficacy* scale obtained inter-item correlations that were all larger than .30 and all were statistically significant ($p < .05$), except for the correlation between FEEL_EFF_4 and FEEL_EFF_1. Furthermore, the scale obtained a KMO of .846 and Bartlett's test of sphericity indicated that the identity matrix null hypothesis could be rejected ($p < .05$). Therefore, the *feelings of efficacy* scale was factor analysable.

The residual correlation matrix indicated that 23 (51%) of nonredundant residual correlations had absolute values that were greater than .05. Therefore, the single-factor solution did not provide a credible explanation of the observed inter-item correlation matrix if such a large percentage of the correlation estimates deviate noticeably from the observed inter-item correlations. The significant number of large residual correlations strongly suggested the presence of a second factor. The eigenvalue-greater-than-one rule suggested the extraction of two factors. The scree plot was somewhat ambiguous and could be interpreted to either suggest the extraction of one factor or three factors. The decision was therefore made to force the extraction of a second factor.

A large percentage (37%) of the inter-item correlations that were reproduced from the extracted two-factor structure for the *feelings of efficacy* scale still deviated more than .05 from the corresponding observed correlations. The 2-factor factor structure therefore still did not provide a valid and credible description of the mechanism that produced the observed inter-item correlation matrix. The extraction of three factors was therefore requested. The resultant pattern matrix is shown in Table 5.67.

Table 5.67

Rotated three-factor structure (pattern matrix) for the feelings of efficacy scale

	Factor		
	1	2	3
FEEL_EFF_8	**.769**	-.021	-.114
FEEL_EFF_9	**.733**	-.205	-.019
FEEL_EFF_10	**.693**	.097	.029
FEEL_EFF_6	**.595**	-.124	.075
FEEL_EFF_7	**.527**	.093	.159
FEEL_EFF_5	**.321**	.214	.304
FEEL_EFF_1	.245	**-.649**	.209

FEEL_EFF_3	-.046	-.032	**.598**
FEEL_EFF_4	.191	.343	**.541**
FEEL_EFF_2	.051	-.175	**.532**

Note: Figures in bold indicate the factor on which each item predominantly loaded.

For the three-factor structure only 4 (8%) of non-redundant residual correlations had absolute values greater than .05. The 3-factor structure therefore provided a plausible description of the mechanism that produced the inter-item correlation matrix. The proposition of a single-factor first-order *feelings of efficacy* factor structure completely failed to provide a plausible explanation for the observed correlation matrix. In sum this scale failed to pass the unidimensionality test.

Upon investigation of the item loading pattern it becomes evident that items FEEL_EFF_5 to FEEL_EFF_10 loaded on factor1[32], item FEEL_EFF_1 loaded on factor 2[33] and items FEEL_EFF_2 to FEEL_EFF_4 loaded on factor 3. Factor 1 seems to represent an *ingenuity to deal with (unforeseen) problems* latent dimension of *feelings of efficacy*, whereas factor 3 was interpreted as a *grit* factor. Factor 1 was interpreted as a *general resourcefulness* factor. Despite the fact that the theorising that culminated in the proposed structural model conceptualised *feelings of efficacy* as a unidimensional latent variable, the 3-factor finding was not really disconcerting because the factor fission was found to present a meaningful division of the factor that was originally conceptualised as inseparable.

Initial evidence suggests a unidimensional factor structure, as several studies have replicated a single-factor solution using both exploratory and confirmatory factor analysis techniques (Chen et al., 2001; 2004). However, Bosscher and Smith (1998) examined the factor structure of the generalised self-efficacy measurement tool that was used to measure levels of feelings of efficacy in this study. These authors also found that a three-factor model best fitted their data. They interpreted the three factors as an *initiative* factor, an *effort factor* and a *persistence* factor.

As argued in Chapter 2, the effectance motive must be conceived to involve satisfaction (a feeling of efficacy) in transactions in which behaviour has an exploratory, varying experimental character which allows an organism to find out how the environment can be changed and what

[32] It needs to be acknowledged that FEEL_EFF_5 is somewhat of a complex with modest loadings on all three factors.
[33] Given that only one item loaded on factor 2 this factor should be considered poorly defined.

consequences flow from these changes. *Feelings of efficacy* can be conceptualised as a relatively stable belief than an individual can marshal the resources needed to deal with the challenges that he or she experiences. Therefore, feelings of efficacy is a belief that one has in one's competence. Therefore, it can be argued that the perceived ability to cope with problems that the current study termed an *ingenuity to deal with (unforeseen) problems* factor or the *initiative* dimension identified in other studies may be the fundamental constitutive definition of the construct *feelings of efficacy.*

The four items that loaded on factor 2 and factor 3, as well as item FEEL_EFF_5 that showed itself as a complex item, were therefore deleted from the *feelings of efficacy* scale. After the removal of these 5 items, the item analysis reported a satisfactory Cronbach's alpha of .809. The McDonald's omega of the reduced scale was .814. Items means ranged from 3.733 to 3.979 on a five-point Likert scale, while the standard deviations ranged from .651 to .78, which suggests an absence of poor and incentive items. There were also no clear outliers towards the lower end of the squared multiple correlation and corrected item-total correlation distribution. FEEL_EFF_7 had a slightly lower squared multiple correlation than the other items (.309), yet not enough to be considered problematic. None of the items, if deleted would have resulted in an improved internal consistency of the scale. Therefore, all of the remaining items were retained.

Dimensionality analysis via restricted EFA was conducted on the five items included in the reduced *feelings of efficacy* scale. The correlation matrix revealed that all the correlations exceeded .30 and all the inter-item correlations were statistically significant ($p < .05$). A KMO value of .818 provided support for the factor analysability of the reduced scale. The latter was corroborated by Bartlett's test of sphericity (604.893; $p = .00$), which indicated that the null hypothesis that the correlation matrix in the parameter is an identity matrix, could be rejected. The residual correlation matrix indicated that 2 (20%) of the residual correlations were large with values larger than .05. The 1-factor solution therefore provided a valid and credible explanation for the reduced *feelings of efficacy* scale inter-item correlation matrix. Moreover, only one factor obtained an eigenvalue greater than one (2.855). The scree plot also suggested the extraction of a single factor. The good fit of the 1-factor factor structure substantiated the unidimensionality assumption. The factor matrix in Table 5.68 indicates that the items loaded satisfactory ($\lambda_{ij} > .50$) on the single extracted factor.

Table 5.68

Factor structure of revised feelings of efficacy scale

	Factor 1
FEEL_EFF_9	.758
FEEL_EFF_8	.709
FEEL_EFF_10	.688
FEEL_EFF_6	.634
FEEL_EFF_7	.615

5.5.25. INTEGRATION WITH JOB

The results of the dimensionality analysis indicated that the correlation matrix was factor analysable. All the inter-item correlations were larger than .30 and all were statistically significant ($p < .05$). The scale obtained a KMO of .823 and the Bartlett test of sphericity indicated that the identity matrix null hypothesis could be rejected ($p < .05$).

The residual correlation matrix shows that, 4 (40%) of nonredundant residual correlations had an absolute value greater than .05. In contrast the eigenvalue-greater-than-one rule and the location of the elbow in the scree plot suggested the extraction of one factor. The large percentage of large residuals correlations demonstrate that, despite indications of the scree plot and the Kaiser rule to the contrary, the requested 1-factor factor structure does not provide a valid description of the mechanism that caused the items of the *integration with job* scale to correlate in the manner that they do. The large percentage of large residual correlations strongly suggest the presence of a second factor. The decision was made to force the extraction of two factors. The pattern matrix is shown in Table 5.69.

Table 5.69

Rotated factor structure (pattern matrix) for integration with job scale

	Factor 1	Factor 2
INTEGR_4	**.870**	-.077
INTEGR_5	**.552**	.264
INTEGR_1	-.055	**.770**
INTEGR_3	.320	**.511**
INTEGR_2	.456	**.472**

Note: Figures in bold indicate the factor on which each item predominantly loaded.

The residual correlation matrix indicates that only 1 (10%) of the inter-item correlations reproduced from the 2-factor solution deviated more than .05 from the observed inter-item correlations. The factor structure displayed in Table 5.69 therefore provides a plausible description of the mechanism that caused the items of the *integration with job* scale to correlate in the manner that they do. The rotated factor structure of the *integration with job* scale indicated that INTEGR_1, INTEGR_2 and INTEGR_3 loaded on factor 2. INTEGR_2 showed itself as a complex item. Inspection of the item wording revealed that these three items seem to deal with the degree of integration of identity or self that an individual experience with their work and organisation. Factor 2 was interpreted as an *organisation and work entwinement* factor. The remaining two items (INTEGR_4 and INTEGR_5) loaded on factor 1 and deal with a sense of belonging/being at home that a person experiences within an organisational context. Factor 1 was interpreted as a *belonging/being at home factor*. The factor correlation matrix indicates a positive and moderately strong correlation of .657 between the two factors.

Both factors represent a meaningful facet of the *integration with the job* construct. Given that all of the items, but for INTEGR_2, loaded satisfactory on one factor, combined with the fact that the factor fission made conceptual sense, it was decided to retain all five of the items[34].

A satisfactory stratified alpha of .862 was reported for the two-factor model.

In an attempt to determine whether the items of the *integration with the job* scale could still be used to operationalise the *integration with the job* latent variable the measurement model implied by the pattern matrix shown in Table 5.69 was fitted. If the first-order 2-factor *integration with the job* measurement model fitted at least reasonably well this would allow the fitting of a second-order *integration with the job* measurement model in which the two first-order *integration with the job* factors loaded on a single second-order *perceived integration with the job* factor. This in turn, would allow the testing of the statistical significance of the indirect effects of the second-order *integration with the job* factor on the *integration with the job* scale items.

The multivariate normality null hypothesis had to be rejected (Table 5.70). The attempt at normalisation moderately reduced the deviation from multivariate normality but nonetheless failed to fully rectify the problem (Table 5.71).

[34] The communality for item Integr_2 was .714.

Table 5.70

Test of multivariate normality of the integration with the job scale before normalisation

Skewness			Kurtosis			Skewness and Kurtosis	
Value	z-score	p-value	Value	z-score	p-value	Chi-square	p-value
2.524	8.658	.000	44.038	7.258	.000	127.634	0.000

Table 5.71

Test of multivariate normality of the integration with the job scale after normalisation

Skewness			Kurtosis			Skewness and Kurtosis	
Value	z-score	p-value	Value	z-score	p-value	Chi-square	p-value
1.973	6.992	.000	43.394	6.912	.000	96.661	.000

The first-order 2-factor *integration with the job* measurement model reflecting the loading pattern shown in the pattern matrix (Table 5.69) was consequently fitted to the normalised data using robust maximum likelihood estimation. The fitted model returned an admissible solution but with poor fit (RMSEA = .126; $p < .05$). Inspection of the modification indices (Figure 5.9) showed numerous statistically significant ($p < .01$) modification index values for the off-diagonal of the measurement error variance-covariance matrix (Θ_δ). If model fit would improve statistically significantly ($p < .01$) if provision is made for correlated measurement error terms it implies a common source of variance shared by (most) items that the model currently fails to explicitly acknowledge[35].

[35] The measurement error terms (and the error variance estimates) currently capture this source of variance but the model fails to explicitly reflect the fact that the unknown sources of systematic variance that cause variance in the items in addition to the *integration with the job* factor that it currently reflects, to some degree overlap across the items.

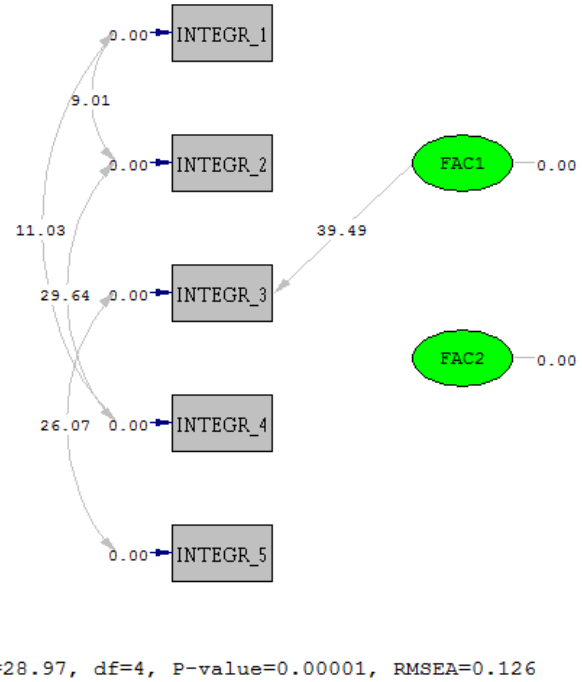

Figure 5.9. Statistically significant (p < .01) modification index values for the first-order 2-factor *integration with the job* measurement model

The *integration with the job* scale is, however, too short to allow the fitting of a bifactor model (Reise, 2012) that would have formally modelled the currently omitted broad, general, factor that affects the response to all items in addition to the more specific, narrow, *integration with the job* factor that the items currently reflect. The addition of such a broad, general factor would, however, result in a model with negative degrees of freedom[36] when the model is fitted in the normal way with freely estimated factor loadings.

To circumvent the problem of the negative degrees of freedom the factor loadings of the general factor were constrained to be equal across the five items. The fitted bifactor model with an equality constraint imposed on the factor loadings of the general factor model returned an inadmissible solution with a negative error variance estimate for INTEGR_1. The model in which the measurement error variance of INTEGR_1 was constrained to .10 also returned an inadmissible solution with an inter-latent variable correlation (ϕ_{12}) exceeding unity. When inter-latent variable correlation (ϕ_{12}) was constrained to .95 the bifactor model converged with an admissible solution (Figure 5.10)

[36] Given that the covariance between the broad, general, factor and the two more specific, narrow *integration with the job* factors are set to zero there are 16 parameters that have to be estimated in the bifactor model. The degree of freedom is therefore: df = (5 x 6)/2 – 16 = -1.

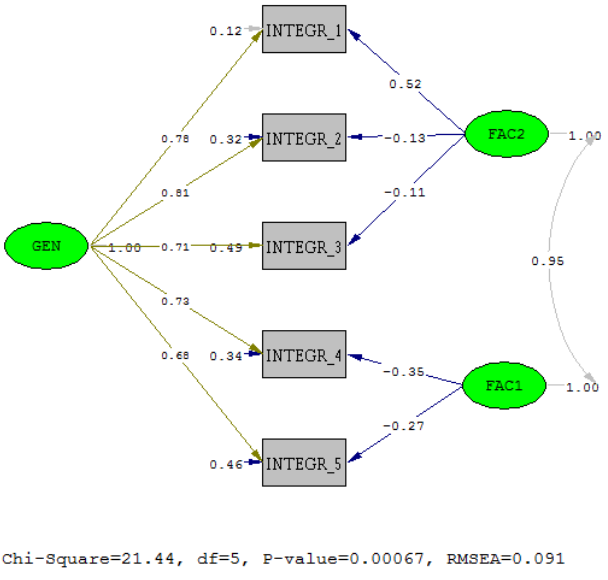

Figure 5.10. Bifactor *integration with the job* measurement model with equality constraints imposed on the factor loadings of the general factor, with $\theta_{\delta 11}$ constrained to .10 and ϕ_{12} constrained to .95 (completely standardised solution)

Both the exact fit and the close fit null hypotheses had to be rejected ($p < .05$). The RMSEA indicated poor model fit in the sample. Kenny, Kaniskan and McCoach (2015, p. 503), however, warn that:

> Using the RMSEA to assess the model fit in models with small df is problematic and potentially misleading unless the sample size is very large. We urge researchers, reviewers, and editors not to dismiss models with large RMSEA values with small df without examining other information. In fact, we think that it advisable for researchers to completely avoid computing the RMSEA when model df are small[37].

The normed fit index (NFI = .9818), the comparative fit index (CFI = .9859) and the incremental fit index (IFI = .9860) indicated good model fit. The standardised root mean square residual (SRMR = .06225) indicated reasonable model fit. It was consequently judged that the degree of fit achieved warranted the interpretation of the measurement model parameter estimates.

The unstandardised factor loading matrix is shown in Table 5.72. All the factor loadings are statistically significant when tested against a non-directional alternative hypothesis, but for the

[37] It is acknowledged that the argument could be made that this line of reasoning also applied to earlier small degree of freedom models that have been rejected as poor-fitting models. In mitigation of these earlier decisions it needs to be pointed out that the obtained RMSEA estimates tended to exceed .1.

loading of INTEGR_3 on FAC2 (p > .05). The proportion of variance that the bifactor model explains in each of the scale items is shown in Table 5.73.

Table 5.72

Unstandardised factor loadings for the bifactor integration with the job measurement model

	FAC1	FAC2	GEN
INTEGR_1	- -	0.4693*	0.7116*
		(0.0425)	(0.0243)
		11.0304	29.2413
INTEGR_2	- -	-	0.7116*
		0.1164*	
		(0.0578)	(0.0243)
		-2.0133	29.2413
INTEGR_3	- -	-0.1119	0.7116*
		(0.0673)	(0.0243)
		-1.6640	29.2413
INTEGR_4	-	- -	0.7116*
	0.3384*		
	(0.0606)		(0.0243)
	-5.5837		29.2413
INTEGR_5	-	- -	0.7116*
	0.2842*		
	(0.0698)		(0.0243)
	-4.0746		29.2413

Note: FAC1 refers to the *organisation and work entwinement* factor and FAC2 refers to the *belonging/being at home* factor. INTEGR_i refers to the items of the *integration with the job* scale; i=1, 2, …, 5. The first row in each cell represents the unstandardised factor loading estimate, the second row the standard error of the estimate and the third row the z-value.
* p<.05

Table 5.73

R^2 for the first-order bifactor integration with the job measurement model

INTEGR_1	INTEGR_2	INTEGR_3	INTEGR_4	INTEGR_5
.8790	.6820	.5094	.6552	.5380

McDonald's multidimensional omega (Widhiarso & Ravand, 2014) was calculated for the *integration with the job* scale from the completely standardised factor loadings and measurement error variances. A highly satisfactory value of .89 was obtained.

Table 5.73 shows that the bifactor *integration with the job* measurement model explained substantial proportions of variance in the items of the *integration with the job* scale. This finding , along with the meaningfulness of the factor fission, the statistical significance of the factor loadings, the item analysis results and the value of the stratified alpha as well as the multidimensional omega warranted the use the scale items in the calculation of two item parcels to operationalise the *integration with the job* latent variable.

5.5.26. SELF-IDENTITY MOTIVE/NEED

The self-identity scale obtained inter item correlations that were all larger than .30 and all were considered statistically significant ($p < .05$). Furthermore, the factor analysability of this scale was supported by a KMO value of .803 and Bartlett's test of sphericity that indicated that the identity matrix null hypothesis could be rejected ($p < .05$).

The residual correlation matrix showed that none (0%) of the nonredundant residual correlations had an absolute value greater than .05. This indicates that the 1-factor structure provided a highly credible explanation for the observed inter-item correlation matrix. The eigenvalue-greater-than-one rule and the position of the elbow in the scree plot also suggested the extraction of one factor. The unidimensionality assumption for this scale was therefore supported. The factor matrix, in Table 5.74, indicated that all the items loaded satisfactory on a single extracted factor ($\lambda_{ij} > .50$).

Table 5.74

Factor structure for the self-identity scale

	Factor 1
SELF_IDENT_3	.916
SELF_IDENT_1	.784
SELF_IDENT_4	.750
SELF_IDENT_2	.678

McDonald's coefficient omega demonstrated that the general factor was estimated to account for 87% of the variance in this scale's total scores based on the one-factor model. This estimate demonstrates adequate internal consistency reliability. Earlier, during the item analysis a Cronbach alpha of .860 was obtained.

5.5.27. SELF-EFFICACY MOTIVE/NEED

The dimensionality analysis for the 4-item *self-efficacy motive* scale revealed that all the item pairs in the correlation matrix obtained correlations that were larger than .30 and all correlated statistically significantly ($p < .05$). The scale obtained a KMO value of .828, which implies that the scale was factor analysable (> .60). Furthermore, the Bartlett test of sphericity indicated that the identity that the identity matrix null hypothesis could be rejected ($p < .05$), corroborating that the correlation matrix was factor analysable.

The residual correlation matrix indicated that none of the nonredundant residual correlations had absolute values greater than .50. This implies that the 1-factor solution provided a credible

explanation for the observed inter-item correlation matrix. The eigenvalue-greater-than-one rule and the scree plot also suggested the extraction of one factor. Therefore, the unidimensionality assumption was supported. The factor matrix shown in Table 5.75 indicated that all the items loaded satisfactory on the extracted factor (>.50).

McDonald's coefficient omega demonstrated that the general factor was estimated to account for 88% of the variance in this scale's total scores based on the one-factor model. This estimate demonstrates adequate internal consistency reliability.

Table 5.75

Factor structure for the self-efficacy motive scale

	Factor 1
SELF_EFF_4	.828
SELF_EFF_3	.823
SELF_EFF_1	.816
SELF_EFF_2	.791

5.6.28. PSYCHOLOGICAL OWNERSHIP

Correlations larger than .30 were attained for all item pairs and all of the inter-item correlations were additionally statistically significant ($p < .05$). A KMO of .868 (> .60), confirmed that the correlation matrix was suitable for factor analysis. The factor analysability assumption was further corroborated by the Bartlett test of sphericity which indicated that the null hypothesis that the correlation matrix is an identity matrix in the population could be rejected ($p < .05$).

The residual correlation matrix revealed that there were 6 (40%) nonredundant residual correlations with absolute values greater than .05 indicating that the 1-factor solution failed to provide a satisfactory plausible explanation for the observed inter-item correlation matrix. This despite the fact that both the eigenvalue-greater-than-one rule and the scree plot indicated the extraction of one factor. The unidimensionality assumption was therefore not corroborated for the *psychological ownership* scale.

The extraction of 2 factors was consequently requested. The resultant 2-factor solution shown in Table 5.76 succeeded in accurately reproducing 13 (87%) of the observed inter-item correlations. The 2-factor solution therefore provides a plausible description of the mechanism that brought about the observed inter-item correlation matrix.

Table 5.76

Rotated *factor structure (pattern matrix) for the psychological ownership scale*

	Factor	
	1	2
PO_5	**.903**	.018
PO_4	**.876**	.034
PO_6	**.800**	-.003
PO_2	**.647**	-.268
PO_1	-.057	**-.987**
PO_3	.189	**-.731**

Note: Figures in bold indicate the factor on which each item predominantly loaded.

Item PO_1 and PO_3 loaded negatively on factor 2. Based on the common theme shared by these two items factor 2 was interpreted as an *ownership for the job* factor. Items PO_2, PO_3, PO_5 and PO_6 loaded positively on factor 1. Based on the common theme shard by these four items factor 1 was interpreted as an *ownership for the work done in the organisation* factor. The distinction between the two factors is rather subtle but closely related. The first factor represents a broader sense of ownership for the work which one does in the organisation that includes not only one's core job but also more general organisational tasks. The second factor represents a narrower sense of ownership for one's core job. The factor correlation matrix showed a strong negative correlation (-.794) between the two extracted factors[38]. Because of the subtleness of the distinction between the two factors as well as the high correlation between the two factors the practical meaningfulness of the factor fission is somewhat questionable. The factor fission really is a mathematical necessity to adequately explain the observed inter-item correlation matrix.

In an attempt to determine whether the items of the *psychological ownership* scale could still be used to operationalise the *psychological ownership* latent variable the measurement model implied by the pattern matrix shown in Table 5.76 was fitted. If the first-order 2-factor *psychological ownership* measurement model fitted at least reasonably well this would allow the fitting of a second-order *psychological ownership* measurement model in which the two first-order *psychological ownership* factors loaded on a single second-order *psychological ownership* factor. This in turn, would allow the testing of the statistical significance of the indirect effects of the second-order *psychological ownership* factor on the *psychological ownership* scale items.

[38] The negative correlation was due to the negative loadings of PO_1 and PO_2 on factor 2.

The multivariate normality null hypothesis had to be rejected (Table 5.77). The attempt at normalisation substantially reduced the deviation from multivariate normality but nonetheless failed to salvage the situation (Table 5.78).

Table 5.77

Test of multivariate normality of the psychological ownership scale before normalisation

Skewness			Kurtosis			Skewness and Kurtosis	
Value	z-score	p-value	Value	z-score	p- value	Chi-square	p-value
10.915	21.415	.000	80.266	14.064	.000	656.417	.000

Table 5.78

Test of multivariate normality of the psychological ownership scale after normalisation

Skewness			Kurtosis			Skewness and Kurtosis	
Value	z-score	p-value	Value	z-score	p-value	Chi-square	p-value
7.471	16.996	.000	72.910	12.391	.000	442.411	.000

The first-order 2-factor *psychological ownership* measurement model reflecting the loading pattern shown in the pattern matrix (Table 5.76) was consequently fitted to the normalised data using robust maximum likelihood estimation. The fitted model returned an admissible solution but with poor fir (RMSEA = .096; $p < .05$). Inspection of the modification indices (Figure 5.11) showed numerous statistically significant ($p < .01$) modification index values for the off-diagonal of the measurement error variance-covariance matrix (Θ_δ). If model fit would improve statistically significantly ($p < .01$) if provision is made for correlated measurement error terms it implies a common source of variance shared by (most) items that the model currently fails to explicitly acknowledge.

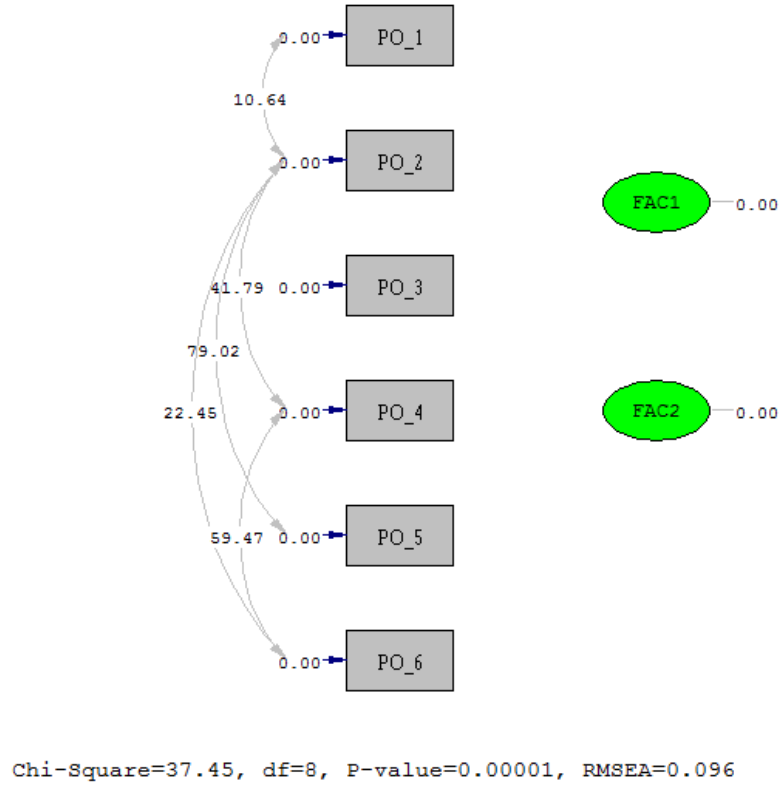

Figure 5.11. Statistically significant ($p < .01$) modification index values for the first-order 2-factor *psychological ownership* measurement model

A bifactor model (Reise, 2012) was consequently fitted in which a broad, general factor, uncorrelated with the two more specific, narrow, factors, was added. The model initially returned an inadmissible solution with a negative measurement error estimate for PO_1 ($\theta_{\delta 11}$) and a latent variable inter-correlation (ϕ_{12}) exceeding unity. The measurement error variance of PO_1 was subsequently fixed to .1 and ϕ_{12} was fixed to .20. The revised model still returned an inadmissible solution with a negative measurement error estimate for PO_2 ($\theta_{\delta 22}$). The measurement error variance of PO_2 was subsequently also fixed to .1. The revised measurement model (Figure 5.12) converged with an admissible solution in 20 iterations.

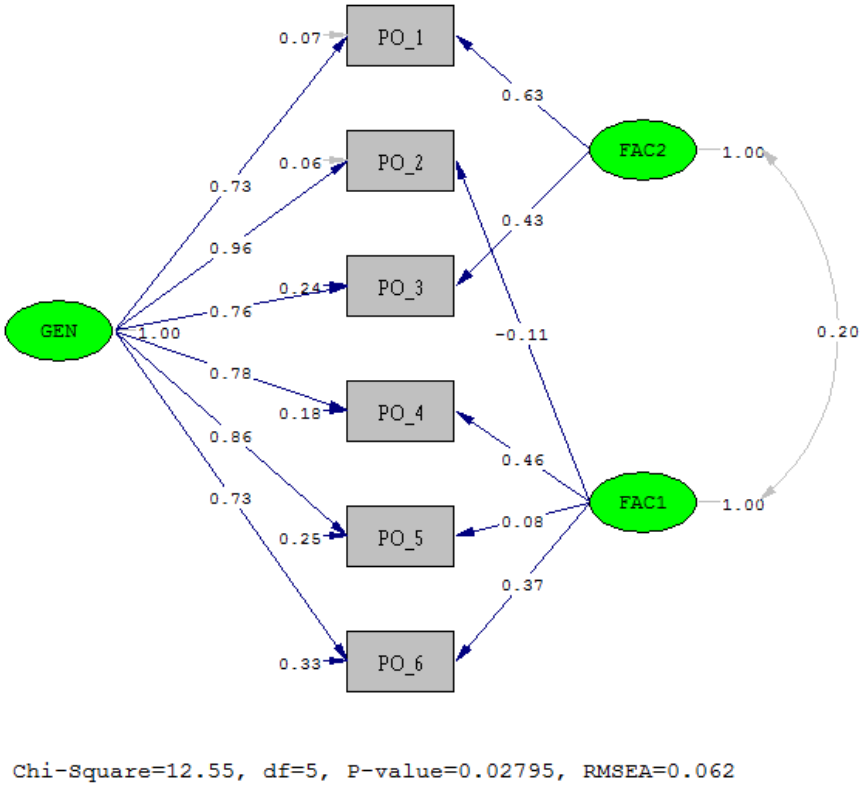

Figure 5.12. Bifactor *psychological ownership* measurement model with $\theta_{\delta 11}$ and $\theta_{\delta 11}$ fixed to .10 and ϕ_{12} fixed to .20 (completely standardised solution)

The exact fit null hypothesis had to be rejected ($p < .05$) but the close fit null hypothesis was not rejected ($p > .05$). This warranted the interpretation of the measurement model parameter estimates. The unstandardised factor loading matrix (Λ^{X}) is shown in Table 5.79.

Table 5.79

Unstandardised factor loading matrix for the bifactor psychological ownership measurement model

	FAC1	FAC2	GEN
PO_1	- -	0.7525*	0.8737*
		(0.0440)	(0.0541)
		17.0868	16.1376
PO_2	-0.1427	- -	1.1973*
	(0.1063)		(0.0416)
	-1.3429		28.7806
PO_3	- -	0.5085*	0.9062*
		(0.0609)	(0.0522)
		8.3519	17.3500
PO_4	0.5293*	- -	0.9098*
	(0.1067)		(0.0606)
	4.9603		15.0196
PO_5	0.0976	- -	1.0324*
	(0.1173)		(0.0473)
	0.8322		21.8315

Table 5.79

Unstandardised factor loading matrix for the bifactor psychological ownership measurement model (continued)

	FAC1	FAC2	GEN
PO_6	0.5042*	- -	0.9803*
	(0.1242)		(0.0656)
	4.0604		14.9502

Note: FAC1 refers to the *ownership for the work done in the organisation* factor, FAC2 refers to the *ownership for the job* factor and GEN refers to the broad, general, factor. PO_i refers to the items of the *integration with the job* scale; i=1, 2, …, 6. The first row in each cell represents the unstandardised factor loading estimate, the second row the standard error of the estimate and the third row the z-value.
* p<.05

All items loaded statistically significantly ($p < .05$) on the broad, general, factor. Both the items assigned to factor 2 (PO_1 and PO_3) loaded statistically significantly ($p < .05$) on that factor, but two (PO_2 and PO_5) of the four items assigned to factor 1 (PO_2, PO4, PO_5 and PO_6) loaded statistically insignificantly ($p > .05$) on this factor. The proportion variance the bifactor model explained in each of the psychological ownership scale items is shown in Table 5.81.

Table 5.81

R^2 for the bifactor psychological ownership measurement model

PO_1	PO_2	PO_3	PO_4	PO_5	PO_6
.9301	.9356	.7611	.8222	.7487	.6711

McDonald's multidimensional omega (Widhiarso & Ravand, 2014) was calculated for the *psychological ownership* scale from the completely standardised factor loadings and measurement error variances. A highly satisfactory value of .96 was obtained.

Table 5.81 shows that the bifactor model explained 67% or more of the variance in the items of the *psychological ownership* scale. From the completely standardised factor loading matrix (not shown) it is evident that the broad, general, factor, rather than the more specific, narrow factors, is the more dominant influence determining item responses. These finding, along with the item analysis results as well as the highly satisfactory multidimensional McDonald's omega, warranted the calculation of two item parcels to operationalise the psychological ownership latent variable in the proposed structural model.

5.6.29. MOTIVATION TO PURSUE THE ROUTES TO PSYCHOLOGICAL OWNERSHIP (VALENCE SUBSCALE)

The valence and expectancy subscales, from which the motivation to pursue the routes to psychological ownership were calculated multiplicatively, presented methodological complications in both the item analysis and the dimensionality analysis. The items of the two

subscales referred to successful performance on the three routes (*self-investment*, *gaining control* and *gaining knowledge*). More specifically the items tapped into the valence of successful performance on the three routes and the subjective probability of successful performance on the three routes if effort would be exerted. The valence of successfully traveling the routes to psychological ownership is not a unidimensional construct. Neither is the expectancy of successfully traveling the routes to psychological ownership. The valence associated with one route need not be related to the valence attached to the two other routes. Neither need the expectancies be related. If the subscales would render highly valid and reliable measures, high inter-item correlations are therefore not necessarily result. High internal consistency reliability for each subscale as a whole cannot therefore be logically expected. Neither can unidimensionality be logically expected for either subscale.

For the *valence* subscale inter-item correlations for all item pairs attained correlations that were larger than .30 which were also statistically significant ($p < .05$). A KMO of .832 confirmed that the correlations in the correlation matrix were suitable for factor analysis (> .60). The factor analysability assumption was further supported by the Bartlett test of sphericity (1437.206; $p = .00$) which indicated that the null hypothesis that the correlation matrix is an identity matrix in the population could be rejected ($p < .05$).

As expected, the residual correlation matrix showed that 19 (52%) of the residual correlations were larger than .05. The requested single-factor factor structure therefore did not provide a valid (i.e. permissible) and credible description of the mechanism that produced the observed inter-item correlation matrix. The eigenvalue-greater-than-one rule indicated the extraction of two factors. The scree plot was somewhat ambiguous and indicated the extraction of either one or two factors. This did not corroborate the unidimensionality assumption made for this subscale. However, it was somewhat expected, since the nine items were designed to reflect the valence associated with the three routes to psychological ownership (*self-investment*, *gaining control*, *intimate knowledge*).

The extraction of two factors was consequently requested. The residual correlation matrix for the 2-factor solution indicated that 9 (25%) of the residual correlations were larger than .05. The 2-factor solution therefore provided a sufficiently feasible explanation for the observed inter-item correlation matrix to justify the interpretation of the factor loading matrix. The pattern matrix is shown in Table 5.82.

Table 5.82

Rotated 2-factor factor structure (pattern matrix) for the motivation to pursue the routes to psychological ownership (valence) subscale

	Factor	
	1	2
MOT_VAL_8	**.772**	-.166
MOT_VAL_7	**.748**	-.079
MOT_VAL_4	**.707**	-.007
MOT_VAL_1	**.666**	.076
MOT_VAL_3	**.647**	.175
MOT_VAL_9	**.517**	.270
MOT_VAL_6	**.465**	.358
MOT_VAL_5	-.093	**.836**
MOT_VAL_2	.203	**.583**

Note: Figures in bold indicate the factor on which each item predominantly loaded.

It is evident from the factor matrix in Table 5.82 above that MOT_VAL_2 and MOT_VAL_5 loaded on the second factor while rest of the items loaded on factor 1. Item MOT_VAL_6 showed itself as a complex item with moderately high loadings on both factors. Upon deeper inspection of the items it became evident that the two items that loaded on the second factor pertains to the *self-investment* while the rest of the items reflects dimensions of *gaining intimate knowledge* and *control*.

The *motivation to pursue the routes to psychological ownership (valence)* tapped into three distinct routes. It therefore makes sense to expect that a 1-factor factor structure would fit the data of the valence items developed to tap into each of the three routes. Items MOT_VAL_1, MOT_VAL_4 and MOT_VAL_7 were written to reflect the *gaining knowledge route*. Items MOT_VAL_2, MOT_VAL_5 and MOT_VAL_8 were written to reflect the *self-investment route.* Items MOT_VAL_3, MOT_VAL_6 and MOT_VAL_9 were written to reflect the *gaining control route.* The 1-factor matrix for the *gaining intimate knowledge* sub-subscale is shown in Table 5.83.

Table 5.83

Factor structure for the gaining intimate knowledge sub-subscale of the motivation to pursue the routes to psychological ownership (valence) subscale

	Factor
	1
MOT_VAL_4	.817
MOT_VAL_7	.731
MOT_VAL_1	.641

The residual correlation matrix indicated that 0 (0%) of the reproduced correlations derived from the extracted single-factor structure deviated more than .05 from the observed inter-item correlations. The single-factor solution shown in Table 5.83 therefore provided a valid and credible explanation for the observed correlation matrix. All items showed acceptable (λ_{ij} > .50) loadings on the single extracted factor. The 1-factor matrix for the *self-investment* sub-subscale is shown in Table 5.84.

Table 5.84

Factor structure for the self-investment sub-subscale of the motivation to pursue the routes to psychological ownership (valence) subscale

	Factor 1
MOT_VAL_2	.959
MOT_VAL_5	.567
MOT_VAL_8	**.213**

Note: Figure in bold indicate a problematic factor loading

The residual correlation matrix indicated that 0 (0%) of the reproduced correlations derived from the extracted single-factor structure deviated more than .05 from the observed inter-item correlations. The single-factor solution shown in Table 5.84 therefore provided a valid and credible explanation for the observed correlation matrix. All items showed acceptable (λ_{ij} > .50) loadings on the single extracted factor, but for item MOT_VAL_8. The manner in which item MOT_VAL_8 was phrased (seeing your effort come to fruition in your job), in hindsight, did seem to be somewhat problematic as an outcome of the successful traveling of the *self-investment* route. The item is vague in that it does not specify what the effort is directed at specifically (*self-investment*, the routes in general, task performance, …), nor what the fruits that stem from the effort, specifically are. The item analysis performed on the items of the *self-investment* sub-subscale only, also resulted in the flagging of item MOT_VAL_8 as a problematic item[39]. This suggests that the possibility of excluding item MOT_VAL_8 (and therefore necessarily also MOT_EXP_8) from the calculation of item parcel indicators to operationalise the motivation to pursue the routes to psychological ownership should be seriously considered. The 1-factor matrix for the *gaining control* sub-subscale is shown in Table 5.85.

[39] Item MOT_VAL_8 was, however, not flagged as a problematic item when the item analysis was performed on the whole motivation to pursue the routes to psychological ownership (valence) subscale.

Table 5.85

Factor structure for gaining control sub-subscale of the motivation to pursue the routes to psychological ownership (valence) subscale

	Factor 1
MOT_VAL_9	.761
MOT_VAL_6	.758
MOT_VAL_3	.699

The residual correlation matrix indicated that 0 (0%) of the reproduced correlations derived from the extracted single-factor structure deviated more than .05 from the observed inter-item correlations. The single-factor solution shown in Table 5.79 therefore provided a valid and credible explanation for the observed correlation matrix. All items showed acceptable (λ_{ij}>.50) loadings on the single extracted factor.

A stratified alpha of .853 was reported for the multifactor subscale when item MOT_VAL_8 was retained in the *self-investment* sub-subscale.

To further investigate the construct validity of the *motivation to pursue the routes to psychological ownership (valence)* subscale a measurement model reflecting the design intention underpinning the subscale, as explained above, was fitted.

The multivariate normality null hypothesis had to be rejected (Table 5.86). The attempt at normalisation dramatically reduced the deviation from multivariate normality but nonetheless failed to salvage the situation (Table 5.87). Robust maximum likelihood estimation was consequently used to fit the model to the normalised data.

Table 5.86

Test of multivariate normality of the motivation to pursue the routes to psychological ownership (valence) subscale before normalisation

Skewness			Kurtosis			Skewness and Kurtosis	
Value	z-score	p-value	Value	z-score	p-value	Chi-square	p-value
93.295	54.163	.000	498.039	21.248	.000	3385.144	.000

Table 5.87

Test of multivariate normality of the motivation to pursue the routes to psychological ownership (valence) subscale after normalisation

Skewness			Kurtosis			Skewness and Kurtosis	
Value	z-score	p-value	Value	z-score	p-value	Chi-square	p-value
10.642	16.986	.000	120.882	10.024	.000	389.014	.000

The *motivation to pursue the routes to psychological ownership (valence)* measurement model fitted poorly (RMSEA= .134; p < .05). Both the exact fit and close fit null hypotheses were rejected (p < .05). An examination of the modification indices calculated for the fitted model revealed (Figure 5.13) numerous statistically significant (p < .01) modification index values for the off-diagonal of the measurement error variance-covariance matrix (Θ_δ).

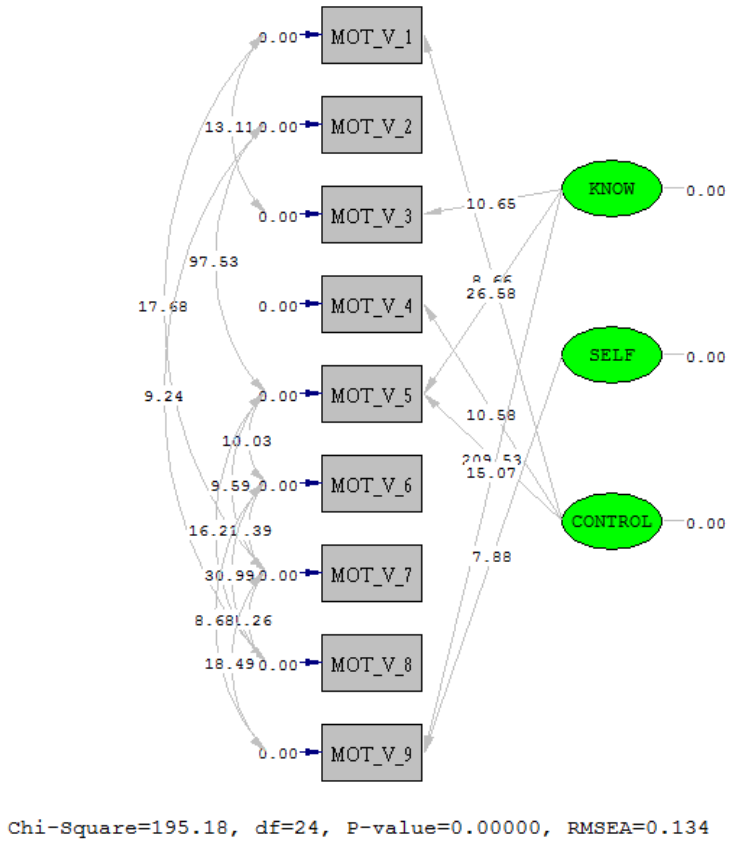

Figure 5.13. Statistically significant (p < .01) modification index values for the first-order 3-factor *motivation to pursue the routes to psychological ownership (valence)* measurement model

A bifactor model (Reise, 2012) was consequently fitted that makes provision for a broad, general, factor on which all subscale items load that is uncorrelated with the three more specific, narrow, route factors. The bifactor model returned an inadmissible solution with a negative measurement error variance estimate for MOT_VAL_6 ($\theta_{\delta 66}$). In the subsequent run $\theta_{\delta 66}$ was constrained to .1. The revised bifactor model showed poor fit (RMSEA = .082; p < .05), albeit better than without the broad, general, factor. Both the exact fit and close fit null hypotheses were rejected (p < .05). Inspection of the modification indices calculated for the

revised bifactor model indicated that allowing item MOT_VAL_9 (having the ability to decide how things are done in your job) to load on the *gaining knowledge* route outcome would statistically significantly ($p < .01$) improve the fit of the model. Item MOT_VAL_9 was designated to reflect an outcome of the *gaining control* route. *Post hoc* it does, however, make sense that this item also could be interpreted to reflect an outcome of the *gaining knowledge* route. This path was consequently added[40]. The revised bifactor *motivation to pursue the routes to psychological ownership (valence)* measurement model (Figure 5.14) converged in 55 iterations and returned an admissible solution that fitted the sample data reasonably (RMSEA = .057; $p > .05$). The probability of observing the sample RMSEA estimate under the close fit null hypothesis was, however, sufficiently large ($p > .05$) not to reject the close fit null hypothesis.

The close fit warranted the interpretation of the *motivation to pursue the routes to psychological ownership (valence)* measurement model parameter estimates. The unstandardised factor loading matrix is shown in Table 5.88. Table 5.88 shows that all the items of the *motivation to pursue the routes to psychological ownership (valence)* subscale loaded positively and statistically significantly ($p < .05$) on the broad, general factor. Moreover, all items, but for item MOT_V_1[41], loaded statistically significantly ($p<.05$) on the more specific, narrow, factor they were designed to reflect. All items loaded positively on their designated narrow factors but for item MOT_V_8 (seeing your effort come to fruition in your job) and item MOT_V_9 (having the ability to decide how things are done in your job), that loaded negatively on the SELF and KNOW[42] factors respectively factors. The negative factor loadings of these two items on these two narrow factors means that when controlling for the variance in item responses due to the broad, general, factor (and in the case of item MOT_VAL_9 also controlling for the variance explained by *gaining control*), an increase in the valence associated with self-investment in and gaining knowledge of tone's job tends to be associated with a response more towards the negative end of the item response scale. No logical explanation as to why this should be the case could be offered and consequently this finding to some degree erodes confidence in these two items.

[40] The fact that the completely standardised change was negative to some degree eroded confidence in the decision to ad the path. It, however, needs to be considered that the expected change estimate reflects the partial influence of the *gaining knowledge* narrow factor on MOT_VAL_9 when controlling for the *gaining control* narrow factor and the broad, general, factor.

[41] The observed variable names had to be shortened to be acceptable to LISREL 8.8.

[42] Item MOT_V_9 was not originally designated to reflect the gaining knowledge outcome factor. This path was added based on modification index feedback on the original model.

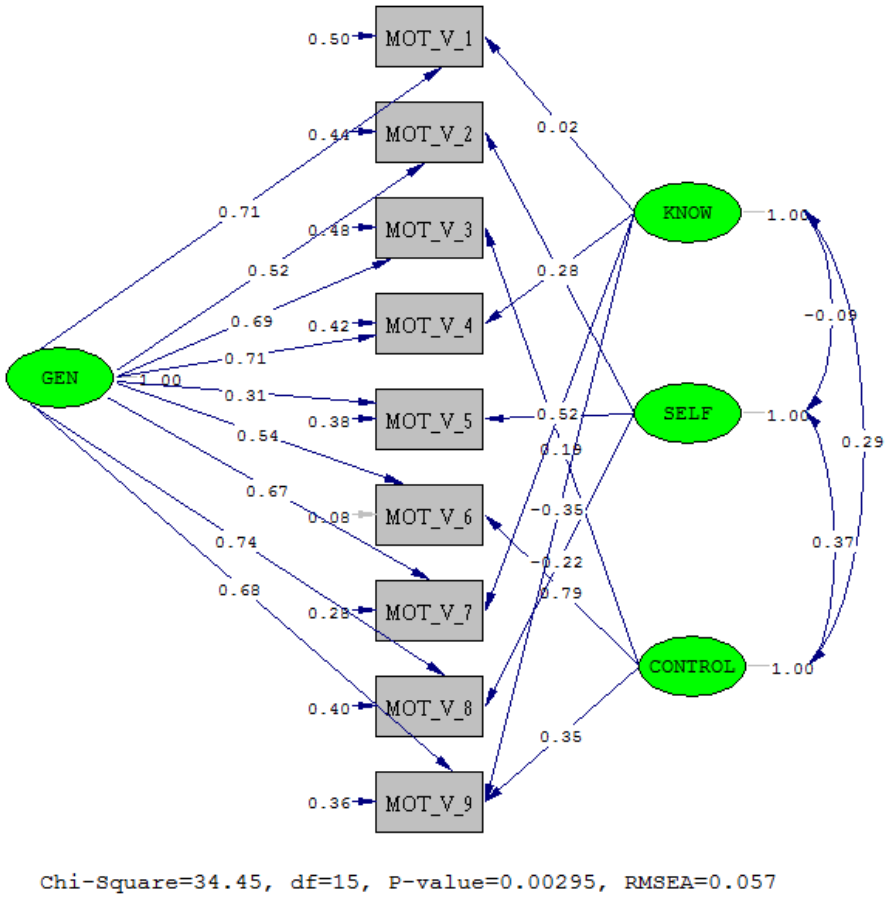

Figure 5.14. Bifactor *motivation to pursue the routes to psychological ownership (valence)* measurement model with $\theta_{\delta 66}$ fixed to .1 and λ_{91} freed to be estimated (completely standardised solution)

The proportion of variance that the bifactor model explains in each item of the *motivation to pursue the routes to psychological ownership (valence)* subscale is shown in Table 5.89.

Table 5.88

Unstandardised factor loading matrix for the bifactor motivation to pursue the routes to psychological ownership (valence) measurement model

	KNOW	SELF	CONTROL	GEN
MOT_V_1	0.0194	- -	- -	0.5912*
	(0.0621)			(0.0392)
	0.3121			15.0909
MOT_V_2	- -	0.5832*	- -	0.5665*
		(0.0720)		(0.0553)
		8.0979		10.2479
MOT_V_3	- -	- -	0.1893*	0.6746*
			(0.0467)	(0.0441)
			4.0564	15.3017

Table 5.88

Unstandardised factor loading matrix for the bifactor motivation to pursue the routes to psychological ownership (valence) measurement model (continued)

	KNOW	SELF	CONTROL	GEN
MOT_V_4	0.2526*	- -	- -	0.6470*
	(0.0479)			(0.0468)
	5.2701			13.8108
MOT_V_5	- -	1.1606*	- -	0.5056*
		(0.1153)		(0.0940)
		10.0637		5.3806
MOT_V_6	- -	- -	0.8736*	0.5975*
			(0.0425)	(0.0664)
			20.5672	8.9974
MOT_V_7	0.4316*	- -	- -	0.5574*
	(0.0679)			(0.0449)
	6.3591			12.4042
MOT_V_8	- -	-0.1898*	- -	0.6316*
		(0.0433)		(0.0399)
		-4.3820		15.8092
MOT_V_9	-0.3274*	- -	0.3196*	0.6329*
	(0.0889)		(0.0705)	(0.0489)
	-3.6805		4.5353	12.9475

Note: Know refers to the *gaining knowledge outcome* factor, SELF refers to the *self-investment* outcome factor, CONTROL refers to the *gaining control outcome* factor and GEN refers to the broad general factor. MOT_V__i refers to the items of the *motivation to pursue the routes to psychological ownership (valence)*; i=1, 2, …, 9. The first row in each cell represents the unstandardised factor loading estimate, the second row the standard error of the estimate and the third row the z-value.
* p<.05

Table 5.89

R^2 for the bifactor motivation to pursue the routes to psychological ownership (valence) measurement model

MOT_V_1	MOT_V_2	MOT_V_3	MOT_V_4	MOT_V_5	MOT_V_6
.4990	.5569	.5181	.5765	.6211	.9180
MOT_V_7	MOT_V_8	MOT_V_9			
.7192	.5955	.6428			

Table 5.89 shows that *circa* 50% or more of the variance in the items of the *bifactor motivation to pursue the routes to psychological ownership (valence)* subscale were explained by the bifactor model. Noteworthy is the fact that *circa* 60% of the variance in item MOT_V_8 was explained by the bifactor model with the major contribution coming from the broad, general factor, according to the completely standardised factor loading matrix (not shown). This vindicates the previous argument and decision to not delete item MOT_V_8 based on the item analysis and initial dimensionality analysis results.

McDonald's multidimensional omega (Widhiarso & Ravand, 2014) was calculated for the *motivation to pursue the routes to psychological ownership (valence)* subscale from the

completely standardised factor loadings and measurement error variances. A highly satisfactory value of .90 was obtained.

5.6.30. MOTIVATION TO PURSUE THE ROUTES TO PSYCHOLOGICAL OWNERSHIP (EXPECTANCY SUBSCALE)

The dimensionality analysis of the expectancy subscale indicated that all the item pairs in the correlation matrix obtained correlations that were larger than .30 and that all were statistically significant ($p < .05$). The subscale obtained a KMO value of .851 and Bartlett's test of sphericity indicated that the identity matrix null hypothesis could be rejected ($p < .05$). Therefore, the correlation matrix was factor analysable.

The *expectancy* subscale of the *motivation to pursue the routes to psychological ownership* latent variable was not conceptualised as a one-dimensional construct. Therefore, as expected, the residual correlation matrix showed that 25 (60%) of the nonredundant residual correlations obtained absolute values greater than .05, implying that the requested 1-factor solution did not provide a very convincing explanation of the observed inter-item correlation matrix. The unidimensionality assumption was therefore not corroborated. The eigenvalue-greater-than-one rule suggested the extraction of two factors. The scree plot was ambiguous and suggested the extraction of either a single factor or three factors.

The extraction of two factors was subsequently requested. The residual correlation matrix indicated that 9 (25%) of the reproduced correlations deviated more than .05 from the thirty-six observed inter-item correlations. The 2-factor solution therefore provided a plausible explanation for the observed inter-item correlation matrix. The factor (pattern) matrix for the rotated two-factor structure is presented in Table 5.90.

Table 5.90

Rotated factor structure for the motivation to Pursue the Routes to Psychological Ownership (expectancy) subscale

	Factor	
	1	2
MOT_EXP_6	**.732**	.004
MOT_EXP_5	**.711**	.086
MOT_EXP_9	**.703**	-.038
MOT_EXP_2	**.687**	-.030
MOT_EXP_3	**.667**	-.170
MOT_EXP_7	-.020	**-.814**
MOT_EXP_4	-.010	**-.739**
MOT_EXP_8	.007	**-.722**
MOT_EXP_1	.057	**-.691**

Note: Figures in bold indicate the factor on which each item predominantly loaded.

It is evident from the rotated 2-factor matrix that items MOT_EXP_2, MOT_EXP_3, MOT_EXP_5 MOT_EXP_6 and MOT_EXP_9 loaded positively onto factor 1. Items MOT_EXP_1, MOT_EXP_4, MOT_EXP_7 and MOT_EXP_8 loaded positively on factor 2. Upon deeper inspection of the items, it was established that the items that load on factor two seems to relate to *self-investment* and *control*, while *intimate knowledge* seems to load on factor one. The self-investment item, MOT_EXP_8 (seeing your effort come to fruition in your job), loaded inappropriately on factor 2 instead of on factor 1 along with its colleagues. The loading pattern found for the *motivation to pursue the routes to psychological ownership (expectancy)* subscale stands in contrast with that found on the *motivation to pursue the routes to psychological ownership (valence)* subscale where *gaining intimate knowledge* and *control* loaded on the same factor (factor 1). This lack of consistency is unfortunate and eroded confidence in the logical meaningfulness of the groupings of routes in a single factor.

The *motivation to pursue the routes to psychological ownership (expectancy)* subscale tapped into the same three distinct routes than the *motivation to pursue the routes to psychological ownership (valence)* subscale. It therefore makes sense to expect that a 1-factor factor structure would also fit the data of the expectancy items developed to tap into each of the three routes. The numbering of the items that were assigned to each route in the *motivation to pursue the routes to psychological ownership (expectancy)* subscale corresponds to the assignment in the *motivation to pursue the routes to psychological ownership (valence)* subscale. The 1-factor matrix for the *gaining intimate knowledge* sub-subscale is shown in Table 5.91.

Table 5.91

Factor structure for the gaining intimate knowledge sub-subscale of the motivation to pursue the routes to psychological ownership (expectancy) subscale

	Factor 1
MOT_EXP_7	.802
MOT_EXP_4	.755
MOT_EXP_1	.717

The residual correlation matrix indicated that 0 (0%) of the reproduced correlations derived from the extracted single-factor structure deviated more than .05 from the observed inter-item correlations. The single-factor solution shown in Table 5.91 therefore provided a valid and credible explanation for the observed correlation matrix. All items showed acceptable (λ_{ij} > .50) loadings on the single extracted factor. The 1-factor matrix for the *self-investment* sub-subscale is shown in Table 5.92.

Table 5.92

Factor structure for the self-investment sub-subscale of the motivation to pursue the routes to psychological ownership (expectancy) subscale

	Factor 1
MOT_EXP_2	.925
MOT_EXP_5	.668
MOT_EXP_8	**.342**

Note: Figure in bold indicate a problematic factor loading

The residual correlation matrix indicated that 0 (0%) of the reproduced correlations derived from the extracted single-factor structure deviated more than .05 from the observed inter-item correlations. The single-factor solution shown in Table 5.92 therefore provided a valid and credible explanation for the observed correlation matrix. All items showed acceptable (λ_{ij} > .50) loadings on the single extracted factor except for item MOT_EXP_8. This agrees with the results obtained on the *self-investment* sub-subscale of the *motivation to pursue the routes to psychological ownership (valence) subscale.* The discussion presented and comments made in paragraph 5.6.29 also applies to item MOT_EXP_8 here. The 1-factor matrix for the *gaining control* sub-subscale is shown in Table 5.93.

Table 5.93

Factor structure for gaining control sub-subscale of the motivation to pursue the routes to psychological ownership (expectancy) subscale

	Factor 1
MOT_EXP_9	.843
MOT_EXP_6	.783
MOT_EXP_3	.718

The residual correlation matrix indicated that 0 (0%) of the reproduced correlations derived from the extracted single-factor structure deviated more than .05 from the observed inter-item correlations. The single-factor solution shown in Table 5.93 therefore provided a valid and credible explanation for the observed correlation matrix. All items showed acceptable (λ_{ij} > .50) loadings on the single extracted factor.

A stratified alpha of .891 was reported for the composite homogenous sets of items contained in the two-factor model solution.

The construct validity of the *motivation to pursue the routes to psychological ownership (expectancy)* subscale was tested further by fitting a measurement model reflecting the design intention underpinning the subscale, as explained above.

The multivariate normality null hypothesis had to be rejected (Table 5.94). The attempt at normalisation moderately reduced the deviation from multivariate normality but nonetheless failed to salvage the situation (Table 5.95). Robust maximum likelihood estimation was consequently used to fit the model to the normalised data.

Table 5.94

Test of multivariate normality of the motivation to pursue the routes to psychological ownership (expectancy) subscale before normalisation

Skewness			Kurtosis		Skewness and Kurtosis		
Value	z-score	p-value	value	z-score	p-Value	Chi-square	p-value
26.456	32.662	.000	152.925	16.477	.000	1338.288	.000

Table 5.95

Test of multivariate normality of the motivation to pursue the routes to psychological ownership (expectancy) subscale after normalisation

Skewness			Kurtosis		Skewness and Kurtosis		
Value	z-score	p-value	Value	z-score	p-value	Chi-square	p-value
19.758	27.111	.000	139.825	14.363	.000	941.289	.000

The *motivation to pursue the routes to psychological ownership (expectancy)* measurement model fitted poorly (RMSEA = .135; $p < .05$). Both the exact fit and close fit null hypotheses were rejected ($p < .05$). An examination of the modification indices calculated for the fitted model revealed (Figure 5.15) numerous statistically significant ($p < .01$) modification index values for the off-diagonal of the measurement error variance-covariance matrix (Θ_δ).

A bifactor model was consequently fitted that made provision for a broad, general, factor, uncorrelated with the three more specific, narrow, factors. on which all the items loaded. The fitted bifactor model (Figure 5.16) converged in 45 iterations with an admissible solution that showed reasonable fit in the sample (RMSEA = .077; $p < .05$). The probability of observing the sample RMSEA estimate under the close fit null hypothesis was, however, sufficiently small ($p = .02601$) that the close fit null hypothesis had to be rejected. The normed fit index (NFI = .9824, the comparative fit index (CFI = .9871), the incremental fit index (IFI = .9872) and the standardised root mean square residual (SRMR = .02341) all indicated good model fit.

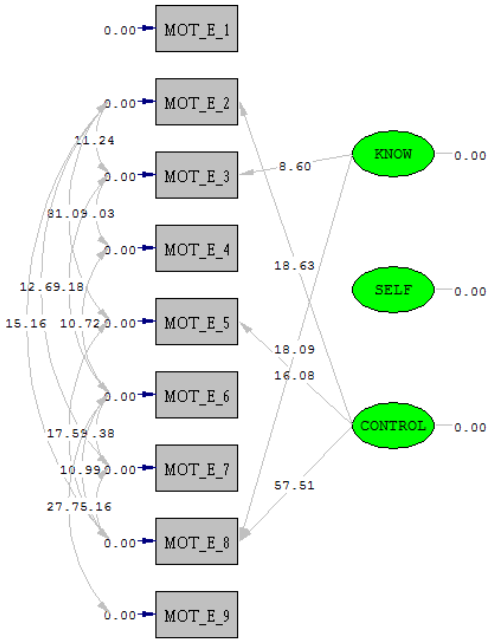

Figure 5.15. Statistically significant (p < .01) modification index values for the first-order 3-factor *motivation to pursue the routes to psychological ownership (expectancy)* measurement model.

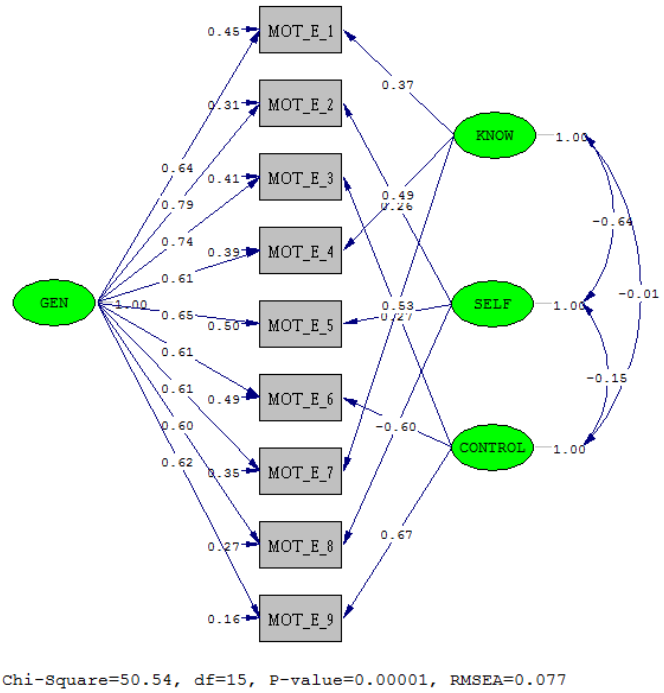

Figure 5.16. Bifactor *motivation to pursue the routes to psychological ownership (expectancies)* measurement model (completely standardised solution)

The basket of fit statistics warranted the interpretation of the bifactor *motivation to pursue the routes to psychological ownership (expectancy)* measurement model parameter estimates. Table 5.96 shows the unstandardised factor loading matrix (Λ^{X}).

Table 5.96

Unstandardised factor loading matrix for the bifactor motivation to pursue the routes to psychological ownership (expectancy) measurement model

	KNOW	SELF	CONTROL	GEN
MOT_E_1	0.3026*	- -	- -	0.5226*
	(0.0505)			(0.0426)
	5.9974			12.2781
MOT_E_2	- -	0.3135*	- -	0.9423*
		(0.0883)		(0.0588)
		3.5503		16.0340
MOT_E_3	- -	- -	0.2088*	0.8146*
			(0.0606)	(0.0504)
			3.4450	16.1750
MOT_E_4	0.4603*	- -	- -	0.5671*
	(0.0578)			(0.0525)
	7.9583			10.8001
MOT_E_5	- -	0.3819*	- -	0.9354*
		(0.0990)		(0.0742)
		3.8597		12.6131
MOT_E_6	- -	- -	0.4256*	0.6919*
			(0.0888)	(0.0559)
			4.7950	12.3731
MOT_E_7	0.4418*	- -	- -	0.5130*
	(0.0526)			(0.0482)
	8.3972			10.6454
MOT_E_8	- -	-0.5929	- -	0.5946*
		(0.1080)		(0.0624)
		-5.4898		9.5300
MOT_E_9	- -	- -	0.7237*	0.6657*
			(0.1270)	(0.0553)
			5.6965	12.0377

Note: Know refers to the *gaining knowledge outcome* factor, SELF refers to the *self-investment* outcome factor, CONTROL refers to the *gaining control outcome* factor and GEN refers to the broad general factor. MOT_E__i refers to the items of the *motivation to pursue the routes to psychological ownership (expectancy)*; i=1, 2, …, 9. The first row in each cell represents the unstandardised factor loading estimate, the second row the standard error of the estimate and the third row the z-value.
* p<.05

Table 5.96 shows that all the items of the *motivation to pursue the routes to psychological ownership (expectancy)* subscale loaded positively and statistically significantly ($p < .05$) on the broad, general, factor. All the items of the subscale also loaded statistically significantly ($p < .05$) on the more specific, narrow, factor they were designated to reflect. Moreover, all items, but for MOT_E_8 loaded positively on the more specific, narrow, factor they were designated to reflect. The consistency in the negative and statistically significant ($p < .05$) loading of item MOT_V_8 and item MOT_E_8 across the two subscales on SELF provided some cause not to too flippantly dismiss the negative partial regression coefficient even though the current study failed to provide a convincing explanation for the finding.

The proportion of variance that the bifactor model explains in each item of the *motivation to pursue the routes to psychological ownership (valence)* subscale is shown in Table 5.97.

Table 5.97

R^2 for the bifactor motivation to pursue the routes to psychological ownership (valence) measurement model

MOT_E_1	MOT_E_2	MOT_E_3	MOT_E_4	MOT_E_5	MOT_E_6
.5538	.6933	.5855	.6148	.4985	.5148
MOT_E_7	MOT_E_8	MOT_E_9			
.6483	.7267	.8405			

Table 5.97 shows that the bifactor model explained 50% or more of the variance in the items of the *motivation to pursue the routes to psychological ownership (valence)* subscale. Again, noteworthy is the fact that *circa* 73% of the variance in item MOT_V_8 was explained by the bifactor model with the broad, general factor, and SELF contributing equally according to the completely standardised factor loading matrix (not shown).

McDonald's multidimensional omega (Widhiarso & Ravand, 2014) was calculated for the *motivation to pursue the routes to psychological ownership (expectancy) sub*scale from the completely standardised factor loadings and measurement error variances. A highly satisfactory value of .92 was obtained.

5.6.31. MOTIVATION TO PURSUE THE ROUTES TO PSYCHOLOGICAL OWNERSHIP SCALE

To further examine the construct validity of the 18-item *motivation to pursue the routes to psychological ownership* scale (comprising the valence and the expectancy subscales) the 6-factor measurement model implied by the design intention of the scale was fitted. The model reflected the fact that the items comprising the *motivation to pursue the routes to psychological ownership* scale were developed to reflect either the valence associated with specific outcomes or the expectancy of achieving these outcomes if effort would be exerted to travel the routes to psychological ownership. The model, moreover, reflected the fact that the items comprising the *motivation to pursue the routes to psychological ownership* scale were developed to tap into outcomes associated with either *self-investment*, *gaining intimate knowledge* about the job or *gaining control* of the job.

The multivariate normality null hypothesis had to be rejected (Table 5.98). The attempt at normalisation substantially reduced the deviation from multivariate normality but nonetheless

failed to salvage the situation (Table 5.99). Robust maximum likelihood estimation was consequently used to fit the model to the normalised data.

Table 5.98

Test of multivariate normality of the motivation to pursue the routes to psychological ownership scale before normalisation

Skewness			Kurtosis			Skewness and Kurtosis	
Value	z-score	p-value	Value	z-score	p-value	Chi-square	p-value
93.295	54.163	.000	498.039	21.248	.000	3385.144	.000

Table 5.99

Test of multivariate normality of the motivation to pursue the routes to psychological ownership scale after normalisation

Skewness			Kurtosis			Skewness and Kurtosis	
Value	z-score	p-value	Value	z-score	p-value	Chi-square	p-value
76.648	46.188	.000	465.502	18.698	.000	2482.959	.000

The *motivation to pursue the routes to psychological ownership* model converged in 57 iterations with an admissible solution. The model showed reasonable fit in the sample (RMSEA = .075; $p < .05$). The probability of observing the sample RMSEA estimate under the close fit null hypothesis was nonetheless too small not to reject the close fit null hypothesis. The normed fit index (NFI = .9692), the comparative fit index (CFI = .9784), the incremental fit index (IFI = .9785) and the standardised root mean square residual (SRMR = .04141) all indicate good model fit in the sample. This was interpreted as sufficient justification to interpret the measurement model parameter estimates. The completely standardised fitted model is shown in Figure 5.17.

The unstandardised factor loading matrix ($\mathbf{\Lambda^X}$) is shown in Table 5.100. Table 5.100 shows that all items of the *motivation to pursue the routes to psychological ownership* scale loaded statistically significantly on their designated factors. Again, noteworthy is the fact that MOT_V_8 and MOT_E_8 both loaded negatively on the SELF factor when controlling for VAL and EXP.

The proportion of variance that the bifactor model explains in each item of the *motivation to pursue the routes to psychological ownership (valence)* subscale is shown in Table 5.95. But for two items (MVAL_2 and MVAL_70, the fitted measurement model explained 53% or more of the variance in the items of the *motivation to pursue the routes to psychological ownership*

scale. Table 5.101 shows that 70% of the fitted model explained variance70% of the variance in item MVAL_8 and 67% of the variance in item MEXP_8.

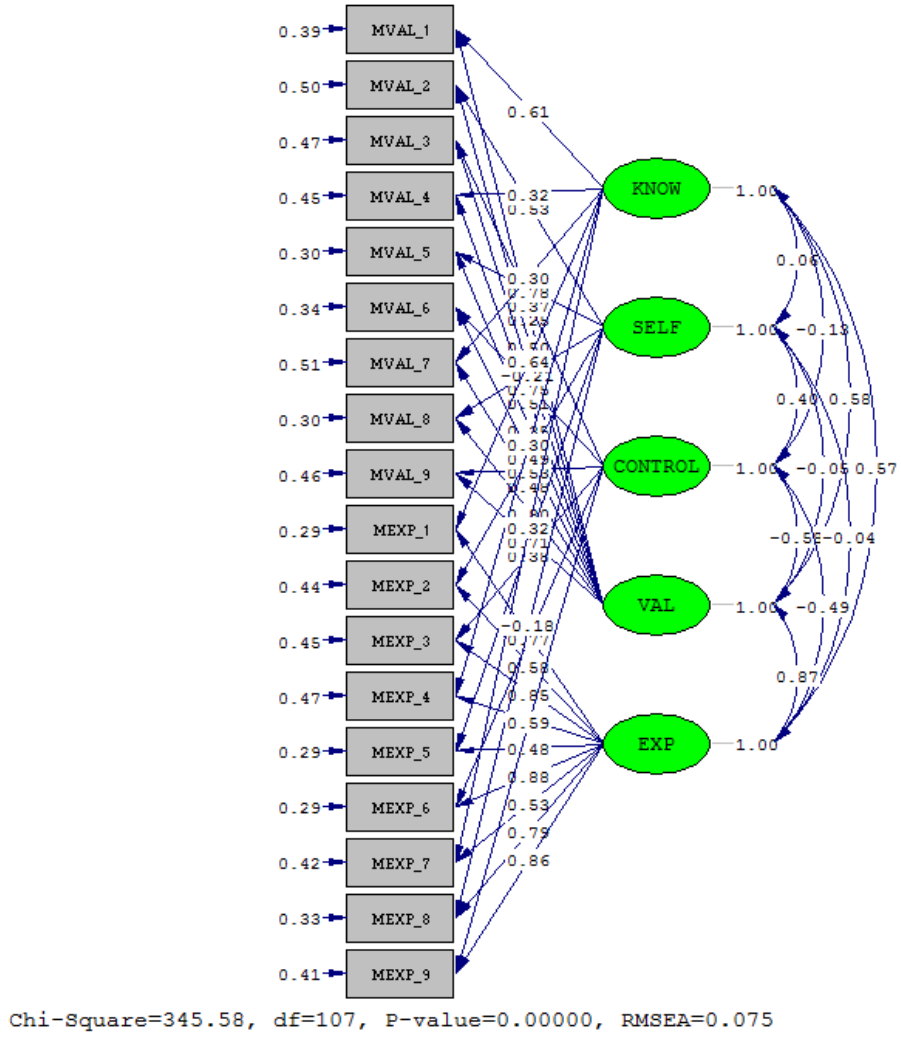

Figure 5.17. First-order 6-factor *motivation to pursue the routes to psychological ownership* measurement model (completely standardised solution)

This leaves the methodological conundrum whether to retain item MOT_VAL_8 and MOT_EXP_8 or to delete them. The current study choose to take the prudent option and delete these two items based on the inexplicable, albeit intriguing, negative partial regression slope coefficients that were obtained when regressing the item responses on the SELF factor and statistically controlling for the broad, general, valence and expectancy factors.

Table 5.100

Unstandardised factor loading matrix for the 6-factor motivation to pursue the routes to psychological ownership measurement model

	KNOW	SELF	CONTROL	VAL	EXP
MVAL_1	0.5084*	- -	- -	0.2132*	- -
	(0.0910)			(0.1060)	
	5.5868			2.0110	
MVAL_2	- -	0.5732*	- -	0.5409*	- -
		(0.0632)		(0.1015)	
		9.0628		5.3276	
MVAL_3	- -	- -	0.3579*	0.8493*	- -
			(0.0870)	(0.1046)	
			4.1140	8.1156	
MVAL_4	0.2920*	- -	- -	0.4673*	- -
	(0.0686)			(0.0781)	
	4.2540			5.9857	
MVAL_5	- -	1.2500*	- -	0.5645*	- -
		(0.0703)		(0.2076)	
		17.7920		2.7199	
MVAL_6	- -	- -	0.8296*	1.0634*	- -
			(0.1489)	(0.2176)	
			5.5698	4.8861	
MVAL_7	0.2499*	- -	- -	0.3989*	- -
	(0.0794)			(0.0791)	
	3.1462			5.0405	
MVAL_8	- -	-0.1771*	- -	0.6816*	- -
		(0.0488)		(0.0460)	
		-3.6263		14.8255	
MVAL_9	- -	- -	0.4859*	0.8291*	- -
			(0.1042)	(0.1306)	
			4.6636	6.3496	
MEXP_1	0.5218*	- -	- -	- -	0.2336*
	(0.0755)				(0.1002)
	6.9100				2.3302
MEXP_2	- -	0.5836*	- -	- -	0.6976*
		(0.0728)			(0.1100)
		8.0134			6.3429
MEXP_3	- -	- -	0.4208*	- -	0.9311*
			(0.0964)		(0.1169)
			4.3668		7.9628
MEXP_4	0.2759*	- -	- -	- -	0.4799*
	(0.0681)				(0.0814)
	4.0496				5.8956
MEXP_5	- -	1.0150*	- -	- -	0.6905*
		(0.0682)			(0.1699)
		14.8765			4.0651
MEXP_6	- -	- -	0.8694*	- -	0.9979*
			(0.1482)		(0.2170)
			5.8670		4.5982
MEXP_7	0.2714*	- -	- -	- -	0.4441*
	(0.0714)				(0.0746)
	3.8008				5.9540
MEXP_8	- -	-0.1732*	- -	- -	0.7802*
		(0.0604)			(0.0540)
		-2.8700			14.4414
MEXP_9	- -	- -	0.6380*	- -	0.9191*
			(0.1219)		(0.1582)
			5.2344		5.8087

Note: KNOW refers to the *gaining knowledge outcome* factor, SELF refers to the *self-investment* outcome factor, CONTROL refers to the *gaining control outcome* factor, VAL refers to the *valence of outcomes* factor and EXP refers to the *expectancies of outcome*s factor. MVAL_i refers to the items of the *motivation to pursue the routes to psychological ownership (valence)*; subscale; i=1, 2, …, 9. MEXP__i refers to the items of the *motivation to pursue the routes to psychological ownership (expectancy)* subscale; i=1, 2, …, 9. The first row in each cell represents the unstandardised factor loading estimate, the second row the standard error of the estimate and the third row the z-value. * p<.05

Table 5.101

R^2 for the bifactor motivation to pursue the routes to psychological ownership measurement model

MVAL_1	MVAL_2	MVAL_3	MVAL_4	MVAL_5	MVAL_6
.6143	.4972	.5267	05535	.7019	.6578
MVAL_7	MVAL_8	MVAL_9	MEXP_1	MEXP_2	MEXP_3
.4893	.6956	.5367	.7077	.5587	.5481
MEXP_4	MEXP_5	MEXP_6	MEXP_7	MEXP_8	MEXP_9
.5274	.7086	.7066	.5779	.6694	.5913

Note: MVAL_i refers to the *motivation to pursue the routes to psychological ownership (valence)*; i=1, 2, …, 9. MEXP__i refers to the items of the *motivation to pursue the routes to psychological ownership (expectancy)*; i=1, 2, …, 9.

McDonald's multidimensional omega (Widhiarso & Ravand, 2014) was calculated for the *motivation to pursue the routes to psychological ownership* scale from the completely standardised factor loadings and measurement error variances. A highly satisfactory value of .92 was obtained.

5.6.32. PERCEIVED ABILITY

The dimensionality analysis was lastly performed on the *perceived ability* scale which consists of ten items. The five negatively keyed items were reflected prior to the dimensionality analysis. This scale obtained inter-item correlations that were mostly larger than .30 except for twenty-three of the forty-five inter-item correlations (51.1%.) The item pairs that correlated lower than .30 mostly, but not exclusively, involved the correlation between reflected and un-reflected items. This in turn suggests the presence of a negatively keyed factor. However, the KMO value of .787 suggested that the scale could indeed be factor analysable. This finding was corroborated by Bartlett's test of sphericity which indicated that the identity matrix null hypothesis could be rejected ($p < .05$), providing substantive support that the correlation matrix was indeed factor analysable.

The requested single-factor factor structure provided an implausible explanation of the observed inter-item correlation matrix with 37 (82%) of the residual correlations larger than .05. This did not corroborate the unidimensionality assumption made for this scale. The eigenvalue-greater-than-one rule and the scree plot suggested the extraction of two factors. Consequently, a decision was made to force the extraction of two factors. The pattern matrix is shown in Table 5.102.

Table 5.102

Rotated factor structure (pattern matrix) for the perceived ability scale

	Factor	
	1	2
PERC_ABLTY_10	**.701**	.058
PERC_ABLTY_7	**.666**	.053
PERC_ABLTY_4	**.617**	-.092
PERC_ABLTY_3	**.615**	-.016
PERC_ABLTY_1	**.505**	.149
PERC_A2R	-.171	**.747**
PERC_A6R	.093	**.705**
PERC_A9R	.108	**.598**
PERC_A8R	.020	**.498**
PERC_A5R	.071	**.483**

The residual correlation matrix indicated that there were 14 (31%) nonredundant residual correlations that had absolute values greater than .05, which demonstrates that the two-factor model did provide a relatively convincing explanation for the observed inter-item correlation matrix. As indicated in the pattern matrix, all of the reversed score items loaded onto factor 2, which suggests that the main difference between the factors can be attributed to the method or nature of the items. Factor 1 is the *positively keyed* factor whereas factor 2 represents the *negatively keyed* factor.

In an attempt to determine whether the items of the *perceived ability* scale could still be used to operationalise the *perceived ability* latent variable despite the factor fission, the measurement model implied by the pattern matrix shown in Table 5.102 was fitted. If the first-order 2-factor *perceived ability* measurement model fitted at least reasonably well this would allow the fitting of a second-order *perceived ability* measurement model in which the two first-order *perceived ability* factors loaded on a single second-order *perceived ability* factor. This in turn, would allow the testing of the statistical significance of the indirect effects of the second-order *perceived ability* factor on the *perceived ability* scale items.

The multivariate normality null hypothesis had to be rejected (Table 5.103). The attempt at normalisation substantially reduced the deviation from multivariate normality but nonetheless failed to salvage the situation (Table 5.104). The 2-factor *perceived ability* measurement model was consequently fitted to the normalised data using RML estimation.

Table 5.103

Test of multivariate normality of the perceived ability of job to satisfy the self-identity need scale before normalisation

Skewness			Kurtosis			Skewness and Kurtosis	
Value	z-score	p-value	Value	z-score	p-value	Chi-square	p-value
20.254	26.031	.000	150.442	11.753	.000	815.777	.000

Table 5.104

Test of multivariate normality of the perceived ability of job to satisfy the self-identity need scale after normalisation

Skewness			Kurtosis			Skewness and Kurtosis	
Value	z-score	p- value	Value	z-score	p-value	Chi-square	p-value
12.661	17.701	.000	133.553	6.867	.000	360.468	.000

The fitted *perceived ability* measurement model showed mediocre fit (RMSEA = .080; $p < .05$). Both the exact fit and close fit null hypotheses had to be rejected ($p < .05$). The modification indices showed numerous statistically significant ($p < .01$) modification index values for the off-diagonal of the measurement error variance-covariance matrix (Θ_δ). This in turn suggested the presence of a general factor that, independent of the influence of FAC1 and FAC2, affected the item responses of all the items in the scale. The current measurement model failed to explicitly model this shared item variance.

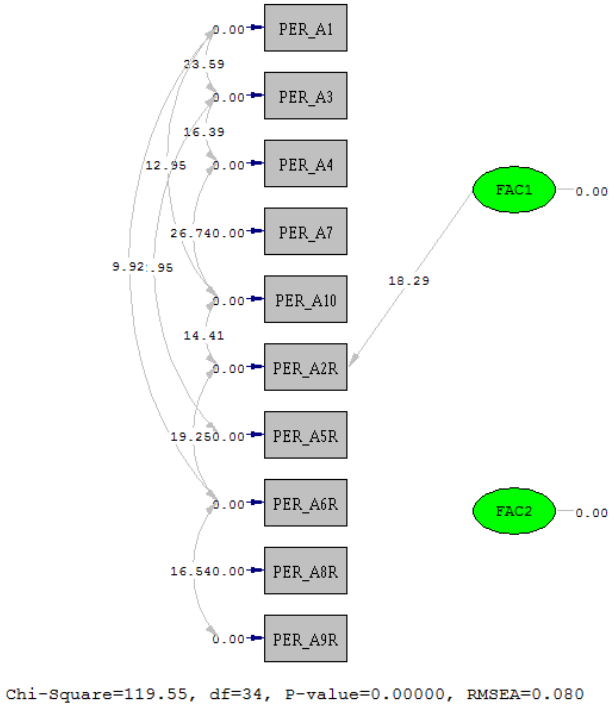

Figure 5.18. Statistically significant ($p < .01$) modification index values for the first-order 2-factor *perceived ability* measurement model.

A bifactor model (Reise, 2012) was consequently fitted that made provision for such a broad, general factor, uncorrelated with the two more specific, narrow, factors. The fitted bifactor model returned an inadmissible solution with a negative measurement error variance estimate for PER_A4 ($\theta_{\delta 44}$). The model was subsequently revised by fixing $\theta_{\delta 44}$ to .10. The revised model converged in 27 iterations with an admissible solution. The revised *perceived ability* bifactor measurement model (Figure 5.19) showed reasonable fit in the sample (RMSEA = .070; $p < .05$). The probability of observing the sample RMSEA estimate under the close fit null hypothesis was, however, sufficiently small (.03846) to reject the close fit null hypothesis. The normed fit index (NFI = .9575), the comparative fit index (CFI = .9713), the incremental fit index (IFI = .9716) and the standardised root mean square residual (SRMR = .04381) indicated good fit in the sample. These findings were interpreted as sufficient evidence to justify the interpretation of the measurement model parameter estimates.

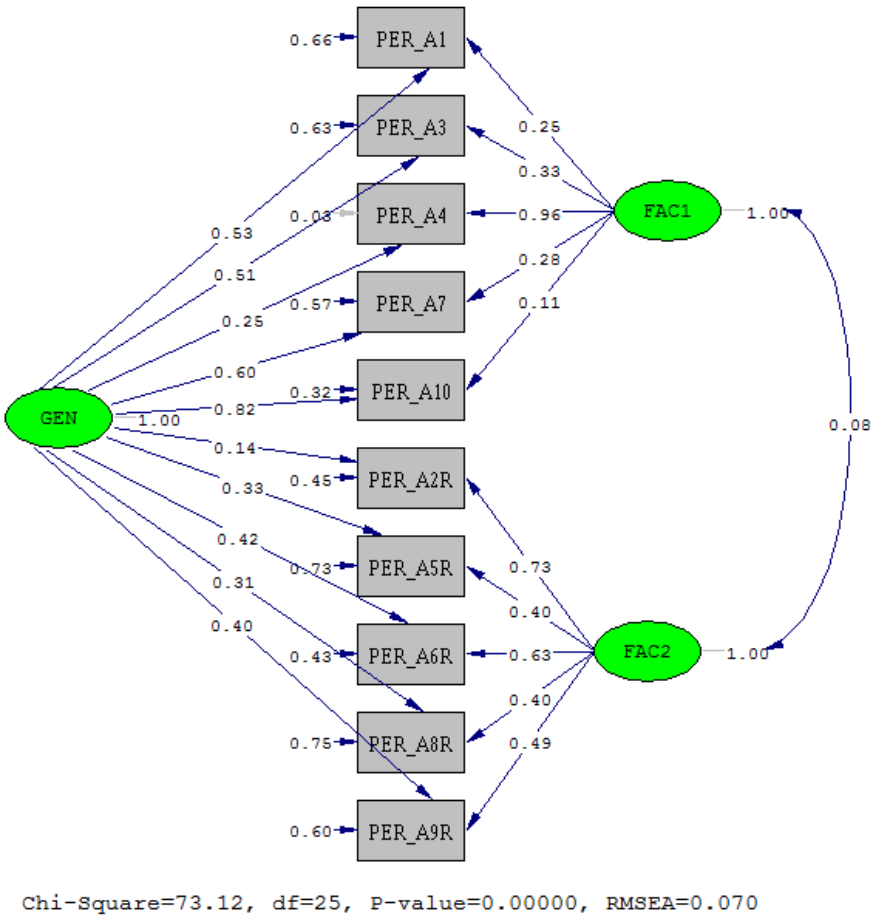

Figure 5.19. Bifactor *perceived ability* measurement model (completely standardised solution)

Table 5.105 shows the unstandardised factor loading matrix (Λ^X). Table 5.105 indicates that all the items of the *perceived ability* scale loaded positively and statistically significantly ($p < .05$) on the broad, general, perceived ability factor. All the items also loaded positively and statistically significantly ($p < .05$) on the narrow factors that they were designated to reflect, but for PER_A10 that loaded statistically insignificantly ($p > .05$) on the positively keyed factor (FAC1).

Table 5.106 reflects the proportion of variance that the revised fitted bifactor *perceived ability* measurement model explained in each of the items of the *perceived ability* scale.

Table 5.105

Unstandardised factor loading matrix for the bifactor perceived ability measurement model

	FAC1	FAC2	GEN
PER_A1	0.1468*	- -	0.3169*
	(0.0481)		(0.0374)
	3.0559		8.4639
PER_A3	0.2098*	- -	0.3295*
	(0.0402)		(0.0374)
	5.2154		8.8048
PER_A4	0.5933*	- -	0.1522*
	(0.0276)		(0.0711)
	21.4699		2.1413
PER_A7	0.1692*	- -	0.3583*
	(0.0492)		(0.0352)
	3.4354		10.1705
PER_A10	0.0685	- -	0.5184*
	(0.0590)		(0.0332)
	1.1622		15.6022
PER_A2R	- -	0.6904*	0.1348*
		(0.0522)	(0.0603)
		13.2220	2.2359
PER_A5R	- -	0.3488*	0.2879*
		(0.0566)	(0.0519)
		6.1587	5.5429
PER_A6R	- -	0.5283*	0.3511*
		(0.0434)	(0.0500)
		12.1749	7.0200
PER_A8R	- -	0.3724*	0.2854*
		(0.0505)	(0.0591)
		7.3765	4.8281
PER_A9R	- -	0.4034*	0.3333*
		(0.0581)	(0.0464)
		6.9440	7.1798

Note: FAC1 refers to the *positively keyed* factor and FAC2 refers to the *negatively keyed* factor, PER_A_i refers to the items of the *perceived ability* scale; i=1, 2, …, 10. The first row in each cell represents the unstandardised factor loading estimate, the second row the standard error of the estimate and the third row the z-value.
* p<.05

Table 5.106 indicates that the revised fitted bifactor *perceived ability* measurement model explained rather modest proportions of the variance in the items of the *perceived ability* scale. Only in the case of PER_A10, PER_A2R and PER_A6R[43] did the fitted measurement model

[43] PER_A4 was not considered as $\theta_{\delta 44}$ was fixed to .10

explain more than 50% of the item variance. Nonetheless, the fitted measurement model explained more than 25% of the variance in each of the items of the *perceived ability* scale.

Based on these findings, along with the item analysis results, all items of the *perceived ability* scale were utilised in the calculation of two item parcels to operationalise the *perceived ability* latent variable in the proposed *psychological ownership structural model.*

Table 5.106

R^2 for the bifactor perceived ability measurement model

PER_A1	PER_A3	PER_A4	PER_A7	PER_A10	PER_A2R
.3419	.3704	.9740	.4330	.6787	.5538
PER_A5R	PER_A6R	PER_A8R	PER_A9R		
.2675	.5718	.2515	.4027		

Note: PER_A_i refers to the *motivation to pursue the routes to psychological ownership (valence)*; i=1, 2, …, 10.

The stratified alpha cannot be calculated for bifactor models. The multidimensional omega can, however, be calculated (Widhiarso & Ravand, 2014). McDonald's multidimensional omega (Widhiarso & Ravand, 2014) was calculated for the *perceived ability* scale from the completely standardised factor loadings and measurement error variances. A satisfactory value of .85 was obtained.

5.6.33. CONCLUDING REMARKS PERTAINING TO THE ITEM- AND DIMENSIONALITY ANALYSIS

The architecture of a measuring instrument for a given construct is intended to reflect essentially one-dimensional sets of items that reflect variance in each of the latent variables collectively comprising the to be assessed construct domain. The question that needed to be asked is whether this intention was indeed successful before any item parcels were calculated and the hypothesised structural model was tested. Item analysis via SPSS's reliability procedure allowed one to identity and remove weak items that did not contribute to the internal consistency of the various constructs in question. Restricted exploratory factor analysis was used to examine the unidimensionality assumption.

Table 5.107 presents a summary of the findings and decisions made during the item analysis and dimensionality analysis phases. It can be deduced from the table that there were three scales/subscales (out of the 18 initial assumed unidimensional scales and subscales) that returned appropriately calculated reliability coefficients that fell below the critical cut-off value of .80 assumed in this study. In two cases (*autonomy and task significance*) the shortfall was

negligible (ω = .79). in the case of the locus of control scale, however, the reliability (ω= .641) and the factor structure was sufficiently problematic to abandon the use of the scale.

Two of the four job characteristics (*autonomy* and *task significance*) returned reliability coefficients below .80. It, however, needs to be taken into account that the job characteristics was included as separate constructs within the structural model which implies that these subscales consisted of only three items. A scale that consists of a small number of items is at a disadvantage the internal consistency reliability of a scale is a function of the number of items in the scale and the degree of their intercorrelations. The researcher decided that these two variables should be retained in the structural model since their reliability coefficients did not fall practically significantly lower than the cut-off value of .80 and there were no options available to delete any items as these scales are already very short.

The *internal locus of control* scale returned a Cronbach's alpha of .614 and a McDonald's omega of .641 which fell well under the critical cut-off value of .80. LOC_1 and LOC_2 were flagged as especially problematic due to their excessively low inter-item correlations. This supposition was corroborated by the low squared multiple correlations of the two problematic items (.095 and .141) which implies that these two items share insufficient variance with the remainder of the items. The deletion of these two items did not improve the internal consistency of the subscale which will remain unacceptably lower than the critical cut-off value of .80. Furthermore, no items, if deleted, would improve the Cronbach alpha, (the removal of LOC_1 would increase ω in the third decimal by two digits). Moreover, the loading pattern in the 3-factor pattern matrix did not offer a meaningful interpretation of the three factors. Therefore, it was decided that the scale could not be included in further analyses of the structural model. The internal locus of control latent variable was therefore removed from the structural model.

Under paragraph 5.3 it was argued that the size of the sample that the current study managed to attain did not allow the empirical testing of the full originally hypothesised psychological ownership structural model. it was consequently decided to remove the polynomial phantom variables from the structural model. This reduced the number of freed model parameters by 54 to 191 and improved the ratio of observations to freed parameters to 2.2: 1, which, although still not satisfactory, was slightly better than the ratio for the full model. The item analysis in addition indicated the need to rather delete *locus of control* from the model. *Locus of control* was not included as a main effect in the model but rather in interaction with gaining control. The deletion of locus of control from the model reduced the number of freed parameters in the comprehensive LISREL model further by 13 to 170. Moreover, in contrast to the initial

decision to operationalise the *perceived ability x self investment interaction effect* with 4 indicator variables (i.e. the unstandardised residuals when regressing each of four product terms calculated from the two item parcel indicators of *perceived ability* and *self-investment*), two item parcels were calculated from the four unstandardised residuals. This reduced the number of freed model parameters further by 7 to 163 and improved the ratio of observations to freed parameters to 2.5: 1. The fact that the ratio is still less than the lower limit suggested by Bentler and Chou (1987) is acknowledged as a methodological limitation.

The reduced structural model in which the 6 polynomial phantom latent variables have been deleted and in which the locus of control latent interaction effect had been deleted, is shown in Figure 5.20.In sum, the findings provided sufficient justification to combine the remaining items into item parcels as indicated in section 5.10.

Table 5.107

Summary of findings: Item and dimensionality analyses

Scale	Sample Size	Initial number of items	Cronbach's alpha	McDonald's omega	Stratified alpha	Multidimensional omega	Number of items deleted	Factor structure that showed acceptable fit
AUT	397	3	**.777**	**.79**			0	1-factor first-order model
TSK_IDENT	397	3	.826	.83			0	1-factor first-order model
TSK_VAR	397	3	.826	.85			0	1-factor first-order model
TSK_SIG	397	3	**.784**	**.79**			0	1-factor first-order model
JOB CAR	397	12				.94		4-factor bifactor model
INT_KNOW	397	4	.898	.90			0	1-factor first-order model
SLF_INVST	397	4	.886	.89			0	1-factor first-order model
CONTROL	397	6				.88	0	2-factor bifactor model
ROUTES						.92		4—factor bifactor model
PERC_EFF	397	6	.874	.88			0	1-factor first-order model
PERC_IDENT	397	6	-		.879		0	2-factor model
LOC	397	8	**.614**	.641			All items	3-factor first-order model
FEEL_EFF	397	10	.826	.814			5	3 factor first-order model (1-factor first-order model)
INTEGR	397	5				.89	0	2-factor bifactor model
MOT_VAL	397	9				.90	0	3-factor bifactor model
MOT_EXP	397	9				.92	0	3-factor bifactor model
MOT						.92		5-factor first-order model
SELF-IDENT	397	4	.860	.87			0	1-factor first-order model
SELF_EFF	397	4	.886	.88			0	1-factor first-order model
PERC_ABLY	397	10				.85	0	2-factor bifactor model
PO	397	6				.96	0	2-factor bifactor model

Note: Values in bold represent reliability coefficients smaller than .80. AUT refers to *autonomy*, TSK IDENT refers to *task identity*, *TASK_VAR refers to* task variety, TSK_SIG refers to *task significance*, JOB CAR refers to *job characteristics*, *INT KNOW refers to gaining intimate knowledge*, SELF_INVEST refers to *self-investment*, CONTROL refers to *gaining control*, ROUTES refers to the three *routes to psychological ownership*, PERC_EFF refers to *perceived ability of the job to satisfy the self-efficacy need*, *PERC IDENT refers to the* perceived ability of the job to satisfy the self-identity need, LOC refers to *internal locus of control*, *FEEL_EFF refers to* feelings of efficacy, INTEGR refers to *integration of the self into the job*, MOT_VAL refers to *motivation to pursue the routes to psychological ownership (valence)*, MOT_EXP refers to *motivation to pursue the routes to psychological ownership (expectancy)*, MOT refers to *motivation to pursue the routes to psychological ownership*, SELF_IDENT refers to *self-identity need*, SELF_EFF refers to *self-efficacy need*, PERC_ABLY refers to *perceived ability* and PO refers to *psychological ownership.*

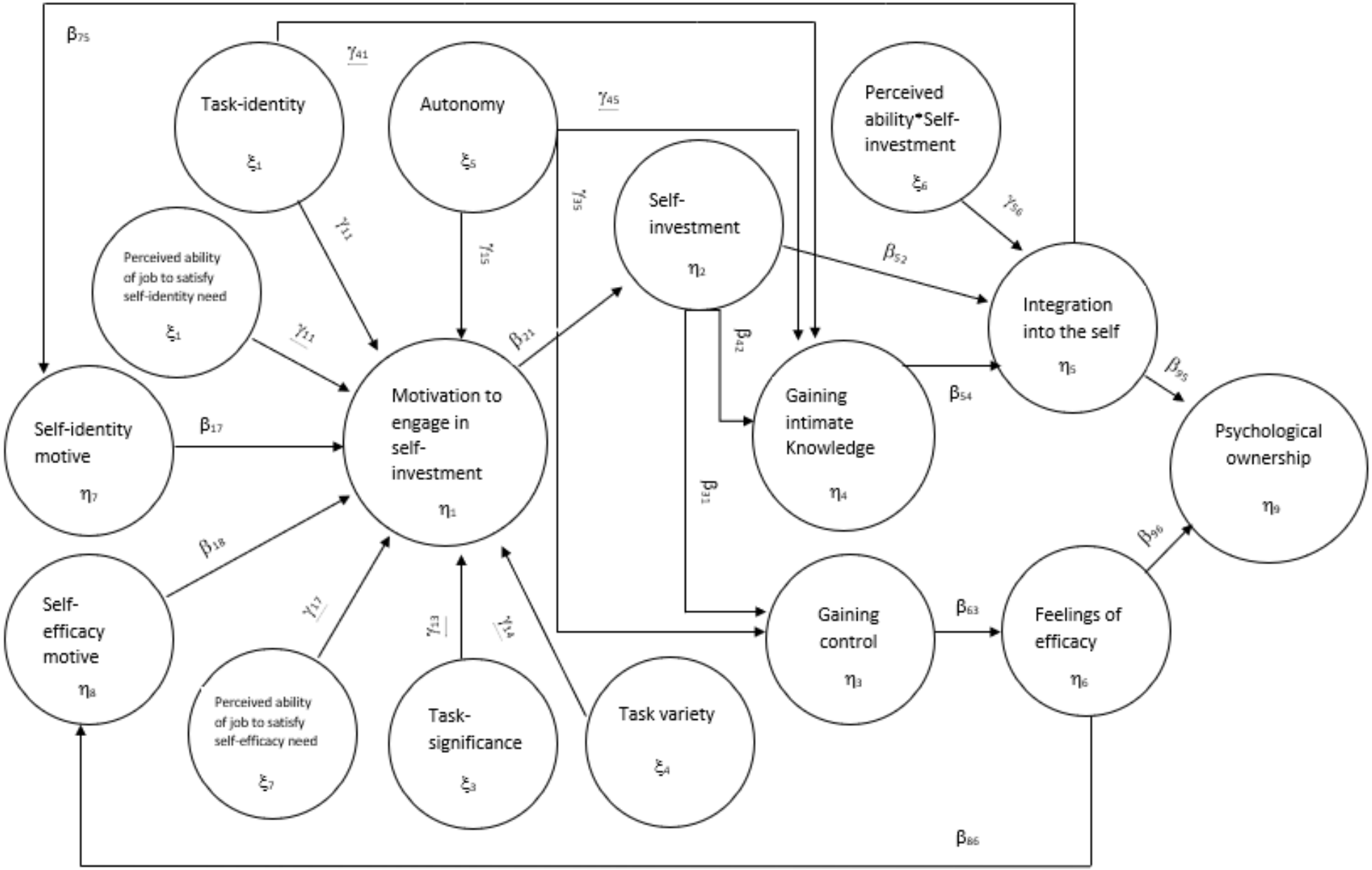

Figure 5.20. Reduced Klopper-Lee psychological ownership structural model without *locus of control* and the polynomial phantom latent variables

5.7. ITEM PARCELS

An ideal situation in research would be to use the individual items that make up the scale to operationalise the latent variables they were developed to represent. However, this scenario would lead to very complex comprehensive LISREL models with a large number of structural, and especially, measurement model parameters that need to be estimated[44]. In the current study the challenge to keep the ratio of observations to freed model parameters within an acceptable range presented an especially pressing problem. Therefore, to operationalise the latent variables in a manner that reduced the complexity of the comprehensive LISREL model as much as possible without simplifying the structural model further, two item parcels were created for each latent variable in the structural model shown in Figure 5.20, but for the four latent job characteristic variables. The latter four latent variables were operationalised via three item indicators each because the limited length of each subscale precluded the calculation of item parcels. Little, Cunningham, Shahar, and Widaman (2002) point out that there are several advantages or psychometric merits justifying the use of item parcelling. These include, but are not limited to the low reliability, communality and greater likelihood of distributional violations involved in the use of individual items. Models based on parcels are also, according to Little et al. (2002), more parsimonious and display less of a chance of correlation between the measurement error terms.

Therefore, before the fitting of the measurement and structural model could commence item parcels were created by calculating the means of the even and uneven numbered items of each scale or subscale and creating two item parcels per latent variable (but for the four job characteristic latent variables). The orthogonalising, or residual centring procedure proposed by Little et al. (2006) was used to calculate the effect indicators for the latent *perceived ability x self-investment* interaction effect in the model. This prosedure resulted in four unstandardised residual terms. Rather than using these as indicators of the latent interaction effect two item parcels were also calculated (RES_P1 and RES_P2) to represent the latent *perceived ability x self-investment* interaction effect.

5.8. DATA SCREENING PRIOR TO FITTING THE MEASUREMENT MODEL AND COMPREHENSIVE LISREL MODEL

The default method of estimation that LISREL uses when fitting a measurement or structural model to continuous data is maximum likelihood estimation which assumes that the distribution of the indicator variables follows a multivariate normal distribution (Mels, 2003).

[44] This was the case in the first attempt to fit the measurement model where parcels were allocated in terms of their theoretical hypothesised relationships. This resulted in the parcelling being done in an odd-even format as opposed to construct mean scores being determined. The drawback of this subsequent approach is recognised but the researcher would like to highlight that the situation was an unavoidable one due to a smaller than desired sample size (a problem that plagues many research studies especially at an academic level).

Therefore, prior to fitting the psychological ownership measurement and comprehensive LISREL model, the data was screened by testing the null hypothesis that the item parcel and item indicators that were used to operationalise the latent variables follow a multivariate normal distribution. This allowed the researcher to decide on the appropriate estimation technique that should be used. The results of the test of multivariate normality are shown in Table 5.103. The results of the thirty-six tests of univariate normality are shown in Table 5.102.

Table 5.102

Tests of univariate normality before normalisation

Variable	Skewness		Kurtosis		Skewness and Kurtosis	
	Z-score	p-value	Z-score	p-value	Chi-square	p-value
AUTON_1	-4.212	.000	0.888	0.375	18.527	.000
TSK_I_1	-3.086	.002	-1.487	0.137	11.732	.003
TSK_V_1	-3.932	.000	-2.104	0.035	19.889	.000
TSK_S_1	-3.810	.000	-3.967	0.000	30.253	.000
TSK_V_2	-6.474	.000	2.133	0.033	46.464	.000
TSK_I_2	-4.621	.000	-1.830	0.067	24.705	.000
TSK_V_3	-5.915	.000	0.591	0.555	35.335	.000
TSK_S_2	-6.434	.000	2.461	0.014	47.454	.000
AUTON_2	-5.676	.000	0.902	0.367	33.029	.000
TSK_I_3	-5.564	.000	-1.055	0.292	32.073	.000
AUTON_3	-3.300	.001	-4.622	0.000	32.255	.000
TSK_S_3	-6.060	.000	-0.002	0.998	36.718	.000
INTK_P1	-4.293	.000	-1.318	0.188	20.167	.000
INTK_P2	-5.248	.000	1.302	0.193	29.231	.000
SELFI_P1	-6.984	.000	3.976	0.000	64.589	.000
SELFI_P2	-5.993	.000	1.575	0.115	38.401	.000
CONT_P1	-2.994	.003	-5.709	0.000	41.551	.000
CONT_P2	-1.446	.148	-4.326	0.000	20.802	.000
PEFF_P1	-2.926	.003	-1.723	0.085	11.528	.003
PEFF_P2	-1.978	.048	-1.936	0.053	7.660	.022
PID_P1	-3.881	.000	-0.497	0.619	15.306	.000
PID_P2	-2.571	.010	-1.824	0.068	9.937	.007
FEFF_P1	-0.151	.880	2.812	0.005	7.928	.019
FEFF_P2	-3.926	.000	4.234	0.000	33.338	.000
INTE_P1	-2.069	.039	-2.431	0.015	10.192	.006
INTE_P2	-2.584	.010	-0.112	0.910	6.691	.035
SID_P1	-5.983	.000	0.641	0.521	6.205	.000
SID_P2	-6.058	.000	2.042	0.041	40.873	.000
SEFF_P1	-6.650	.000	4.034	0.000	60.488	.000
SEFF_P2	-6.667	.000	4.016	0.000	60.573	.000
PO_P1	-5.760	.000	1.650	0.099	35.897	.000
PO_P2	-4.057	.000	-2.284	0.022	21.672	.000
MOT_P1	-0.420	.674	1.158	0.247	1.517	**.468**
MOT_P_2	-0.237	.813	1.394	0.163	2.000	**.368**
RES_P1	3.447	.001	8.331	0.000	81.279	.000
RES_P2	-6.026	.000	9.124	0.000	119.552	.000

Note: Entries in bold indicate univariate distributions that deviate statistically insignificantly ($p > .05$) from univariate normality

The exceedance probabilities associated with the skewness and kurtosis Chi-square statistic (Table 5.102) showed that all but two of the thirty-six univariate item parcel distributions failed the test of univariate normality ($p < .05$). The univariate normality null hypothesis was not

rejected (p > .05) only for the two *motivation to pursue the routes to psychological ownership* parcels (MOT_P1 and MOT_P2).

Table 5.103

Test of multivariate normality before normalisation

Skewness			Kurtosis			Skewness and Kurtosis	
Value	z-score	p-value	Value	z-score	p-value	Chi-Square	p-value
399.755	90.339	.000	1593.915	21.139	.000	8607.938	.000

Table 5.103 shows that the null hypothesis that the multivariate item parcel distribution follows a multivariate normal distribution also had to be rejected (χ^2 = 8607.938; p < .05). Therefore, in an attempt to satisfy the multivariate normality assumption made by the maximum likelihood estimation technique, the data was normalised. The results for the test of multivariate normality on the normalised data is displayed in Table 5.104.

Table 5.104

Test of multivariate normality after normalisation

Skewness			Kurtosis			Skewness and Kurtosis	
Value	z-score	p-value	Value	z-score	p-value	Chi-Square	p-value
353.168	78.800	.000	1531.093	17.800	.000	6526.323	.000

Table 5.104 indicates that the attempt at normalising the data improved the symmetry and kurtosis of the multivariate indicator variable distribution, however, it failed to salvage the situation completely since the multivariate normality assumption was still not met (p < .05). Therefore, the decision was made to use robust maximum likelihood (RML) estimation as the alternative method of estimation in a situation where the data failed to meet the multivariate normality assumption. RML estimation was consequently used to analyse the normalised data since the normalisation reduced the deviation of the observed indictor distribution from the theoretical multivariate normal distribution.

5.9. EVALUATING THE FIT OF THE MEASUREMENT MODEL VIA CONFIRMATORY FACTOR ANALYSIS

The psychological ownership measurement model describes the manner in which the latent variables comprising the proposed psychological ownership structural model express themselves in the indicator variables that were calculated and designated to reflect them. The comprehensive LISREL model fit indices can only be unambiguously interpreted to infer the fit of the structural model if it can be shown that the indicator variables that were used to operationalise the latent variables successfully reflect the latent variables that they were

intended to reflect (form of, 2000). Therefore, the fit of the measurement model needed to be assessed prior to fitting the comprehensive *psychological ownership* LISREL model and deriving inferences on the fit of the *psychological ownership* structural model.

The operationalisation of the latent variables was regarded as successful if:

- The measurement model obtained at least reasonable fit;
- The unstandardised factor loadings were statistically significant ($p < .05$);
- The completely standardised factor loadings were sufficiently large ($\lambda_{ij} \geq .71$);
- The unstandardised measurement error variances were statistically significant ($p < .05$)[45];
- The completely standardised measurement error variances were sufficiently small ($\Theta_{\delta ij} < .50$).
- The inter-latent variable correlations were not excessively large (evidence of discriminant validity ($\phi_{jk} < .90$); and
- The R^2 values for the indicator variables were large ($R^2 > .50$).

In addition to the goodness of fit statistics, the magnitude and distribution of the standardised residuals and the magnitude of the modification indices were also evaluated to assess the quality of the measurement model fit. If the model showed at least reasonable fit, the measurement model parameter estimates and squared multiple correlations (R^2) for the indicators were interpreted.

Furthermore, in the fitted psychological ownership measurement model specific measurement error terms, calculated for the indicator variables of the latent interaction effect were allowed to covary (Little et al., 2006). The orthogonalising procedure (Little et al., 2006) that is used to calculate the indicators for the latent product terms and the latent squared terms was described in Chapter 3. The product terms were calculated from the original indicator parcels of the latent variables that were involved in the interaction effect. The residuals obtained when regressing these product terms on the array of original indicators should be allowed to correlate if the product terms, they were derived from, shared an original indicator.

The *psychological ownership* measurement model fit statistics reported by LISREL are presented and interpreted in the following section.

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[45] It is thereby not implied that fallible indicator variable scores with less than perfect reliability and validity are not desired. Rather it constitutes an admission that perfectly reliable and valid measures are not practically attainable. Statistically insignificant ($p>.05$) measurement error variance estimates would give rise to concern because it would be simply too good to be true.

5.9.1. EVALUATING THE PSYCHOLOGICAL OWNERSHIP MEASUREMENT MODEL FIT

The fitted model returned an inadmissible solution with the measurement error variance of RES_P2 (possibly) not identified. A parameter is unidentified if there are more unknowns that need to be estimated than there are known pieces of information from which the estimates have to be derived. When a parameter is not identified it is not possible to obtain an estimate. In an attempt to circumvent this problem, the measurement error variance of RES_P2 was fixed to .10. The solution converged; however, it was still unacceptable due to a negative error variance for FEFF_P2 (although not statistically significant ($p > .05$))[46]. Therefore, the error variance for FEFF_P2 was also fixed to .10. The revised model converged in 38 iterations and returned an admissible solution. The fitted measurement model is depicted as a path diagram in Figure 5.21.

[46] It could therefore be have been argued that no interpretation should have been attached to this negative measurement error variance. H0i: $\theta_{\delta 24,24} = 0$ could not be rejected. Structural model parameter estimates are typically not interpreted in terms of sign or magnitude if the estimates are not statistically significant.

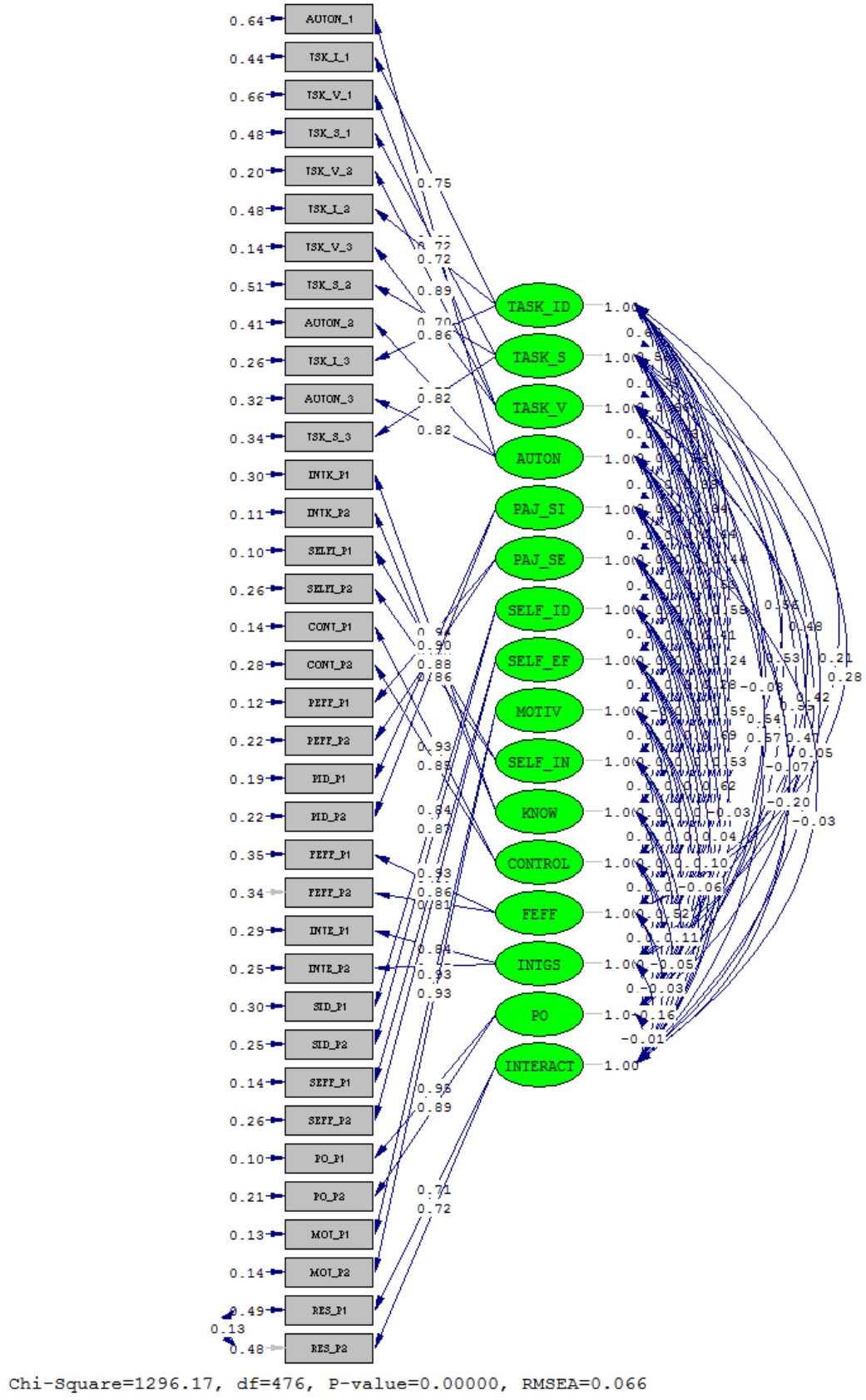

Figure 5.21. Psychological ownership measurement model (completely standardised solution) with $\theta_{\delta 36,36}$ and $\theta_{\delta 24,24}$ fixed to .1.

5.9.2. MEASUREMENT MODEL FIT INDICES

The purpose of evaluating the overall fit of a model is to determine the extent to which the model is consistent with the empirical data at hand. The full range of goodness of fit indices provided by LISREL 8.8 (Du Toit & Du Toit, 2001) is presented in Table 5.105. It is important to take note that none of these indices are undeniably superior to the rest in all circumstances. Therefore, a variety of indices will be discussed and interpreted.

Table 5.105

Goodness of fit statistics for the psychological ownership measurement model

Goodness of fit statistics
Degrees of Freedom = 476
Minimum Fit Function Chi-Square = 1556.0457 (p = .0)
Normal Theory Weighted Least Squares Chi-Square = 1456.5651 (p = .0)
Satorra-Bentler Scaled Chi-Square = 1296.1714 (p = .0)
Estimated Non-centrality Parameter (NCP) = 820.1714
90 Percent Confidence Interval for NCP = (716.9422; 931.0370)
Minimum Fit Function Value = 3.9294
Population Discrepancy Function Value (F0) = 2.0711
90 Percent Confidence Interval for F0 = (1.8105; 2.3511)
Root Mean Square Error of Approximation (RMSEA) = .06596
90 Percent Confidence Interval for RMSEA = (0.06167; .07028)
p-Value for Test of Close Fit (RMSEA < 0.05) = .0000
Expected Cross-Validation Index (ECVI) = 4.2328
90 Percent Confidence Interval for ECVI = (3.9721; 4.5127)
ECVI for Saturated Model = 3.3636
ECVI for Independence Model = 85.8059
Chi-Square for Independence Model with 630 Degrees of Freedom = 33907.1423
Independence AIC = 33979.1423
Model AIC = 1676.1714
Saturated AIC = 1332.0000
Independence CAIC = 34158.5641
Model CAIC = 2623.1193
Saturated CAIC = 4651.3016
Normed Fit Index (NFI) = .9618
Non-Normed Fit Index (NNFI) = .9674
Parsimony Normed Fit Index (PNFI) = .7267
Comparative Fit Index (CFI) = .9754
Incremental Fit Index (IFI) = .9755
Relative Fit Index (RFI) = .9494
Critical N (CN) = 169.2500
Root Mean Square Residual (RMR) = .1315
Standardized RMR = .05238
Goodness of Fit Index (GFI) = .8298
Adjusted Goodness of Fit Index (AGFI) = .7619
Parsimony Goodness of Fit Index (PGFI) = .5931

Note: the fit indices in bold are the ones discussed in the text

The measurement model fit was evaluated by testing the exact fit (H_{035a}) and close fit (H_{035b}) null hypothesis that were formulated in Chapter 3 but whose numbering was adapted in this chapter. The null hypothesis that the model provides a perfect account of the manner in which

the latent variables manifest themselves in the indicator variables postulated that fitted covariance matrix and the observed inter-parcel covariance matrix in the population coincided:

$$H_{035a}: \text{RMSEA} = 0$$

$$H_{a35a}: \text{RMSEA} > 0$$

The exact fit null hypothesis, that the model fits the population data exactly, was tested by means of the Satorra-Bentler scaled chi-square. The scaled chi-squared returned a value of (χ^2 = 1296.17; $p < .05$). The probability of observing the sample RMSEA estimate (.0659) under the exact fit null hypothesis was small ($p < .05$). The exact fit null hypothesis (H_{028a}: RMSEA = 0) was consequently rejected ($p < .05$), implying imperfect model fit in the parameter. However, as previously mentioned, it is somewhat unrealistic to assume that the measurement model would provide a perfect representation of the manner in which the latent variables manifest themselves in the indicator variables. Furthermore, the researcher was not very surprised by this result as the χ^2 test statistic is very sensitive to the sample size. Therefore, it would be more appropriate to hypothesise that the measurement model provides an approximate account of the manner in which the latent variable manifest themselves in the indicator variables. Consequently, the following close fit null hypothesis was tested:

$$H_{035b}: \text{RMSEA} <= .05$$

$$H_{035b}: \text{RMSEA} >.05$$

The close fit null hypothesis (H_{028a}) was evaluated by inspecting the probability of obtaining the sample estimate of the root mean square error of approximation (RMSEA) under the close fit null hypothesis. The RMSEA expresses the difference between the observed and estimated sample covariance matrices with values below .05 indicating good fit and RMSEA smaller than .08 indicating reasonable fit. Table 5.104 indicates that the close fit null hypothesis (RMSEA<=.05) should also be rejected. This implies that the model does not fit the data closely in the parameter. However, the RMSEA value of .0659 indicates that the *psychological ownership* measurement model achieved reasonable fit in the sample. This is admittedly a somewhat disappointing result, as it erodes confidence in the validity of the measurement model as a description of the mechanism that produced the observed covariance matrix. Reduced confidence in the successful operationalisation of the latent variables comprising the proposed structural model in turn erodes confidence that the structural model results provide valid verdicts on the validity of the path-specific hypotheses. However, the .05 critical value proposed by MacCallum, Browne and Sugawara, 1996) for the RMSEA statistic as indicative

of good model fit has more recently been questioned as overly strict. Hooper, Coughlan & Mullen (2008, p. 54) present the following stance in this regard:

> Recommendations for RMSEA cut-off points have been reduced considerably in the last fifteen years. Up until the early nineties, an RMSEA in the range of 0.05 to 0.10 was considered an indication of fair fit and values above 0.10 indicated poor fit (MacCallum et al, 1996). It was then thought that an RMSEA of between 0.08 to 0.10 provides a mediocre fit and below 0.08 shows a good fit (MacCallum et al, 1996). However, more recently, a cut-off value close to .06 (Hu and Bentler, 1999) or a stringent upper limit of 0.07 (Steiger, 2007) seems to be the general consensus amongst authorities in this area.

Most likely a rephrased close fit null hypothesis that posits a parametric RMSEA of .60 would not have been rejected in the current study. In addition, it is generally accepted that model fit should not be evaluated in terms of a single fit statistic but rather in terms of a basket taken from the full array of fit statistics produced by LISREL 8.8 (Diamantopoulos & Siguaw, 2000; Hooper et al., 2008). Therefore, it would be prudent to evaluate some of the other fit statistics as well, in order to get a fuller understanding of the situation at hand.

Rather than solely focusing on the error due to approximation, in would be prudent to also assess the overall error that is presented by the expected cross-validation index (ECVI). The ECVI reveals whether a model is likely to cross-validate across samples of the same size from the same population. The ECVI can be interpreted by comparing the ECVI of the model to the independence model and the saturated model. In this case, the ECVI for the model (4.232) was slightly larger than the value obtained for the saturated model (3.363), which negatively reflects on the overall fit of the model. This implies that there are several paths that can be added to the model that should improve the model fit. The slightly smaller ECVI for the saturated model further corroborates the disappointing yet reasonable fit that the measurement model obtained.

Kelloway (1998) states that the assessment of parsimonious fit acknowledges that model fit can always be improved by adding more paths to the model, and estimating more parameters until exact fit is achieved in the form of a saturated just-identified model with no degrees of freedom. Akaike's information (AIC) and the consistent version of AIC (CAIC) represent two criteria that address the issue of parsimony in the assessment of model fit, as such, statistical goodness-of-fit, as well as the number of estimated parameters, are taken into account. Bozdogan (1987), however, noted that the AIC carried a penalty only as it related to degrees of freedom (thereby reflecting the number of estimated parameters in the model), and not to

sample size. Presented with factor analytic findings that revealed that AIC tends to yield asymptotically inconsistent estimates, he proposed the CAIC, which takes sample size into account (Bandalos, 1993). Therefore, it would be more appropriate to focus on the CAIC statistic as this study did not meet the expected sample size of 500. Similar to the interpretation of the ECVI, the CAIC must be compared to the independence model and saturated model. From the results in Table 5.105, it is evident that the model CAIC (2623.119) was smaller than the values obtained by the independence model (4651.301) and the saturated model (34158.564). This provides support for the conclusion that reasonable fit wad obtained by the measurement model.

The normed fit index (NFI = .962), the non-normed fit index (NNFI =. 967), the comparative fit index (CFI = .975), the incremental fit index (IFI = .975) and the relative fit index (RFI = .949) are known as relative/incremental fit indices (Diamantopoulos & Siguaw, 2000). Relative/ incremental indices demonstrate how much better the given model fits in comparison to a baseline model (usually the independence model). Values that approach unity are indicative of good fit. Table 5.105 indicates that all of the values observed for the relative/incremental indices fall above .90, which paints a more positive picture of the fit for the measurement model in comparison to the other indices discussed thus far. More recently a critical cut-off value of .95 had been suggested (Hu & Bentler, 1999). Even when evaluated more stringently these results point to acceptable measurement model fit.

Residuals represent the difference between elements of the observed and reproduces covariance matrices. Standardised residuals can be interpreted in terms of standard deviations units deviating from the mean (i.e. in terms of z-scores). The standardised root mean residual (SRMR) serves as a summary measure of standardised residuals. Therefore, SRMR represents the average value across all standardised residuals, and ranges from zero to 1.00; in a well-fitting model this value will be small (.05 or less) (Kelloway, 1998). The value of .052 shown in Table 5.104 represents the average discrepancy between the sample observed and hypothesised covariance matrices and can be interpreted as meaning that the model explains the covariance to within an average standardised error of .052. The fact that this statistic also falls slightly below the critical cut-off of good fit corroborated the argument that the measurement model obtained at least reasonable fit. Hu and Bentler (1999) indicate that SRMR values as high as .08 may be regarded as acceptable.

Finally, the goodness-of-fit index (GFI) is a measure of the relative amount of variance and covariance in the sample data that is jointly explained by the sample data. The adjusted GFI

(AGFI) differs from the GFI in that the AGFI provides adjustment for the number of degrees of freedom in the specified model. As such, similar to the CAIC statistic, it also addresses the issue of parsimony by incorporating a penalty for the inclusion of additional parameters. Both these indices should range between 0 and 1.00, with values exceeding .90 indicating good model fit (Diamantopoulos & Siguaw, 2000). The GFI (.829) and AGFI (.761) fall below the benchmark value of good fit. Hooper et al. (2008, p. 54), however warn that

> When there are a large number of degrees of freedom in comparison to sample size, the GFI has a downward bias (Sharma et al, 2005). In addition, it has also been found that the GFI increases as the number of parameters increases (MacCallum and Hong, 1997) and also has an upward bias with large samples (Bollen, 1990; Miles and Shevlin, 1998). Traditionally an omnibus cut-off point of 0.90 has been recommended for the GFI however, simulation studies have shown that when factor loadings and sample sizes are low a higher cut-off of 0.95 is more appropriate (Miles and Shevlin, 1998). Given the sensitivity of this index, it has become less popular in recent years and it has even been recommended that this index should not be used (Sharma et al, 2005). Related to the GFI is the AGFI which adjusts the GFI based upon degrees of freedom, with more saturated models reducing fit (Tabachnick and Fidell, 2007). Thus, more parsimonious models are preferred while penalised for complicated models. In addition to this, AGFI tends to increase with sample size. As with the GFI, values for the AGFI also range between 0 and 1 and it is generally accepted that values of 0.90 or greater indicate well-fitting models. Given the often-detrimental effect of sample size on these two fit indices they are not relied upon as a stand-alone.

Hu and Bentler prosed the use of 2-fit index combination rules to evaluate model fit. Hooper et al (2008, p. 59) summarise (part of) the Hu and Bentler (1999) as shown in Table 5.206.

Table 5.106

Hu and Bentler's (1999) 2-fit index combination rules (1999)

Fit Index Combination	Combinational Rules
NNFI and SRMR	NNFI of .96 or higher and an SRMR of .09 or lower
RMSEA and SRMR	RMSEA of .060 or lower and a SRMR of .09 or lower
CFI and SRMR	CFI of .96 or higher and a SRMR of .09 or lower

Reprinted from "Structural Equation Modelling: Guidelines for Determining Model Fit." The psychological conditions of meaningfulness, safety and availability and the engagement of the human spirit at work.", by Hooper, D., Coughlan, J. and Mullen, M. R. (2008), The Electronic Journal of Business Research Methods Volume 6(1), p. 59.

Evaluating the fit of the *psychological ownership* measurement model in the sample in terms of the 2-fit index combination rules proposed by Hu and Bentler (1999) the model met the criteria set by the first and third combination rule but failed to meet the criteria set by the second combination rule (even if only marginally so).

Considering the basket of fit statistics discussed above reasonable measurement model fit in the sample and parameter was concluded based on the fit statistics.

5.9.3. MEASUREMENT MODEL STANDARDISED RESIDUALS

Loehlin and Beaujean (2017) warned that one should not over emphasise the goodness-of-fit indices and ignore the residuals when evaluating the fit of a model. They point out the importance of inspecting the covariance residuals since the smallness of the residuals provide an absolute sense of goodness of fit, while larger residuals can suggest which aspects of the data are least effectively captured by the model. Standardised residuals can be interpreted as z-score and can be considered large if they exceed +2.58 or -2.58. Positive residuals imply underestimation[47], which suggests the need for modification by adding additional explanatory paths (through freeing of parameters). Negative residuals indicate overestimation, suggesting the need for modification through the deletion of explanatory paths (through the fixing of parameters) (Diamantopoulos & Siguaw, 2000). Table 5.107 and Figure 5.22 provides a summary of the standardised residuals for the current *psychological ownership* measurement model.

Table 5.107

Summary statistics for standardised residuals

Smallest Standardized Residual = -18.3620
Median Standardized Residual = 0.0000
Largest Standardized Residual = 16.2828

```
-18|4
 -16|
 -14|
 -12|
 -10|22
  - 8|
  - 6|6
  - 4|6410654221
  - 2|9864432110000009998888887766665554443333333222222111111000000
  - 0|99999999888777776666555555444443333333333333322222222222111111000000000+94
    0|11111111122222222222222233333333344444444444444555555555555556666666666+19
    2|00000000111111222222233334444445555566666667777788888899000001111223334 4+08
    4|0001122344558899244569
    6|1
    8|
   10|
   12|
   14|
   16|3
```

Figure 5.22. Stem-and-leaf plot of the standardised residuals

[47] This follows from the fact that covariance residuals are calculated as the observed covariance minus the estimated covariance derived from the model parameter estimates.

In order to support the finding of reasonable fit, the spread of the residuals should be dispersed reasonably symmetrical around zero. The distribution presented in the stem-and-leaf plot in Figure 5.22 appears to be slightly negatively skewed with the positive residuals dominating slightly, which suggests that the covariance terms are somewhat underestimated. This is more clearly illustrated in the list of large standardised covariance residuals shown in Table 5.208.

Table 5.108

List of large negative and large positive standardised residuals

Residual	Value
Residual for TSK_I_2 and AUTON_1	-2.9197
Residual for TSK_S_2 and AUTON_1	-5.6192
Residual for AUTON_3 and TSK_S_2	-4.0852
Residual for TSK_S_3 and TSK_I_2	-3.2877
Residual for INTK_P1 and TSK_S_3	-2.7659
Residual for INTK_P2 and TSK_I_2	-3.5763
Residual for SELFI_P1 and AUTON_1	-2.8411
Residual for CONT_P1 and AUTON_3	-7.5916
Residual for CONT_P2 and TSK_V_3	-3.2218
Residual for CONT_P2 and TSK_S_2	-2.7797
Residual for CONT_P2 and TSK_I_3	-4.5727
Residual for PEFF_P1 and TSK_V_2	-2.5843
Residual for PEFF_P1 and TSK_S_3	-11.1642
Residual for PEFF_P1 and SELFI_P1	-3.3631
Residual for PEFF_P2 and TSK_I_2	-4.2394
Residual for PEFF_P2 and TSK_I_3	-2.7750
Residual for PID_P2 and TSK_S_2	-3.0884
Residual for PID_P2 and AUTON_3	-4.4445
Residual for PID_P2 and CONT_P2	-18.3620
Residual for FEFF_P1 and TSK_V_2	-3.0247
Residual for FEFF_P1 and TSK_V_3	-2.9133
Residual for FEFF_P1 and INTK_P2	-3.0236
Residual for FEFF_P1 and SELFI_P2	-2.7804
Residual for INTE_P1 and AUTON_3	-4.1807
Residual for INTE_P1 and INTK_P2	-5.3549
Residual for INTE_P1 and PID_P1	-4.5227
Residual for INTE_P2 and TSK_V_2	-3.1105
Residual for SID_P2 and PEFF_P2	-3.4009
Residual for SID_P2 and INTE_P2	-2.8412
Residual for SEFF_P1 and TSK_V_3	-2.9824
Residual for SEFF_P1 and TSK_S_3	-3.8326
Residual for PO_P1 and TSK_S_3	-5.0870
Residual for PO_P1 and CONT_P2	-5.0115
Residual for PO_P1 and FEFF_P1	-2.6354
Residual for PO_P2 and AUTON_3	-2.7378
Residual for MOT_P1 and AUTON_3	-2.9963
Residual for MOT_P1 and CONT_P2	-3.9438
Residual for MOT_P1 and PEFF_P2	-3.0155
Residual for MOT_P1 and SEFF_P1	-3.0342
Residual for MOT_P2 and TSK_V_2	-2.5883
Residual for MOT_P2 and INTE_P2	-2.5782
Largest Positive Standardized Residuals	
Residual for TSK_V_1 and TSK_I_1	3.1204
Residual for TSK_S_1 and TSK_I_1	2.5884
Residual for TSK_S_1 and TSK_V_1	5.3787
Residual for TSK_S_2 and TSK_I_1	2.7000
Residual for TSK_S_2 and TSK_V_1	4.4193
Residual for AUTON_2 and TSK_V_1	7.0931
Residual for AUTON_2 and TSK_S_2	3.6298
Residual for TSK_I_3 and TSK_V_1	3.9700

Table 5.108

List of large negative and large positive standardised residuals (continued)

Residual for TSK_I_3 and AUTON_2	3.9162
Residual for TSK_S_3 and AUTON_3	3.1811
Residual for INTK_P1 and TSK_I_1	3.2759
Residual for INTK_P1 and AUTON_2	2.6145
Residual for INTK_P2 and TSK_I_1	3.6522
Residual for INTK_P2 and TSK_V_1	2.6289
Residual for SELFI_P1 and TSK_I_1	3.0150
Residual for SELFI_P1 and TSK_V_1	3.5001
Residual for SELFI_P2 and TSK_I_1	4.2096
Residual for SELFI_P2 and TSK_V_1	4.2362
Residual for SELFI_P2 and TSK_S_1	5.3675
Residual for SELFI_P2 and TSK_V_3	5.5125
Residual for SELFI_P2 and AUTON_2	5.6384
Residual for CONT_P1 and TSK_V_1	4.8603
Residual for CONT_P1 and SELFI_P2	4.0356
Residual for CONT_P2 and TSK_V_1	3.8931
Residual for PEFF_P1 and TSK_V_1	4.4216
Residual for PEFF_P2 and TSK_V_1	5.1941
Residual for PEFF_P2 and TSK_V_3	2.6538
Residual for PEFF_P2 and TSK_S_2	2.6820
Residual for PEFF_P2 and INTK_P1	2.7330
Residual for PID_P1 and TSK_V_1	4.0646
Residual for PID_P2 and TSK_V_1	5.9007
Residual for FEFF_P1 and TSK_V_1	3.3112
Residual for FEFF_P2 and TSK_V_1	4.4751
Residual for FEFF_P2 and SELFI_P1	4.0677
Residual for INTE_P1 and TSK_V_1	4.4612
Residual for INTE_P1 and TSK_S_3	2.8379
Residual for INTE_P2 and TSK_V_1	4.0432
Residual for INTE_P2 and AUTON_2	3.1203
Residual for INTE_P2 and INTK_P1	2.5832
Residual for INTE_P2 and PEFF_P2	2.6080
Residual for SID_P1 and INTE_P1	4.7883
Residual for SID_P2 and PEFF_P1	2.8098
Residual for SEFF_P1 and TSK_I_1	2.9919
Residual for SEFF_P1 and TSK_V_1	3.1685
Residual for SEFF_P1 and TSK_S_2	2.5980
Residual for SEFF_P1 and AUTON_2	3.6412
Residual for SEFF_P2 and AUTON_2	3.3942
Residual for PO_P1 and TSK_I_1	2.7679
Residual for PO_P1 and TSK_V_1	4.8491
Residual for PO_P1 and TSK_S_1	3.0270
Residual for PO_P1 and TSK_S_2	2.7933
Residual for PO_P1 and AUTON_2	3.0465
Residual for PO_P1 and INTK_P1	4.3117
Residual for PO_P2 and TSK_V_1	3.3079
Residual for PO_P2 and AUTON_2	3.6338
Residual for PO_P2 and INTK_P1	4.9172
Residual for PO_P2 and SEFF_P1	3.5084
Residual for MOT_P1 and SEFF_P2	2.8034
Residual for MOT_P2 and TSK_V_1	3.1346
Residual for MOT_P2 and AUTON_2	3.4155
Residual for MOT_P2 and CONT_P1	2.8163
Residual for MOT_P2 and PO_P1	16.2828
Residual for RES_P1 and TSK_I_1	2.8633
Residual for RES_P1 and PEFF_P1	2.9363
Residual for RES_P1 and SID_P2	2.6756
Residual for RES_P2 and TSK_S_2	2.9651

Table 5.108 indicates that there were 44 extreme negative residuals and 67 extreme positive residuals larger than 2.58. The number of large residuals (111) needs to be interpreted in comparison to the total number of unique observed variance-covariance terms (666)[48].Therefore approximately 17% (111/666*100 = 16.67%) of the observed variance-covariance terms were poorly estimated from the measurement model parameter estimates. The fitted measurement model, therefore, succeed in reasonably accurately reproducing 555 of the 666 unique variance and covariances in the observed sample covariance matrix (*circa* 83%). This slightly elevated percentage of significant residuals corroborated the verdict of disappointing, yet reasonable, fit that was derived from the fit statistics that were obtained for the *psychological ownership* measurement model

A plot of the standardised residuals against the normal deviates that have the same relative position in the normal distribution than the standardised residuals have in the observed distribution is shown in Figure 5.23. The Q-pot shown in Figure 5.23 suggests (Hayduk, 1987) that the distribution of standardised residuals is approximately normal (given the linear trend) but that the standardised residuals are less variable than would be expected based on the asymptotic variances used to standardise the residuals (given the slope less steep than 45 degrees).

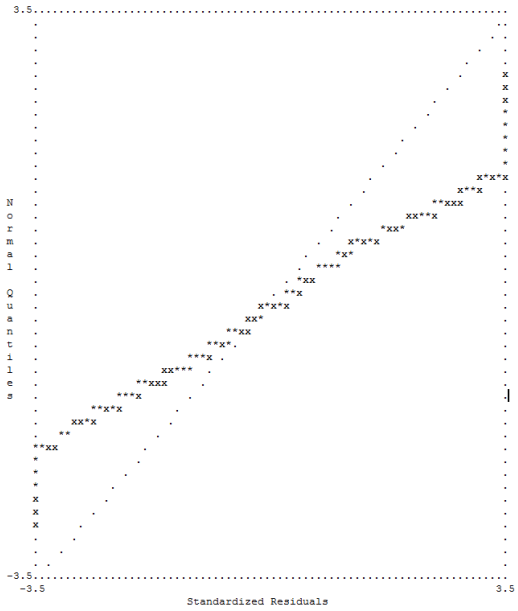

Figure 5.23. Q plot of the standardised residuals

[48] [36 x (36 + 1)] / 2 = 666

5.9.4. MEASUREMENT MODEL MODIFICATION INDICES

In addition to the fit statistics and the standardised covariance residuals, the modification indices were also investigated as a further comment on the fit of the *psychological ownership* measurement model. Modification indices reflect the extent to which the χ^2 fit statistic would decrease should a current fixed parameter in the model be freed (Diamantopoulos & Siguaw, 2000). A value that exceeds the critical chi-square value of 6.64 indicates that the fit of the model would statistically significantly improve if that parameter were to be set free ($p < .01$). Therefore, a large number of significant chi-square statistics would comment negatively on the fit of the measurement model, because there would be numerous possibilities that exist that would improve the fit of the model. It should be noted that the focus of this investigation is not so much on possible ways of actually modifying the measurement model, instead, the focus still falls on evaluating the overall fit of the model. The modification indices for the factor loading matrix ($\mathbf{\Lambda^X}$) and the error variance-covariance matrix ($\mathbf{\Theta_\delta}$) were of particular interest. The modification indices calculated for the lambda-X matrix are presented in Table 5.109.

Table 5.109

Modification indices for the lambda-X factor loading matrix

Item parcel	TASK_ID	TASK_S	TASK_V	AUTON	PAJ_SI	PAJ_SE
AUTON_1	**7.0917**	**15.2269**	6.0077	- -	1.6101	- -
TSK_I_1	- -	3.4571	0.4246	0.1440	1.4300	1.4761
TSK_V_1	**28.2176**	**42.0142**	- -	**48.1627**	**38.1863**	**46.4500**
TSK_S_1	1.2316	- -	3.0163	1.8674	**8.6949**	**10.5445**
TSK_V_2	3.6976	1.6344	- -	**7.3580**	0.7772	3.1300
TSK_I_2	- -	4.6743	3.7375	1.5248	0.6361	0.8787
TSK_V_3	0.0441	0.9086	- -	0.0032	2.9211	0.9317
TSK_S_2	5.0814	- -	0.0406	1.7180	1.1702	0.1003
AUTON_2	5.3780	**25.2611**	**28.2223**	- -	1.0407	0.0016
TSK_I_3	- -	0.2890	1.6486	0.8008	0.1015	0.0157
AUTON_3	0.2819	2.1757	5.5838	- -	2.1484	0.5028
TSK_S_3	**8.1712**	- -	6.2110	0.0285	1.7554	5.3182
INTK_P1	6.2955	1.0831	2.7372	2.3900	3.0745	**9.0250**
INTK_P2	**6.7004**	1.0226	2.7944	2.7287	3.7497	**11.9411**
SELFI_P1	2.1741	**7.3938**	**10.3908**	**11.1865**	1.9212	2.0098
SELFI_P2	2.5281	**9.1706**	**8.5276**	**13.6314**	2.1276	2.4277
CONT_P1	4.1741	**9.0104**	6.1285	0.0098	**37.0853**	**9.0735**
CONT_P2	4.8387	**7.9197**	6.2792	0.0062	**27.8499**	**7.9405**
PEFF_P1	6.1299	3.6098	5.1824	0.0534	2.9861	- -
PEFF_P2	**8.5319**	5.1460	5.9289	- -	- -	- -
PID_P1	**7.4163**	0.0442	3.4544	0.0455	- -	1.9371
PID_P2	**12.4971**	0.1394	4.6827	- -	- -	- -
FEFF_P1	5.4005	1.8087	**8.0024**	0.1580	0.5613	2.3708
FEFF_P2	5.3979	1.8376	**8.8276**	0.1591	0.5793	2.4860
INTE_P1	3.1622	**6.7072**	2.5450	2.6678	2.9457	**10.2568**
INTE_P2	2.4378	3.9132	1.8344	0.9226	0.5138	2.9929
SID_P1	0.5733	3.2977	2.1652	**6.6997**	0.6018	0.5673
SID_P2	0.6680	4.1824	2.1692	**7.4733**	0.5183	0.4992
SEFF_P1	1.1022	0.5708	1.9024	1.2688	1.1915	0.0988
SEFF_P2	1.0764	0.5528	1.7270	1.1648	1.1647	0.0903
PO_P1	0.2808	2.8684	5.4147	0.0055	**18.7254**	2.0092

Table 5.109

Modification indices for the lambda-X factor loading matrix (continued)

Item parcel	TASK_ID	TASK_S	TASK_V	AUTON	PAJ_SI	PAJ_SE
PO_P2	0.3159	2.7127	3.2744	0.0048	**10.6186**	1.1975
MOT_P1	0.3767	1.0873	0.5532	5.2753	0.4311	6.3677
MOT_P2	0.3628	1.1619	0.6315	4.5446	0.3651	5.1575
RES_P1	**9.7499**	0.8972	5.1520	4.4070	3.8220	**7.5820**
RES_P2	**6.7266**	0.1015	2.8016	2.1509	2.1076	4.7331

Table 5.109

Modification indices for the lambda-X factor loading matrix (continued)

Item parcel	SELF_ID	SELF_EF	MOTIV	SELF_IN	KNOW	CONTROL
AUTON_1	0.0100	5.5412	0.2409	**6.8489**	6.1516	**198.1953**
TSK_I_1	0.7050	5.8105	3.8252	**17.1330**	**15.3728**	1.7321
TSK_V_1	6.5145	**11.2687**	**11.2312**	**19.6554**	**9.6954**	**42.0513**
TSK_S_1	0.0120	0.2631	0.0087	6.5499	0.6398	5.8244
TSK_V_2	0.8611	1.3153	3.0285	0.0183	0.8316	**7.7110**
TSK_I_2	0.6654	3.5214	0.1992	5.0390	3.8907	0.0000
TSK_V_3	0.0500	0.1202	0.0616	4.4912	5.0553	0.0022
TSK_S_2	0.0519	5.9740	1.2574	1.9214	1.9047	0.9461
AUTON_2	**8.8314**	**23.4916**	**15.7943**	**16.4446**	**6.8154**	2.2424
TSK_I_3	0.0051	0.2240	4.6112	2.5685	2.2567	1.2325
AUTON_3	**7.0719**	**9.7435**	**12.9832**	5.0192	1.0473	0.1025
TSK_S_3	0.0826	6.0755	0.8469	**14.0124**	3.4035	1.2797
INTK_P1	1.1426	0.1036	0.3527	0.0245	- -	5.1345
INTK_P2	1.2415	0.0901	0.3549	0.0165	- -	5.5828
SELFI_P1	2.7364	0.1549	0.6627	- -	3.7118	**7.0270**
SELFI_P2	2.8686	0.2231	0.5659	- -	4.6953	**8.0787**
CONT_P1	0.5338	4.3744	**7.7056**	5.5100	**13.8513**	- -
CONT_P2	0.5061	4.2738	5.4880	4.8504	**13.6231**	- -
PEFF_P1	**7.6007**	0.7526	2.8552	2.4551	2.0754	0.6872
PEFF_P2	6.4410	0.8164	2.8789	2.7473	1.7253	- -
PID_P1	0.6143	0.7263	0.2242	0.0095	0.5221	0.3437
PID_P2	0.7835	0.8134	0.2786	0.0111	0.5785	1.2335
FEFF_P1	2.0326	3.6241	0.0289	**7.3996**	**7.3574**	0.0485
FEFF_P2	2.0183	3.6516	0.0270	**7.8162**	**7.3130**	0.0496
INTE_P1	**25.8088**	0.8115	0.0656	2.1117	6.2477	1.6838
INTE_P2	**20.7776**	0.6426	0.0534	1.7253	6.0555	0.8997
SID_P1	- -	**21.5021**	2.1898	1.8353	0.0390	2.9939
SID_P2	- -	- -	**13.1773**	2.0212	0.0405	2.7158
SEFF_P1	2.9571	- -	5.4328	0.6411	1.0212	0.0466
SEFF_P2	3.6090	- -	6.3218	0.5519	0.8977	0.0411
PO_P1	**7.6606**	**9.7353**	0.2200	0.4230	0.2398	2.6091
PO_P2	5.0066	4.8088	0.1473	0.1768	0.1575	2.1427
MOT_P1	**9.5010**	0.0190	- -	**9.5314**	1.6636	**30.9983**
MOT_P2	**11.0961**	0.0217	- -	**8.5348**	1.5510	**20.3668**
RES_P1	0.0560	2.8712	0.1605	0.8420	0.3814	3.7823
RES_P2	0.0035	1.8373	0.6961	0.0125	0.0241	1.8776

Table 5.109

Modification indices for the lambda-X factor loading matrix (continued)

Item parcel	FEFF	INTGS	PO	INTERACT
AUTON_1	0.9838	1.1373	3.9809	1.1117
TSK_I_1	2.2575	0.6040	**11.3238**	**9.8757**
TSK_V_1	**28.2726**	**31.6460**	**33.9193**	0.0014

TSK_S_1	0.0383	0.5789	**6.7117**	0.5138
TSK_V_2	2.9190	4.7800	2.1326	0.5378
TSK_I_2	0.0146	0.0630	0.0003	1.5632

Table 5.109

Modification indices for the lambda-X factor loading matrix (continued)

Item parcel	FEFF	INTGS	PO	INTERACT
TSK_V_3	0.4502	0.0985	1.1271	0.6027
TSK_S_2	2.1788	0.0556	5.2067	**10.5229**
AUTON_2	4.1362	6.3559	**22.7325**	0.0116
TSK_I_3	1.5386	0.2489	**8.6510**	2.8456
AUTON_3	1.5593	2.7642	**8.0758**	0.7242
TSK_S_3	1.2213	0.2671	**21.9396**	**11.6238**
INTK_P1	4.5465	5.3457	**21.6794**	3.4084
INTK_P2	5.0123	6.0524	**17.9746**	3.6217
SELFI_P1	4.5239	0.1912	0.2538	5.9497
SELFI_P2	3.3368	0.1062	0.3057	3.0876
CONT_P1	2.4923	2.3779	6.1662	5.7193
CONT_P2	2.7045	2.0199	**7.5128**	4.8684
PEFF_P1	0.6567	**8.9069**	0.4034	3.7334
PEFF_P2	0.5800	**14.6771**	0.5247	3.9064
PID_P1	3.1358	0.9477	0.6652	3.6969
PID_P2	2.8638	3.4431	0.8296	3.7451
FEFF_P1	- -	0.0869	**7.1082**	9.5770
FEFF_P2	- -	0.0896	**7.1984**	9.5033
INTE_P1	0.1532	- -	**16.7628**	1.6860
INTE_P2	0.1459	- -	**18.5438**	1.6690
SID_P1	0.0266	**7.4447**	0.2669	**16.7124**
SID_P2	0.0306	**7.9900**	0.2872	**16.2299**
SEFF_P1	0.1603	0.0000	**9.3304**	2.8283
SEFF_P2	0.1473	0.0000	**9.6187**	2.7200
PO_P1	0.0048	1.6397	- -	0.3748
PO_P2	0.0037	1.5171	- -	0.3785
MOT_P1	2.4640	**11.8947**	**7.8641**	6.4422
MOT_P2	2.4556	**10.1637**	6.2888	6.3544
RES_P1	1.7140	1.2090	2.5936	- -
RES_P2	0.7439	0.3865	0.8286	- -

Note: Values in bold indicate statistically significant (p < .01) modification index values. TASKID represents the *task identity* latent variable, TASK_S represents the *task significance* latent variable, TASK_V represents the *task variety* latent variable, AUTON represents the *autonomy* latent variable, PAJ_SI represents the *perceived ability of the job to satisfy the self-identity need* latent variable, PAJ_SE represents the *perceived ability of the job to satisfy the self-efficacy need* latent variable, SELF_ID represents the *self-identity need* latent variable, SELF_EF represents the *self-efficacy need* latent variable, MOTIV represents the *motivation to pursue the routes to psychological ownership* latent variable, SELF_IN represents the *self-investment* latent variable, KNOW represents the *gaining intimate knowledge* latent variable, CONTROL represents the *gaining control* latent variable, FEFF represents the *feeling of efficacy* latent variable, INTGS represents *the integrating the self* latent variable, PO represents the *psychological ownership* latent variable, INTERACT represents the latent *perceived ability x self-investment* interaction effect. AUTON_i, are the item indicators of the *autonomy* latent variable, TSK_Ii are the item indicators of the *task identity* latent variable, TSK_Si are the item indicators of the *task significance* latent variable, TSK_Vi are the item indicators of the task variety latent variable, *INTK_Pi* are the item parcel indicators of the *gaining intimate knowledhe* latent variable, SELFI_Pi are the item parcel indicators of the *self-investment* latent variable, CONT_Pi are the item parcel indicators of the *gaining control* latent variable, PEFF_Pi are the item parcel indicators of the *perceived ability of the job to satisfy the self-efficacy need* latent variable, PID_Pi are the item parcel indicators of *the perceived ability of the job to satisfy the self-identity need* latent variable, FEFF_Pi are the item parcel indicators of the *feeling of self-efficacy* latent variable, INTE_Pi are the item parcel indicators of the *gaining intimate knowledge* latent variable, SID_Pi are the item parcel indicators of the *self-identity need* latent variable, SEFF_Pi are the item parcel indicators of the *self-efficacy need* latent variable, PO_Pi are the item parcel indicators of the *psychological ownership* latent variable, MOT_Pi are the item parcel indicators of the *motivation to pursue the routes to psychological ownership* latent variable and RES_Pi are the residual parcel indicators of the latent *perceived ability x self-investment* interaction effect..

Table 5.109 indicates that 111 parameters, if set free, would improve the fit of the model significantly (p < .01). It is possible to derive an indirect evaluation of the fit of the

measurement model by determining the percentage of the currently fixed parameters in the lambda-X matrix that have significant modification indices. There were 111 of the 550 possible ways of modifying the model through the freeing of factor loadings currently constrained to zero ([70/540[49]]*100 = 20.56%) that would result in a significant improvement of the measurement model[50]. This somewhat large percentage commented negatively on the fit of the *psychological ownership* measurement model. However, this ratio is not so large as to consider the fit of the model as poor. The modification indices calculated for the measurement error variance matrix (θ_δ) is shown in Table 5.110.

Table 5.110

Modification indices for the theta-delta measurement error variance matrix

Item parcel	AUTON_1	TSK_I_1	TSK_V_1	TSK_S_1	TSK_V_2	TSK_I_2
AUTON_1	- -					
TSK_I_1	0.2036	- -				
TSK_V_1	1.9706	0.0032	- -			
TSK_S_1	2.2593	5.3534	**11.2401**	- -		
TSK_V_2	1.4985	0.0852	**10.7597**	1.3456	- -	
TSK_I_2	2.2867	6.4711	3.3735	1.3550	5.2144	- -
TSK_V_3	2.9698	0.7850	3.1747	0.0466	- -	**9.1307**
TSK_S_2	**31.5611**	2.0150	3.4224	1.5578	4.9823	0.0170
AUTON_2	**13.6545**	1.7115	**14.1744**	4.4194	1.4533	9.7928
TSK_I_3	0.1583	**757.3808**	2.6094	**7.7252**	0.1493	- -
AUTON_3	**12.5461**	1.4044	**8.5414**	5.6211	0.8187	0.3967
TSK_S_3	0.8432	2.9540	2.5558	0.0021	2.2079	3.8899
INTK_P1	4.0226	2.2979	0.0095	4.8861	3.9901	5.6366
INTK_P2	3.1840	1.1686	0.5846	1.2071	**10.6838**	4.4707
SELFI_P1	**8.3613**	0.1533	0.5737	0.0940	0.8052	0.2740
SELFI_P2	5.3533	3.6500	0.0011	3.2139	0.5316	1.3051
CONT_P1	3.4279	0.2727	0.0652	0.5289	0.0013	0.0561
CONT_P2	0.9116	0.0149	0.2769	0.6829	**8.5688**	4.1079
PEFF_P1	0.5220	0.3134	0.0100	3.6578	0.0171	**10.3209**
PEFF_P2	0.7349	0.6503	0.3906	1.4071	0.3623	**23.3154**
PID_P1	0.1757	3.5238	0.0266	2.8590	1.0373	2.0154
PID_P2	0.0502	2.2182	0.3700	0.3800	**8.2723**	2.7816
FEFF_P1	0.0010	2.0296	3.1365	2.8939	4.5161	0.6498
FEFF_P2	0.2036	1.6795	2.1259	1.0040	0.4185	0.8685
INTE_P1	1.0381	0.0518	0.1277	0.6838	0.0134	1.5139
INTE_P2	0.0401	0.3231	0.7672	3.4672	2.0062	0.2326
SID_P1	1.9191	1.2347	1.0064	1.7016	2.4712	2.4629
SID_P2	0.0110	2.8184	0.0978	2.3801	**8.2122**	0.5158
SEFF_P1	4.4580	5.7529	3.3421	2.5913	0.2515	2.7097
SEFF_P2	0.1102	0.3905	0.7536	3.2553	0.0037	1.9143
PO_P1	0.2166	2.8450	2.5249	**14.0798**	0.0001	3.3806
PO_P2	0.3407	4.0731	1.2335	**10.6911**	0.4179	0.1588
MOT_P1	2.8940	0.4130	**7.0355**	0.0142	2.4054	1.3050
MOT_P2	1.4894	0.0069	2.7542	0.2304	5.3654	0.0500
RES_P1	0.0846	0.0889	0.0917	0.0011	3.2119	0.0448
RES_P2	0.0295	4.7385	0.0850	0.0097	3.2024	0.7175

[49] (36 x 16) – 36 = 576 – 36 = 540 Where there are 36 indicator variables, 12 latent variables operationalised by 2 item parcels each and 4 latent variables operationalised by 3 item indicators each.

[50] It is thereby not claimed that the sequential freeing of all of the 111 factor loadings currently would result in a statistically significant ($p < .01$) increase in model fit. What is claimed is that freeing any one of 111 factor loadings fixed to zero in the current model will statistically significantly ($p < .01$) improve the fit of the model. Freeing any one of them would, however, affect the remaining modification index values.

Table 5.110

Modification indices for the theta-delta measurement error variance matrix (continued)

Item parcel	TSK_V_3	TSK_S_2	AUTON_2	TSK_I_3	AUTON_3	TSK_S_3
TSK_V_3	- -					
TSK_S_2	0.8619	- -				
AUTON_2	1.5869	**25.4702**	- -			
TSK_I_3	0.0022	2.0744	**15.2835**	- -		
AUTON_3	0.7495	**10.9993**	0.1084	0.4498	- -	
TSK_S_3	0.6955	1.3139	3.4495	1.0506	**31.4336**	- -
INTK_P1	0.3752	0.3122	0.5667	0.3871	0.6468	0.4017
INTK_P2	0.5848	0.8704	1.3475	0.0665	0.1106	0.1776
SELFI_P1	5.5261	0.7612	0.1406	0.0017	0.1380	2.5136
SELFI_P2	3.8347	0.0006	1.6701	0.2669	1.5778	0.0175
CONT_P1	0.7291	0.0436	4.4286	0.0001	6.1751	0.3995
CONT_P2	1.8796	0.4144	0.2207	4.2689	**13.8865**	0.0037
PEFF_P1	0.0453	0.2256	0.1413	0.5556	1.7688	**18.6887**
PEFF_P2	0.1345	2.4710	4.2733	0.0927	1.2531	**10.8356**
PID_P1	1.7044	0.2500	0.7090	0.2365	2.2136	0.0028
PID_P2	0.4123	1.5001	1.9142	0.0632	5.5946	0.1348
FEFF_P1	0.1642	3.0968	0.6687	0.1442	4.7147	**12.2453**
FEFF_P2	0.2256	0.0692	0.5717	0.1424	3.8978	1.8832
INTE_P1	1.6507	0.0000	0.0339	1.6921	**15.1933**	**8.2628**
INTE_P2	0.0900	0.1819	0.6749	1.0325	**15.2796**	5.2555
SID_P1	6.4515	**12.2498**	2.7710	0.2163	0.0138	6.5484
SID_P2	**11.9731**	4.3966	3.0337	0.0075	0.5266	1.6556
SEFF_P1	2.2489	4.6318	0.4895	2.2119	5.3071	4.0641
SEFF_P2	2.6602	0.9468	0.7334	0.8101	5.0189	1.1765
PO_P1	0.0311	0.4130	1.1098	**8.8021**	0.0786	**8.7842**
PO_P2	1.1464	0.0308	6.2331	4.4232	0.6297	3.1830
MOT_P1	0.0256	1.9501	4.1110	2.2226	3.5173	2.6989
MOT_P2	0.9152	5.3808	2.1157	0.0652	1.2011	4.2675
RES_P1	0.3108	1.3853	0.8151	**6.7295**	0.0897	0.9303
RES_P2	0.3331	**10.2835**	0.0631	**10.6482**	1.3164	0.4205

Table 5.110

Modification indices for the theta-delta measurement error variance matrix (continued)

Item parcel	INTK_P1	INTK_P2	SELFI_P1	SELFI_P2	CONT_P1	CONT_P2
INTK_P1	- -					
INTK_P2	- -	- -				
SELFI_P1	0.0354	1.1445	- -			
SELFI_P2	3.8309	0.1034	- -	- -		
CONT_P1	3.6229	5.9519	1.4678	1.5627	- -	
CONT_P2	0.5286	2.3862	1.5596	2.5399	- -	- -
PEFF_P1	0.2790	0.0001	0.1431	1.6020	6.1659	**6.9704**
PEFF_P2	6.0851	**6.7304**	2.8368	0.9422	0.1942	0.2860
PID_P1	0.0414	1.0857	0.1066	0.6505	0.0301	2.7528
PID_P2	0.4431	3.2838	0.1100	0.0045	**19.4564**	**10.7170**
FEFF_P1	**19.9770**	**14.0950**	0.1726	0.4213	0.0632	0.4159
FEFF_P2	**9.5015**	**6.7348**	3.3307	0.9638	0.2949	0.9811
INTE_P1	0.1176	0.8959	0.0322	0.0099	1.5976	2.3195
INTE_P2	0.8161	0.1858	1.8506	3.4338	4.0490	0.2766
SID_P1	0.0381	0.1923	0.3044	2.9098	2.2219	**14.7246**
SID_P2	0.1019	0.2865	0.0007	0.9479	0.4566	**7.5541**
SEFF_P1	0.5122	0.5253	0.2794	0.3127	2.1972	0.0793
SEFF_P2	3.3991	2.6363	0.2367	0.2858	1.2111	0.0845
PO_P1	0.0284	1.3111	0.0028	0.0691	0.1104	3.5779
PO_P2	**15.7218**	3.4766	0.2607	0.9344	0.0252	3.5277

MOT_P1	5.2701	**10.2348**	1.5228	0.2900	0.0786	**19.6531**
MOT_P2	0.9723	4.5397	1.3581	0.3897	0.6018	**14.8087**
RES_P1	1.7929	0.5483	0.0743	0.0699	**9.6992**	**7.8180**
RES_P2	0.0105	0.2174	1.5525	0.7746	5.9764	3.9720

Table 5.110

Modification indices for the theta-delta measurement error variance matrix (continued)

Item parcel	PEFF_P1	PEFF_P2	PID_P1	PID_P2	FEFF_P1	FEFF_P2
PEFF_P1	- -					
PEFF_P2	- -	- -				
PID_P1	**8.2755**	**7.1986**	- -			
PID_P2	**16.6092**	**18.1720**	- -	- -		
FEFF_P1	1.4651	0.2173	0.0337	1.1201	- -	
FEFF_P2	0.3023	1.5361	3.0792	**7.2335**	6.2024	3.6528
INTE_P1	1.6746	2.1810	5.1697	1.5015	4.1761	1.1338
INTE_P2	0.8035	1.1527	1.5339	0.0375	2.0460	0.2387
SID_P1	0.1938	0.8764	1.0222	0.4718	0.2074	0.2447
SID_P2	**6.9121**	**6.9733**	2.1815	0.0172	1.9701	1.8408
SEFF_P1	0.4722	0.2559	1.2879	0.0500	0.0363	0.1204
SEFF_P2	0.4612	1.3257	2.5291	0.3659	1.0491	0.7148
PO_P1	2.4461	0.3692	**13.2172**	0.0189	**12.4507**	**13.3415**
PO_P2	5.1000	1.8733	**8.7558**	1.5481	**11.3375**	**12.3395**
MOT_P1	1.3840	1.0451	1.4321	0.2001	0.7870	0.2440
MOT_P2	0.1064	0.0002	0.1591	0.1525	0.6969	0.1946
RES_P1	**8.1889**	5.9310	0.5731	0.8706	0.4454	2.4784
RES_P2	1.3297	0.1742	0.2171	0.1256	1.2735	0.0522

Table 5.110

Modification indices for the theta-delta measurement error variance matrix (continued)

Item parcel	INTE_P1	INTE_P2	SID_P1	SID_P2	SEFF_P1	SEFF_P2
INTE_P1	- -					
INTE_P2	- -	- -				
SID_P1	**29.7791**	**11.2903**	- -			
SID_P2	6.1526	0.2697	- -	- -		
SEFF_P1	0.0254	0.0449	1.1061	1.0152	- -	
SEFF_P2	2.3073	1.9630	1.3030	1.4289	- -	- -
PO_P1	3.4538	4.4225	2.7393	1.7751	0.3249	0.0004
PO_P2	0.1187	0.0073	0.0161	**11.0809**	**9.8904**	**7.9797**
MOT_P1	0.4792	**9.3340**	6.4428	0.0614	1.2469	0.2940
MOT_P2	0.0457	**12.4668**	1.9882	0.7527	0.1975	1.3832
RES_P1	1.3106	1.2146	3.0898	1.1687	4.0940	1.2143
RES_P2	2.1351	1.9534	0.4957	1.5749	2.9399	0.6081

Table 5.110

Modification indices for the theta-delta measurement error variance matrix (continued)

Item parcel	PO_P1	PO_P2	MOT_P1	MOT_P2	RES_P1	RES_P2
PO_P1	- -					
PO_P2	- -	- -				
MOT_P1	0.0015	0.1620	- -			
MOT_P2	1.1174	0.6944	- -	- -		
RES_P1	1.9767	1.6796	1.0687	3.8589	- -	
RES_P2	5.3662	5.3647	**6.8510**	**12.5082**	- -	- -

Note: Values in bold indicate statistically significant ($p < .01$) modification index values. AUTON_i, are the item indicators of the *autonomy* latent variable, TSK_Ii are the item indicators of the *task identity* latent variable, TSK_Si are the item indicators of the *task significance* latent variable, TSK_Vi are the item indicators of the task variety latent variable, *INTK_Pi* are the item parcel indicators of the *gaining intimate knowledhe* latent variable, SELFI_Pi are the item parcel indicators of the

self-investment latent variable, CONT_Pi are the item parcel indicators of the *gaining control* latent variable, PEFF_Pi are the item parcel indicators of the *perceived ability of the job to satisfy the self-efficacy need* latent variable, PID_Pi are the item parcel indicators of *the perceived ability of the job to satisfy the self-identity need* latent variable, FEFF_Pi are the item parcel indicators of the *feeling of self-efficacy* latent variable, INTE_Pi are the item parcel indicators of the *gaining intimate knowledge* latent variable, SID_Pi are the item parcel indicators of the *self-identity need* latent variable, SEFF_Pi are the item parcel indicators of the *self-efficacy need* latent variable, PO_Pi are the item parcel indicators of the *psychological ownership* latent variable, MOT_Pi are the item parcel indicators of the *motivation to pursue the routes to psychological ownership* latent variable and RES_Pi are the residual parcel indicators of the latent *perceived ability x self-investment* interaction effect.

In terms of the theta-delta matrix (Table 5.110), 74 of the 630[51] modification indices calculated for the fixed measurement error covariances were statistically significant ($p < .01$). This implies that 11.75% of the parameters, if set free, would result in a significant improvement in the measurement model fit. This relatively small percentage of large significant modification indices paints a somewhat more positive picture of the model fit.

5.9.5. DECISION ON THE FIT OF THE MEASUREMENT MODEL

The goodness-of-fit statistics indicated that both the exact fit hypothesis (H_{033a}: RMSEA = 0) and the close fit null hypothesis (H_{033b}: RMSEA ≤ .05) should unfortunately be rejected. However, the RMSEA value of .0659 indicated that the *psychological ownership* measurement model at least achieved reasonable fit in the sample (<. 08). Other fit statistics that address the issue of parsimony in the assessment of model fit such as the CAIC painted a more positive picture of the model fit. Furthermore, the reasonably small percentage of large residuals (albeit slightly above the historically older, more stringent cut-off value of .05) (.052) indicated reasonable model fit. In addition, the relatively modest percentage of parameters in the lambda-X and theta- delta matrices that, if set free, would improve the model fit significantly, served as corroborating evidence for the reasonable, albeit modest, model fit. An interpretation of the measurement model parameter estimates and squared multiple correlations (R^2) for the indicators was thus considered permissible.

5.10. MEASUREMENT MODEL PARAMETER ESTIMATES AND SQUARED MULTIPLE CORRELATIONS

The revision of the hypothesised psychological ownership structural model that was necessitated by the psychometric shortcomings of the locus of control scale and the too low observations to freed model parameters ratio. This in turn necessitated the reformulation of the measurement model and structural model statistical hypotheses originally formulated in Chapter 3. The revised measurement model statistical hypotheses were formulated (after the

[51] [36 x (36 - 1)] / 2 = 630

removal of *internal locus of control* gaining control* interaction effect and the latent squared and products terms used in the polynomial regression analysis)[52]:

H_{033a}: RMSEA = 0

H_{a33a}: RMSEA > 0

H_{033b}: RMSEA ≤ .05

H_{a33b}: RMSEA >.05

H_{0i}: $\lambda_{jk} = 0$; i = 34, 35, …, 69; j = 1, 2 …, 36; k = 1, 2 …, 16

H_{ai}: $\lambda_{jk} = 0$; i = 34, 35, …, 69; j = 1, 2 …, 36; k = 1, 2 …, 16

H_{0i}: $\Theta_{\delta jj} = 0$; i = 70, 71, …, 105; j = 1, 2 …, 36

H_{ai}: $\Theta_{\delta jj} > 0$; i = 70, 71, …, 105; j = 1, 2 …, 36

H_{0i}: $\Theta_{\delta ij} = 0$; i = 106; i = 35; j = 36

H_{ai}: $\Theta_{\delta ij} \neq 0$; i = 106; i = 35; j = 36

H_{0i}: $\phi_{jk} = 0$; i = 107 108, …, 226; j = 1, 2 …, 16; k= 1, 2 …, 16; j≠k[53]

H_{ai}: $\phi_{jk} > 0$; i = 107, 108, …, 226; j = 1, 2 …, 16; k= 1, 2 …, 16; j≠k

In order to determine the construct validity of the indicator variables used to operationalise the latent variables one must assess the magnitude and significance of the paths between each latent variable and its indicator variables (Diamantopoulos & Siguaw, 2000). In both the unstandardised and completely standardised solution of the lambda-X matrix, the factor loadings represent the slope of the regression of the item parcels on the latent variables. In the completely standardised solution, however, both the item parcels (indicators) and latent variables have been standardised to a z-score and are interpreted accordingly. In the completely standardised solution, the factor loadings therefore describe the average change in the item parcel indicator, expressed in standard deviation units, associated with one standard deviation increase in the latent variable represented by the item parcel.

The unstandardised lambda-X factor loading matrix is shown in Table 5.111. The unstandardised matrix consist of three values of importance. However, the last value,

[52] The numbering of the measurement model statistical hypotheses follow on the structural model statistical hypotheses because the latter logically were discussed prior to the former in Chapter 3. In Chapter 5, however, when discussing the results, the opposite order applies.

[53] There are (16 x 15)/2 = 120 unique latent variable variance and covariance terms in **Θ**.

representing the z-values[54] are of particular importance, as they provide information on the significance of the hypothesised relationship (Diamantopoulos & Siguaw, 2000). Parameters can be regarded as significant when the z-score exceeds 1.6449 given that the factor loading alternative hypotheses were formulated as directional hypotheses.

Table 5.111

Psychological ownership measurement model unstandardised lambda-X factor loading matrix

	TASK_ID	TASK_S	TASK_V	AUTON	PAJ_SI	PAJ_SE
AUTON_1	- -	- -	- -	0.6799* (0.0576) 11.8046	- -	- -
TSK_I_1	1.0225* (0.0576) 17.7549	- -	- -	- -	- -	- -
TSK_V_1	- -	- -	0.7682* (0.0593) 12.9634	- -	- -	- -
TSK_S_1	- -	1.0701* (0.0634) 16.8835	- -	- -	- -	- -
TSK_V_2	- -	- -	1.1347* (0.0512) 22.1709	- -	- -	- -
TSK_I_2	1.0720* (0.0652) 16.4344	- -	- -	- -	- -	- -
TSK_V_3	- -	- -	1.2693* (0.0490) 25.8973	- -	- -	- -
TSK_S_2	- -	0.8902* (0.0568) 15.6859	- -	- -	- -	- -
AUTON_2	- -	- -	- -	0.9925* (0.0524) 18.9454	- -	- -
TSK_I_3	1.1945* (0.0557) 21.4501	- -	- -	- -	- -	- -
AUTON_3	- -	- -	- -	1.1635* (0.0526) 22.1190	- -	- -
TSK_S_3	- -	1.1837* (0.0586) 20.1887	- -	- -	- -	- -
PEFF_P1	- -	- -	- -	- -	- -	0.7169* (0.0285) 25.1364
PEFF_P2	- -	- -	- -	- -	- -	0.6764* (0.0290) 23.2986
PID_P1	- -	- -	- -	- -	0.7015* (0.0308) 22.7876	- -
PID_P2	- -	- -	- -	- -	0.7110* (0.0311) 22.8600	- -

[54] These values are often referred to as t-values. However, in samples of the magnitude attained in the current study, the sampling distribution of the parameter estimate follows a univariate normal distribution rather than a t-distribution (Guilford & Fruchter, 1978).

Table 5.111

Psychological ownership measurement model unstandardised lambda-X factor loading matrix (continued)

	SELF_ID	SELF_EF	MOTIV	SELF_IN	KNOW	CONTROL
INTK_P1	- -	- -	- -	- -	0.7500*	- -
					(0.0363)	
					20.6550	
INTK_P2	- -	- -	- -	- -	0.8879*	- -
					(0.0336)	
					26.4591	
SELFI_P1	- -	- -	- -	0.9595*	- -	- -
				(0.0375)		
				25.5584		

Table 5.111

Psychological ownership measurement model unstandardised lambda-X m factor loading matrix (continued)

	SELF_ID	SELF_EF	MOTIV	SELF_IN	KNOW	CONTROL
SELFI_P2	- -	- -	- -	0.9388*	- -	- -
				(0.0437)		
				21.5008		
CONT_P1	- -	- -	- -	- -	- -	1.1021*
						(0.0461)
						23.9211
CONT_P2	- -	- -	- -	- -	- -	1.1439*
						(0.0547)
						20.9179
SID_P1	1.1327*	- -	- -	- -	- -	- -
	(0.0566)					
	19.9985					
SID_P2	0.9604*	- -	- -	- -	- -	- -
	(0.0515)					
	18.6524					
SEFF_P1	- -	0.7898*	- -	- -	- -	- -
		(0.0344)				
		22.9415				
SEFF_P2	- -	0.7123*	- -	- -	- -	- -
		(0.0350)				
		20.3589				
MOT_P1	- -	- -	6.9506*	- -	- -	- -
			(0.3022)			
			23.0008			
MOT_P2	- -	- -	7.1250*	- -	- -	- -
			(0.3093)			
			23.0324			

Table 5.111

Psychological ownership measurement model unstandardised lambda-X factor loading matrix (continued)

	FEFF	INTGS	PO	INTERACT
FEFF_P1	0.5098*	- -	- -	- -
	(0.0284)			
	17.9610			
FEFF_P2	0.4374*	- -	- -	- -
	(0.0231)			
	18.9468			

Table 5.111

Psychological ownership measurement model unstandardised lambda-X factor loading matrix (continued)

	FEFF	INTGS	PO	INTERACT
INTE_P1	- -	0.6973*	- -	- -
		(0.0348)		
		20.0652		
INTE_P2	- -	0.7118*	- -	- -
		(0.0334)		
		21.2943		
PO_P1	- -	- -	1.0147*	- -
			(0.0397)	
			25.5668	
PO_P2	- -	- -	0.9895*	- -
			(0.0449)	
			22.0161	
RES_P1	- -	- -	- -	0.2931*
				(0.0479)
				6.1219
RES_P2	- -	- -	- -	0.3304*
				(0.0222)
				14.8559

Note: * p<.05. TASKID represents the *task identity* latent variable, TASK_S represents the *task significance* latent variable, TASK_V represents the *task variety* latent variable, AUTON represents the *autonomy* latent variable, PAJ_SI represents the *perceived ability of the job to satisfy the self-identity need* latent variable, PAJ_SE represents the *perceived ability of the job to satisfy the self-efficacy need* latent variable, SELF_ID represents the *self-identity need* latent variable, SELF_EF represents the *self-efficacy need* latent variable, MOTIV represents the *motivation to pursue the routes to psychological ownership* latent variable, SELF_IN represents the *self-investment* latent variable, KNOW represents the *gaining intimate knowledge* latent variable, CONTROL represents the *gaining control* latent variable, FEFF represents the *feeling of efficacy* latent variable, INTGS represents *the integrating the self* latent variable, PO represents the *psychological ownership* latent variable, INTERACT represents the latent *perceived ability x self-investment* interaction effect. AUTON_i, are the item indicators of the *autonomy* latent variable, TSK_Ii are the item indicators of the *task identity* latent variable, TSK_Si are the item indicators of the *task significance* latent variable, TSK_Vi are the item indicators of the task variety latent variable, *INTK_Pi* are the item parcel indicators of the *gaining intimate knowledhe* latent variable, SELFI_Pi are the item parcel indicators of the *self-investment* latent variable, CONT_Pi are the item parcel indicators of the *gaining control* latent variable, PEFF_Pi are the item parcel indicators of the *pereceived ability of the job to satisfy the self-efficacy need* latent variable, PID_Pi are the item parcel indicators of *the perceived ability of the job to satisfy the self-identity need* latent variable, FEFF_Pi are the item parcel indicators of the *feeling of self-efficacy* latent variable, INTE_Pi are the item parcel indicators of the *gaining intimate knowledge* latent variable, SID_Pi are the item parcel indicators of the *self-identity need* latent variable, SEFF_Pi are the item parcel indicators of the *self-efficacy need* latent variable, PO_Pi are the item parcel indicators of the *psychological ownership* latent variable, MOT_Pi are the item parcel indicators of the *motivation to pursue the routes to psychological ownership* latent variable and RES_Pi are the residual parcel indicators of the latent *perceived ability x self-investment* interaction effect.

Table 5.111 indicates that all of the factor loadings were statistically significant ($p < .05$). H_{0i}: $\lambda_{jk} = 0$; i = 34, 35, …, 69; j = 1, 2 …, 36; k = 1, 2 …, 16 were therefore all rejected in favour of H_{ai}: $\lambda_{jk} = 0$; i = 34, 35, …, 69; j = 1, 2 …, 36; k = 1, 2 …, 16. Therefore, it can be assumed that the item parcels provided to some degree a valid reflection of the latent variable they were intended to measure. However, sole reliance should not be placed on the unstandardised factor loadings to compare the validity of the indicators as the indicators are not all expressed in the same metric (Diamantopoulos & Siguaw, 2000). Therefore, in addition to the unstandardised lambda-X matrix, attention was also paid to the completely standardised $\mathbf{\Lambda^X}$ matrix due to the comparative value of standardised factor loading estimates that are all expressed in the same

standard deviation unit metric. The completely standardised lambda-X factor loading matrix is presented in Table 5.112.

Table 5.112

Psychological ownership measurement model completely standardised lambda-X factor loading matrix

	TASK_ID	TASK_S	TASK_V	AUTON	PAJ_SI	PAJ_SE
AUTON_1	- -	- -	- -	**.6004**	- -	- -
TSK_I_1	.7508	- -	- -	- -	- -	- -
TSK_V_1	- -	- -	**.5846**	- -	- -	- -
TSK_S_1	- -	.7185	- -	- -	- -	- -
TSK_V_2	- -	- -	.8930	- -	- -	- -
TSK_I_2	.7218	- -	- -	- -	- -	- -
TSK_V_3	- -	- -	.9270	- -	- -	- -
TSK_S_2	- -	**.7024**	- -	- -	- -	- -
AUTON_2	- -	- -	- -	.7657	- -	- -
TSK_I_3	.8603	- -	- -	- -	- -	- -
AUTON_3	- -	- -	- -	.8221	- -	- -
TSK_S_3	- -	.8153	- -	- -	- -	- -
PEFF_P1	- -	- -	- -	- -	- -	.9372
PEFF_P2	- -	- -	- -	- -	- -	.8848
PID_P1	- -	- -	- -	- -	.9015	- -
PID_P2	- -	- -	- -	- -	.8830	- -

Table 5.112

Psychological ownership measurement model completely standardised lambda-X factor loading matrix (continued)

	SELF_ID	SELF_EF	MOTIV	SELF_IN	KNOW	CONTROL
INTK_P1	- -	- -	- -	- -	.8353	- -
INTK_P2	- -	- -	- -	- -	.9460	- -
SELFI_P1	- -	- -	- -	.9482	- -	- -
SELFI_P2	- -	- -	- -	.8576	- -	- -
CONT_P1	- -	- -	- -	- -	- -	.9269
CONT_P2	- -	- -	- -	- -	- -	.8503
SID_P1	.8393	- -	- -	- -	- -	- -
SID_P2	.8676	- -	- -	- -	- -	- -
SEFF_P1	- -	.9260	- -	- -	- -	- -
SEFF_P2	- -	.8587	- -	- -	- -	- -
PO_P1	- -	- -	- -	- -	- -	- -
PO_P2	- -	- -	- -	- -	- -	- -
MOT_P1	- -	- -	.9310	- -	- -	- -
MOT_P2	- -	- -	.9283	- -	- -	- -

Table 5.112

Psychological ownership measurement model completely standardised lambda-X factor loading matrix (continued)

	FEFF	INTGS	PO	INTERACT
FEFF_P1	.8069	- -	- -	- -
FEFF_P2	.8104	- -	- -	- -
INTE_P1	- -	.8424	- -	- -
INTE_P2	- -	.8650	- -	- -
PO_P1	- -	- -	.9471	- -

Table 5.112

Psychological ownership measurement model completely standardised lambda-X factor loading matrix (continued)

	FEFF	INTGS	PO	INTERACT
PO_P2	- -	- -	.8871	- -
MOT_P1	- -	- -	- -	- -
MOT_P2	- -	- -	- -	- -
RES_P1	- -	- -	- -	.7110
RES_P2	- -	- -	- -	.7224

Note: values in bold represent completely standardised factor loadings that fell below the λ_{ij} = .71 critical cut-off value. TASKID represents the *task identity* latent variable, TASK_S represents the *task significance* latent variable, TASK_V represents the *task variety* latent variable, AUTON represents the *autonomy* latent variable, PAJ_SI represents the *perceived ability of the job to satisfy the self-identity need* latent variable, PAJ_SE represents the *perceived ability of the job to satisfy the self-efficacy need* latent variable, SELF_ID represents the *self-identity need* latent variable, SELF_EF represents the *self-efficacy need* latent variable, MOTIV represents the *motivation to pursue the routes to psychological ownership* latent variable, SELF_IN represents the *self-investment* latent variable, KNOW represents the *gaining intimate knowledge* latent variable, CONTROL represents the *gaining control* latent variable, FEFF represents the *feeling of efficacy* latent variable, INTGS represents *the integrating the self* latent variable, PO represents the *psychological ownership* latent variable, INTERACT represents the latent *perceived ability x self-investment* interaction effect. AUTON_i, are the item indicators of the *autonomy* latent variable, TSK_Ii are the item indicators of the *task identity* latent variable, TSK_Si are the item indicators of the *task significance* latent variable, TSK_Vi are the item indicators of the task variety latent variable, *INTK_Pi* are the item parcel indicators of the *gaining intimate knowledhe* latent variable, SELFI_Pi are the item parcel indicators of the *self-investment* latent variable, CONT_Pi are the item parcel indicators of the *gaining control* latent variable, PEFF_Pi are the item parcel indicators of the *pereceived ability of the job to satisfy the self-efficacy need* latent variable, PID_Pi are the item parcel indicators of *the perceived ability of the job to satisfy the self-identity need* latent variable, FEFF_Pi are the item parcel indicators of the *feeling of self-efficacy* latent variable, INTE_Pi are the item parcel indicators of the *gaining intimate knowledge* latent variable, SID_Pi are the item parcel indicators of the *self-identity need* latent variable, SEFF_Pi are the item parcel indicators of the *self-efficacy need* latent variable, PO_Pi are the item parcel indicators of the *psychological ownership* latent variable, MOT_Pi are the item parcel indicators of the *motivation to pursue the routes to psychological ownership* latent variable and RES_Pi are the residual parcel indicators of the latent *perceived ability x self-investment* interaction effect.

The factor loadings for the completely standardised lambda-X matrix were considered to be satisfactory if the factor loading estimates exceeded a cut-off of .71 (Hair et al., 2006). From Table 5.112 it is evident that all the loadings were greater than .71, except for the loading of AUTON_1 on the *autonomy* latent variable, the loading of TSK_V_1 on the *task variety* latent variable and the loading of TSK_S_2 on the *task significance* latent variable. These identified indicator variables could be regarded, to some degree, as problematic. However, as previously mentioned, the four job-characteristic latent variables (*task identity*, *task variety*, *task significance*, *autonomy*) were operationalised via three item indicator variables (since the scale for each of these latent variables consisted of only three items). Therefore, the validity of each individual item indicator should really, in fairness, have been evaluated against the less stringent critical cut-off value of .50. Judged against this criterion these to item indicators were not problematic. The factor loadings for the two problematic indicators were not excessively low and therefore did not warrant serious concern.

In addition to the completely standardised lambda-X matrix, the squared multiple correlations (R^2) of the indicators were evaluated, which are presented in Table 5.113.

Table 5.113

Psychological ownership measurement model squared multiple correlations for X-variables

AUTON_1	TSK_I_1	TSK_V_1	TSK_S_1	TSK_V_2	TSK_I_2
0.3605	0.5637	**0.3417**	0.5162	0.7974	0.5209
TSK_V_3	TSK_S_2	AUTON_2	TSK_I_3	AUTON_3	TSK_S_3
0.8593	**0.4934**	0.5863	0.7402	0.6758	0.6648
INTK_P1	INTK_P2	SELFI_P1	SELFI_P2	CONT_P1	CONT_P2
0.6978	0.8950	0.8990	0.7356	0.8591	0.7231
PEFF_P1	PEFF_P2	PID_P1	PID_P2	FEFF_P1	FEFF_P2
0.8784	0.7828	0.8127	0.7797	0.6510	0.6567
INTE_P1	INTE_P2	SID_P1	SID_P2	SEFF_P1	SEFF_P2
0.7096	0.7483	0.7044	0.7527	0.8575	0.7373
PO_P1	PO_P2	MOT_P1	MOT_P2	RES_P1	RES_P2
0.8970	0.7870	0.8668	0.8617	0.5055	0.5219

Note: values in bold are proportions of explained indicator variable variance less than .50.

The R^2 correlations represent the proportion of variance in an indicator that is attributed to the underlying latent variable it was supposed to reflect. High squared multiple correlations would indicate a high validity of an indicator. According to Hair et al (2006), a critical factor loading of .71 suggest a critical R^2 cut-off value of .50. Table 4.113 shows that all of the indicators exceeded the .50 cut-off, except for AUTON_1 (.361), TSK_V_1 (.342) and TSK_S_2 (.493), echoing the results in Table 5.112. However, as previously discussed, these indicators consist of only one item each, which means that the appropriate critical cut-off value is actually .25. When evaluated against this more appropriate critical cut-off proportion, the size of the R^2 values for these three indicators did not pose a threat to the integrity of the measures.

The unstandardised measurement error variance estimates and the single unstandardised measurement error covariance presented in Table 5.114 were interpreted by testing the following hypotheses:

H_{0i}: $\Theta_{\delta jj} = 0$; i = 70, 71, …, 105; j = 1, 2 …, 36

H_{ai}: $\Theta_{\delta jj} > 0$; i = 70, 71, …, 105; j = 1, 2 …, 36

H_{0i}: $\Theta_{\delta ij} = 0$; i = 106; i = 35; j = 36

H_{ai}: $\Theta_{\delta ij} \neq 0$; i = 106; i = 35; j = 36

Table 5.114 shows that all of the measurement error variance estimates were statistically significant ($p < .05$). The estimated covariance between the measurement error terms associated with RES_P1 and RES_P2 was statistically insignificant ($p > .05$). The statistical significance of the two measurement error variances that were fixed to .10 was not evaluated (RES_P2 and FEFF_P2). This implies that H_{0i}: $\Theta_{\delta jj} = 0$ could be rejected ($p < .05$) for all i, except for i = 93

and i = 105 were H_{0i} could not be tested. This allows the conclusion that all of the indicators, except for the latter two, were statistically significantly ($p < .05$) plagued by measurement error. H_{0i}: $\Theta_{\delta ij} = 0$; i = 106; i = 35; j = 36 was not rejected. The measurement error associated with the indicators of the latent interaction effect therefore did not correlate statistically significantly ($p > .05$).

Table 5.114

Unstandardised theta-delta measurement error variance matrix

	AUTON_1	TSK_I_1	TSK_V_1	TSK_S_1	TSK_V_2	TSK_I_2
AUTON_1	0.8202* (0.0693) 11.8377					
TSK_I_1	- -	0.8092* (0.0846) 9.5668				
TSK_V_1	- -	- -	1.1368* (0.0746) 15.2432			
TSK_S_1	- -	- -	- -	1.0733* (0.1133) 9.4708		
TSK_V_2	- -	- -	- -	- -	0.3272* (0.0521) 6.2812	
TSK_I_2	- -	- -	- -	- -	- -	1.0567* (0.1456) 7.2559

Table 5.114

Unstandardised theta-delta measurement error variance matrix (continued)

	TSK_V_3	TSK_S_2	AUTON_2	TSK_I_3	AUTON_3	TSK_S_3
TSK_V_3	0.2639* 0.0447) 5.9065*					
TSK_S_2	- -	0.8137 0.0666) 12.2246				
AUTON_2	- -	- -	0.6950* (0.0714) 9.7360			
TSK_I_3	- -	- -	- -	0.5008* (0.0749) 6.6833		
AUTON_3	- -	- -	- -	- -	0.6495* (0.0705) 9.2164	
TSK_S_3						0.7066* (0.0733) 9.6363

Table 5.114

Unstandardised theta-delta measurement error variance matrix (continued)

	INTK_P1	INTK_P2	SELFI_P1	SELFI_P2	CONT_P1	CONT_P2
INTK_P1	0.2436* (0.0282)					

	8.6264					
INTK_P2	- -	0.0925* (0.0271) 3.4105				
SELFI_P1	- -	- -	0.1034* (0.0305) 3.3886			
SELFI_P2	- -	- -	- -	0.3169* (0.0354) 8.9488		
CONT_P1	- -	- -	- -	- -	0.1992* (0.0362) 5.5082	
CONT_P2	- -	- -	- -	- -	- -	0.5012* (0.0583) 8.5941

Table 5.114

Unstandardised theta-delta measurement error variance matrix (continued)

	PEFF_P1	PEFF_P2	PID_P1	PID_P2	FEFF_P1	FEFF_P2
PEFF_P1	0.0712* (0.0090) 7.9317					
PEFF_P2	- -	0.1269* (0.0154) 8.2496				
PID_P1	- -	- -	0.1134* (0.0163) 6.9398			
PID_P2	- -	- -	- -	0.1428* (0.0168) 8.4798		
FEFF_P1	- -	- -	- -	- -	0.1393* (0.0183) 7.6051	
FEFF_P2	- -	- -	- -	- -	- -	**0.1000**

Table 5.114

Unstandardised theta-delta measurement error variance matrix (continued)

	INTE_P1	INTE_P2	SID_P1	SID_P2	SEFF_P1	SEFF_P2
INTE_P1	0.1990* (0.0273) 7.2903					
INTE_P2	- -	0.1704* (0.0327) 5.2119				
SID_P1	- -	- -	0.5383* (0.0657) 8.1902			
SID_P2	- -	- -	- -	0.3030* (0.0700) 4.3316		

Table 5.114

Unstandardised theta-delta measurement error variance matrix (continued)

	INTE_P1	INTE_P2	SID_P1	SID_P2	SEFF_P1	SEFF_P2
SEFF_P1	- -	- -	- -	- -	0.1036* (0.0231) 4.4944	
SEFF_P2	- -	- -	- -	- -	- -	0.1808* (0.0232) 7.7840

Table 5.114

Unstandardised theta-delta matrix (continued)

	PO_P1	PO_P2	MOT_P1	MOT_P2	RES_P1	RES_P2
PO_P1	0.1183* (0.0296) 3.9894					
PO_P2	- -	0.2650* (0.0423) 6.2671				
MOT_P1	- -	- -	7.4223* (1.8018) 4.1193			
MOT_P2	- -	- -	- -	8.1477* (1.8760) 4.3431		
RES_P1	- -	- -	- -	- -	0.0840* (0.0262) 3.2123	
RES_P2	- -	- -	- -	- -	0.0246 (0.0180) **1.3647**	0.1000

Note: * p < .05. AUTON_i, are the item indicators of the *autonomy* latent variable, TSK_Ii are the item indicators of the *task identity* latent variable, TSK_Si are the item indicators of the *task significance* latent variable, TSK_Vi are the item indicators of the task variety latent variable, *INTK_Pi* are the item parcel indicators of the *gaining intimate knowledhe* latent variable, SELFI_Pi are the item parcel indicators of the *self-investment* latent variable, CONT_Pi are the item parcel indicators of the *gaining control* latent variable, PEFF_Pi are the item parcel indicators of the *pereceived ability of the job to satisfy the self-efficacy need* latent variable, PID_Pi are the item parcel indicators of *the perceived ability of the job to satisfy the self-identity need* latent variable, FEFF_Pi are the item parcel indicators of the *feeling of self-efficacy* latent variable, INTE_Pi are the item parcel indicators of the *gaining intimate knowledge* latent variable, SID_Pi are the item parcel indicators of the *self-identity need* latent variable, SEFF_Pi are the item parcel indicators of the *self-efficacy need* latent variable, PO_Pi are the item parcel indicators of the *psychological ownership* latent variable, MOT_Pi are the item parcel indicators of the *motivation to pursue the routes to psychological ownership* latent variable and RES_Pi are the residual parcel indicators of the latent *perceived ability x self-investment* interaction effect.

The completely standardised theta-delta measurement error variance matrix is presented in Table 5.115. The completely standardised theta-delta matrix indicates the proportion of variance in the items and item parcels that is not explained by the underlying latent variable it was earmarked to reflect. Put differently, these values indicate the proportion of variance in the item indicators and item parcels that is due to systematic non-relevant variance and random error variance that cannot be explained in terms of the latent variable. Values that fell below .50 were considered as satisfactory, suggesting that less than 50% of the variance in the indicators can be attributed to random error. As expected, AUTON_1, TSK_V_1 and TKS_S_2 had more than 50% error variance. Essentially, the inferences that can be drawn from these results remain the same as the conclusion drawn from the interpretation of the R^2 values and

the completely standardised factor loadings. Since these indicators were single items the critical cut-off measurement error variance value that applies to them is .75. Taking both the measurement error variances and squared multiple correlations into consideration, it can be argued that the item indicators as well as the composite indicators that were used to reflect the latent variables contained in the *psychological ownership* measurement model showed satisfactory validity.

Table 5.115

Completely standardised theta-delta measurement error variance matrix

	AUTON_1	TSK_I_1	TSK_V_1	TSK_S_1	TSK_V_2	TSK_I_2
AUTON_1	**.6395**					
TSK_I_1	- -	.4363				
TSK_V_1	- -	- -	**.6583**			
TSK_S_1	- -	- -	- -	.4838		
TSK_V_2	- -	- -	- -	- -	.2026	
TSK_I_2	- -	- -	- -	- -	- -	.4791
	TSK_V_3	TSK_S_2	AUTON_2	TSK_I_3	AUTON_3	TSK_S_3
TSK_V_3	.1407					
TSK_S_2	- -	**.5066**				
AUTON_2	- -	- -	.4137			
TSK_I_3	- -	- -	- -	.2598		
AUTON_3	- -	- -	- -	- -	.3242	
TSK_S_3	- -	- -	- -	- -	- -	.3352
SELFI_P1	INTK_P1	INTK_P2		SELFI_P2	CONT_P1	CONT_P2
INTK_P1	.3022					
INTK_P2	- -	.1050				
SELFI_P1	- -	- -	.1010			
SELFI_P2	- -	- -	- -	.2644		
CONT_P1	- -	- -	- -	- -	.1409	
CONT_P2	- -	- -	- -	- -	- -	.2769
	PEFF_P1	PEFF_P2	PID_P1	PID_P2	FEFF_P1	FEFF_P2
PEFF_P1	.1216					
PEFF_P2	- -	.2172				
PID_P1	- -	- -	.1873			
PID_P2	- -	- -	- -	.2203		
FEFF_P1	- -	- -	- -	- -	.3490	
FEFF_P2	- -	- -	- -	- -	- -	.3433
	INTE_P1	INTE_P2	SID_P1	SID_P2	SEFF_P1	SEFF_P2
INTE_P1	.2904					
INTE_P2	- -	.2517				
SID_P1	- -	- -	.2956			
SID_P2	- -	- -	- -	.2473		
SEFF_P1	- -	- -	- -	- -	.1425	
SEFF_P2	- -	- -	- -	- -	- -	.2627
	PO_P1	PO_P2	MOT_P1	MOT_P2	RES_P1	RES_P2
PO_P1	.1030					
PO_P2	- -	.2130				
MOT_P1	- -	- -	.1332			
MOT_P2	- -	- -	- -	.1383		
RES_P1	- -	- -	- -	- -	.4945	
RES_P2	- -	- -	- -	- -	.1303	.4781

Note: values in bold indicate completely standardised measurement error variances larger than .50.

Finally, it is important to evaluate the discriminant validity with which the indicator variables reflect the latent variables they were designated to represent. The latent variables comprising

the proposed psychological ownership structural model are related, but qualitatively distinct, latent variables. An important question is whether the measures that were developed to reflect the latent variables comprising the structural model succeeded in distinguishing between the latent variables as qualitatively distinct, but related, variables. The concern is that some of the measures may not be sensitive enough to discriminate between qualitatively distinct, but related, latent variables. The qualitatively distinct, but related, latent variables are then represented through their insensitive measures as if they were the same latent variable. According to Foxcroft and Roodt (2013), discriminant validity is achieved when the measurement tools of related constructs succeed in distinguishing these constructs from each other. Discriminant validity is determined by evaluating the magnitude of the inter-correlations between the latent variables depicted in the phi matrix (Table 5.116). The statistical significance of the inter-correlations between the 16 latent variables were assessed by testing the following 120 hypotheses:

H_{0i}: $\phi_{jk} = 0$; i = 107 108, …, 226; j = 1, 2 …, 16; k= 1, 2 …, 16; j≠k

H_{ai}: $\phi_{jk} > 0$; i = 107, 108, …, 226; j = 1, 2 …, 16; k= 1, 2 …, 16; j≠k

Table 5.116 shows that all the inter-correlations were statistically significant ($p < .05$) except for the correlation between SELF_ID and KNOW and also ten of the inter-correlations involving the interaction-effect between *self-investment* and *perceived ability*. This suggests that H_{0i}: $\phi_{jk} = 0$ could be rejected for all i = 118, 119, …, 237; j = 1, 2 …, 16; k= 1, 2 …, 16, except for H_{0162}, H_{0222}, H_{0223}, H_{0224}, H_{0226}, H_{0227}, H_{0228}, H_{0229}, H_{0230}, H_{0233} and H_{0236}[55]. H_{0231} was not tested since the correlation between *investing the self* and the latent interaction effect was constrained to zero. The lack of correlation between the latent interaction effect and the SELF_IN latent variables can be explained in terms of the orthogonalising procedure (Little et al., 2006) that was used to create the two indicator variables (RES_P1 and RES_P2) for the latent interaction-effect. The lack of inter-correlation between *gaining intimate knowledge* and *self-identity need* was somewhat unexpected. The need for self-identity was theorised as a fundamental motivational driver of the traveling of the routes to psychological ownership. *Self-identity need* correlated statistically significantly ($p < .05$) with the other two routes (*self-investment* and *gaining control*), although not very strongly. *Self-identity need* correlated statistically significantly ($p < .05$) and moderately strong (.39) with the *motivation to travel the routes to psychological ownership*. This raises the possibility that the deflated correlations

[55] The numbering of the statistical hypotheses in the lower off-diagonal of **Φ** moved from the left upper off-diagonal cell, down one row, across in the row, down one row, across in the row etc.

between the *self-identity need* and *self-investment* and *gaining intimate knowledge* might be due to lack of opportunity or ability. The fact that a similar trend does not exist for the *self-efficacy need*, however, erodes confidence in this possibility.

Table 5.116 shows that none of the correlations were excessively large ($\phi_{jk} > .90$). A few correlations were, however, larger than .80. Therefore, discriminant validity did not seem to be a cause for concern. The absence of any ϕ_{jk} greater than .90 is not very strong evidence of discriminant validity though. The possibility still exists that latent variables could correlate unity in the parameter but correlate less than unity in the statistic because of sampling error. To examine this possibility the discriminant validity of the indicator measures was in addition also examined by calculating the 95% confidence intervals for the ϕ_{jk} estimates that exceeded .80. The results are shown in Table 5.117. The 95% confidence intervals were calculated using an Excel macro developed by Scientific Software international (Mels, 2010).

Table 5.116

Unstandardised phi inter-latent variable correlation matrix

	TASK_ID	TASK_S	TASK_V	AUTON	PAJ_SI	PAJ_SE
TASK_ID	1.0000					
TASK_S	.6625*	1.0000				
	(0.0468)					
	14.1429					
TASK_V	.5760*	.7560*	1.0000			
	(0.0509)	(0.0377)				
	11.3069	20.0452				
AUTON	.7482*	.7530*	.6192*	1.0000		
	(0.0321)	(0.0386)	(0.0448)			
	23.2759	19.4921	13.8182			
PAJ_SI	.6611*	.6607*	.5400*	.7491*	1.0000	
	(0.0429)	(0.0401)	(0.0476)	(0.0355)		
	15.4260	16.4569	11.3483	21.1263		
PAJ_SE	.7284*	.6238*	.5719*	**.8542***	**.8839***	1.0000
	(0.0324)	(0.0406)	(0.0434)	(0.0242)	(0.0208)	
	22.4948	15.3782	13.1683	35.2455	42.4793	
SELF_ID	.2795*	.4172*	.2803*	.3388*	.4273*	.3684*
	(0.0591)	(0.0572)	(0.0596)	(0.0594)	(0.0569)	(0.0509)
	4.7266	7.2952	4.7061	5.7033	7.5133	7.2389
SELF_EF	.3905*	.3942*	.3656*	.3867*	.3807*	.4157*
	(0.0542)	(0.0534)	(0.0480)	(0.0603)	(0.0515)	(0.0529)
	7.1979	7.3831	7.6161	6.4138	7.3945	7.8627
MOTIV	.3411*	.4538*	.2905*	.4908*	.4637*	.4231*
	(0.0479)	(0.0468)	(0.0483)	(0.0527)	(0.0464)	(0.0486)
	7.1190	9.6956	6.0119	9.3197	9.9990	8.7126
SELF_IN	.4420*	.5537*	.4895*	.5305*	.4348*	.4860*
	(0.0523)	(0.0475)	(0.0544)	(0.0454)	(0.0443)	(0.0414)
	8.4500	11.6541	8.9941	11.6863	9.8098	11.7313
KNOW	.4358*	.5325*	.3824*	.3885*	.3853*	.3558*
	(0.0540)	(0.0521)	(0.0552)	(0.0562)	(0.0527)	(0.0566)
	8.0746	10.2188	6.9300	6.9083	7.3055	6.2829

Table 5.116

Unstandardised phi inter-latent variable correlation matrix (continued)

	TASK_ID	TASK_S	TASK_V	AUTON	PAJ_SI	PAJ_SE
CONTROL	.5580*	.5471*	.4087*	**.8553***	.7105*	**.8282***
	(0.0375)	(0.0472)	(0.0454)	(0.0256)	(0.0320)	(0.0205)
	14.8993	11.5923	9.0017	33.4458	22.2334	40.3576
FEFF	.2135*	.2787*	.2432*	.2751*	.2528*	.2962*
	(0.0644)	(0.0703)	(0.0616)	(0.0608)	(0.0713)	(0.0625)
	3.3164	3.9620	3.9504	4.5231	3.5437	4.7391
INTGS	.4819*	.5877*	.4246*	.5927*	.6933*	.6398*
	(0.0487)	(0.0398)	(0.0499)	(0.0422)	(0.0359)	(0.0390)
	9.8977	14.7553	8.5043	14.0425	19.3261	16.4015
PO	.5325*	.5353*	.4702*	.5654*	.5321*	.6182*
	(0.0480)	(0.0510)	(0.0530)	(0.0489)	(0.0548)	(0.0419)
	11.0946	10.4861	8.8762	11.5665	9.7186	14.7408
INTERACT	-.0291	.0512	-.0746	-.1951*	-.0258	-.0322
	(0.0657)	(0.0616)	(0.0746)	(0.0622)	(0.0582)	(0.0543)
	-0.4423	0.8313	-1.0002	-3.1367	-0.4435	-0.5926

Table 5.116

Unstandardised phi inter-latent variable correlation matrix (continued)

	SELF_ID	SELF_EF	MOTIV	SELF_IN	KNOW	CONTROL
SELF_ID	1.0000					
SELF_EF	.6120*	1.0000				
	(0.0462)					
	13.2601					
MOTIV	.5364*	.5660*	1.0000			
	(0.0438)	(0.0426)				
	12.2393	13.2708				
SELF_IN	.1536*	.2844*	.3877*	1.0000		
	(0.0572)	(0.0576)	(0.0509)			
	2.6837	4.9334	7.6146			
KNOW	-.0057	.2777*	.3524*	.6854*	1.0000	
	(0.0611)	(0.0554)	(0.0530)	(0.0347)		
	-0.0936	5.0125	6.6547	19.7374		
CONTROL	.3452*	.3807*	.4662*	.4869*	.3625*	1.0000
	(0.0559)	(0.0562)	(0.0513)	(0.0415)	(0.0478)	
	6.1757	6.7738	9.0872	11.7445	7.5758	
FEFF	.1919*	.2589*	.3624*	.3714*	.3386*	.2906*
	(0.0680)	(0.0633)	(0.0551)	(0.0534)	(0.0587)	(0.0579)
	2.8223	4.0871	6.5725	6.9592	5.7656	5.0170
INTGS	.4497*	.3661*	.4473*	.3714*	.2833*	.5832*
	(0.0531)	(0.0520)	(0.0510)	(0.0531)	(0.0549)	(0.0435)
	8.4630	7.0431	8.7637	6.9998	5.1570	13.4044
PO	.2727*	.5252*	.5372*	.6226*	.5154*	.6229*
	(0.0585)	(0.0483)	(0.0403)	(0.0405)	(0.0452)	(0.0397)
	4.6579	10.8707	13.3223	15.3558	11.3931	15.6849
INTERACT	.0380	.1032	-.0575	0	.1119*	-.0502
	(0.0642)	(0.0641)	(0.0656)		(0.0563)	(0.0583)
	0.5919	1.6089	-0.8761		1.9891	-0.8621

Table 5.116

Unstandardised phi inter-latent variable correlation matrix (continued)

	FEFF	INTGS	PO	INTERACT
FEFF	1.0000			
INTGS	.2013*	1.0000		
	(0.0636)			
	3.1661			
PO	.4055*	.5785*	1.0000	

	(0.0529)	(0.0491)		
	7.6647	11.7821		
INTERACT	-.0297*	-.1569*	-.0097	1.0000
	(0.0684)	(0.0627)	(0.0606)	
	-0.4344	-2.5022	-0.1596	

Note: * p < .05. TASKID represents the *task identity* latent variable, TASK_S represents the *task significance* latent variable, TASK_V represents the *task variety* latent variable, AUTON represents the *autonomy* latent variable, PAJ_SI represents the *perceived ability of the job to satisfy the self-identity need* latent variable, PAJ_SE represents the *perceived ability of the job to satisfy the self-efficacy need* latent variable, SELF_ID represents the *self-identity need* latent variable, SELF_EF represents the *self-efficacy need* latent variable, MOTIV represents the *motivation to pursue the routes to psychological ownership* latent variable, SELF_IN represents the *self-investment* latent variable, KNOW represents the *gaining intimate knowledge* latent variable, CONTROL represents the *gaining control* latent variable, FEFF represents the *feeling of efficacy* latent variable, INTGS represents *the integrating the self* latent variable, PO represents the *psychological ownership* latent variable, INTERACT represents the latent *perceived ability x self-investment* interaction effect.

Table 5.117 shows that none of the confidence intervals calculated for the inter-latent variable correlations that exceeded .80 included unity. This commented variably on the discriminant validity of the measures used to operationalise the latent variables comprising the proposed psychological ownership structural model. One of the intervals did, however, include the .90.

Table 5.117

95% confidence interval for the ϕ_{ij} estimates that exceeded .80

Estimate	Standard error estimate	Lower limit of 95% confidence interval	Upper limit of 95% confidence interval	Phi
.8542	0.0242	.799	.895	6,4
.8839	0.0208	.836	.919	6,5
.8553	0.0256	.796	.898	12,4
.8282	0.0205	.784	.864	12,6

The magnitude of $\phi_{12,4}$ gave rise to the most concern since a direct effect of *autonomy* on *gaining control* was hypothesised, although not to a degree that a finding of a statistically significant ($p < .05$) γ_{35} would be seriously attributed to the fact that the same latent variable was measured twice. The discriminant validity of the indicator variables could have been further evaluated by calculating the average variance extracted (AVE) for each latent variable and comparing AVE_j and AVE_k with ϕ^2_{jk}. Discriminant validity would be regarded as a problem if AVEj and/or AVEk was greater than .50 and were less than ϕ^2_{jk} (Diamantopoulos & Siguaw, 2000; Farrell, 2010). The danger of problems with the discriminant validity of the indicator measures was not considered serious enough to necessitate these calculations.

5.11. FITTING THE REDUCED COMPREHENSIVE LISREL MODEL

The overarching substantive research hypothesis, that emerged through theorising in response to the second-generation research-initiating question, was presented as a structural model. the

initial overarching substantive research hypothesis unfortunately had to be reduced because the unreliability of the locus of control measure and the study's inability to achieve its sample size target. The reduced overarching substantive research hypothesis was tested by testing the fit of the reduced structural model. The evaluation of the reduced structural model fit was aimed at evaluating the validity and credibility of the model parameter estimates so as to sanction the testing the various hypothesised relationships in the model. This includes relationships between exogenous and endogenous latent variables, and amongst the endogenous latent variables. Therefore, the main purpose of this section is to determine whether the theoretical and hypothesised relationships specified in Chapter 2 were supported by the data. The fit of structural model as such could, however, not be empirically tested since the structural model comprised only of latent variables. The fit of the proposed *psychological ownership* structural model needed to be inferred from the fit of the comprehensive *psychological ownership* LISREL model and the fit of the measurement model. A visual representation of the fitted reduced comprehensive *psychological ownership* LISREL model is presented in Figure 5.24.

The evaluation of the comprehensive LISREL model fit was based on the full spectrum of goodness of fit indices provided by LISREL 8.8. In addition to the fit statistics, the magnitude and distribution of the standardised covariance residuals and the size of the modification indices calculated for the beta, gamma and psi matrixes were also examined to arrive at an integrative decision regarding the fit of the comprehensive LISREL model. If the comprehensive LISREL model obtained, at least, reasonable fit, given the reasonable fit of the measurement model, it warranted the interpretation of the structural model parameter estimates and squared multiple correlations for the endogenous latent variable.

5.11.1. EVALUATING THE REDUCED COMPREHENSIVE PSYCHOLOGICAL OWNERSHIP LISREL MODEL FIT

The reduced comprehensive LISREL model converged in 33 iterations with an admissible solution. The constraints imposed on the measurement model were maintained. The full spectrum of model fit indices reported by LISREL 8.8 are presented in Table 5.118

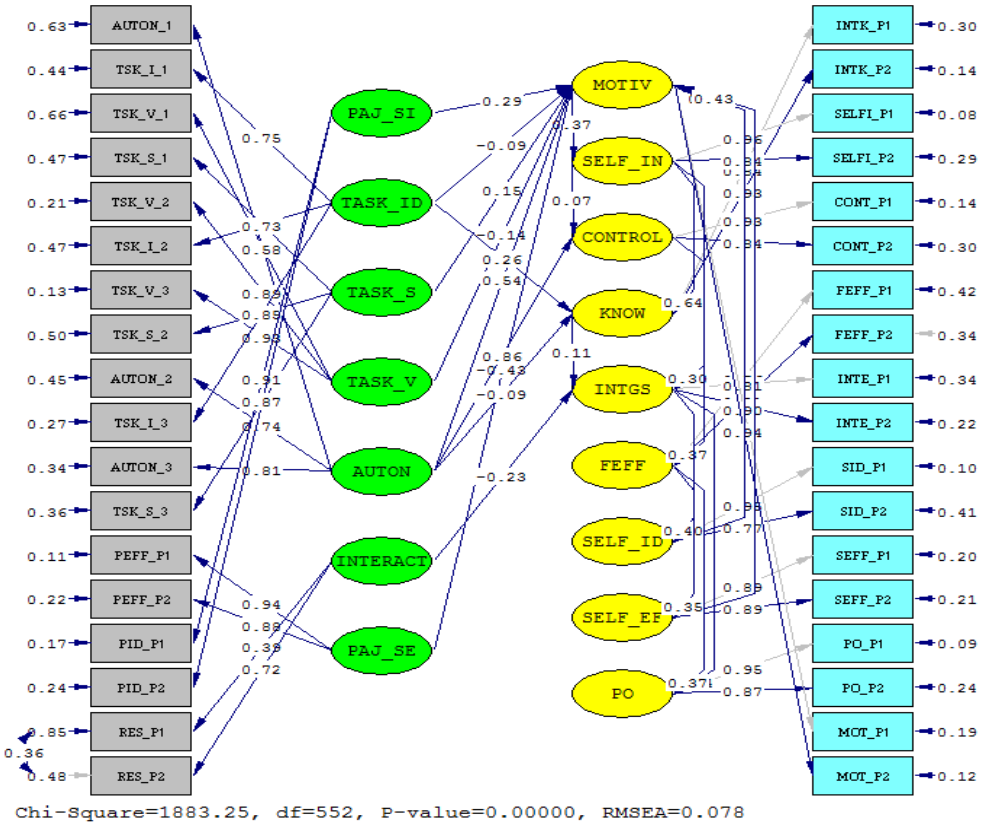

Figure 5.24. Representation of the reduced comprehensive *psychological ownership* LISREL model (completely standardised solution)

Table 5.118

Goodness of fit statistics for the reduced comprehensive *psychological ownership* LISREL *model*

Goodness of fit statistics
Degrees of Freedom = 552
Minimum Fit Function Chi-Square = 2337.7505 (P = 0.0)
Normal Theory Weighted Least Squares Chi-Square = 2128.3271 (P = 0.0)
Satorra-Bentler Scaled Chi-Square = 1883.2501 (P = 0.0)
Estimated Non-centrality Parameter (NCP) = 1331.2501
90 Percent Confidence Interval for NCP = (1203.1022; 1466.9542)
Minimum Fit Function Value = 5.9034
Population Discrepancy Function Value (F0) = 3.3617
90 Percent Confidence Interval for F0 = (3.0381; 3.7044)
Root Mean Square Error of Approximation (RMSEA) = 0.07804
90 Percent Confidence Interval for RMSEA = (0.07419; 0.08192)
P-Value for Test of Close Fit (RMSEA < 0.05) = 0.0000
Expected Cross-Validation Index (ECVI) = 5.3314
90 Percent Confidence Interval for ECVI = (5.0078; 5.6741)
ECVI for Saturated Model = 3.3636
ECVI for Independence Model = 85.8059
Chi-Square for Independence Model with 630 Degrees of Freedom = 33907.1423
Independence AIC = 33979.1423
Model AIC = 2111.2501
Saturated AIC = 1332.0000
Independence CAIC = 34158.5641
Model CAIC = 2679.4188

Table 5.118

Goodness of fit statistics for the psychological ownership structural model (continued)

Goodness of fit statistics
Saturated CAIC = 4651.3016
Normed Fit Index (NFI) = 0.9445
Non-Normed Fit Index (NNFI) = 0.9543
Parsimony Normed Fit Index (PNFI) = 0.8275
Comparative Fit Index (CFI) = 0.9600
Incremental Fit Index (IFI) = 0.9601
Relative Fit Index (RFI) = 0.9366
Critical N (CN) = 133.9421
Root Mean Square Residual (RMR) = 0.6234
Standardized RMR = 0.1815
Goodness of Fit Index (GFI) = 0.7697
Adjusted Goodness of Fit Index (AGFI) = 0.7221
Parsimony Goodness of Fit Index (PGFI) = 0.6379

Note: Fit statistics in bold are interpreted in text.

Table 5.118 indicates that the exact fit null hypothesis (H_{01a}: RMSEA = 0)[56], tested by the Satorra-Bentler chi square (χ^2) statistic, had to be rejected ($p < .05$). In other words, the comprehensive *psychological ownership* LISREL model did not provide a perfect account of the psychological dynamics underlying the construct *psychological ownership.* Regrettably, the comprehensive LISREL model also failed to display close fit in the parameter as the close fit null hypothesis (H_{01b}: RMSEA $\leq .05$) had to be rejected ($p < .05$). However, the other goodness of fit statistics returned mixed results. For instance, the goodness of fit index (GFI) was .77, which fell below the .90 cut-off value for favourable fit. Furthermore, the SRMR (0.182) indicated that on average, the residuals were much larger than the desired cut-off of .50.

On the other hand, the CFI was .96, which fell slightly above .95, suggesting acceptable fit. In addition, the CAIC (2679.419) also achieved a smaller value than the independence model (34158.564) and the saturated model (4651.402), which suggested reasonable overall model fit. Furthermore, the normed fit index (NFI=.944), the non-normed fit index (NNFI=.954), the incremental fit index (IFI=.960) and the relative fit index (RFI=.937) demonstrated to what extent the baseline model fits in comparison to a baseline model (usually the independence model). All of these values closely approach unity, which suggests a well-fitting model. Hu and Bentler (1999) proposed a number of 2-fit index combination rules to evaluate model fit, three of which were shown in Table 4.106. The fitted comprehensive *psychological ownership*

[56] The numbering of the exact fit and close fit null hypotheses for the comprehensive LISREL model were not affected by the reduction of the structural model.

LISREL model only partially met two of the three combination rules but failed to cleanly meet any of the three rules. This eroded confidence in the model.

It is important to note that the RMSEA estimate of .078 was still below the critical cut-off of .08, which suggest reasonable model fit (Loehlin & Beaujeam, 2017). The statistical power associated with testing the *psychological ownership* structural model was evaluated using Preacher and Coffman's (2006) software in R. The evaluation was conducted by specifying a RMSEA value of .05 under H_0 and an RMSEA of .08 under H_a, a significance level of .05, a sample size of 397, and degrees of freedom of 552. The results suggested that the probability of rejecting the close fit null hypothesis if the comprehensive model showed mediocre fit (RMSEA=.08) was quite high (1), almost a certainty. Moreover, even when one adjusts the effect size assumed under H_a to .06, the statistical power associated with the test of close fit remains quite high (.9886102). This implies that the test for close fit was a statistically sensitive test to the extent that even if the comprehensive LISREL model fitted quite reasonably in the parameter (RMSEA=.06), H_{01b} would with high probability have been rejected. Although this was not empirically substantiated, the probability that a null hypothesis H_{01c}: RMSEA ≤ .70 would have been rejected is most likely small. This realisation improved the confidence in the position of reasonable or acceptable model fit in the sample and the parameter.

5.11.2. REDUCED COMPREHENSIVE LISREL MODEL STANDARDISED RESIDUALS

Figure 5.25 presents the stem-and-leaf plot of standardised variance-covariance residuals. The standardised residuals were also examined as it also serves the purpose of commenting on the quality of the model fit.

```
- 5|8
 - 5|
 - 4|
 - |
 - 3|
 - 3|
 - 2|
 - 2|
 - 1|
 - 1|2
 - 0|865555
 - 0|444444333333333332222222222222222221111111111111111111111111111111111+29
  0|11111111111111111111111111111111111111111111111111111111112222222222+89
  0|55555555555555555555555555555555555555555555555555555555555555555555+20
  1|000
  1|
  2|
  2|
  3|
  3|6
```

Figure 5.25. Stem-and-leaf plot of the reduced comprehensive *psychological ownership* model standardised residuals

This examination involves the inspection of the distribution of the residuals via the stem-and-leaf plot, as well as taking the number of small and large standardised residuals into account.

From the stem-and-leaf plot in Figure 5.25, it appears that the standardised residuals are symmetrically distributed around zero. This is indicative of good model fit. The small number of residuals that can be observed on the extreme negative and extreme positive sides of the stem-and-leaf plot are too few to be indicative of definitive underestimation or overestimation of the model. Table 5.119 provides a summary of the largest negative and largest positive standardised residuals. From Figure 2.25 it is clear that the largest positive and negative residuals represent two outliers.

Table 5.119

Summary statistic for the standardised residuals

Summary Statistic	Value
Smallest Standardized Residual =	-58.3979
Median Standardized Residual =	2.4264
Largest Standardized Residual =	36.4382

The summary statistics for the standardised residuals of the structural model showed that there were 322 large statistically significant ($p < .01$) positive standardised residuals and 24 large statistically significant ($p < .01$) negative standardised residuals. In other words, 51.95% (346/666[57]) of the standardised residuals were large. This implies that the fitted LISREL model thus succeeded in accurately reproducing only 320 of the 666 unique variance and covariances in the observed sample covariance matrix. The rather high percentage of large standardised residuals placed the finding of reasonable fit under pressure.

5.11.3. REDUCED STRUCTURAL MODEL MODIFICATION INDICES

Modification indices provide information on the quality of the model fit. However, in addition to this, modification indices indicate possible ways that the *psychological ownership* structural model can be modified, therefore, serving as empirical suggestions for future research. These possible modifications will be explored in Chapter 5. The main focus in this section is on the fit of the comprehensive LISREL model. Modification indices for gamma, beta and psi were examined. Those modification indices that were larger than 6.6449 indicated paths or relationships that will statistically significantly ($p < .01$) improve the fit of the comprehensive LISREL model. The proportion of significantly large modification indices relative to the

[57] [36 x (36 + 1)] / 2 = 666

current fixed or constrained elements were therefore calculated as additional comments on the fit of the comprehensive LISREL model.

The modification indices for gamma revealed that 35 of the 51 (68%) suggested paths would statistically significantly ($p < .01$) improve the model fit if these paths were to be set free. The modification indices for beta revealed that 32 of the 58 parameters (55%), if set free, would statistically significantly ($p < .01$) improve the fit of the model. Lastly, the modification indices for psi revealed that 15 of the 31 (48%) suggested additional paths would statistically significantly ($p < .01$) improve the fit of the model, if set free.

The latter findings suggested that there was plenty of room for improvement in the structural model. This again commented negatively on the fit of the model. However, since there were no inadmissible values returned when the model was fitted, and reasonable or acceptable fit was obtained, the *psychological ownership* structural model was not modified based on these indices. As previously mentioned, the modification indices were evaluated to gain more perspective over the fit of the model. The researcher believes that the modification indices should be used to derive data-driven, theoretically plausible, hypothesis for future research, and should not be used to empirically iterate the originally hypothesised model to better fit on the data used to derive the suggested modifications. That this possibility holds a certain alure under the current circumstances is, however, confessed.

In order to make a decision on whether it was warranted to proceed with the interpretation of the structural model parameter estimates, the current study emphasised the fit statistics and the power analysis results more strongly than the analysis of the standardised residuals and the modification indices. Although the researcher acknowledges that the evidence gathered on model fit is not unanimous, he would argue that the foregoing evidence regarding comprehensive LISREL model fit, taken in conjunction with the reasonable fit of the measurement model, justified the interpretation of various model parameter estimates, including the gamma, beta, and psi matrices, as well as the squared multiple correlations of the endogenous latent variables.

5.11.4. REDUCED STRUCTURAL MODEL PARAMETER ESTIMATES AND SQUARED MULTIPLE CORRELATIONS

The removal of the latent locus of control x gaining control interaction effect and the latent polynomial phantom variables from the originally hypothesised structural model necessitated

the dropping of specific path-specific hypotheses[58] as well as the reformulation and renumbering of the path-specific statistical hypotheses. The reformulated path-specific statistical hypotheses for the revised *Klopper-Lee psychological ownership structural model* are presented below:

Hypotheses 2: In the proposed psychological ownership structural model it is hypothesised that the *salience of the self- identity motive* ($\eta_{7)}$ has a positive influence on the *motivation to pursue the routes to psychological ownership* (η_1).

$$H_{02}: \beta_{17} = 0$$

$$Ha_2: \beta_{17} > 0$$

Hypotheses 3: In the proposed psychological ownership structural model it is hypothesised that the *salience of the self-efficacy motive* (η_8) has a positive influence on the *motivation to pursue the routes to psychological ownership* (η_1).

$$H_{03}: \beta_{18} = 0$$

$$Ha_3: \beta_{18} > 0$$

Hypothesis 6: In the proposed psychological ownership structural model it is hypothesised that *perceived ability of the job characteristics to satisfy self-identity need* (ξ_1) positively influences *motivation to engage in the routes towards psychological ownership* (η_1).

$$H_{04}: \gamma_{11} = 0$$

$$Ha_4: \gamma_{11} > 0$$

Hypothesis 8: In the proposed psychological ownership structural model it is hypothesised that the *perceived ability of job to satisfy self- efficacy need* (ξ_7) positively influences *motivation to engage in the routes towards psychological ownership* (η_1).

$$H_{05}: \gamma_{17} = 0$$

$$Ha_5: \gamma_{17} > 0$$

[58] The original numbering of the substantive path-specific hypotheses were retained.

Hypotheses 16: In the proposed psychological ownership structural model it is hypothesised that the level of *task identity* (ξ_2) has a positive influence on the *motivation to pursue the routes to psychological ownership* (η_1).

$$H_{06}: \gamma_{12} = 0$$

$$Ha_6: \gamma_{12} > 0$$

Hypotheses 17: In the proposed psychological ownership structural model it is hypothesised that the level of *task significance* (ξ_3) has a positive influence on the *motivation to pursue the routes to psychological ownership* (η_1).

$$H_{07}: \gamma_{13} = 0$$

$$Ha_7: \gamma_{13} > 0$$

Hypotheses 18: In the proposed psychological ownership structural model it is hypothesised that the level of *task variety* (ξ_4) has a positive influence on the *motivation to pursue the routes to psychological ownership* (η_1).

$$H_{08}: \gamma_{14} = 0$$

$$Ha_8: \gamma_{14} > 0$$

Hypotheses 19: In the proposed psychological ownership structural model it is hypothesised that the level of *autonomy* (ξ_5) that a job offers has a positive influence on the *motivation to pursue the routes to psychological ownership* (η_1).

$$H_{09}: \gamma_{15} = 0$$

$$Ha_9: \gamma_{15} > 0$$

Hypotheses 20: In the proposed psychological ownership structural model it is hypothesised that the level of *motivation to pursue the routes to psychological ownership* (η_1) has a positive influence on *self-investment* (η_2).

$$H_{010}: \beta_{21} = 0$$

$$Ha_{10}: \beta_{21} > 0$$

Hypotheses 21: In the proposed psychological ownership structural model it is hypothesised that the level of *autonomy* (ξ_5) that a job offers has a positive influence on the level of *gaining con*trol (η_3).

$$H_{011}: \gamma_{35} = 0$$

$$Ha_{11}: \gamma_{35} > 0$$

Hypotheses 22: In the proposed psychological ownership structural model it is hypothesised that the level of *task identity* (ξ_2) that a job offers has a positive influence on *gaining intimate knowledge* (η_4).

$$H_{012}: \gamma_{42} = 0$$

$$H_{a12}: \gamma_{42} > 0$$

Hypotheses 23: In the proposed psychological ownership structural model it is hypothesised that the level of *autonomy* (ξ_5) that a job offers has a positive influence on *gaining intimate knowledge* (η_4).

$$H_{013}: \gamma_{45} = 0$$

$$H_{a13}: \gamma_{45} > 0$$

Hypotheses 24: In the proposed psychological ownership structural model it is hypothesised that the level of *self- investment* (η_2) has a positive influence on *gaining control* (η_3).

$$H_{014}: \beta_{32} = 0$$

$$H_{a14}: \beta_{32} > 0$$

Hypotheses 25: In the proposed psychological ownership structural model it is hypothesised that the level of *self-investment* (η_2) has a positive influence on *gaining intimate knowledge* (η_4).

$$H_{015}: \beta_{42} = 0$$

$$H_{a15}: \beta_{42} > 0$$

Hypotheses 26: In the proposed psychological ownership structural model it is hypothesised that the degree of *integration of the job into the self-identity* ($\eta 5$) has a positive influence on the *self-identity motive* (η_7).

$$H_{o16}: \beta_{75} = 0$$

$$H_{a16}: \beta_{75} > 0$$

Hypotheses 27: In the proposed psychological ownership structural model it is hypothesised that the level of *feelings of efficacy* (η_6) has a positive influence on the *efficacy motive* (η_8).

$$H_{o17}: \beta_{86} = 0$$

$$H_{a17}: \beta_{86} > 0$$

Hypotheses 28: In the proposed psychological ownership structural model it is hypothesised that the level of *gaining intimate knowledge* (η_4) has a positive influence on the level of *integration of the job into the self-identity* (η_5).

$$H_{0118}: \beta_{54} = 0$$

$$H_{a18}: \beta_{54} > 0$$

Hypotheses 29: In the proposed psychological ownership structural model it is hypothesised that the level of *self-investment* (η_2) has a positive influence on the *integration of the job into the self-identity* (η_5).

$$H_{019}: \beta_{52} = 0$$

$$H_{a19}: \beta_{52} > 0$$

Hypotheses 30: In the proposed psychological ownership structural model it is hypothesised that *gaining control* (η_3) has a positive influence on *feelings of efficacy* (η_6).

$$H_{020}: \beta_{63} = 0$$

$$H_{a20}: \beta_{63} > 0$$

Hypotheses 32: In the proposed psychological ownership structural model it is hypothesised that the *perceived ability x self-investment* (ξ_6) interaction effect will positively affect the extent to which the individual *integrates the target into the self* (η_5).

$$H_{021}: \gamma_{56} = 0$$

$$H_{212}: \gamma_{56} > 0$$

Hypotheses 33: In the proposed psychological ownership structural model it is hypothesised that the degree to which the individual *integrates the target into the self* (η_5) will positively influence experienced levels of *psychological ownership* (η_9).

$$H_{022}: \beta_{95} = 0$$

$$H_{a22}: \beta_{95} > 0$$

Hypotheses 34: In the proposed psychological ownership structural model it is hypothesised that the degree to which an individual experiences *feelings of efficacy* (η_6) will positively influence experienced levels of *psychological ownership* (η_9).

$$H_{023}: \beta_{96} = 0$$

$$H_{a23}: \beta_{96} > 0$$

In addition to the path-specific statistical hypotheses, nine structural error variance hypotheses were formulated:

$H_{0i}: \psi_{pk} = 0$; i = 24, 25, …, 32; p = 1, 2, …, 9; k = 1, 2, …, 9; p ≠k

$H_{0i}: \psi_{pk} > 0$; i = 24, 25, …, 32; p = 1, 2, …, 9; k = 1, 2, …, 9; p ≠k

In order to evaluate whether the data supported the hypothesised relationships, the focus was placed on four relevant aspects. According to Diamantopoulos and Siguaw (2000) the following four aspects are relevant when assessing the structural model:

Firstly, the sign of the estimated path coefficient should be assessed, which had to correspond with the manner in which the latent variables were hypothesised to be related (i.e., the sign had to correspond with the effect hypothesised under H_{ai}). Secondly, the statistical significance (p <. 05) of the unstandardised estimated path coefficients should be examined in order to determine whether the estimate could be generalised to the parameter i.e., H_{0i} had to be

rejected). Thirdly, assuming the statistical significance, the magnitude of the completely standardised estimates should be evaluated to determine the strength of the hypothesised relationship. Finally, the squared multiple correlations of the endogenous variables need to be examined to determine the proportion of variance accounted for by the latent variables that were hypothesised to influence them.

The unstandardised gamma and beta regression coefficient matrices were analysed in order to determine whether the hypothesised path-specific relationships were supported by the data. The unstandardised gamma matrix was used to investigate the statistical significance of the estimated path coefficients γ_{ij}, which expresses the strength of the hypothesised relationship between the exogenous (ξ_j) and endogenous (η_i) latent variables. The unstandardised beta matrix, on the other hand, was used to evaluate the statistical significance of the estimated path coefficients or β_{ij} parameter estimates which expresses the strength of the hypothesised relationships between the endogenous latent variables η_j and η_i. The unstandardised gamma matrix is presented in Table 5.120 and the unstandardised beta matrix is shown in Table 5.121.

Table 5.120

Unstandardised gamma matrix

	PAJ_SI	TASK_ID	TASK_S	TASK_V	AUTON	INTERACT	PAJ_SE
MOTIV	0.2928*	-0.0872	0.1504	-0.1447	0.5412*	- -	-0.4343*
	(0.1432)	0.0935)	(0.1551)	(0.1097)	(0.1780)		(0.2488)
	2.0448	-0.9323	0.9696	-1.3181	3.0411		-1.7455
SELF_IN	- -	- -	- -	- -	- -	- -	- -
CONTROL	- -	- -	- -	- -	0.8583*	- -	- -
					(0.0429)		
					19.9858		
KNOW	- -	0.2615*	- -	- -	-0.0866	- -	- -
		(0.0818)			(0.0798)		
		3.1959			-1.0859		
INTGS	- -	- -	- -	- -	- -	-0.2330*	- -
						(0.0653)	
						-3.5696	
FEFF	- -	- -	- -	- -	- -	- -	- -
SELF_ID	- -	- -	- -	- -	- -	- -	- -
SELF_EF	- -	- -	- -	- -	- -	- -	- -

* $p < .05$

TASKID represents the *task identity* latent variable, TASK_S represents the *task significance* latent variable, TASK_V represents the *task variety* latent variable, AUTON represents the *autonomy* latent variable, PAJ_SI represents the *perceived ability of the job to satisfy the self-identity need* latent variable, PAJ_SE represents the *perceived ability of the job to satisfy the self-efficacy need* latent variable, SELF_ID represents the *self-identity need* latent variable, SELF_EF represents the *self-efficacy need* latent variable, MOTIV represents the *motivation to pursue the routes to psychological ownership* latent variable, SELF_IN represents the *self-investment* latent variable, KNOW represents the *gaining intimate knowledge* latent variable, CONTROL represents the *gaining control* latent variable, FEFF represents the *feeling of efficacy* latent variable, INTGS represents *the integrating the self* latent variable, PO represents the *psychological ownership* latent variable, INTERACT represents the latent *perceived ability x self-investment* interaction effect.

From Table 5.120, it is evident that the following null hypotheses could be rejected ($p < .05$): H_{04}, H_{09}, H_{011}, and H_{012}. Support was therefore obtained for the following path-specific substantive research hypotheses:

- Hypothesis 6: In the proposed psychological ownership structural model it is hypothesised that *perceived ability of the job characteristics to satisfy self-identity need* positively influences *motivation to pursue the routes towards psychological ownership*.
- Hypotheses 19: In the proposed psychological ownership structural model it is hypothesised that the level of *autonomy* that a job offers has a positive influence on the *motivation to pursue the routes to psychological ownership.*
- Hypotheses 21: In the proposed psychological ownership structural model it is hypothesised that the level of *autonomy* that a job offers has a positive influence on the level of *gaining control*.
- Hypotheses 22: In the proposed psychological ownership structural model it is hypothesised that the level of *task identity* that a job offers has a positive influence on *gaining intimate knowledge*.

However, four null hypotheses could not be rejected (H_{06}, H_{07}, H_{08}, and H_{013}) because the path coefficient estimates were statistically insignificant ($p > .05$). Support was therefore not obtained for the following path-specific substantive research hypotheses:

- Hypotheses 16: In the proposed psychological ownership structural model it is hypothesised that the level of *task identity* has a positive influence on the *motivation to pursue routes to psychological ownership*.
- Hypotheses 17: In the proposed psychological ownership structural model it is hypothesised that the level of *task significance* has a positive influence on the *motivation to pursue routes to psychological ownership*.
- Hypotheses 18: In the proposed psychological ownership structural model it is hypothesised that the level of *task variety* has a positive influence on the *motivation to pursue routes to psychological ownership.*
- Hypotheses 23: In the proposed psychological ownership structural model it is hypothesised that the level of *autonomy* that a job offers has a positive influence on *gaining intimate knowledge.*

For two of the hypothesised relationships between exogenous and endogenous latent variables the estimated path coefficients displayed inconsistent signs compared to the manner in which they were hypothesised to relate. The relationships between *perceived ability*self-investment*

and *integration into the self*, and between *perceived ability of job to satisfy self-efficacy need* and *motivation to engage in self investment* had inconsistent signs compared to the direction of the hypothesised causal relationship. H_{05} and H_{021} were therefore also not rejected despite the fact that the conditional probability associated with the two estimates was smaller than .05. Support was therefore also not obtained for the following path-specific substantive research hypotheses, despite the path coefficients being statistically significant ($p < .05$):

- Hypothesis 8: In the proposed psychological ownership structural model it is hypothesised that the *perceived ability of the job characteristics to satisfy the self-efficacy need* positively influences *motivation to engage in the routes towards psychological ownership*.
- Hypotheses 32: In the proposed psychological ownership structural model it is hypothesised that the *perceived ability* will moderate the effect that *self-investment* has on the extent to which the individual *integrates the job into the self*.

Table 5.121

Unstandardised beta matrix

	MOTIV	SELF_IN	CONTROL	KNOW	INTGS	FEFF
MOTIV	- -	- -	- -	- -	- -	- -
SELF_IN	0.3657* (0.0578) 6.3288	- -	- -	- -	- -	- -
CONTROL	- -	0.0710* (0.0348) 2.0440	- -	- -	- -	- -
KNOW	- -	0.6412* (0.0526) 12.1889	- -	- -	- -	- -
INTGS	- -	0.3029* (0.0803) 3.7723	- -	0.1139 (0.0808) 1.4099	- -	- -
FEFF	- -	- -	0.3712* (0.0626) 5.9293	- -	- -	- -
SELF_ID	- -	- -	- -	- -	0.3968* (0.0572) 6.9347	- -
SELF_EF	- -	- -	- -	- -	- -	0.3468* (0.0704) 4.9279
PO	- -	- -	- -	- -	0.5354* (0.0585) 9.1495	0.3736* (0.0576) 6.4861

Table 5.121

Unstandardised beta matrix (continued)

	SELF_ID	SELF_EF	PO
MOTIV	0.1549*	0.4275*	- -
	(0.0526)	(0.0580)	
	2.9427	7.3666	
SELF_IN	- -	- -	- -
CONTROL	- -	- -	- -
KNOW	- -	- -	- -
INTGS	- -	- -	- -
FEFF	- -	- -	- -
SELF_ID	- -	- -	- -
SELF_EF	- -	- -	- -
PO	- -	- -	- -

* $p < .05$

TASKID represents the *task identity* latent variable, TASK_S represents the *task significance* latent variable, TASK_V represents the *task variety* latent variable, AUTON represents the *autonomy* latent variable, PAJ_SI represents the *perceived ability of the job to satisfy the self-identity need* latent variable, PAJ_SE represents the *perceived ability of the job to satisfy the self-efficacy need* latent variable, SELF_ID represents the *self-identity need* latent variable, SELF_EF represents the *self-efficacy need* latent variable, MOTIV represents the *motivation to pursue the routes to psychological ownership* latent variable, SELF_IN represents the *self-investment* latent variable, KNOW represents the *gaining intimate knowledge* latent variable, CONTROL represents the *gaining control* latent variable, FEFF represents the *feeling of efficacy* latent variable, INTGS represents *the integrating the self* latent variable, PO represents the *psychological ownership* latent variable, INTERACT represents the latent *perceived ability x self-investment* interaction effect.

The unstandardised beta matrix shown in Table 5.121 expresses the strength of the influence of the endogenous latent variable (η_j) that were hypothesised to affect another endogenous latent variable (η_i). The statistical significance of the estimated path coefficients was evaluated on a 5% significance level via one-tailed significance tests due to the directional nature of the alternative hypotheses (Diamantopoulos & Siguaw, 2000). Table 5.121 indicates that all β_{ij} estimates were statistically significant ($p < .05$), except for β_{54}. Therefore, the following null hypotheses could be rejected: H_{02}, H_{03}, H_{010}, H_{014}, H_{015}, H_{016}, H_{017}, H_{019}, and H_{020}, H_{022}, H_{023}. Support was therefore obtained for the following path-specific substantive research hypotheses:

- Hypotheses 2: In the proposed psychological ownership structural model it is hypothesised that the *salience of the self- identity motive* has a positive influence on the *motivation to pursue routes to psychological ownership*.
- Hypotheses 3: In the proposed psychological ownership structural model it is hypothesised that the *salience of the self-efficacy motive* has a positive influence on the *motivation to pursue routes to psychological ownership*.
- Hypotheses 20: In the proposed psychological ownership structural model it is hypothesised that the level of *motivation to pursue routes to psychological ownership* has a positive influence on *self-investment*.

- Hypotheses 24: In the proposed psychological ownership structural model it is hypothesised that the level of *self- investment* has a positive influence on *gaining control*.
- Hypotheses 25: In the proposed psychological ownership structural model it is hypothesised that the level of *self-investment* has a positive influence on *gaining intimate knowledge*.
- Hypotheses 26: In the proposed psychological ownership structural model it is hypothesised that the degree of integration of the job into the self-identity has a positive influence on the self-identity motive.
- Hypotheses 27: In the proposed psychological ownership structural model it is hypothesised that the level of feelings of efficacy has a positive influence on the efficacy motive.
- Hypotheses 29: In the proposed psychological ownership structural model it is hypothesised that the level of *self-investment* has a positive influence on the *integration of the job*.
- Hypotheses 30: In the proposed psychological ownership structural model it is hypothesised that the level of *gaining control* has a positive influence on *feelings of efficacy*.
- Hypotheses 33: In the proposed psychological ownership structural model it is hypothesised that the degree to which the individual *integrates the target into the self* will positively influence experienced levels of *psychological ownership*.
- Hypotheses 34: In the proposed psychological ownership structural model it is hypothesised that the degree to which an individual experiences *feelings of efficacy* will positively influence experienced levels of *psychological ownership*.

Hypothesis H_{018} was the only null hypotheses that could not be rejected. This implies that there is insufficient evidence to conclude that a generalisable (causal) relationship exists between the *intimate knowledge* that one gains in a job and the extent to which that job is *integrated into the self-identity* (Hypotheses 28).

The unstandardised psi residual error variance matrix is shown in Table 5.122.

Table 4.122

Unstandardised psi residual error variance matrix

MOTIV	SELF_IN	CONTROL	KNOW	INTGS	FEFF
0.5720*	0.8493*	0.2398*	0.5308*	0.7758*	0.8597*
(0.0653)	(0.0787)	(0.0376)	(0.0727)	(0.0931)	(0.1167)
8.7589	10.7981	6.3795	7.3044	8.3296	7.3674
SELF_ID	SELF_EF*	PO			
0.8284*	0.8772	0.5463*			
(0.1223)	(0.1039)	(0.0618)			
6.7722	8.4419	8.8368			

* $p < .05$

TASKID represents the *task identity* latent variable, SELF_ID represents the *self-identity need* latent variable, SELF_EF represents the *self-efficacy need* latent variable, MOTIV represents the *motivation to pursue the routes to psychological ownership* latent variable, SELF_IN represents the *self-investment* latent variable, KNOW represents the *gaining intimate knowledge* latent variable, CONTROL represents the *gaining control* latent variable, FEFF represents the *feeling of efficacy* latent variable, INTGS represents *the integrating the self* latent variable, PO represents the *psychological ownership* latent variable,

The psi matrix illustrates the variances in the structural error terms. Table 5.122 indicates that all of the ψ_{jj} estimates were statistically significant ($p < .05$). H_{0i}: $\psi_{pk} = 0$; $i = 24, 25, \ldots, 32$; $p = 1, 2, \ldots, 9$; $k = 1, 2, \ldots, 9$; $p \neq k$ could therefore be rejected for all i in favour of H_{0i}: $\psi_{pk} > 0$; $i = 24, 25, \ldots, 32$; $p = 1, 2, \ldots, 9$; $k = 1, 2, \ldots, 9$; $p \neq k$. This implies that a statistically significant proportion of variance in each of the endogenous latent variables contained in the model was not explained by the model. This finding was to be expected. Although the objective of the study was to expand Lee's (2017) description of the psychological mechanism that regulates the level of *psychological ownership* experienced by employees it acknowledges that the current model still only offered a partial description of the psychological mechanism actually at work[59].

In addition to the direction and the statistical significance of the unstandardised path coefficient parameter estimates, further insight can be gained from the completely standardised parameter estimates in order to determine the magnitude of the regression slopes of the statistically significant ($p < .05$) relationships in the structural model. The completely standardised path coefficient parameter estimates computed for the structural model reflect the average change in a certain endogenous latent variable (η_i), expressed in standard deviation units, associated with one standard deviation change in an endogenous (η_j) or exogenous (ξ_j) latent variable (given that the effect of all other latent variables linked to η_i in the model, are held constant).

[59] The study in addition would want to argue that although (cumulative) research should be conducted as if omniscience was an attainable ideal, zero structural error variance in the parameter is in reality (most likely) an unattainable ideal for fallible human researchers.

The completely standardised gamma, beta and psi matrices are depicted in Table 5.123, Table 5.124 and Table 5.125.

Table 5.123

Completely standardised gamma matrix

	PAJ_SI	TASK_ID	TASK_S	TASK_V	AUTON	INTERACT	PAJ_SE
MOTIV	.2928	-.0872	.1504	-.1447	**.5412**	- -	-.4343
SELF_IN	- -	- -	- -	- -	- -	- -	- -
CONTROL	- -	- -	- -	- -	**.8583**	- -	- -
KNOW	- -	.2615	- -	- -	-.0866	- -	- -
INTGS	- -	- -	- -	- -	- -	-.2330	- -
FEFF	- -	- -	- -	- -	- -	- -	- -
SELF_ID	- -	- -	- -	- -	- -	- -	- -
SELF_EF	- -	- -	- -	- -	- -	- -	- -
PO	- -	- -	- -	- -	- -	- -	- -

Values in bold indicate completely standardised regression slopes of noteworthy magnitude.
TASKID represents the *task identity* latent variable, TASK_S represents the *task significance* latent variable, TASK_V represents the *task variety* latent variable, AUTON represents the *autonomy* latent variable, PAJ_SI represents the *perceived ability of the job to satisfy the self-identity need* latent variable, PAJ_SE represents the *perceived ability of the job to satisfy the self-efficacy need* latent variable, SELF_ID represents the *self-identity need* latent variable, SELF_EF represents the *self-efficacy need* latent variable, MOTIV represents the *motivation to pursue the routes to psychological ownership* latent variable, SELF_IN represents the *self-investment* latent variable, KNOW represents the *gaining intimate knowledge* latent variable, CONTROL represents the *gaining control* latent variable, FEFF represents the *feeling of efficacy* latent variable, INTGS represents *the integrating the self* latent variable, PO represents the *psychological ownership* latent variable, INTERACT represents the latent *perceived ability x self-investment* interaction effect.

Table 5.124

Completely standardised beta matrix

	MOTIV	SELF_IN	CONTROL	KNOW	INTGS	FEFF	SELF_ID	SELF_EF	PO
MOTIV	- -	- -	- -	- -	- -	- -	.1549	.4275	- -
SELF_IN	.3657	- -	- -	- -	- -	- -			- -
CONTROL	- -	.0710	- -	- -	- -	- -			- -
KNOW	- -	**.6412**	- -	- -	- -	- -			- -
INTGS	- -	.3029	- -	.1139	- -	- -			- -
FEFF	- -	- -	.3712	- -	- -	- -			- -
SELF_ID	- -	- -	- -	- -	.3968	- -			- -
SELF_EF	- -	- -	- -	- -	- -	.3468			- -
PO	- -	- -	- -	- -	**.5354**	.3736			- -

Values in bold indicate completely standardised regression slopes of noteworthy magnitude.
TASKID represents the *task identity* latent variable, SELF_ID represents the *self-identity need* latent variable, SELF_EF represents the *self-efficacy need* latent variable, MOTIV represents the *motivation to pursue the routes to psychological ownership* latent variable, SELF_IN represents the *self-investment* latent variable, KNOW represents the *gaining intimate knowledge* latent variable, CONTROL represents the *gaining control* latent variable, FEFF represents the *feeling of efficacy* latent variable, INTGS represents *the integrating the self* latent variable, PO represents the *psychological ownership* latent variable,

Table 5.123 and Table 5.124 indicate that the statistically significant effects generally were rather modest. The most noticeably strong effects were found for the effect of *autonomy* on *gaining control* (.858), the effect of *self-investment* on *gaining intimate knowledge* (.641), the effect of *autonomy* on *motivation to pursue the routes to psychological ownership* (.541) and the effect of *integration of the job into the self* on *psychological ownership* (.535). The influence of the *self-identity need* on *the motivation to pursue the routes to psychological*

ownership (.1549) and the influence of *self-investment* on *gaining control* (.071), on the other hand, were insignificant. Nevertheless, overall, most of the statistically significant ($p < .05$) path coefficients were of a satisfactory, albeit modest, magnitude. In a complex, richly interconnected psychological mechanism one would expect the influence of any individual component, when controlling for all other components involved, to be rather modest.

Table 5.125

Completely standardised psi matrix

MOTIV	SELF_IN	CONTROL	KNOW	INTGS	FEFF
.5720	**.8493**	.2398	.5308	.7758	**.8597**
SELF_ID	SELF_EF	PO			
.8284	**.8772**	.5463			

Values in bold indicate completely standardised residual error variance of noteworthy magnitude.
TASKID represents the *task identity* latent variable, SELF_ID represents the *self-identity need* latent variable, SELF_EF represents the *self-efficacy need* latent variable, MOTIV represents the *motivation to pursue the routes to psychological ownership* latent variable, SELF_IN represents the *self-investment* latent variable, KNOW represents the *gaining intimate knowledge* latent variable, CONTROL represents the *gaining control* latent variable, FEFF represents the *feeling of efficacy* latent variable, INTGS represents *the integrating the self* latent variable, PO represents the *psychological ownership* latent variable,

Table 5.125 displays the magnitude of the completely standardised variance (ψ_{jj}) in the structural error terms (ζ_j). Put differently, the completely standardised psi matrix indicates the proportion of the variance in each of the endogenous latent variables in the model that is not explained by the model. It was expected that the psi variances would be statistically significant ($p < .05$) and of reasonable magnitude since it was appreciated that the fitted structural model does not provide a comprehensive description of the psychological mechanism that regulates the level of psychological ownership experienced by employees. However, the magnitude of some of the structural error variances was nonetheless somewhat disappointing. Table 5.125 shows that the model provided a somewhat disappointing explanation for the variance in *self investment* (15%), *feelings of efficacy* (14%), *self-identity need* (18%) and *self-efficacy need* (13%). However, the model explained a rather gratifying proportion of variance (45%) for the focal endogenous latent variable (*psychological ownership).*

Table 5.162 shows the R^2 for the structural equations that reflect the proportion of variance in each endogenous latent variable that can be explained by the weighted linear composite of effects linked to it in the model (Diamantopoulos & Siguaw, 2000). A small R^2 value would, therefore, indicate areas in the model that need elaboration.

Table 5.126

Squared multiple correlations for the endogenous latent variables

MOTIV	SELF_IN	CONTROL	KNOW	INTGS	FEFF
.4280	.1507	**.7602**	**.4692**	.2242	.1403
SELF_ID	SELF_EF	PO			
.1716	.1228	**.4537**			

Values in bold indicate proportions of explained variance of noteworthy magnitude.
TASKID represents the *task identity* latent variable, SELF_ID represents the *self-identity need* latent variable, SELF_EF represents the *self-efficacy need* latent variable, MOTIV represents the *motivation to pursue the routes to psychological ownership* latent variable, SELF_IN represents the *self-investment* latent variable, KNOW represents the *gaining intimate knowledge* latent variable, CONTROL represents the *gaining control* latent variable, FEFF represents the *feeling of efficacy* latent variable, INTGS represents *the integrating the self* latent variable, PO represents the *psychological ownership* latent variable,

Table 5.162 echoes the inferences that were derived from Table 5.125. The *psychological ownership* structural model was able to explain 45% of variance in *psychological ownership.* The *psychological ownership* structural model also provides a satisfactory explanation (more than 30%) of the variance in *motivation to pursue the routes to psychological ownership* (43%), *gaining control* (76%), and *gaining intimate knowledge* (47%). On the other hand, the model provided a somewhat disappointing explanation of the variance in *self-investment* (15%), *integration into the self* (22%), *feelings of efficacy* (14%), *self-identity need* (17%) and *self-efficacy need* (12%). These low squared multiple correlation values are not overly concerning as one could not expect a second-generation explanatory structural model to provide a perfect explanation of the variance in a focal latent variable. However, the admittedly somewhat disappointing number of high structural (or residual) error variances indicate several areas in the model that require aggressive elaboration or extension. The need for further research is addressed in Chapter 6.

5.12. OBSERVED SCORE POLYNOMIAL REGRESSION ANALYSIS WITH RESPONSE SURFACE ANALYSIS

A unique contribution that this study brought to the understanding of the psychological mechanism regulating differences in the levels of the *psychological ownership* construct across different employees in different organisations resides in the new understanding that one gains when the individual root needs of *psychological ownership* as well as the individual job characteristics are treated as separate latent variables in the hypothesised psychological mechanism rather than treating the *root needs* and *job characteristics* as two composite multidimensional latent variables (as used in Lee (2017)) to see the affect that these unidimensional constructs have on *motivation to engage in self-investment* as well as the other routes to psychological ownership. The *psychological ownership* structural model that was empirically tested in the current study by fitting the reduced comprehensive LISREL model shown in Figure 5.20 tested the effect of four of the individual *job*

characteristic dimensions (*task identity*, *task significance*, *task variety* and *autonomy*) on the *motivation to pursue the routes to psychological ownership* as well as the individual effect of the salience of two of the three *psychological ownership root needs* (the self-identity need and the self -efficacy need) on the *motivation to pursue the routes to psychological ownership*. This model in addition made hypothesised that the *perceived ability of the job to satisfy the self-identity need* and the *perceived ability of the job to satisfy the self-efficiency need* would separately affect the *motivation to pursue the routes to psychological ownership*.

The original psychological ownership structural model also hypothesised that the *motivation to pursue the routes to psychological ownership* latent variable responds nonlinearly to the degree and nature of congruence and the degree and nature of incongruence between the *salience of the self-identity need* and the *perceived ability of the job to satisfy the self-identity need.* In addition, the original structural model also hypothesised that the *motivation to pursue the routes to psychological ownership* latent variable responds non-linearly to the degree of congruence and the degree of incongruence between the *salience of the self-efficacy need* and the *perceived ability of the job to satisfy the self-efficacy need.* To allow these two hypotheses to be examined as an integral part of the original structural model, the model also made provision for six phantom latent variables (the squared *salience of the self-identity need*, the squared *perceived ability of the job to satisfy the self-identity need*, the squared *salience of the self-efficacy need*, the squared *perceived ability of the job to satisfy the self-efficacy need*, the product of the *salience of the self-identity need* and the *perceived ability of the job to satisfy the self-identity need*, and the product of the *salience of the self-efficacy need* and the *perceived ability of the job to satisfy the self-efficacy need).* The structural linkage of these six phantom latent variables to the *motivation to pursue the routes to psychological ownership* latent variable , in addition to the *salience of the self-identity need*, the *perceived ability of the job to satisfy the self-identity need*, the *salience of the self-efficacy need* and the *perceived ability of the job to satisfy the self-efficacy need* main effects permitted the relationships between the congruence and incongruence between the *salience of the self-identity need* and the *perceived ability of the job to satisfy the self-identity need* to be nonlinear The original intention was to test the two congruence hypotheses by using the structural model parameter estimate output as input in the Cunningham Excel macro (Shanock et al., 2010) to allow the plotting of the two *motivation to pursue the routes to psychological ownership* response surfaces and to calculate and test the statistical significance of the four surface test values: a_1, a_2, a_3, and a_4 (Shanock et al., 2010).

Unfortunately, the smaller than desired sample that the current study managed to attain necessitated a reduction in the number of model parameters that had to be estimated. The most obvious candidates for deletion[60] were the phantom latent variables that were created to allow the *motivation to pursue the routes to psychological ownership* response surfaces to be nonlinear because of the manner in which the indicators of the latent phantom variables had to be calculated (Little et al., 2006). Since the deletion of these six phantom latent variables would preclude the use of latent variable polynomial regression analyses to study hypotheses on the nature of the *motivation to pursue the routes to psychological ownership* response surfaces observed variable polynomial regression analyses with response surface analyses were rather conducted as two separate, stand-alone analyses. The isolation of the effect of the degree of congruence and the degree of incongruence between the *salience of the self-identity need* and the *perceived ability of the job to satisfy the self-identity need* on the *motivation to pursue the routes to psychological ownership* and the effect of the degree of congruence and the degree of incongruence between the *salience of the self-efficacy need* and the *perceived ability of the job to satisfy the self-efficacy need* from the remainder of the proposed *psychological ownership* was not the ideal. The explanation for variance in *psychological ownership* across employees, jobs and organisations lies in the whole of the nomological network of latent variables directly and indirectly affecting *psychological ownership*. Dissecting the network invariably results in a loss of meaning. Nonetheless, observed variable polynomial regression analysis with response surface analysis was considered preferable over not utilising the available data at all.

Observed variable polynomial regression analysis with response surface analysis allows for theorising in terms of a multidimensional space and not a single bipolar congruence latent variable. In this multidimensional space congruence and incongruence can vary in degree and nature (the employee experiences a root need as salient and the job characteristics are such that they provide satisfaction of these needs [+ +] or the employee does not experience a root need as salient and the job characteristics are such that they cannot satisfy the need [- -] and either the employee experiences a root need as salient but the job characteristics cannot satisfy the need [+ -] or the employee does not experience a root need as salient but the job characteristics can satisfy the need [- +]).

[60] It is acknowledged that deletion of latent variables from the model was not the only available option to reduce the number of model parameters that had to be estimated. Imposing equality constraints on specific measurement model parameters or structural model parameters was another option. Fixing specific parameters to constants was another option. There was, however, not sufficient theoretical justification to warrant the latter two options.

This increase in meaningfulness within the model is attained by making provision for curvilinearity in the response surface depicting the reaction of *motivation to pursue the routes to psychological ownership* to the congruence and incongruence between the salience of an *employee's efficacy root need* and the *perceived ability of the job to satisfy an employee's efficacy root n*eed (first pair of independent variables) and the congruence/incongruence between the salience of an *employee's self-identity root need* and the *perceived ability of the job to satisfy an employee's self-identity root n*eed (second pair of independent variables).

The two narrow-focus structural models implied by the observed variable polynomial regression analyses are depicted in Figure 4.26 and Figure 4.27[61]. The first narrow-focus structural model depicts the manner in which the congruence and incongruence between the salience of an employee's *self-identity need* and an employee's *perception of the ability that the job has to satisfy self-identity* affects *motivation to engage in self-investment.* The second narrow-focus structural model depicts the manner in which the congruence and incongruence between the salience of an employee's *self-efficacy need* and an employee's *perception of the ability that the job has to satisfy self-efficacy* affects *motivation to engage in self-investment.*

[61] It is acknowledged that the current study's decision to approach the investigation of the hypotheses that the *motivation to pursue the routes to psychological ownership* responds curvilinearly to the degree and nature of the congruence and the degree and nature of the incongruence between the *salience of the root needs* and the *perceived ability of the job to satisfy these needs* in terms of two separate observed variable polynomial regression analyses rather than a single multivariate regression analysis comprising ten predictors, could be criticised. If the analysis had been approached in this manner it would have implied a single structural model. If the polynomial regression analysis had been approached as a single multivariate regression analysis comprising ten predictors, it would have allowed the study to examine the effect of congruence and incongruence between one *root need* and the *perceived ability of the job to satisfy that need* when statistically controlling for the other need and the perceived ability of the job to satisfy that need. The decision to perform two separate observed variable polynomial regression analyses was partly based on sample size considerations and partly based on expediency considerations. Although the insight brought by the two separate analyses is definitely not without value not (also) performing as a single multivariate regression analysis comprising ten predictors is acknowledged as a methodological limitation.

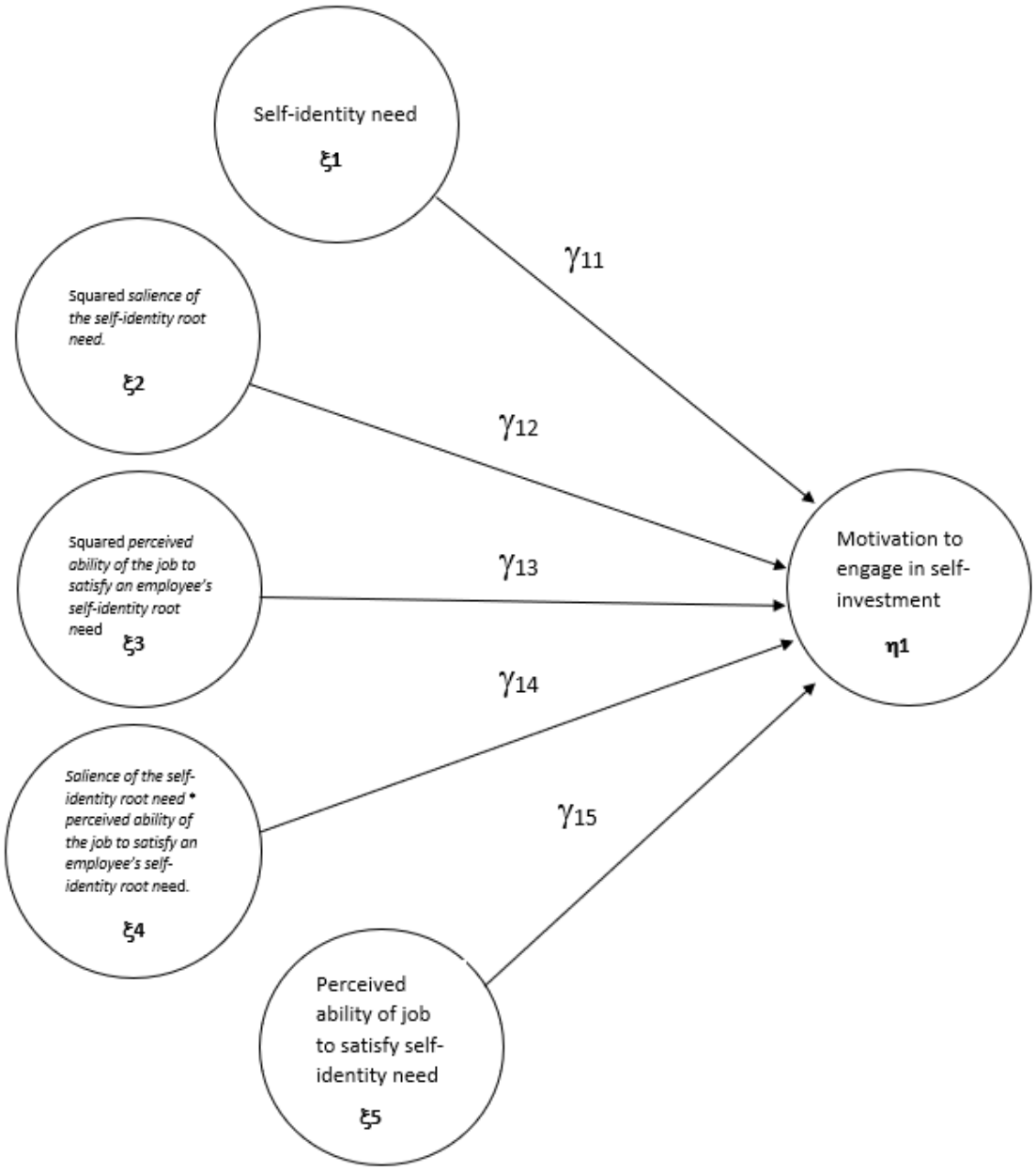

Figure 5.26. The narrow-focus self-identity congruence *motivation to engage in routes to psychological ownership* structural model

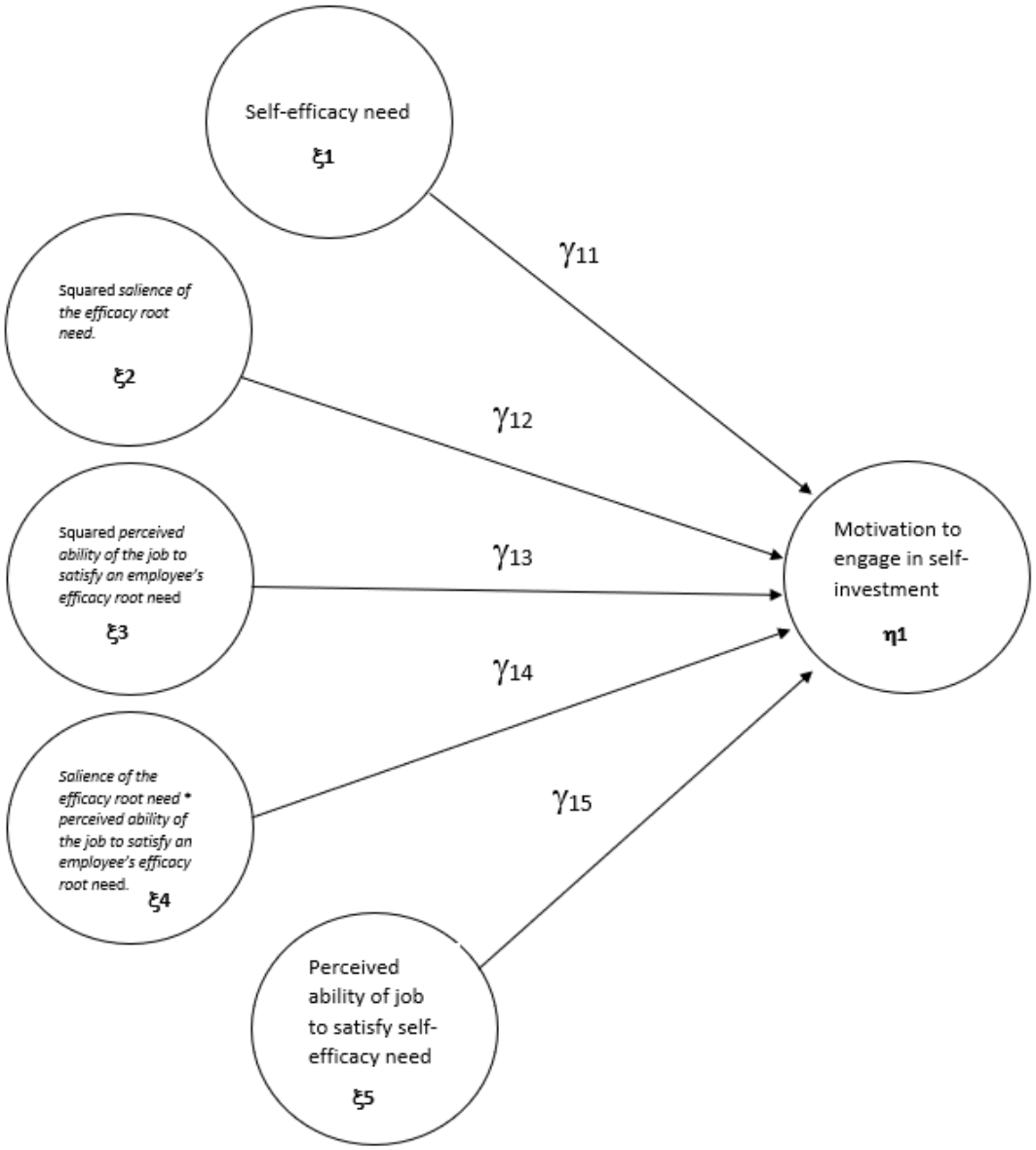

Figure 5.27. The narrow-focus self-efficacy congruence *motivation to engage in the routes to psychological ownership* structural model

5.12.1. INCIDENCE OF CONGRUENCE

Prior to conducting the observed variable polynomial regression analysis, the incidence of congruence and incongruence had to be investigated in order to determine whether there are sufficient incidences of congruence as well as both types of incongruence (+ - and - +) to warrant further analyses. Put differently, one must determine whether the response surface floor is sufficiently covered with observations to warrant a credible estimate of the response surface before one can proceed with the procedure of obtaining estimates of the response surface.

The incidence of congruence and incongruence were presented using bar charts and scatter plots. The two sets of predictor variables (*self-identity need* and *perceived ability of job to satisfy the self-identity need, self-efficacy need* and *perceived ability of job to satisfy the self-efficacy need*) were standardised. Next, the difference in the standardised predictor variables were calculated (by subtracting the standardised *perceived ability of job to satisfy the root need* from the standardised *salience of the root need*)[62] and these differences in the two sets of variables were recoded into two trichotomous discrepancy variables ($Z_{Discrep\text{-}effd}$ and $Z_{Discrep\_idd}$). Values that fell in the range of -5. to +5. were considered to represent congruence, values that were smaller than -5. were considered to represent incongruence, and values larger than +5. were considered to represent incongruence. The bar charts were created by plotting the percentage of observations that fell in each of the three $Z_{Discrep}$ categories for the two first-order root need variables. The scatter plots were obtained by plotting the values of the two sets of standardised predictor variables.

Ideally, the bar chart should reveal relatively equal representation of incidences of congruence and both types of incongruence and observations should be randomly scattered across the whole of the floor of the response surface rather than being restricted to only a specific area.

5.12.1.1. Incidence of self-identity need - perceived ability of the job to satisfy the self-identity need congruence and incongruence

The bar chart and scatter plot used to describe the incidence of congruence and incongruence between the *salience of the self-identity need* and the *perceived ability of the job to satisfy the self-identity need* are depicted in Figure 5.28 and Figure 5.29. The bar chart in Figure 5.28 painted a reasonably acceptable picture, as it revealed relatively equal representation of congruence and the two forms of incongruence. The bar chart of the trichotomized discrepancy scores, however, does not provide a sufficiently stringent evaluation of the extent to which the data will permit credible estimates of the response surface across the whole of the response space. The scatter plot provides a better assessment of the extent to which the floor of the response surface is adequately covered with observations to allow a credible estimate of the response surface across the whole of the response space.

[62] The precise nature of the calculation is important since it determines the manner in which negative and positive discrepancy scores are interpreted.

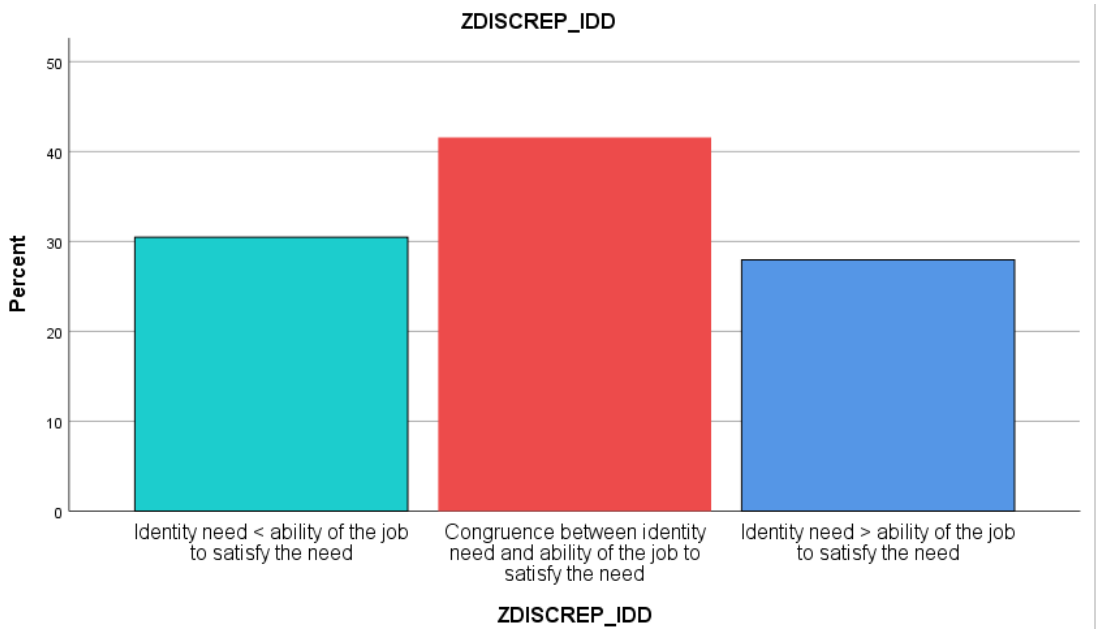

Figure 5.28. Bar chart: Congruence and incongruence between the *salience of the self-identity need* and the *perceived ability of the job to satisfy the self-identity need*

The scatter plot revealed that there appeared to be a lack of incongruence observation in the bottom right corner of the graph demarcated by the red shaded triangle in Figure 5.29.

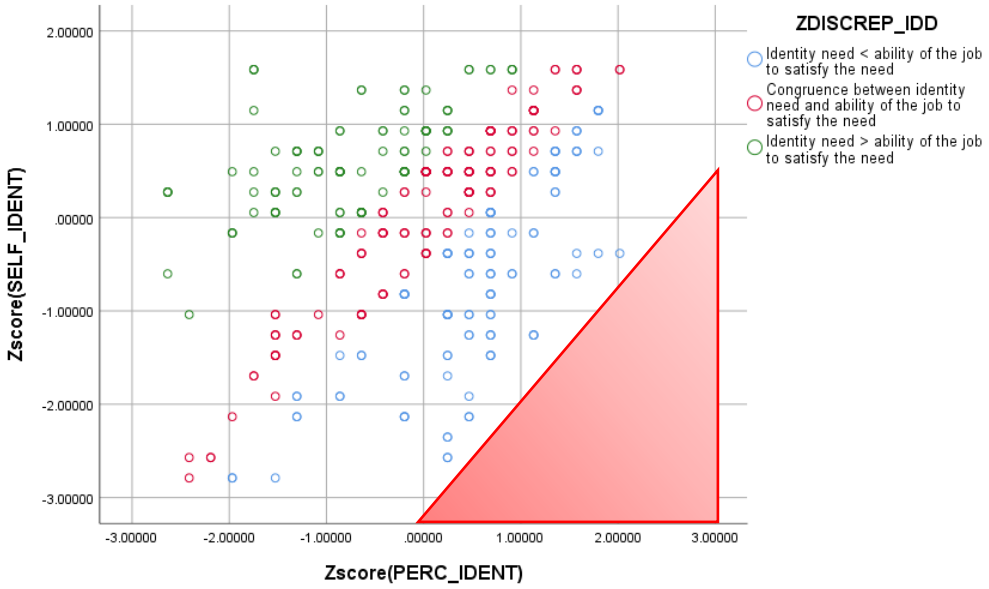

Figure 5.29. Scatter plot: Congruence and incongruence between the *salience of the self-identity need* and the *perceived ability of the job to satisfy the self-identity need*

In the demarcated area the response surface will reflect an extrapolation of the trends observed elsewhere in the space rather than on the *motivation to pursue the routes to psychological*

ownership scores of cases falling in this region of the response space. To conclude, there seemed to be sufficient incidences of the two types of congruence and sufficient incidences of the two types of incongruence to warrant the calculation of the response surface test values and the response surface plane. Moreover, the floor of the response space was reasonable adequately covered with observations to allow credible estimates of the response surface values. However, when interpreting the response surface, it should be kept in mind that in the area demarcated by the red triangle in Figure 5.29 the graph was drawn on extensive extrapolation of trends that were observed in the more populated area of the floor of the response space. This implies that the position of the response surface might be based on extrapolation rather than empirical data, which is admittedly a shortcoming.

5.12.1.2. Incidence of self-efficacy need – perceived ability of the job to satisfy the self-efficacy need congruence and incongruence

The bar chart and scatter plot used to describe the incidence of congruence and incongruence between the *salience of the self-efficacy need* and the *perceived ability of the job to satisfy the self-efficacy need* are depicted in Figure 5.30 and Figure 5.31. The bar chart in Figure 5.30 revealed relatively equal representation of congruence and the two forms of incongruence. Furthermore, the scatter plot revealed that there appears to be a lack of congruence and incongruence observations in the bottom left corner of the graph demarcated by the red shaded triangle in Figure 5.29 as well as incongruence observations in the upper left corner of the floor of the response space (demarcated by the smaller red shaded triangle). A comparison of the two scatter plots indicated that empirical investigation of the congruence and incongruence hypotheses would be riskier in the case of the self-efficacy root need that in the case of the self-identity root need. In sum, there seems to be enough incidences of congruence compared to the incidences of the two types of incongruence to warrant the calculation of the response surface test values and the response surface estimates. However, the extent to which the whole of the floor of the response space was adequately covered with observations to allow credible estimates of the response surface values gave reason for concern. More so than in the case of the previous response space. Nonetheless it was decided to proceed with the fitting of the polynomial regression model, the calculation of the surface test values and the drawing of the response surface. However, similar to the model above, when interpreting the response surface graph, it should be kept that the position of the response surface might be based on extrapolation rather than empirical data, which is admittedly a shortcoming for this study.

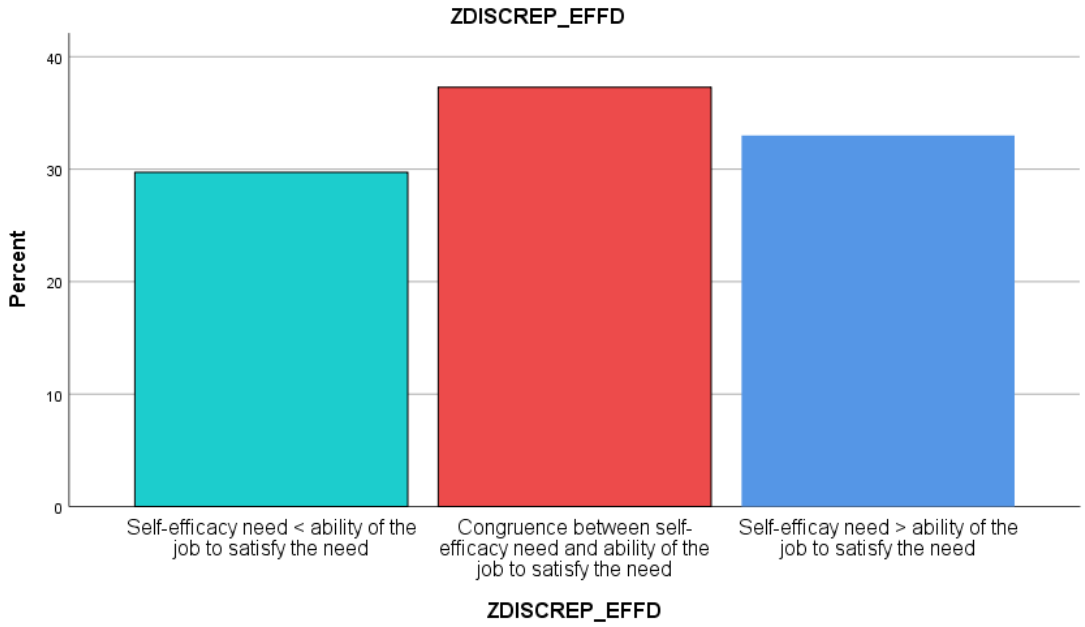

Figure 5.30. Bar chart: Congruence and incongruence between the *salience of the self-efficacy need* and the *perceived ability of the job to satisfy the self-efficacy need*

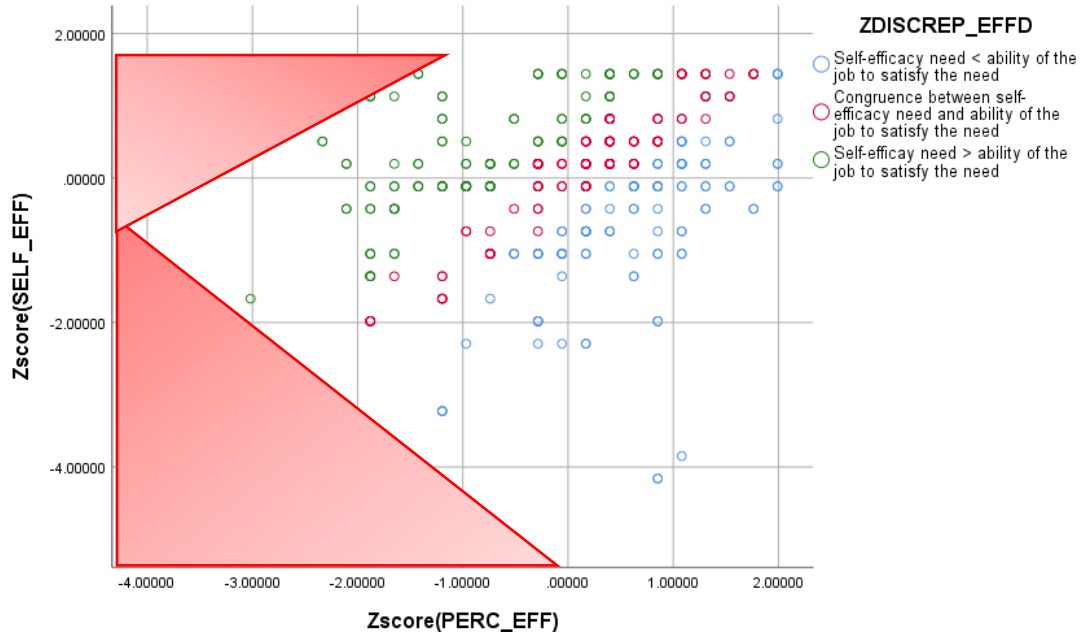

Figure 5.31. Scatter plot: Congruence and incongruence between the *salience of the self-efficacy need* and the *perceived ability of the job to satisfy the self-efficacy need*

5.12.2. INTERPRETING THE FIT OF THE TWO NARROW-FOCUS STRUCTURAL MODELS

Two separate observed variable polynomial regression models were fitted. The *motivation to pursue the routes to psychological ownership* latent variable, the *salience of the self-identity need* latent variable, the *salience of the self-efficacy need* latent variable, the *perceived ability of the job to satisfy the self-identity need* latent variable and the *perceived ability of the job to satisfy the self-efficacy need* latent variable were operationalised via the total scores of the scales used to measure these latent variables. The total score measures of the four main effects were subsequently mean centred by subtracting the mean from each observation total score. The indicators of the latent squared terms and latent product terms were calculated by squaring the men-centred sums and calculating the product terms from the mean-centred sums. The two fitted observed variable polynomial regression models are specified through equations 1 and 2[63].

$$E\,[Y_1|X_1;\ X_2,\ X_1^2;\ X_1{*}X_2;\ X_2^2] = \beta_1X_1 + \beta_2X_2 + \beta_3X_1^2 + \beta_4X_1{*}X_2 + \beta_5X_2^2 \qquad [1$$

$$E\,[Y_1|X_3;\ X_4,\ X_3^2;\ X_3{*}X_4;\ X_4^2] = \beta_1X_3 + \beta_2X_4 + b_3X_3^2 + \beta_4X_3{*}X_4 + \beta_5X_3^2 \qquad [2]$$

Where:

- Y_1 represents the mean-centred *motivation to pursue the routes to psychological ownership* total score;
- X_1 represents the mean-centred *salience of the self-identity need* total score (b1_CENTRED_SELF_IDENT)[64];
- X_2 represents the mean-centred *perceived ability of the job to satisfy the self-identity need* total score (b2_CENTRED_PERC_IDENT);
- X_3 represents the mean-centred *salience of the self-efficacy need* total score (b1_CENTRED_SELF_EFF);
- X_4 represents the mean-centred *perceived ability of the job to satisfy the self-efficacy need* total score (b2_CENTRED_PERC_EFF);
- X_1^2 represents squared mean-centred *salience of the self-identity need* total score (b3_CENTRED_SQ_SELF_IDENT);

[63] The two polynomial regression equations are defined in the parameter. The partial regression coefficients (b_i) will be estimated in the sample.
[64] The variable names in SPSS included an explicit reference to the partial regression coefficient so as to make it easier to read off the appropriate covariances in the SPSS output required for the Cunningham macro.

- X_3^2 represents the squared mean-centred *salience of the self-efficacy need* total score (b3_CENTRED_SQ_SELF_EFF);
- X_2^2 represents the squared mean-centred *perceived ability of the job to satisfy the self-identity need* total score (b5_CENTRED_SQ_PERC_IDENT);
- X_4^2 represents the squared mean-centred *perceived ability of the job to satisfy the self-efficacy need* total score (b5_CENTRED_SQ_PERC_EFF);
- X_1*X_2 represents the product of the mean-centred *salience of the self-identity need* total score and the mean-centred *perceived ability of the job to satisfy the self-identity need* total score (b4_CENTRED_PROD_SELF_IDENT_PERC_IDENT);
- X_3*X_4 represents the product of the mean-centred *salience of the self-efficacy need* total score and the mean-centred *perceived ability of the job to satisfy the self-efficacy need* total score (b4_CENTRED_PROD_SELF_EFF_PERC_EFF).

5.12.2.1. Reformulation of the statistical hypotheses

Hypotheses 4, 5, 7, 9, 10 and 11 posited that the latent polynomial variables (i.e. the squared and product terms) explained unique variance in the motivation to pursue the routes to psychological ownership. These hypotheses were not empirically tested due to the removal of the latent polynomial variables from the structural model. Hypothesis 2, 3 6 and 7 posited that the *salience of the self-identity need*, the *salience of the self-efficacy need*, *the perceived ability of the job to satisfy the self-identity need* and the *perceived ability of the job to satisfy the self-efficacy need* explained unique variance in the *motivation to pursue the routes to psychological ownership*. These latter four paths remained in the reduced structural model and these four hypotheses were empirically tested. Rather than testing these ten hypotheses as integral components of the original larger *psychological ownership* structural model as originally intended, they were tested by separately empirically testing the two narrow-focussed structural models via two observed score polynomial regression analyses. This necessitated the formulation of two new overarching substantive research hypotheses

The first over-arching substantive research hypothesis (**Hypothesis 35**) posited that the *self-identity congruence motivation to pursue the routes to psychological ownership* structural model shown in Figure 5.28 provides a valid explanation of the underlying psychological mechanism that determines the levels of *motivation to pursue the routes to psychological ownership.* Hypothesis 35 was tested by testing the following null hypothesis:

$$H_{0227}: P = 0$$ [65]

$$H_{0227:} P > 0$$

H_{0227} was tested by fitting the following observed score polynomial regression model in the sample:

$$E[Y| X_1, X_2, X_1^2, X_1*X_2, X_2^2] = a + b_1X_1 + b_2X_2+b_3X_1^2 + b_4X_1*X_2 + b_5X_2^2$$

Where:

- Y represents a composite indicator[66] of the *motivation to pursue the routes to psychological ownership;*
- X_1 represents a composite indicator[67] of the *salience of the self-identity need*; and
- X_2 represents a composite indicator[68] of the *perceived ability of the job to satisfy the self-identity need.*

The following hypotheses were tested by evaluating the statistical significance of the partial regression coefficient estimates b_i; i = 1, 2, …., 5 by testing the following statistical null hypotheses:

- **Hypotheses 2:** In the proposed narrow-focussed *motivation to pursue the routes to psychological ownership* structural model it is hypothesised that the *salience of the self-identity motive* has a positive influence on the motivation to pursue self-investment.

$$H_{0228}: \beta_1=0$$[69]

$$Ha_{228}: \beta_1>0$$

- **Hypotheses 5**: In the proposed narrow-focussed *motivation to pursue the routes to psychological ownership* structural model it is hypothesised that the *squared salience of the self-identity motive* has a positive influence on the motivation to pursue self-investment.

$$H_{0229}: \beta_3=0$$

[65] The numbering of the statistical hypotheses continues from where the measurement model phi hypotheses left off. The symbol used in H_{0227} is the Greek capital letter rho.
[66] The total score on the *motivation to pursue the routes to psychological ownership* scale was used as composite indicator.
[67] The composite indicator was the standardised, mean-centred total score obtained on the *self-identity* scale.
[68] The composite indicator was the standardised, mean-centred total score obtained on the *perceived ability of the job to satisfy the self-identity need* scale
[69] The symbol β in the polynomial regression statistical hypotheses refer to the parametric partial regression coefficients and not to path coefficients between endogenous latent variables in a structural model.

$$Ha_{229}: \beta_3>0$$

- **Hypothesis 6:** In the proposed narrow-focussed *motivation to pursue the routes to psychological ownership* structural model it is hypothesised that *perceived ability of the job characteristics to satisfy self-identity need* positively influences motivation to engage in the routes towards psychological ownership.

$$H_{0230}: \beta_2=0$$

$$Ha_{230}: \beta_2>0$$

- **Hypothesis 7**: In the proposed narrow-focussed *motivation to pursue the routes to psychological ownership* structural model it is hypothesised that *squared perceived ability of the job characteristics to satisfy the self-identity need* positively influences motivation to engage in the routes towards psychological ownership.

$$H_{0231}: \beta_5=0$$

$$Ha_{231}: \beta_5>0$$

- **Hypothesis 10**: In the proposed narrow-focussed *motivation to pursue the routes to psychological ownership* structural model it is hypothesised that the *self-identity need * perceived ability of the job characteristics to satisfy self-identity need* interaction effect positively influences motivation to engage in the routes towards psychological ownership.

$$H_{0232}: \beta_4=0$$

$$Ha_{232}: \beta_4>0$$

Hypotheses 2, 5, 6, 7 and 10, although important, were not the of prime interest[70]. Rather the manner in which employees' *motivation to engage in the routes to psychological ownership* changes curvilinearly as the congruence and incongruence between the *salience of the self-identity need* and the p*erceived ability of the job to satisfy the self-identity need* changes in magnitude and nature was of prime interest. The shape of the *motivation to engage in the routes to psychological ownership* response surface along the lines of congruence and incongruence was of prime interest.

[70] The partial regression coefficients are of importance in as far as they determine the values of the response surface test values a_1 to a_4 that describe the slope and curvature of the response surface along the lines of congruence and incongruence.

Hypothesis 12 posits that a) *motivation to engage in the routes to psychological ownership* changes positively as congruence moves from the perception that the job does not allow the satisfaction of the self-identity need combined with low salience of the self-identity need (- -) to the perception that the job does allow the satisfaction of the self-identity need combined with high salience of the self-identity need (+ +); b) *motivation to engage in the routes to psychological ownership* changes convexly (along the line of congruence) as congruence moves from the perception that the job does not allow the satisfaction of the self-identity need combined with low salience of the self-identity need to the perception that the job does allow the satisfaction of the self-identity need combined with high salience of the self-identity need. Hypothesis 12 was tested by testing the following response surface test vale statistical hypotheses:

$$H_{0233a}: a_1=0^{71}$$

$$H_{a233a}: a_1>0^{72}$$

$$H_{0233b}: a_2=0$$

$$H_{a233b}: a_2>0$$

Hypothesis 13: posits that a) *motivation to engage in the routes to psychological ownership* changes positively as incongruence changes from the perception that the job does allow the satisfaction of the self-identity need combined with low salience of the self-identity need (- +) to the perception that the job does not allow the satisfaction of the self-identity need combined with high salience of the self-identity need; b) *motivation to engage in the routes to psychological ownership* changes linearly as incongruence changes from the perception that the job does allow the satisfaction of the self-identity need combined with low salience of the self-identity need to the perception that the job does not allow the satisfaction of the self-identity need combined with high salience of the self-identity need. Hypothesis 13 was tested by testing the following response surface test vale statistical hypotheses:

$$H_{0234a}: a_3=0^{73}$$

$$H_{a234a}: a_3<0$$

[71] The response surface test value a_1 describes the slope of the response surface along the line of congruence as one moves from (- -) congruence to (+ +) congruence.
[72] The response surface test value a_2 describes the curvature of the response surface along the line of congruence as one moves from (- -) congruence to (+ +) congruence. A positive value describes a convex surface and a negative vale a concave surface.
[73] The response surface test value a_3 describes the slope of the response surface along the line of incongruence as one moves from (- +) congruence to (+ -) congruence.

$$H_{0234b}: a_4=0^{74}$$

$$H_{a234b}: a_4\neq 0$$

The second over-arching substantive research hypothesis (**Hypothesis 36**) posited that the *self-efficacy congruence motivation to pursue the routes to psychological ownership* structural model shown in Figure 5.28 provides a valid explanation of the underlying psychological mechanisms that determines the levels of *motivation to pursue the routes to psychological ownership.* Hypothesis 36 was tested by testing the following null hypothesis:

$$H_{0235}: P = 0$$

$$H_{0235}: P > 0$$

H_{0357} was tested by fitting the following observed score polynomial regression model in the sample:

$$E[Y| X_3, X_4, X_3^2, X_3*X_4, X_4^2] = a + b_1X_3 + b_2X_4+b_3X_3^2 + b_4X_3*X_4 + b_5X_4^2$$

Where:

- Y represents a composite indicator[75] of the *motivation to pursue the routes to psychological ownership;*
- X_3 represents a composite indicator[76] of the *salience of the self-efficacy need*; and
- X_2 represents a composite indicator[77] of the *perceived ability of the job to satisfy the self-efficacy need.*

The following hypotheses were tested by evaluating the statistical significance of the partial regression coefficient estimates b_i; i = 1, 2, …., 5 by testing the following statistical null hypotheses:

Hypotheses 3: In the proposed narrow-focussed *motivation to pursue the routes to psychological ownership* structural model it is hypothesised that the salience of the self-efficacy motive has a positive influence on the motivation to pursue self-investment.

$$H_{0236}: \beta_1 =0$$

$$Ha_{236}: \beta_1 >0$$

[74] The response surface test value a_4 describes the curvature of the response surface along the line ofin congruence as one moves from (- +) congruence to (+ -) congruence. A positive value describes a convex surface and a negative vale a concave surface.
[75] The total score on the *motivation to pursue the routes to psychological ownership* scale was used as composite indicator.
[76] The composite indicator was the standardised, mean-centred total score obtained on the *self-efficacy* scale.
[77] The composite indicator was the standardised, mean-centred total score obtained on the *perceived ability of the job to satisfy the self-efficacy need* scale

Hypotheses 4: In the proposed narrow-focussed *motivation to pursue the routes to psychological ownership* structural model it is hypothesised that the *squared salience of the self-efficacy motive* has a positive influence on the motivation to engage in the routes towards psychological ownership.

$$H_{0237}: \beta_3 = 0$$

$$H_{a237}: \beta_3 > 0$$

Hypothesis 8: In the proposed narrow-focussed *motivation to pursue the routes to psychological ownership* structural model it is hypothesised that the *perceived ability of the job characteristics to satisfy the self-efficacy* need positively influences motivation to engage in the routes towards psychological ownership.

$$H_{0238}: \beta_2 = 0$$

$$H_{a238}: \beta_2 > 0$$

Hypothesis 9: In the proposed narrow-focussed *motivation to pursue the routes to psychological ownership* structural model it is hypothesised that *squared perceived ability of the job characteristics to satisfy the self-efficacy need* positively influences motivation to engage in the routes towards psychological ownership.

$$H_{0239}: \beta_5 = 0$$

$$Ha_{239}: \beta_5 > 0$$

Hypothesis 11: In the proposed narrow-focussed *motivation to pursue the routes to psychological ownership* structural model it is hypothesised that the *self-efficacy need* * *perceived ability of the job characteristics to satisfy self-efficacy need* positively influences motivation to engage in the routes towards psychological ownership.

$$H_{0240}: \beta_4 = 0$$

$$Ha_{240}: \beta_4 > 0$$

Hypotheses 3, 4, 8, 9 and 11, although important, were not the of prime interest. Rather the manner in which employees' *motivation to engage in the routes to psychological ownership* changes curvilinearly as the congruence and incongruence between the *salience of the self-efficacy need* and the p*erceived ability of the job to satisfy the self-efficacy need* changes in magnitude and nature was of prime interest. The shape of the *motivation to engage in the routes*

to psychological ownership response surface along the lines of congruence and incongruence was of prime interest.

Hypothesis 14 posits that a) *motivation to engage in the routes to psychological ownership* changes positively as congruence moves from the perception that the job does not allow the satisfaction of the self-efficacy need combined with low salience of the self-efficacy need (- -) to the perception that the job does allow the satisfaction of the needs combined with high salience of the self-efficacy need (+ +); b) motivation to engage in the routes to psychological ownership changes convexly (along the line of congruence) as congruence moves from the perception that the job does not allow the satisfaction of the self- efficacy need combined with low salience of the self-efficacy need to the perception that the job does allow the satisfaction of the self-efficacy need combined with high salience of the self-efficacy need. Hypothesis 14 was tested by testing the following response surface test vale statistical hypotheses:

$$H_{0141a:}\ a_1=0$$

$$H_{a141a:}\ a_1>0$$

$$H_{0141b:}\ a_2=0$$

$$H_{a141b:}\ a_2>0$$

Hypothesis 15 posit that a) motivation to engage in the routes to psychological ownership changes positively as incongruence changes from the perception that the job does allow the satisfaction of the needs combined with low salience of the self-efficacy need (- +) to the perception that the job does not allow the satisfaction of the needs combined with high salience of the self-efficacy need; b) motivation to engage in the routes to psychological ownership changes linearly as incongruence changes from the perception that the job does allow the satisfaction of the needs combined with low salience of the self-efficacy need to the perception that the job does not allow the satisfaction of the needs combined with high salience of the self-efficacy need. Hypothesis 15 was tested by testing the following response surface test vale statistical hypotheses:

$$H_{0142a:}\ a_3=0$$

$$H_{a142a:}\ a_3<0$$

$$H_{0142b:}\ a_4=0$$

$$H_{a142b:}\ a_4\neq0$$

The regression output for each of the narrow-focus structural models are presented and discussed in the following section. The specific response surface hypotheses were only tested if the multiple correlation (R) was significant ($p < .05$) and H_{0227}: P = 0 and H_{0235}: P = 0 were rejected. The polynomial regression model was fitted on the sample data via SPSS version 26.

5.12.2.2. Interpreting the fit and the statistical significance of the parameter estimates of the polynomial regression model in which motivation to engage in the routes to psychological ownership is regressed on the salience of the self-identity need, the perceived ability of the job to satisfy the self-identity need, the squared salience of the self-identity need, the product of the salience of the self-identity need and the perceived ability of the job to satisfy the self-identity need and the squared perceived ability of the job to satisfy the self-identity need

The over-arching substantive research hypothesis (**Hypothesis 35**) that the narrow-focus self-identity congruence *motivation to engage in routes to psychological ownership* structural model shown in Figure 5.28 provides a valid explanation of the underlying psychological mechanisms that determines the levels of the *motivation to pursue the routes to psychological ownership* was tested by testing the following null hypothesis:

$$H_{0227}: P = 0$$

$$H_{0227:} P > 0$$

H_{0227} was tested by inspecting the significance of the multiple correlation (R) when regressing *motivation to pursue the routes to psychological ownership* on the *salience of the self-identity need*, the *perceived ability of the job to satisfy the self-identity need*, the squared *salience of the self-identity need*, the product of the *salience of the self-identity need* and the *perceived ability of the job to satisfy the self-identity need* and the squared *perceived ability of the job to satisfy the self-identity need*. The multiple regression output is depicted in Table 5.127.

Table 5.127

Regression output: self-identity need and perceived ability of the job to satisfy the self-identity need

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.599[a]	.359	.350	48.05451

	Sum of Squares	df	Mean Square	F	Sig.
Regression	504647.505	5	100929.501	43.707	.000*
Residual	902911.175	391	2309.236		
Total	1407558.680	396			

Table 5.127

Regression output: self-identity need and perceived ability of the job to satisfy the self-identity need (continued)

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	227.355	3.516		64.665	.000
b1_CENTRED_SELF_IDENT	6.221	.664	.477	9.363	.000*
b2_CENTRED_PERC_IDENT	4.490	.608	.340	7.383	.000*
b3_CENTRED_SQ_SELF_IDENT	.504	.110	.251	4.585	.000*
b4_CENTRED_PROD_SELF_IDENT_PERC_IDENT	-.129	.121	-.053	-1.065	.288
b5_CENTRED_SQ_PERC_IDENT	.260	.106	.116	2.448	.015*

* ($p < .05$)

Table 5.127 indicated that the R value (.599) was statistically significant ($p < .05$). Therefore, H_{0227}: P = 0 was rejected. This implies that the weighted linear combination of the 5 polynomial *self-identity need* and *perceived ability of the job to satisfy the self-identity need* predictors statistically significantly ($p < .05$) explained variance in *motivation to engage in self-investment*. This finding warrants the calculation and interpretation of the response surface test values that describes the manner in which the *motivation to pursue the routes to psychological ownership* responds to the degree and nature of the *self-identity need - perceived ability of the job to satisfy the self-identity need* congruence/incongruence. Table 5.127 also indicates that H_{0236}, H_{0237}, H_{0238} H_{0239} and H_{0240} can be rejected ($p < .05$). Support was therefore obtained for Hypotheses 2, 5, 6 and 7. H_{0232} could not be rejected ($p > .05$). Support was therefore not obtained for Hypothesis 10 that the *self-identity need * perceived ability of the job characteristics to satisfy self-identity need* interaction effect statistically significantly explains unique variance in the *motivation to pursue the routes to psychological ownership*.

Furthermore, the R^2 value (.359) in Table 5.127 indicates that the model succeeded in explaining 35.9% of the variance in *motivation to engage in self-investment.* This somewhat low percentage of variance explained by the *self-identity need congruence motivation to pursue the routes to psychological ownership* structural model should be regarded as a realistic finding considering the fact that the *self-identity need- perceived ability of the job to satisfy the self-identity need* congruence/incongruence is but one factor amongst many, which only accounts for a small part of the complex dynamics underlying *motivation to engage in the routes to psychological ownership.*

5.12.2.3. Interpreting the fit and the statistical significance of the parameter estimates of the polynomial regression model in which motivation to engage in the routes to psychological ownership is regressed on the salience of the self-efficacy need, the perceived ability of the job to satisfy the self-efficacy need, the squared salience of the self-efficacy need, the product of the salience of the self-efficacy need and the perceived ability of the job to satisfy the self-efficacy need and the squared perceived ability of the job to satisfy the self-efficacy need

The over-arching substantive research hypothesis (**Hypothesis 36**) that the *self-efficacy congruence motivation to pursue the routes to psychological ownership* structural model shown in Figure 5.28 provides a valid explanation of the underlying psychological mechanisms that determines the levels of *motivation to pursue the routes to psychological ownership* was tested by testing the following null hypothesis:

$$H_{0235}: P = 0$$

$$H_{0235}: P > 0$$

The regression output is depicted in Table 5.129.

Table 5.129

Regression output: self-efficacy need and perceived ability of the job to satisfy the self-efficacy need

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.573[a]	.328	.319	49.18352

	Sum of Squares	df	Mean Square	F	Sig.
Regression	461722.435	5	92344.487	38.174	.000*
Residual	945836.245	391	2419.019		
Total	1407558.680	396			

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	235.870	3.400		69.369	.000
b1_CENTRED_SELF_EFF	8.961	.973	.483	9.207	.000*
b2_CENTRED_PERC_EFF	3.294	.633	.243	5.207	.000*
b3_CENTRED_SQ_SELF_EFF	.359	.145	.124	2.475	.014*
b4_CENTRED_PROD_SELF_EFF_PERC_EFF	-.383	.178	-.099	-2.150	.032*
b5_CENTRED_SQ_PERC_EFF	.236	.116	.096	2.034	.043*

* ($p < .05$)

Table 5.128 indicated that the R value (.573) was statistically significant ($p < .05$). Therefore, H_{0235}: P = 0 was rejected. This implies that the weighted linear combination of the 5 polynomial *self-efficacy need* and *perceived ability of the job to satisfy the efficacy need* predictors statistically significantly ($p < .05$) explained variance in *motivation to engage in self-investment*. This finding warrants the calculation and interpretation of the response surface test values that describes the manner in which the *motivation to pursue the routes to psychological ownership* responds to the degree and nature of the *self-efficacy need - perceived ability of the job to satisfy the self-efficacy need* congruence/incongruence. Table 5.128 also indicates that H_{0228}, H_{0229}, H_{0230} and H_{0231} can be rejected ($p < .05$). Support was therefore obtained for Hypotheses 3, 4, 8, 9 and 11.

Furthermore, the R^2 value (.328) in Table 5.128 indicates that the model succeeded in explaining 32.8% of the variance in *motivation to engage in self-investment.* This somewhat low percentage of variance explained by the *self-efficacy need congruence motivation to pursue the routes to psychological ownership* structural model should be regarded as a realistic finding considering the fact that *self-efficacy need perceived ability of the job to satisfy the self-identity need* congruence/incongruence is but one factor amongst many, which only accounts for a small part of the complex dynamics underlying

5.12.3. INTERPRETING THE RESPONSE SURFACE TEST VALUES AND GRAPHS

The response surface hypotheses were tested by investigating the sign and the statistical significance of the response surface test values ($a_1 – a_4$), as well as visually inspecting the three-dimensional graph. The Cunningham Excel Macro (Shanock et al., 2010) was used to calculate the test values and to produce the three-dimensional response surface graph. The unstandardised partial regression coefficients and their associated standard errors, the intercept term and the required covariance estimates were obtained by fitting the two polynomial regression models in SPSS version 26 and requesting the covariances between the partial regression coefficients via the BCOV command (Shanock et al., 2010).

5.12.3.1. Interpreting the response surface test values and graph describing the motivation to pursue the routes to psychological ownership as a function of the congruence and incongruence between the self-identity need and the perceived ability of job to satisfy the self-identity need

Table 5.131 shows the calculated response surface test values and their statistical significance.

Table 5.131

Statistical significance of the calculated response surface test values: Self-Identity

Effect	a_i Coefficient	Standard Error	Test Stat (t)	*p*-value
a_1: Slope along x = y (as related to Z)	10.71	0.73	14.724	.000*
a_2: Curvature on x = y (as related to Z)	0.63	0.13	5.035	.000*
a_3: Slope along x = -y (as related to Z)	1.73	1.05	1.655	.099
a_4: Curvature on x = -y (as related to Z)	0.89	0.21	4.248	.000*

* (p, .05)

The positive and statistically significant a_1 ($p < .05$) indicates that the *motivation to pursue the routes to psychological ownership* increases along the line of congruence as congruence moves from low *self-identity need* and low *perceived ability of job to satisfy self-identity need* to high *self-identity need* and high *perceived ability of job to satisfy self-identity*. Therefore, hypothesis H_{0233a}: $a_1=0$ was rejected ($p < .05$). The hypothesis that the *motivation to engage in the routes to psychological ownership* changes positively as congruence moves from the perception that the job does not allow the satisfaction of the self-identity need combined with low salience of the self-identity need (- -) to the perception that the job does allow the satisfaction of the self-identity need combined with high salience of the self-identity need (+ +) was therefore corroborated. The positive and significant a_2 implies *motivation to pursue the routes to psychological ownership* changes convexly along the line of congruence as congruence moves form 00 outwards to low *self-identity need* and low *perceived ability of job to satisfy self-identity need* and from 00 outward to high *self-identity need* and high *perceived ability of job to satisfy self-identity.* Consequently, hypothesis H_{0233b}: $a_2 = 0$ was rejected. Support was therefore found for the hypothesised convex relationship between *self-identity need* and *perceived ability of job to satisfy self-identity need* congruence and *motivation to engage in self-investment*.

A statistically insignificant ($p > .05$) a_3 was obtained, which implies that hypothesis H_{0234a} : a_3 could not be rejected. Support was therefore not found for the hypothesised increase in *motivation to pursue the routes to psychological ownership* along the line of incongruence as incongruence moves from low *self-identity need* and high *perceived ability of job to satisfy self-identity need* to high *self-identity need* and low *perceived ability of job to satisfy self-identity.* The positive statistically significant ($p < .05$) a_4 indicates that *motivation to pursue the routes to psychological ownership* changes convexly along the lines of incongruence as incongruence moves from 00 outward to low *self-identity need* and high *perceived ability of*

job to satisfy self-identity need and from 00 outward to high *self-identity need* and low *perceived ability of job to satisfy self-identity*. Consequently, hypothesis H_{0234b}: $a_4 = 0$ was rejected. Support was therefore not found for the hypothesis that *motivation to engage in the routes to psychological ownership* changes linearly as incongruence changes from the perception that the job does allow the satisfaction of the self-identity need combined with low salience of the self-identity need to the perception that the job does not allow the satisfaction of the self-identity need combined with high salience of the self-identity need.

Figure 5.32 depicts the *motivation to pursue the routes to psychological ownership* response surface graph.

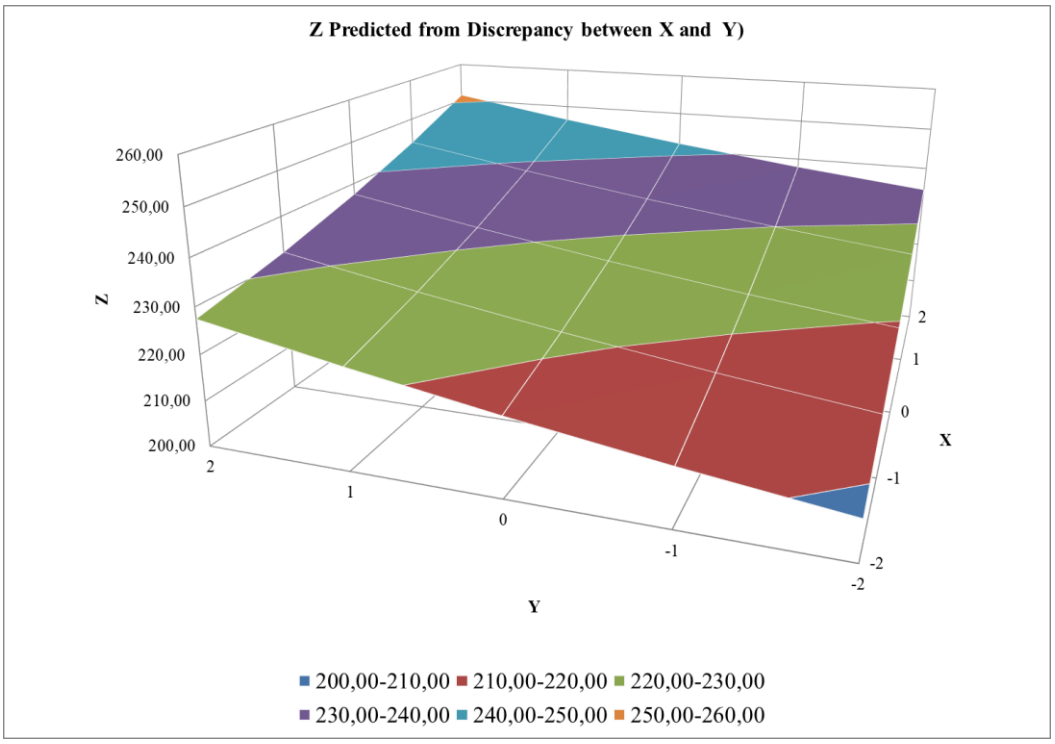

Figure 5.32 Response surface graph*: motivation to pursue the routes to psychological ownership* as a function of the congruence and incongruence between the *self-identity need and the perceived ability of the job to satisfy the self-identity need*

Note: X represents the *self-identity need*, Y represents the *perceived ability of job to satisfy self-identity need* and Z represents the *motivation to pursue the routes to psychological ownership*

The graph visibly subtly reflects the interpretations made for $a_1 - a_2$. The subtilty stemmed from the fact that the colour codes do not differentiate within the 10-unit intervals. If the colour contours had changed every 2 units the convex shape of the response surface along the line of

congruence would probably have been more apparent[78]. Along the line of congruence, the graph shows that the *motivation to engage in the routes to psychological ownership* (Z) increased from low *self-identity need* (X) and low *perceived ability of job to satisfy self-identity need* (Y) to high *self-identity need* (X) and high *perceived ability of job to satisfy self-identity need* (Y) (i.e. increased from - - to + + congruence). Furthermore, *motivation to engage in the routes to psychological ownership* (Z) appeared to increase convexly along the line of congruence from - - to + + congruence.

Figure 5.32, however, shows that although the motivation to pursue the routes to psychological ownership changed curvilinearly along the line of congruence as one moves from - - to + +, the response surface did not form a classical cup structure with the lip again curling up at the - - high congruence end of the congruence continuum like at the + + high congruence end. Rather the response surface seemed to form a curvilinear ski-slope structure with a sharp decent from the + + high congruence end and a flattening out of the surface at the - - high congruence end of the congruence continuum.

Along the line of incongruence, the slope of the general linear trend of the surface was horizontal, which implied that no relationship existed between *motivation to engage in the routes to psychological ownership* (Z) and the congruence between the salience of the *self-identity need* (X) and *perceived ability of job to satisfy self-identity need* (Y). Figure 5.32 moreover subtly shows that the *motivation to engage in the routes to psychological ownership* (Z) increased convexly along the line of incongruence from - +) to + - incongruence. Figure 5.32 shows that the *motivation to pursue the routes to psychological ownership* response surface forms a shallow cup structure with slightly elevated lips on both sides of the incongruence continuum. Although the elevation was slightly higher at the (+ -) end of the incongruence continuum this difference was not large enough to produce a statistically significant positive a_3 surface test value.

The following predictions can be made of the expected *motivation to engage in the routes to psychological ownership* levels based on the response surface graph and the response surface test values:

[78] The calibration of the Z-axis was edited to create a more detailed surface graph. However, attempts to create a finer-grained contour legend did not succeed.

- *Motivation to engage in the routes to psychological ownership* (Z) can be expected to be the highest in a situation where an employee has a high *self-identity need* (X) and if he/she *perceives the job to have the ability to satisfy the self-identity need* (Y),
- *Motivation to engage in the routes to psychological ownership* (Z) can be expected to be the lowest in a situation where an employee does not have high levels of the *self-identity need* (X) and does not *perceive the job to have the ability to satisfy the self-identity need* (Y),
- The *salience of the self-identity need* does not have a stronger impact on the *motivation to pursue the routes to psychological ownership* than the *perceived ability of the job to satisfy the self-identity need*,
- Both the *salience of the self-identity need* and the *perceived ability of the job to satisfy the self-identity need* have, in the absence of the other, a moderate impact on the *motivation to pursue the routes to psychological ownership when they are strongly present.*

5.12.3.2. Interpreting the response surface test values and graph describing the motivation to pursue the routes to psychological ownership as a function of the congruence and incongruence between the self-efficacy need and perceived ability of job to satisfy the self-efficacy

Table 5.132 depicts the calculated response surface test values and their statistical significance.

Table 5.132

Statistical significance of the calculated response surface test values: Self-efficacy

Effect	a_i Coefficient	Standard Error	Test Stat (t)	*p*-value
a_1: Slope along x = y (as related to Z)	12.25	0.93	13.222	.000*
a_2: Curvature on x = y (as related to Z)	0.21	0.20	1.059	.290
a_3: Slope along x = -y (as related to Z)	5.67	1.35	4.183	.000*
a_4: Curvature on x = -y (as related to Z)	0.98	0.25	3.986	.000*

* ($p < .05$)

The positive and statistically significant a_1 ($p < .05$) indicates that *motivation to engage the routes to psychological ownership* increases along the line of congruence as congruence moves from low *self-efficacy need* and low *perceived ability of job to satisfy self-efficacy need* to high *self-efficacy need* and high *perceived ability of job to satisfy self-efficacy need*. Therefore, hypothesis H_{028}: $a_1 = 0$ was rejected ($p < .05$). The statistically insignificant ($p > .05$) a_2 implies that *motivation to engage in the routes to psychological ownership* increases linearly along the

line of congruence as congruence moves from low *self-efficacy need* and low *perceived ability of job to satisfy self-efficacy need (- -)* to high *self-efficacy need* and high *perceived ability of job to satisfy self-efficacy need* (+ +). Consequently, hypothesis H_{028b}: $a_2 = 0$ was not rejected ($p < .05$). Support was therefore not found for the hypothesised convex relationship between *motivation to engage in the routes to psychological ownership* and the degree and nature of the congruence between the salience of the *self-efficacy need* and the *perceived ability of job to satisfy the self-efficacy need*.

A positive and statistically significant a_3 was obtained, which implies that *motivation to engage in the routes to psychological ownership* increases along the line of incongruence as incongruence moves from low *self-identity need* and high *perceived ability of job to satisfy self-identity need* (- +) to high *self-identity need* and low *perceived ability of job to satisfy self-identity* (+ -). Furthermore, the positive statistically significant a_4 indicates that *motivation to engage in self-investment* changes convexly along the lines of incongruence as incongruence moves from 00 outward to low *self-identity need* and high *perceived ability of job to satisfy self-identity need* (- +) and from 00 outward to high *self-identity need* and low *perceived ability of job to satisfy self-identity* (+ -). Consequently, hypothesis H_{029b}: $a_4 = 0$ was rejected.

The *motivation to pursue the routes to psychological ownership* response surface graph is depicted in Figure 5.33. The graph clearly shows that *motivation to engage in the routes to psychological ownership* (Z) increased along the lines of congruence from low *self-efficacy need* and low *perceived ability of job to satisfy self-efficacy need* to high *self-efficacy need* and high *perceived ability of job to satisfy self-efficacy need* (i.e. increased from - - to + + congruence). Furthermore, *motivation to engage in the routes to psychological ownership* (Z) appeared to increase linearly along the line of congruence from - - to + + congruence.

Along the lines of incongruence, it was clear that *motivation to engage in the routes to psychological ownership* (Z) increased moving from low *self-efficacy need* (X) and high *perceived ability of job to satisfy self-efficacy need* (Y) to high *self-efficacy need* (X) and low *perceived ability of job to satisfy self-efficacy need* (Y) (i.e. from - + to + - incongruence). The convex relationship between *motivation to engage in the routes to psychological ownership* and the incongruence between *self-efficacy need* and *perceived ability of job to satisfy self-efficacy need* was somewhat less visible in the graph. This relationship, at first glance, appeared to be of a linear nature. However, upon closer inspection, it was evident that the two corners along the line of incongruence curved upward in a convex manner.

To conclude, the following predictions can be made regarding the expected levels of *motivation to engage in the routes to psychological ownership* based on the response surface graph and the response surface test values:

- *Motivation to engage in the routes to psychological ownership* (Z) can be expected to be highest in a situation where an employee has a high *self-efficacy need* (X) and if he/she *perceives the job to have the ability to satisfy the self-efficacy need* (Y);
- The second highest *motivation to engage in the routes to psychological ownership* (Z) can be expected to occur in a situation where an employee has a high *self-efficacy need* even if the employee does not *perceive the job to have the ability to satisfy the self-efficacy need* (Y);
- *Motivation to engage in the routes to psychological ownership* (Z) can be expected to be lower in a situation where an employee does not have high levels of the *self-efficacy need* (X) and especially so, if he/she does not *perceive the job to have the ability to satisfy the self-efficacy need* (Y), but this also occurs, albeit less so, in a situation where an employee does not have high levels of the *self-efficacy need* (X) while he/she *perceives the job to have the ability to satisfy the self-efficacy need* (Y).

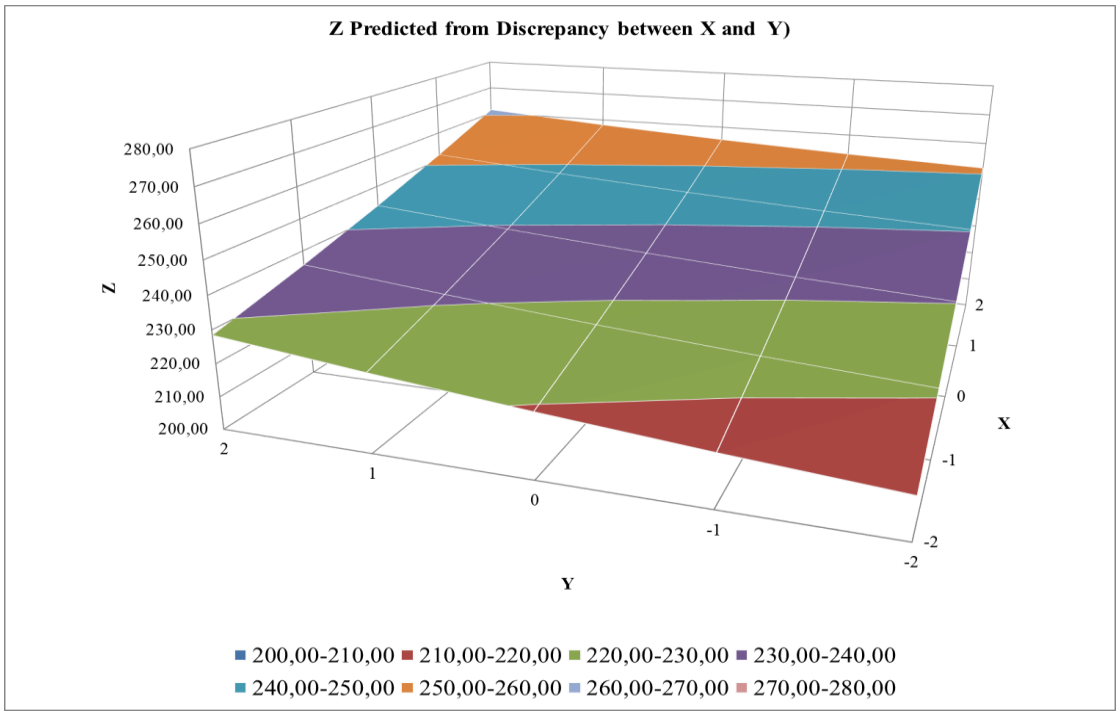

Figure 5.33 Response surface graph: motivation to pursue the routes to psychological ownership as a function of the congruence and congruence between the *self-efficacy need and the perceived ability of the job to satisfy the self-identity need*

Note: X represents *self-efficacy need*, Y represents *perceived ability of job to satisfy self-efficacy need* and Z represents *motivation to pursue the routes to psychological ownership*

CHAPTER 6

IMPLICATIONS, RECOMMENDATIONS AND CONCLUSIONS

6.1. INTRODUCTION

The research-initiating question presented by this study was concerned with what other cognitive and/or non-cognitive person-centred latent variables as well as situation-centred latent variables, over and above those already considered in Lee's (2016) explanatory *psychological ownership* structural model, create additional variance in the levels of *psychological ownership* among employees in different organisational contexts. The proposed *psychological ownership* structural model which was developed through theorising in Chapter 2 served as a substantive theoretical response to the research-initiating question and described the complex nomological network of latent variables that was hypothesised to influence experienced levels of *psychological ownership.* The research methodology that was used to test the substantive research hypotheses and the second-generation explanatory *psychological ownership* structural model was outlined in Chapter 3. This study made use of an *ex post facto* correlation design and SEM techniques to empirically test the overarching and path-specific substantive research hypotheses. The results that were obtained from the SEM statistical analyses were then presented and evaluated in Chapter 5.

The development and testing of an explanatory *psychological ownership* structural model was motivated in Chapter 1 by the need to influence the level of *psychological ownership* experienced by employees in World 1 (Babbie & Mouton, 2001). It is possible to effectively influence the level of *psychological ownership* experienced by employees in World 1 because the level of psychological *ownership* experienced is not a random event but rather determined by a nomological network of latent variables characterising the employee and their working environment. The explanatory structural model that was tested in the current study should therefore allow practitioners to use such a model to influence the *psychological ownership* of working man. Therefore, it is important to reflect on and explicate the practical implications of the current study by reflecting on the degree to which the results obtained on the explanatory structural model would permit the derivation and development of interventions aimed at influencing or manipulating *psychological ownership* levels.

This chapter will firstly present a summary of the research results. Furthermore, the limitations of the study will be discussed and recommendations will be made for future research from a

data-driven as well as a theoretical perspective. Finally, the practical managerial implications will be discussed which should allow for the development of interventions aimed at influencing *psychological ownership* levels.

6.2. SUMMARY OF RESULTS

A brief summary of the results of the various statistical analyses that were performed in Chapter 5 will be presented in the following section. The psychometric evaluation of the 16 measurement instruments via item analysis and dimensionality analysis revealed that all but one of the measurement instruments provided an adequate measure of the specific latent construct that they were designed to assess. In the case of some of the scales/subscales the hypothesised dimensionality was not corroborated. The factor fission was taken into account when deciding on the appropriate assessment of the reliability.

6.2.1 ITEM ANALYSES

Two of the four job characteristics subscales (*autonomy* and *task significance*) returned reliability coefficients below .80, albeit only marginally so when judged in terms of the more appropriate McDonald's omega. It, however, needs to be taken into account that the job characteristics were included as separate constructs within the structural model which implies that these subscales consisted of only three items. A scale that consists of a small number of items has the odds of a favourable internal consistency reliability stacked against it since internal consistency reliability is a function of the number of items in the scale and the degree of their intercorrelations. The researcher decided that these two latent variables should be retained in the structural model since their reliability coefficients did not fall significantly lower than the cut-off value of .80 and there were no options available to delete any items as these scales are already very short.

The *internal locus of control* scale returned a Cronbach's alpha of .614 and a McDonald's omega of .641which fell well under the critical cut-off value of .80. LOC_1 and LOC_2 were flagged as especially problematic due to their excessively low inter-item correlations. This supposition was corroborated by the low squared multiple correlations of the two problematic items (.095 and .141) which implied that these two items shared insufficient variance with the remainder of the items. The deletion of these two items did not improve the internal consistency of the subscale which remained unacceptably lower than the critical cut-off value of .80. Furthermore, no items, if deleted, would have improved the Cronbach alpha or the McDonald's

omega, therefore, it was decided that the scale could not be included in further analyses of the structural model. The internal locus of control latent variable was therefore removed from the structural model.

The reliability of all the remaining scales/subscales was satisfactory (i.e. $r_{tt} > .80$) when evaluating the reliability appropriately given the findings of the dimensionality analysis 9see summary in Table 5.101).

6.2.2. DIMENSIONALITY ANALYSES

The hypothesis that specific scales/subscales measured a unidimensional latent variable or a unidimensional latent dimension of a multidimensional construct was evaluated by requesting the extracting a single factor in an exploratory factor analysis and evaluating the validity of the extracted solution via the percentage of large residual correlations. The dimensionality results demonstrated that in the case of the *gaining control* subscale, the *feelings of efficacy* scale, the *integration with the job* scale, the *motivation to pursue the routes to psychological ownership (valence + expectance)* subscales, the *psychological ownership* scale and the *perceived ability* scale the unidimensionality assumption as originally hypothesised was not corroborated (see Table 5.101).

The first-order 2-factor *control* measurement model was consequently fitted to the normalised data using robust maximum likelihood estimation. The fitted model returned an admissible solution but poor fit (RMSEA=.113; $p<.05$). Although the conceptualisation and operationalisation of the *gaining control* latent dimension of the *routes to psychological ownership* construct did not originally make provision for two narrow (group) factors and a general gaining control factor, both the two narrow factors and the broad, general, factor do make conceptual sense. The control bifactor model initially returned an inadmissible solution with a negative measurement error variance estimate for $\theta_{\delta 55}$. The measurement error variance for CONTR_5 was subsequently fixed to .1 and diagonally weighted least squares was specified as the method of estimation. The bifactor model converged and showed good fit. The two factors that each item was designated to reflect by the bifactor model explain *circa* 65% or more of the variance in each item. This finding, taken in conjunction with the good fit of the bifactor model, the statistically significant factor loadings and the reliability of the *control* subscale scores warranted using all the subscale items in the calculation of two item parcels to operationalise the *control* latent variable in the psychological ownership structural model.

The two-factor measurement model failed to explicitly model the shared item variance. This in turn suggested the presence of a general factor that, independent of the influence of FAC1 and FAC2, affected the item responses of all the items in the scale. A bifactor model was consequently fitted that made provision for such a broad, general factor, uncorrelated with the two more specific, narrow, factors. The fitted bifactor model returned an inadmissible solution with a negative measurement error variance estimate for PER_A4 ($\theta_{\delta 44}$). The model was subsequently revised by fixing $\theta_{\delta 44}$ to .10. The revised model converged in 27 iterations with an admissible solution. The revised *perceived ability* bifactor measurement model showed reasonable fit in the sample (RMSEA=.070). Only in the case of PER_A10, PER_A2R and PER_A6R did the fitted measurement model explain more than 50% of the item variance. Nonetheless, the fitted measurement model explained more than 25% of the variance in each of the items of the *perceived ability* scale. Based on these findings, along with the item analysis results, all items of the *perceived ability* scale were utilised in the calculation of two item parcels to operationalise the *perceived ability* latent variable in the proposed *psychological ownership structural model.*

After the deletion of 5 of the items for the *feelings of efficacy* scale, the uni-dimensionality assumption was met. The items for the *feelings of efficacy* scale were successfully forced onto a single factor solution. As mentioned earlier, the 2-factor finding for the remaining latent variables was not alarming because the factor fission was found to present a meaningful division of the factor that was originally conceptualised as indivisible.

The first-order 2-factor *integration with the job* measurement model returned an admissible solution but with poor fit (RMSEA=.126; $p<.05$). The *integration with the job* scale is, however, too short to allow the fitting of a bifactor model (Reise, 2012) that would have formally modelled the currently omitted broad, general, factor that affects the response to all items in addition to the more specific, narrow, *integration with the job* factor that the items currently reflect. To circumvent the problem of the negative degrees of freedom the factor loadings of the general factor were constrained to be equal across the five items. The standardised root mean square residual (SRMR=.06225) indicated reasonable model fit. All the factor loadings are statistically significant when tested against a non-directional alternative hypothesis, but for the loading of INTEGR_3 on FAC2 ($p>.05$). However, the bifactor *integration with the job* measurement model explained substantial proportions of variance in all of the items (including ITEGR_3) of the *integration with the job* scale. This finding, along with the meaningfulness of the factor fission, the statistical significance of the factor loadings,

the item analysis results and the value of the stratified alpha warranted the use the scale items in the calculation of two item parcels to operationalise the *integration with the job* latent variable.

Both of the *motivation to pursue the routes to psychological ownership* subscales *(expectancy* and *valence)* obtained poor measurement model fit. A bifactor model was consequently fitted for these subscales that made provision for a broad, general, factor, uncorrelated with the three more specific, narrow, factors. on which all the items loaded. The fitted bifactor models converged with an admissible solution. All the items of the two subscales loaded statistically significantly ($p<.05$) on the more specific, narrow, factor they were designated to reflect. Moreover, all items, but for MOT_E_8 and MOT_V_8 loaded positively on the more specific, narrow, factor they were designated to reflect. The consistency in the negative and statistically significant ($p<.05$) loading of item MOT_V_8 and item MOT_E_8 across the two subscales on SELF provided some cause not to too flippantly dismiss the negative partial regression coefficient even though the current study failed to provide a convincing explanation for the finding. However, the current study choose to take the prudent option and delete these two items based on the inexplicable, albeit intriguing, negative partial regression slope coefficients that were obtained when regressing the item responses on the SELF factor and statistically controlling for the broad, general, valence and expectancy factors.

In sum, the findings provided sufficient justification to combine the remaining items into item parcels.

6.2.3. MEASUREMENT MODEL FIT AND PARAMETER ESTIMATES

The measurement initially returned an inadmissible solution. The model converged with an admissible solution after the measurement error variances for RES_P2 and FEFF_P2 were fixed to .10. From the basket of goodness of fit statistics, reasonable fit was obtained for the measurement model, although both the exact and close fit null hypotheses had to be rejected. The reasonable fit was interpreted to indicate that the parameter estimates are sufficiently credible to warrant their interpretation. All of the indicator variables loaded significantly onto the latent variables they were intended to reflect. Satisfactorily high lambda-X parameter estimates and satisfactorily low measurement error variances were observed (with the exception of three item indicators of *autonomy*, *task variety* and *task significance*) Therefore, it was concluded that the indicator variables used to operationalise the latent variables reasonably successfully reflected the latent variables they were intended to represent. This

warranted the unambiguous verdict on the fit of the structural model. The *psychological ownership* structural model was subsequently tested by fitting the comprehensive LISREL model.

6.2.4. STRUCTURAL MODEL FIT AND PARAMETER ESTIMATES

The goodness-of-fit statistics revealed that the comprehensive *psychological ownership* structural model failed to obtain exact fit (H_{01a}: RMSEA = 0) nor did the model achieve close fit (H_{01b}: RMSEA ≤ in the paramater.05). However, it was argued that the model achieved reasonable or acceptable fit in the sample, based on the RMSEA estimate of .078, other fit statistics (e.g. CFI = .960) and the power analyses results. It was acknowledged that the evidence obtained for the model fit was not unanimous, however, there were sufficient evidence of reasonable model fit to justify the interpretation of various structural model parameter estimates (including the gamma, beta and psi matrices) as well as the R^2 values of the endogenous latent variables.

The beta and gamma matrices were examined in order to evaluate whether each of the hypothesised theoretical relationships was supported by the data. The beta matrix revealed that all, but one, path estimate between the endogenous latent variables were statistically significant ($p < .05$). Therefore, the following null hypotheses was rejected: H_{02}, H_{03}, H_{010}, H_{014}, H_{015}, H_{016}, H_{017}, H_{019}, and H_{020}, H_{022}, and H_{023}, while hypothesis H_{018} was the only null hypothesis that could not be rejected. This implies that there was insufficient evidence to conclude that a definite causal relationship exists between the *intimate knowledge* that one gains in a job and the extent to which that job is *integrated into the self-identity*. Support was therefore found for the hypothesised theoretical influence of *self-identity need* on *motivation to engage in self-investment, self-efficacy need* on *motivation to engage in self-investment, motivation to pursue the routes to psychological ownership* on *self-investment, self-investment* on *experience of control, self-investment* on *gaining intimate knowledge, integration of the job into the self-identity* on *self-identity, feelings of efficacy* on *self-efficacy need, self-investment* on *integration of the job into the self-identity, feelings of control* on *feelings of efficacy, integration of the job into the self-identity* on *psychological ownership, and feelings of efficacy* on *psychological ownership.*

The gamma matrix revealed that the following null hypotheses can be rejected ($p < .05$): H_{06}, H_{019}, H_{021}, and H_{022}. Support was therefore found for the positive relationship between *perceived ability of the job characteristics to satisfy self-identity need* and *motivation to engage*

in self-investment, autonomy and *motivation to engage in self-investment, autonomy* and *control,* and *task identity* and *gaining intimate knowledge.*

However, four gamma path coefficients were statistically insignificant ($p > .05$). Therefore, the following hypotheses could not be rejected: H_{06}, H_{07}, H_{08}, and H_{013}. Support was therefore not found for the hypothesis that *task identity* has a positive influence on the *motivation to pursue routes to psychological ownership,* that *task significance* has a positive influence on the *motivation to pursue routes to psychological ownership,* that *task variety* has a positive influence on the *motivation to pursue routes to psychological ownership,* and that *autonomy* has a positive influence on *gaining intimate knowledge*.

The relationships between *perceived ability*self-investment* and *integration into the self*, and between *perceived ability of job to satisfy self-efficacy need* and *motivation to engage in self investment* had inconsistent signs compared to the direction of the hypothesised causal relationship. H_{05} and H_{021} were therefore also not rejected.

The squared multiple correlations (R^2) indicated that the *psychological ownership* structural model was able to explain 45% of variance in *psychological ownership,* which was the focal endogenous latent variable in this study. The *psychological ownership* structural model also provided a satisfactory explanation (more than 30%) of the variance in *motivation to pursue the routes to psychological ownership* (43%), *gaining control* (76%), and *gaining intimate knowledge* (47%). On the other hand, the model provided a somewhat disappointing explanation of the variance in *self-investment* (15%), *integration into the self* (22%), *feelings of efficacy* (14%), *self-identity need* (17%) and *self-efficacy need* (12%). These low squared multiple correlation values were not overly concerning as one could not expect a second - generation explanatory structural model to provide a perfect explanation of the variance in a focal latent variable. However, the admittedly somewhat disappointing number of high structural error variances indicate several areas in the model that require elaboration or extension. This suggests the need for further modifications and elaborations of the *psychological ownership* structural model in future studies. Recommendations for future studies will be discussed in section 5.4. Figure 6.1 provides a visual representation of the relationships in the proposed *psychological ownership* model that were supported by the data (shown in green, as well as those relationships that were not supported by the data (shown in red).

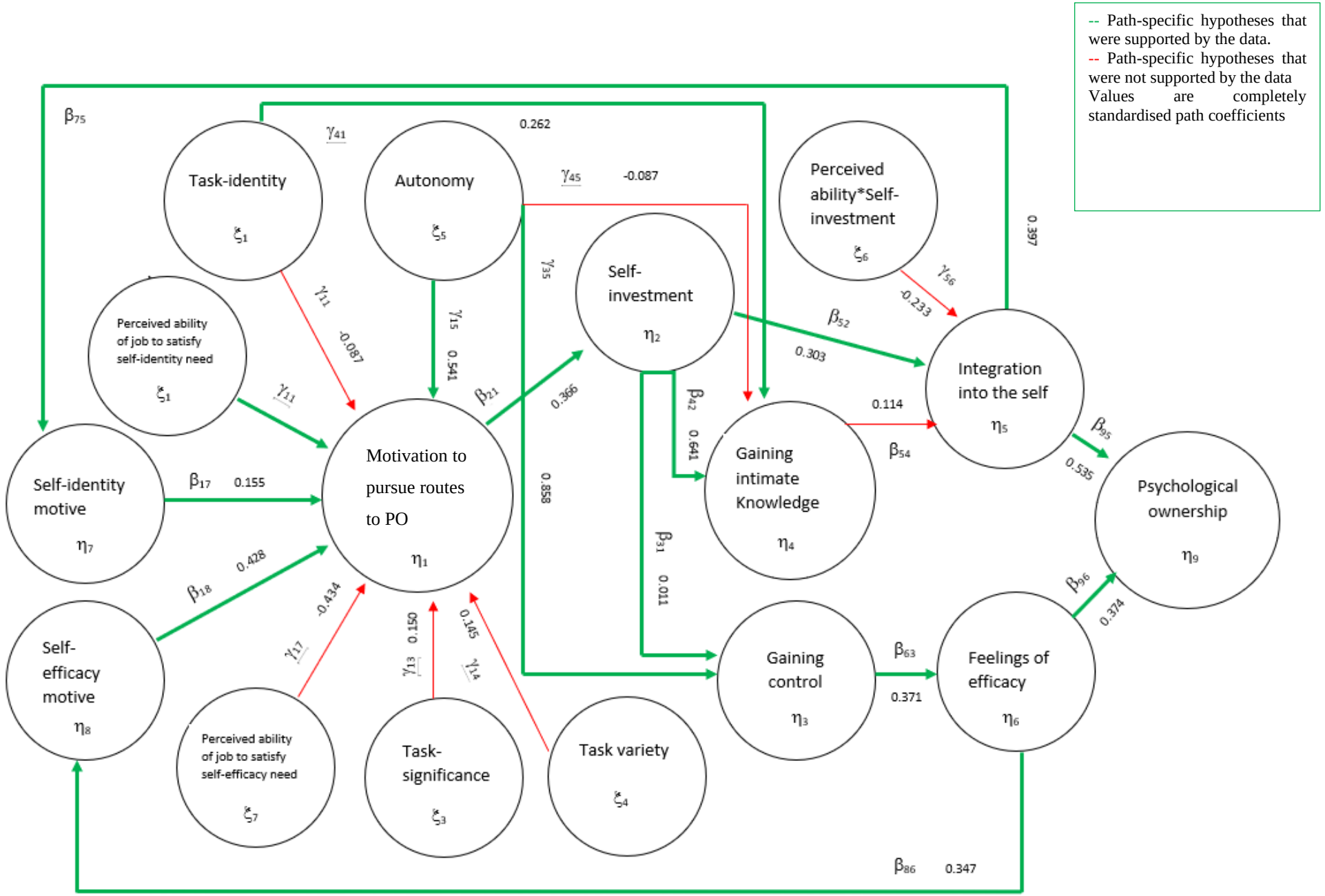

Figure 6.1. Summary of findings on the path-specific substantive hypotheses

It should be noted that the findings do not permit the claim that the hypothesised causal effects hypothesised by the path-specific substantive hypotheses have been conclusively corroborated. At best it can be claimed that the path-specific substantive hypotheses have survived an opportunity to be falsified. Nevertheless, the empirical data provided support for the following relationships:

Based on Lee's (2017) theorising, it was argued that *motivation* is the core psychological mechanism through which *psychological ownership* develops. Lee (2017) relied on Victor Vroom's theory of motivation (1964) that posits that most human behaviour are voluntary. The core mental components of Vroom's (1964) expectancy theory of motivation are: valence, expectancy and instrumentality and these three components interact psychologically to create a motivational force and subsequent behaviour. When relating this to psychological ownership it was argued that *psychological ownership* of a specific job would be *positively valenced* if the *job characteristics* were perceived to satisfy salient psychological ownership roots (that is if the job characteristics were perceived to be high in features that satisfy the psychological ownership root needs of *self -efficacy, self-identity* and *having a home*) and the individual experiences the psychological ownership root needs as salient. The expected pleasure producing 'reward' of feelings of ownership would in turn motivate the psychological "purchasing" behaviour or the traveling of the routes, namely *self-investment, control* and *gaining intimate knowledge*.

The empirical data in the current study supported the notion that the 'root' needs or motives (*self-identity motive* and *self-efficacy motive*) influence a person's *motivation to engage in self-investment*. As mentioned earlier, psychological ownership (toward a target) exist because it satisfies three human needs: *self -efficacy, self-identity* and *having a home*. Lee (2016) described these 'root' needs as the conative engine that motivates an individual to act upon, or engage with, a target. Lee (2017) referred to these needs collectively as *salient psychological ownership root needs* and proposed that they collectively influence an individual's *motivation to pursue the routes to psychological ownership*. In her study Lee (2017) found support for the positive influence of the *salience of the psychological ownership root needs* on *the motivation to pursue the routes to psychological ownership*. Kriek (2019), in a study also aimed at elaborating the Lee (2017) *psychological ownership* structural model that essentially ran parallel to the current study, also examined the effect of the *salience of the psychological ownership root needs* as a multidimensional construct on the motivation to pursue the routes to psychological ownership. Similar to Lee (2017) Kriek (2019) also obtained support for this

path. The current study attempted to understand the influence of these motives separately on person's level of *motivation to pursue self-investment*. However, only the *efficacy* motive and *self-identity* motive were included in the model since the researcher believes that the need for self-identity and belonging are closely related. The current study found support for its position that the salience of the *self-efficacy need* and the salience of the *self-identity need* positive both positively influence the *motivation to pursue the routes to psychological ownership*. The empirical evidence moreover suggested that of the two root needs the influence of the *self-efficacy motive* (.428) had a stronger influence on a person's *motivation to engage in self-investment*. This suggests that individuals might be more motivated to engage their self in a job because of their inherent need to be the cause of something, to feel as if they are in control, rather than for the need to attach their self-identity to the job. The consistency of the findings on the influence of the *salience of the root needs* on the *motivation to pursue the routes to psychological ownership* across the three studies is gratifying. Moreover, the finding of the current study that the *salience of the efficacy* need and the *salience of the self-identity* need each explain unique variance in the *motivation to pursue the routes to psychological ownership* is a welcome finding as well.

Hackman and Oldham (1975) was the biggest advocates of the idea that job complexity (i.e., stimulating and challenging jobs) result in increases in the job's motivating potential. Through the job characteristics model, Hackman and Oldham (1975) found that a positive relationship exists between the job design and three critical psychological states – experienced meaningfulness of the work, experienced responsibility for work outcomes and knowledge of results. The Lee (2017) *psychological ownership* structural model included all five of the job characteristics as a possible influence on *the motivation to pursue the routes to psychological ownership*. Lee (2017) modelled the *job characteristics* as a single five-dimensional latent variable. Her data corroborated the path-specific substantive research hypothesis that the *job characteristics* positively affect the *motivation to pursue the routes to psychological ownership*. Kriek (2019) likewise hypothesised that *job characteristics* as a single five-dimensional latent variable positively affect the *motivation to pursue the routes to psychological ownership*. She also found support for this path. The discussion presented in Chapter 2 suggested that certain job characteristics can be linked to certain routes to psychological ownership which is in disagreement with Lee's (2016) proposal that all the job dimensions work collectively to influence an individual's level of *motivation to pursue the routes to psychological ownership*. This study attempted to deepen the understanding of the

influence that these *job characteristics* have on a separate, distinct level on the nomological network of latent variables hypothesised to influence *psychological ownership*. It was therefore disappointing, and somewhat surprising, that the data did not support three of the four hypothesised relationship between specific *job characteristics* and *motivation to engage in the routes to psychological ownership.* Only *autonomy* had a significant effect on experienced levels of *motivation to engage in the routes to psychological ownership*. This suggests that designing a job in a manner that requires an employee to invest thought and decisions into the job rather than simply their physical energy toward job performance may have the most pronounced effect on an employee's *motivation to engage in the routes to psychological ownership*. On the one hand the lack of evidence in the current study for the hypothesised relationships between the other *job characteristics* and *motivation* does not seem to make theoretical sense. Possible reasons for the lack of support for these relationships may be due to the nature of the measurement instruments that were used to operationalise the four *job characteristics.* As mentioned earlier, the subscales that measured the various job characteristics consist of only three items, which is not an ideal situation. The reliability obtained for these subscales were on the other hand quite reasonable. In addition, the current study examined the individual effects of the different job characteristics because of the possibility that the effects might differ. It should, moreover be kept in mind that the current study found that task variety, task significance and task-identity did not statistically significantly ($p > .05$) explain variance in the *motivation to pursue the routes to psychological ownership* when controlling for all other latent variables linked to *motivation to pursue the routes to psychological ownership* in the model. The current study differs from Lee (2017) and Kriek (2019) in that it included two new latent variables that were hypothesised to affect the *motivation to pursue the routes to psychological ownership,* namely the *perceived ability of the job to satisfy the self-identity need* and the *perceived ability of the job to satisfy the self-efficacy need.* The effect of the *perceived ability of the job to satisfy the self-identity need* on the *motivation to pursue the routes to psychological ownership* was statistically significant ($p < .05$), when controlling for the other latent variables in the model linked to *motivation,* but the effect of the *perceived ability of the job to satisfy the self-efficacy need* was not. It is conceivable that the effect of the various job characteristics on the *motivation to pursue the routes to psychological ownership* could be differentially mediated by the *perceived ability of the job to satisfy the self-identity need* and the *perceived ability of the job to satisfy the self-efficacy need.*

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Furthermore, the data in the current study indicated that *motivation to pursue the routes to psychological ownership* positively influences the extent to which an employee *invests* him-/herself into the job. In other words, salient root needs, certain job characteristics (such as *autonomy*) and the *perceived ability of job to satisfy the self-identity* need act as motivating forces that drive an individual to invest their time, energy and effort in a target of ownership. Both Lee (2017) and Kriek (2019) also found that the *motivation to pursue the routes to psychological ownership* statistically significantly ($p < .05$) affected *self-investment*.

Support was also obtained for the position that *task identity* positively affects *gaining intimate knowledge*. The more a job involves doing a complete distinguishable, identifiable piece of work from beginning to end and with a visible outcomes the more employees can exert effort at becoming knowledgeable experts at it. The empirical data in the current study also supported the affect that the process of *investing the self into a target* has on the extent to which the individual attempts to *gain control* over the target and the extent to which the individual attempts to *gain intimate knowledge* about the target. Therefore, it can be deduced that the act of *investing the self into a target* will bring about the additional routes (*gaining intimate knowledge* and *gaining control*) to *psychological ownership* and this act of investing the self into a target is influenced by the root motives (efficacy motive, self-identity motive and belonging motive) of psychological ownership. Therefore, self- investment is regarded as a crucial behavioural conduit towards psychological ownership, which suggests that this variable should be viewed as the cornerstone of the development of *psychological ownership*. Lee (2017) and Kriek (2019) both also found support for the effect of *self-investment* on *gaining intimate knowledge* and *gaining control*. It should be noted though that strictly speaking the results obtained in the current study and those obtained by Lee (2017) and Kriek (2019) on the effect of *self-investment* on *gaining knowledge* are not comparable because in the latter two studies *gaining control* was modelled to affect gaining knowledge[79]. The same argument strictly speaking applies when comparing the results between the current study and those obtained by Kriek (2019) on the effect of *self-investment* on *gaining control*. In the Kriek (2019) study the *motivation to pursue the routes to psychological ownership* was also allowed to affect *gaining control*. The broad consistency of the findings on the influence of the *motivation to pursue the routes to psychological ownership* on the *routes to psychological*

[79] Lee (2017) and Kriek (2019) therefore found that *self-investment* affected *gaining intimate knowledge*, when controlling for the effect of *gaining control.*

ownership across the three studies bolster confidence in the basic position that the routes are causally interrelated.

Support was also attained for the positive relationship between *self-investment* and *integration of the job into the* self. As mentioned earlier, individuals who invest themselves (their energy, time, effort and attention) into a target causes the individual to become one with object (Pierce et al. 2001). Consequently, the individual may start to feel that the target of ownership flows from the self. Neither Lee (2017) nor Kriek (2019) included this latent variable in their models. Support was, however, not obtained for the hypothesis that self-investment would more strongly influence integration of the job into the self-identity if employees perceived themselves as having the ability to succeed at the job.

The empirical data also supported the hypothesised positive relationship between *task identity* and *gaining intimate knowledge*. This implies that the opportunity to do a whole and identifiable piece of work affords employees the opportunity to become familiar with each of the tasks that are associated with completing a piece of work. Therefore, increasing an employee's task identity will possibly increase their intimate knowledge of the job or target of ownership. Neither Lee (2017) nor Kriek (2019) differentiated between the various specific job characteristics and therefore did not include this path in their models.

Support was also attained for the positive effect that *autonomy* has on *gaining control*. A*utonomy* offers individuals the luxury to have freedom, independence and discretion to make job-related decisions (e.g., scheduling of work and procedures used to perform the work). The creation of autonomy will offer employees the opportunity to satisfy important self-related needs, specifically the efficacy motivation and the associated development of the sense that "I am the cause". Therefore, increasing an employee's level of autonomy will have a positive impact on an employee's propensity to gain control over the job thus increasing their sense of "being the cause". Neither Lee (2017) nor Kriek (2019) differentiated between the various specific job characteristics and therefore did not include this path in their models.

Unfortunately, the relationship between *autonomy* and *gaining intimate knowledge* was not supported by the data. The researcher posited in Chapter 2 that increased levels of autonomy will improve the level as well as the depth of an employee's understanding of his or her job, because they will be obligated to make more job- related decisions which, in effect, requires that they gather and process more relevant job information. The lack of support for this relationship is somewhat disappoint as the theoretical argument made sense. However, the data

may suggest that other factors such as tenure of holding a job could also impact *gaining intimate knowledge*. Neither Lee (2017) nor Kriek (2019) differentiated between the various specific job characteristics and therefore did not include this path in their models.

The fact that the hypothesised positive influence of *gaining intimate knowledge* on *integration of the job into the self-identity* was also not supported by the data was a rather disappointing finding. Chapter 2 provided the example of a gardener who comes to regard the garden as his or her own as a result of working the garden and becoming familiar with it. Through this process the gardener becomes one with the garden (grounded in and with it). Beaglehole (1932) claimed that when an object comes to be known intimately by an individual, it becomes part of the extended self. As a result, it can be argued that knowing an object intimately contributes to the degree to which the target is integrated into the self- identity. The data, however, suggests that the process of *gaining intimate knowledge* does not lead to *integration of the job into the self-identity*. Upon further consideration, this position does seem to make theoretical sense since a person may learn certain things about their job which they do not identify with or which they do not even like. In other words, gaining knowledge of a job does not necessarily ensure that the job will become part of a person's self-identity. Moreover, this line of reasoning suggests that the route of gaining knowledge could have a positive effect on the *integration of the job into the self-identity,* provided that the knowledge gained about the job is compatible with their perception of who they are and who they would like to be or simply the perceived attractiveness of the job. This in turn points to the necessity of including a moderator variable like for example *perceived attractiveness of the job*.

Support was obtained for the hypothesis that *gaining control* positively affects *feelings of efficacy*[80]. The more employees invest time and energy to master their jobs the more they experience the self-belief that they can successfully cope with the demands of their job and achieve their job goals. Neither Lee (2017) nor Kriek (2019) included the *feelings of efficacy* latent variable in their models. A highly pleasing finding was that the empirical evidence supported both the feedback loops contained in the model, namely the positive relationship between *integration into the self* and *self-identity motive*, and the positive influence of *feelings of efficacy* on the self-*efficacy motive.* This process pertains motivation, *effectance* in this case, that drives certain behaviour such as self-investment that in turn influences the extent to which a person gains control that in turn influences a person's *feeling of efficacy*. This degree of

[80] In interpreting the latent variable *feelings of efficacy* the emphasis should be on self-efficacy related to the job specifically.

feelings of efficacy positively feeds back into the degree to which a person experiences the efficacy motive the feedback loop therefore fuels the conative engine since a person who has high *feelings of efficacy* experiences the *root need for self-efficacy/effectance more strongly* which in turn *maintains and strengthens* those *feelings* of efficacy. Similarly, the degree to which the *target of ownership is integrated into the self-identity*, due to *investing the self* feeds back and fuels the conative engine by increasing the salience of the *root need for self-identity*. The two feedback loops therefore entail a cyclical process that deepens the experience of *psychological ownership*. As Dittmar (1992, p. 86) put it "our sense of identity, our self-definitions, are established, maintained, reproduced and transformed". This implies that the degree to which an object is *integrated into the self-identity* will influence an individual's *self-identity motive*. When an object is integrated into the self, the person will be motivated to maintain that sense of identity. Feedback loops in explanatory structural models are important so as to reflect the fact that human behaviour is dynamic and adaptive. The characteristics that in the past affected individuals' behaviour change through the interpretation of the consequences in the present of the past behaviour. The support that the current study found for its hypothesised feedback loops therefore stands in welcome contrast to the failure of both Lee (2017) and Kriek (2019) to obtain support for their hypotheses that *psychological ownership* feeds back onto the *motivation to pursue the routes to psychological ownership* (Lee, 2017) or that *psychological ownership* feeds back onto the salience of the root needs (Kriek, 2020).

The data supported the hypothesis that the satisfaction of the self-identity motive, defined as *integration of the job into the self*, will positively influence an individual's experienced levels of *psychological ownership*. Therefore, in contrast to Lee (2016) who regarded the *routes to psychological ownershi*p as having a direct impact on experienced levels of psychological ownership, this study suggests that these routes (*self-investment*, gaining *intimate knowledge*, gaining *control*) simply act as the behavioural domain of the construct *psychological ownership* through which an individual learns about the consequences of that behaviour, and in turn evaluates the target either as an extension of the self or not.

Following the same line of reasoning as above, the hypothesised relationship between *feelings of efficacy* and *psychological ownership* was supported. Therefore, *feelings of efficacy* can be regarded as the satisfaction of the efficacy motive. According to Pierce et al. (2003) "exploration of, and the ability to control one's environment gives rise to feelings of efficacy, which arises from being the cause". Efficacy is embedded in the motivation of and meaning of

psychological ownership. Therefore, experiencing positive *feelings of efficacy* will positively influence a person's experienced levels of *psychological ownership*.

6.2.5. EVALUATION OF THE RESPONSE SURFACE ANALYSES

Lee (2017) argued that if congruency between the *salience of the individual's root needs* and the job characteristics is perceived then the individual 313should be *motivated to pursue the routes to psychological ownership*. Therefore, the supplementary fit between the salience of an employee's root motives/needs and the job characteristics was regarded as crucial for development of *motivation to pursue the routes to psychological ownership*. The current study, however, attempted to understand the individual effects of the subscales of the *root needs* (*self-identity motive, self-efficacy motive*) and the perceived ability of the job to satisfy these root needs (the *perceived ability of the job to satisfy the self-identity need* and the *perceived ability of the job to satisfy the self-efficacy need*). This required the inclusion of 6 more phantom latent variables that could explain unique variance in *motivation to engage in the routes to psychological ownership*. However, the inclusion of these phantom variables exacerbated the danger of inadmissible parameter estimates that Lee (2017) experienced and it also created the need for a large sample due to the increased number of freed parameters to be estimated. Since, the researcher failed to meet the sample size target of 500 participants (397), it was decided to remove these phantom variables from the fitted structural model in order to decrease the number of parameters that needed to be estimated. It was therefore no longer possible to examine the hypotheses that the degree and nature of the congruence as well as the nature and degree of incongruence between the *salience of the psychological ownership root needs* and the *perceived ability of the job to satisfy these root needs* affect the *motivation to pursue the routes to psychological ownership* as components in a larger psychological mechanism. Therefore, rather than not utilise the available data at all, traditional observed-score polynomial regression analyses with response surface analysis were used to separately describe the manner in which the *motivation to pursue the routes to psychological ownership* responds to changes in the degree and nature of the congruency (or the fit) and the nature and degree of incongruence between the *salience an individual's root needs* and the *perceived ability of the job (characteristics) to satisfy those needs*, without taking any other determinants of *motivation to pursue the routes to psychological ownership* into account. It is acknowledged that this approach did not offer the opportunity, as was originally intended, to study the effect of fit, and the lack of it, between the *salience of the root needs* and the *perceived ability of the job to satisfy the root needs* on the *motivation to pursue the routes to psychological ownership* as

components in a larger psychological mechanism regulating the levels of *psychological ownership* that employees experience. An in-depth understanding of *psychological ownership* lies spread over the whole of the richly interconnected nomological network of latent variables that directly and indirectly affect the level of psychological ownership that employees experience. Dissecting the larger model into smaller narrow-focus models does not optimally contribute to the understanding of the complex mechanism at work.

Therefore, regrettably, the current study performed two separate observed score polynomial regression with response surface analyses in order to gain some understanding of the manner in which congruence and incongruence between the two root needs (*self-identity need, self-efficacy need*) and the *perceived ability of the job to satisfy those needs* affect *motivation to engage in self-investment.*

Inspection of the response surface test values describing the *motivation to pursue the routes to psychological ownership* as a function of the congruence and incongruence between the *salience of the self-identity need* and *the perceived ability of job to satisfy the self-identity need* revealed positive and statistically significant a_1 and a_2 ($p < .05$) test values. $H0_{233a}$ and H0**233b** could therefore both be rejected. Support was therefore found for the hypothesised increase in *motivation to pursue the routes to psychological ownership* along the line of congruence as congruence moves from low *self-identity need* and low *perceived ability of job to satisfy self-identity need* to high *self-identity need* and high *perceived ability of job to satisfy self-identity*. Furthermore, support was also obtained for the hypothesised convex relationship between *motivation to engage in in the routes to psychological ownership* and congruence *in the self-identity need* and *perceived ability of job to satisfy self-identity need as one moves from - -* congruence to + + congruence. A statistically insignificant ($p > .05$) a_3 was obtained, which implies that hypothesis H_{0234a}: $a_{3 = 0}$ could not be rejected. Support was therefore not found for the hypothesised increase in *motivation to pursue the routes to psychological ownership* along the line of incongruence as incongruence moves from low *self-identity need* and high *perceived ability of job to satisfy self-identity need* to high *self-identity need* and low *perceived ability of job to satisfy self-identity*. The positive statistically significant ($p < .05$) a_4 indicated that *motivation to pursue the routes to psychological ownership* changes convexly along the lines of incongruence as incongruence moves from 00 outward to low *self-identity need* and high *perceived ability of job to satisfy self-identity need* and from 00 outward to high *self-identity need* and low *perceived ability of job to satisfy self-identity*. Consequently, hypothesis $H_{0234\,b}$: $a_4 = 0$ was rejected. Support was therefore not obtained for the substantive hypothesis that

motivation to engage in the routes to psychological ownership changes linearly as incongruence changes from the perception that the job does allow the satisfaction of the self-identity need combined with low salience of the self-identity need to the perception that the job does not allow the satisfaction of the self-identity need combined with high salience of the self-identity need. Hypothesis 13 was therefore not corroborated although Hypothesis 12 was corroborated. The current study therefore found a *motivation to pursue the routes to psychological ownership* response surface in a *self-identity need* x *perceived ability of the job to satisfy the self-identity need* space that had a shallow cup-like structure along both the line of congruence and incongruence but that the cup was slightly tilted along the line of incongruence with a higher lip at the + + congruence end but not tilted along the line of incongruence with the lips level at both ends.

Inspection of the response surface test values *motivation to pursue the routes to psychological ownership* as a function of the congruence and incongruence between the *salience of the self-efficacy need* and *the perceived ability of job to satisfy the self-efficacy need* revealed a positive and statistically significant ($p < .05$) a_1 and a statistically insignificant ($p > .05$) a_2 thereby implying that H_{0241a} could be rejected but H_{0241b} could not be rejected. Thus support was found for the hypothesised increase in *motivation to pursue the routes to psychological ownership* along the line of congruence as congruence moves from low *self-efficacy need* and low *perceived ability of job to satisfy self-efficacy need* to high *self-efficacy need* and high *perceived ability of job to satisfy self-efficacy need*. The insignificant a_2 implies that support was not found for the hypothesised convex relationship between the *self-efficacy need* and *perceived ability of job to satisfy self-efficacy need* congruence and *motivation to engage in self-investment* along the line of congruence. A positive and statistically significant ($p < .05$) a_3 was obtained, which implies that *motivation to pursue the routes to psychological ownership* increases along the line of incongruence as incongruence moves from low *self-identity need* and high *perceived ability of job to satisfy self-identity need* to high *self-identity need* and low *perceived ability of job to satisfy self-identity*. H_{0242a}: $a_3 = 0$ was therefore rejected. Furthermore, the positive statistically significant ($p < .05$) a_4 indicated that *motivation to pursue the routes to psychological ownership* changes convexly along the lines of incongruence as incongruence moves from 00 outward to low *self-identity need* and high *perceived ability of job to satisfy self-identity need* and from 00 outward to high *self-identity need* and low *perceived ability of job to satisfy self-identity*. Consequently, hypothesis H_{02242b}: $a_4 = 0$ was rejected. Hypothesis 14 was therefore only partially corroborated although Hypothesis 15 was

fully corroborated. The current study therefore found a *motivation to pursue the routes to psychological ownership* response surface in a *self-efficacy need* x *perceived ability of the job to satisfy the self-efficacy need* space that had a straight ramp-like structure along both the line of congruence and a cup-like structure along the line of incongruence with the ramp increasing towards + + congruence but with the cup was slightly tilted along the line of incongruence with a higher lip at the + - incongruence end.

Lee (2017) obtained a similar result than the current study did with regards to Hypothesis 14, but a different result with regards to Hypothesis 15[81]. Similar to the current study she also found that *motivation to pursue the routes towards psychological ownership* increases as one moves along the line of congruence from - - to + + and that it does so linearly. She moreover found that *motivation to pursue the routes towards psychological ownership* changed convexly along the line of incongruence but that the height of the convex response surface did not significantly differ under the two extreme forms of incongruence. Kriek (2019) did not investigate the effect of congruence/incongruence in *root need salience* and the *perceived ability to satisfy the root needs* on the *motivation to pursue the routes to psychological ownership*.

6.3. LIMITATIONS OF THE STUDY

The first limitation of the current study relates to the sampling technique that was used to recruit participants that are representative of the target population. Since the study investigated feelings of *psychological ownership* experienced by employees in general, operationalising the target population via a sampling population that minimises the sampling gap proved to be quite challenging. Furthermore, organisations are generally reluctant to partake in a study that seemingly provides them with no return on their efforts. Therefore, convenience sampling was used which does not share the virtues of probability sampling due to the discretion that is involved of the participant in the sampling process. The researcher approached companies like Distell as well as public entities such as De Kuilen High school to obtain the data for the current study. The shortcoming of this is that certain contextual factors unique to these organisations might act as moderators. Furthermore, the psychological mechanisms that operates to determine the level of *psychological ownership* experienced by employees within the abovementioned organisations are assumed to be generalisable to all employees in South

[81] Lee (2017), however, differed from the current study in that she examined the effect of congruence/incongruence in *root need salience* and the *perceived ability to satisfy the root need* on the *motivation to pursue the routes to psychological ownership* by combining all three root needs in the two predictor measures.

Africa. However, it is not implied that the levels of the latent variable comprising the psychological mechanism are the same across organisational contexts. Furthermore, social media platforms such as Instagram and Facebook were used to reach the target population. It is acknowledged that these platforms could have jeopardised the diversity of the sample due to the demographics of the participants being similar to that of the researcher. Therefore, the results of this study should be generalised to the target population with great circumspection.

Secondly, not all of the measurement instruments were sufficiently reliable (i.e. *locus of control*). Future research should identify and make use of better measurement tools that are developed to assess the *locus of control* construct.

Thirdly, some of the multidimensional latent variables may not have been accurately captured or portrayed in the *psychological ownership* structural model (i.e. *motivation to pursue the routes to psychological ownership* and *perceived ability* and *gaining control*). Although the subdimensions of these variables were assessed empirically, the model did not explicitly reflect or investigate their various subdimensions separately. The fact that these aforementioned multidimensional variables were reflected in a somewhat oversimplified manner is a shortcoming of this study.

Finally, the sample size was another major shortcoming in this study. The sample size fell substantially short of the Bentler and Chou (1987) guidelines on the ratio of sample size to number of parameters estimated (n=1185 in this study)). The sample size, however, did meet the minimum requirement for the revised comprehensive *psychological ownership* structural model so that the freed model parameters that had to be estimated in the sample (114) did not exceed the number of observations in the sample (n=397) and the ratio of observations to freed parameters of 3.48: 1 roughly approximated Bentler and Chou (1987) lower bound.. However, the sample size in the current study is not ideal. Therefore, the study runs the risk of not accurately reflecting the population the sample was drawn from.

6.4. RECOMMENDATIONS FOR FUTURE RESEARCH

The following section presents the data- as well as theory- driven recommendations for future research.

6.4.1. DATA DRIVEN RECOMMENDATIONS FOR FUTURE RESEARCH

The modification indices calculated for the gamma and beta matrices serve the purpose of indicating possible ways of modifying the *psychological ownership* structural model. More

specifically, the modification indices calculated for **Γ** and **B** indicate paths in the model that, if set free, would statistically significantly ($p < .01$) improve the fit of the model. However, the deliberation whether to add an additional path should be based on the substantive theoretical argument for the change (Diamantopoulos and Siguaw, 2000). Furthermore, the researcher should interpret the magnitude of the standardised expected change in conjunction with the modification indices. The expected change should be sufficiently large to justify the modification or addition and the sign should dovetail with the substantive theoretical justification for the path (Lee, 2017).

The modification indices calculated for the gamma and beta matrices are depicted in Table 6.1 and Table 6.2. The modification indices for **Γ** indicated that 35 paths, if set free, would statistically significantly ($p < .01$) improve the fit of the model. Furthermore, the modification indices calculated for **B** revealed that 32 paths, if set free, would statistically significantly ($p < .01$) improve the fit of the model. It is important to take note that freeing all of the suggested gamma and beta paths would not necessarily statistically significantly ($p < .01$) improve the fit of the model. Therefore, the effect of freeing each currently fixed path on model has been evaluated one at a time. If any of the suggested modifications would be implemented, the modification index values for all remaining currently fixed parameters would change.

The modification indices depicted in Table 6.1 and 6.2 revealed that the path between *motivation to pursue the routes to psychological ownership* and *self-effectance need*, if set free, would result in the largest statistically significant ($p < .01$) improvement in the fit of the structural model as judged by the normal theory chi-square statistic (518.9795). It does seem to make theoretical sense that a reciprocal relationship could exist between one's needs for self-effectance and one's motivation to engage in activities that satisfy those needs. In other words, the need for self-efficacy will increase one's motivation to *pursue the routes to psychological ownership* and, in turn, the motivation will feed one's need for more self-effectance. The crucial question, however, is whether this feedback should be direct like the modification index suggests. Theoretically the current indirect feedback loop (for which empirical support was obtained) in which *motivation to pursue the routes to psychological ownership* affects *self-investment* that affects *gaining control* that affects *feelings of efficacy* that feeds back on to the *salience of the self-efficacy need* seems to make more substantive theoretical sense. Do these two causal mechanisms, however, necessarily have to be mutually exclusive? Vroom's (1964) conceptualisation of motivation is similar, if not essentially the

same, as Fishbein's (Fishbein and Ajzen, 1977) conceptualisation of intention[82]. Could it be that an increase in the intention to act in a manner that holds the perceived potential to satisfy a specific need heighten the salience or intensity of the experienced need? Need only actual satisfaction of a need feed back on the need? Could anticipated satisfaction not also feed back on the need as well? The modification indices calculated for the Kriek (2019) model did not indicate a statistically significant ($p < .01$) index value for the direct feedback loop from *motivation to pursue the routes to psychological ownership* to the *salience of the root needs*. In the Lee (2017) the *salience of the root needs* was an exogenous latent variable and the path under discussion was therefore not included in the gamma and beta modification index matrices.

Table 6.1

*Modification indices for the gamma matrix (**Γ**)*

	PAJ_SI	TASK_ID	TASK_S	TASK_V	AUTON	INTERACT
MOTIV	- -	- -	- -	- -	- -	0.5538
SELF_IN	41.4430**	49.5440**	74.9959**	61.0092**	57.8140**	0.3698
CONTROL	5.0642	9.9437**	16.9390**	17.6437**	- -	1.6874
KNOW	2.8207	- -	16.8768**	0.0583	- -	8.7267**
INTGS	**112.3191****	54.9351**	66.2166**	28.6759**	**88.0293****	- -
FEFF	3.2523	4.6948	11.3984**	9.8100**	- -	0.3738
SELF_ID	9.0631**	3.9710	13.3682**	6.5830	8.0688**	0.0864
SELF_EF	39.0146**	39.9323**	41.8194**	33.9804**	43.0361**	0.5058
PO	14.0188**	30.0126**	23.6146**	19.2314**	30.1145**	1.7286

	PAJ_SE
MOTIV	- -
SELF_IN	50.7774**
CONTROL	12.3390**
KNOW	- -
INTGS	**96.4874****
FEFF	4.6920
SELF_ID	6.3993
SELF_EF	42.9732**
PO	26.0905**

** p< .01
Large modification index value shown in bold

Table 6.2

*Modification indices for the beta matrix (**B**)*

	MOTIV	SELF_IN	CONTROL	KNOW	INTGS	FEFF
MOTIV	- -	19.2100**	0.9315	0.4180	2.0044	19.3724**
SELF_IN	- -	- -	49.8895**	1.2960	40.2305**	33.3617**
CONTROL	1.0024	- -	- -	0.0088	2.9411	6.6082
KNOW	4.6698	- -	- -	- -	- -	6.5031
INTGS	42.2871**	- -	77.8222**	- -	- -	2.3962
FEFF	11.1619**	6.9869**	- -	22.0072**	0.0002	- -
SELF_ID	57.1532**	1.4177	7.2150**	10.889**7	- -	6.4990
SELF_EF	**518.9795****	0.1211	35.2126**	2.9322	30.4572**	- -

[82] Both see the motivation to act or the intention to act as the multiplicative combination of the subjective probability of salient outcomes (expectancies or beliefs) and the subjective evaluation of the worth of those outcomes (valence or evaluation).

PO	36.1515**	**81.3233****	41.1918**	60.6960**	- -	- -
	SELF_ID	SELF_EF	PO			
MOTIV	- -	- -	10.7523**			
SELF_IN	18.0255**	2.1575	82.2089**			
CONTROL	1.9194	0.1573	2.7190			
KNOW	21.5092**	1.5555	1.9459			
INTGS	2.7772	34.1009**	12.4172**			
FEFF	2.1405	66.8409**	19.1866**			
SELF_ID	- -	56.4900**	0.0184			
SELF_EF	73.5652**	- -	62.6249**			
PO	2.3716	34.2619**	- -			

** p< .01
Large modification index value shown in bold

The second largest modification index was the suggested path from *perceived ability of the job to satisfy self-identity need* and *integration of the self into the job* (112.3191). This relationship seems theoretically possible since it can be argued that the probability of a job becoming part of a person's 'sense of self' would be higher in cases where a person perceived the job characteristics as a possible means to satisfy the need for self-identity. Again, however, the important question is whether a direct causal relationship makes substantive theoretical sense. In the fitted structural model, the *perceived ability of the job to satisfy self-identity need* did affect *integration of the job into the self*, albeit indirectly mediated by *motivation to pursue the routes to psychological ownership* and *investing the self.* Moreover, empirical support for the latter indirect effect was obtained in the current study. This latter indirect effect makes more substantive theoretical sense than a direct effect.

The third largest modification index was the suggested path from *perceived ability of the job to satisfy the self-efficacy need* and *integration of the self into the job*. *Integration of self into the job* is defined in this study as the extent to which an individual identifies with a possible target of ownership and excepts the target as an extension of the self. This path made sense from a theoretical point of view in that one can argue that the feeling of self-efficacy or effectance is also rooted in the self-identity or the sense of a target of ownership being an extension of the self. As mentioned in Chapter 2, drawing on the work of Freud and Hendrick (1943), White (1959) suggested that the instinct to master is mainly aimed at exercising and developing the ego. Therefore, it can be argued that objects of possible ownership (such as a job) that is perceived as having the ability to satisfy the instinct to master could possibly directly influence the degree to which the target of possible ownership (the job) is integrated into the self (or the ego). But then again, the previous argument also applies here. The difference is though that in the fitted structural model the *perceived ability of the job to satisfy self-efficacy need* did not affect *integration of the job into the self* indirectly because of a statistically

insignificant ($p > .05$) path from *perceived ability of the job to satisfy self-efficacy need* to *motivation to pursue the routes to psychological ownership.* Such an indirect effect makes more substantive theoretical sense than a direct effect. It seems difficult to construct a convincing argument that eliminates motivation from any explanation of human action.

The fourth largest modification index was the suggested path from *autonomy* to *integration of the self into the job* (88.0293). This suggestion does not make theoretical sense in that any given job that offers an employee *autonomy* could not realistically cause that employee to automatically regard the job as an extension of the self. *Autonomy* only gives an employee the opportunity to travel the routes to psychological ownership, especially *gaining control* over the job. A possible explanation for the suggested additional path could be attributed to the composition of the sample of this study, where the majority or participants were from the same company (Distell).

The next highest modification index that exceeded the critical chi-square value of 6.64 and made theoretical sense was the proposed path leading from *self-investment* to *psychological ownership* (81.3233). As mentioned earlier, Pierce et al. (2001) argued that *psychological ownership* can be observed as a state that develops through certain routes, paths or experiences. Pierce et al. (2001) proposed that the opportunity to invest one's self into a target, the opportunity to have control over a target and the opportunity to gain knowledge about the target, leads to feelings of ownership. In contrast to the Lee (2016) psychological ownership structural model, this study suggested that following the three routes to psychological ownership will not directly influence an individual's experienced level of *psychological ownership,* but rather act as agents for satisfying the three (two in this study) motives for psychological ownership, namely the degree to which an individual has *integrated the target of ownership into his or her self-identity* and a sense of *efficacy that is gained from experiencing control over the target of ownership*. Support was obtained in the current study for this argument. This modification was predominantly motivated by the work of White (1956) who focused on the motives for environmental exploration, control, and subsequent feelings of efficacy. The validity of this proposition, however, does not depend on its exclusivity. The current data suggests that traveling the *self-investment* route to *psychological ownership* does indeed lead directly to feelings of *psychological ownership* in a model that makes provision for the indirect effect of *self-investment* and *gaining control* on *psychological ownership*. Both Lee (2017) and Kriek (2019) found support for the direct effect of *self-investment* on *psychological ownership,* albeit without controlling for the effect of *feelings of efficacy* and *integration of the*

job into the self-identity[83]. Therefore, it would make theoretical sense to include this suggested path within the *psychological ownership* structural model, should the model be used in future empirical research. Freeing the path from self-investment to psychological ownership in the current study improved the RMSEA to .076 and resulted in a statistically significant positive β_{92} estimate[84]. When allowing all three routes to directly affect *psychological ownership*, the unique influence *self-investment* (β_{92}), *gaining intimate knowledge* (β_{94}) and *gaining control* (β_{93}) on *psychological ownership* were all three positive and statistically significant ($p < .05$). The effect of *feeling of efficacy* and *integration of the job into the self-identity* on *psychological ownership* remained statistically significant ($p < .05$)[85].

In addition to adding and/or removing paths between existing latent variables, the multiple correlations calculated for the endogenous latent variables should also be considered in order to determine whether additional latent variables are required in the current model to reach an adequate explanation of *psychological ownership.* The squared multiple correlations (R^2) indicated that the *psychological ownership* structural model was able to explain 45% of variance in *psychological ownership,* which was the focal endogenous latent variable in this study. The model provided a somewhat disappointing explanation of the variance in *self-investment* (15%), *integration of the job into the self* (22%), *feelings of efficacy* (14%), *self-identity need* (17%) and *self-efficacy need* (12%). Therefore, a greater understanding of the factors underlying these endogenous latent variables are required in order to improve our knowledge on possible ways to influence these variables in organisations.

6.4.2. THEORY DRIVEN RECOMMENDATIONS FOR FUTURE RESEARCH

The current study expanded and modified the Lee (2017) *psychological ownership* structural model by treating the *psychological ownership* root needs independently rather than collectively. The job characteristics were also included separately into the structural model to improve the understanding of the effect that these variables have on the other latent variables that are at work underpinning levels of *psychological ownership.* Additionally, the proposed

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[83] Lee (207) and Kriek (2019) found support for the direct effect of all three routs on psychological ownership. It is worthy of note that the modification index values associated with these three paths are all three statistically significant ($p < .01$) in the current study.

[84] The path coefficients β_{95} and β_{96} reflecting the influence of *integration of the job into the self-identity* on *psychological ownership* and the influence of *feelings of efficacy* on *psychological ownership* both remained statistically significant ($p < .05$).

[85] Worthy of note is that the addition of these three paths to the structural model amplified LISREL's insistence that a path from motivation to pursue the routes to psychological ownership to the salience of the self-efficacy motive would statistically significantly ($p < .01$) improve the of the model by decreasing the normal theory chi-square fit statistic by 3714.3891. The question, however, remains why would the assessment that an attempt to travel the routes would likely be successful and would be rewarding would in and by itself increase the *salience of the self-efficacy need* (and the *salience of the self-identity need*).

structural model included two other moderator variables, namely *internal locus of control* and *perceived ability.* It is assumed that the extent to which an employee has an *internal locus of control* will moderate the effect that control has on the extent to which the individual experiences feelings of efficacy. Furthermore, is hypothesised that individuals who have a high *perceived ability* will moderate the effect that *self-investment* has on the extent to which the individual *integrates the target into the self*. An internal *locus of control x control* interaction effect was therefore hypothesised to affect the experiences feelings of efficacy. Likewise, a *perceived ability x self-investment* interaction effect was hypothesised to affect the extent to which the individual *integrates the target into the self.*

The proposed *psychological ownership* structural model also added valuable insight into the knowledge base of the construct by presenting a convincing argument for the inclusion of a "satisfaction factor" (of the root needs). This study suggests that certain routes (*self-investment*, *gaining intimate knowledge*) act as the behavioural domain of the construct *psychological ownership* through which an individual learns about the consequences of that behaviour, and in turn evaluates the target either as an extension of the self or not (*integration of the job into the self)*. While other routes (*control)* allows an individual the freedom to control their environment and be the cause of *feelings of self-efficacy.*

Although this study has led to a better understanding of the manner in which *psychological ownership* comes about, a lack of understanding exists within the present structural model with regards to the practical ways of ensuring the above-mentioned factors are present in the organisation. A few job characteristics (included in the model) can assist in the process of developing *psychological ownership*. It cannot assure that employees will develop *psychological ownership* toward their work, since *psychological ownership* is by its very nature a personal experience involving many subjective evaluations of certain targets. This suggests that the need exits for future research to elaborate the proposed *psychological ownership* structural model with latent variables that determine the subjective evaluation of the job as worthy of psychological purchase. Future research should specifically focus on the consequences of experienced feelings of *psychological ownership* by investigating the relationship that *psychological ownership* has with *job performance*, specifically contextual performance, such as *extra role behaviours* and *counter productive workplace behaviours*. The manner in which *state engagement* (Bailey, Madden, Alfes & Fletcher, 2017; Schaufeli, Salanova, González-Romá & Bakker, 200) is positioned within the larger nomological net also needs to be clarified. For an employee to experience vigour, dedication and absorption

(Schaufeli et al., 2002), it seems reasonable to argue that the employee needs to *personally engage* in the Kahn (1990) sense of the term by *investing the self* into the job. But does *state engagement* flow from *psychological ownership*, does it occur parallel with *psychological ownership* or *psychological ownership* flow from *state engagement*?

Due to practical considerations and time constraints the current study only investigated the influence that *task identity, task significance, task variety* and *autonomy* has on the other antecedents of *psychological ownership.* It is recommended that future research should investigate the effects that regular comprehensive *feedback* has on an individual's *perceived ability.* Consideration should also be given to the possibility that the *job characteristics* could differentially affect the *perceived ability of the job to satisfy the self-identity need* and the *perceived ability of the job to satisfy the self-efficacy need.* Consideration should moreover, be given to the possibility that the effect of the *job characteristics* on the *motivation to pursue the routes to psychological ownership* is fully mediated by *the perceived ability of the job to satisfy the self-identity need* and the *perceived ability of the job to satisfy the self-efficacy need.*

An important limitation of this study is that it did not include the latent interaction effects between the root *needs* and the individual job characteristics due to the fact that this will create an extensively large number of parameters which will require a large sample that is not easily accessible. Future research should include these phantom variables in perhaps a reduced model that only investigates the *motivational* aspect to *engage in self-investment.*

Furthermore, Hofstede's (1980) individualism versus collectivism dimension, contained in his proposed cultural framework, has proved to manifest itself in an individual's self-identity through his/her basic motives for actions within organisations (Van Dyne *et al.*,2000). McIntyre *et al.* (2009) proposed that a positive relationship should exist between individualisms and the self-identity motive and place to dwell motive or roots of *psychological ownership*. Moorman and Blakely (1995) demonstrated a significant relationship between individualism- collectivism and *organisational citizenship behaviour*. Therefore, it would be prudent to examine the possible influences that these cultural differences might have on both the antecedents of *psychological ownership* and the consequences of *psychological ownership.*

The researcher acknowledges that the danger exists in accepting the first most obvious interpretation of any established relation in the process of investigating a complex phenomenon with multiple potential influences. Therefore, it is suggested that future research should focus on the additional cognitive and/or non-cognitive person-centred latent variables as well as

situation-centred latent variables influencing levels of *psychological ownership* within individuals in an organisational context. The work of Kahn (1990) on the prerequisites for *personal engagement* constitute fertile ground for further cognitive and/or non-cognitive person-centred latent variables that could affect *self-investment* via the *motivation to pursue the routes to psychological ownership*.

6.5. PRACTICAL MANAGERIAL RECOMMENDATIONS

The level of *psychological ownership* experienced by employees is not the outcome of some random event but rather determined by a complex nomological net of latent variables characterising the employee and their work environment. Because it is determined, the level *psychological ownership* that employees experience can potentially be influenced. The potential to influence the level of *psychological ownership* that employees experience is, however, depended on the extent to which the underlying nomological net of determinants is validly understood. This dependency formed an important part of the argument that motivated the current study in Chapter 1 and it motivated the motivated the Lee (2017) and the Kriek (2019) studies on *psychological ownership*. The acid test for any explanatory model is therefore the number of effective practical interventions that can be derived from it. Developing and testing an explanatory *psychological ownership* structural model would be of no use if the model did not shed some light on the possible ways in which *psychological ownership* can be influenced/manipulated/ controlled in the workplace. Therefore, it is imperative to derive practical/managerial solutions on how to manipulate or control *psychological ownership*, given the findings obtained in the current study.

It is important to determine whether the direct and indirect determinants of psychological ownership contained in the explanatory structural model are malleable or non-malleable latent variables. A latent variable as a characteristic of a person or situation is considered malleable to the extent that the level (or nature) of the characteristic of the specific person or situation can be altered (e.g. the of *knowledge level* a person has on a specific topic or the *autonomy* of a job). A latent variable as a characteristic of a person or situation is considered non-malleable to the extent that the level (or nature) of the characteristic of the specific person or situation cannot be altered (e.g. the of *conscientiousness* of a person has on a specific topic or the *autonomy* of a job). However, the extent to which a latent variable is malleable should perhaps not be reduced to a binary variable. Rather one should regard the malleability of these latent variables as continuum where it is easier or more difficult to influence the level of the latent variable through an intervention.

The connotative meaning of latent variables or constructs refers to the abstract idea that the (name of) the construct represents and that we have in mind (Kerlinger and Lee, 2000) when we use the (name of) the construct in explanations or descriptions. The connotative meaning of the latent variable lies in its internal structure and the manner in which it is structurally embedded in a larger nomological network. More importantly for the current reflection on practical managerial recommendations for enhancing psychological ownership though, the denotative meaning of a latent variable or construct refers to the observable behaviours in which the construct manifests itself and the observable situations (or conditions) that influence the level of the construct. The denotative meaning of stress can for example be described as being unable to sleep at night or as being forced to play numerous conflicting roles simultaneously. A distinction between behavioural denotations in which a focal latent variable observably expresses itself and observable situational denotations that affect the focal latent variable seems to be important here. The observable situational denotations that affect the focal latent variable are at the same time also behavioural denotations of another latent variable that, directly or indirectly, determines the level of the focal latent variable (i.e. that is causally linked to the focal latent variable in the nomological net). The distinction between the denotations of in which a latent variable observably expresses itself and observable situational denotations that affect the latent variable links with the distinction between measured and experimental operational definitions. Conceptualisation offers an intellectual or cognitive grasp on a construct. Operationalisation, in contrast, offers a practical grasp on a construct (Kerlinger and Lee, 2000). A measured operational definition describes the actions that need to be taken to obtain a measure of a latent variable by describing how the behavioural denotations in which the construct expresses itself need to be elicited, how the behavioural denotations need to be recorded and scored. An experimental operational definition describes the actions that need to be taken to affect the level (or nature) of a latent variable by describing how the situational denotations of the focal construct that affect the focal construct need to be created.

Milkovich, Boudreau and Milkovich (2008) distinguish between flow and stock interventions. All interventions are targeted at affecting either employee performance[86] or some person characteristic or situational characteristic that directly or indirectly affects performance. Flow interventions are typically directed at affecting non-malleable determinants of the latent variable that the intervention targets by controlling the flow of employees into the organisation,

[86] Employee work performance is here again conceptualised, lioke in Chapter 1, as a structurally interrelated set of structurally interrelated behavioural competencies and a structurally interrelated set of latent outcome variables.

up the organisation or out of the organisation. Examples of flow interventions include recruitment, selection, promotion, down-sizing, and job rotation. Flow interventions aimed at enhancing *psychological ownership* will therefore measure latent variables like the *salience of the self-identity need* and the *salience of the self-efficacy need*, attempt to predict expected *psychological ownership* from these measures and regulate the entry into positions within the organisation based on the expected *psychological ownership* score.

Stock interventions, in contrast, are typically directed at affecting malleable determinants of the latent variable that the intervention targets by altering the level or nature of the target latent variable in individuals already employed in a given job. Stock interventions affect the target latent variable by attempting to optimise the standing of current employees on the malleable determinants of the target latent variable by manipulating their denotations to a sufficient degree to have their expected standing on the target latent variable exceed a specified standard. Examples of stock interventions include training and development, job enrichment, financial incentives, leadership development and team building. The expectation is therefore that the experimental manipulation of the direct and/or indirect malleable determinants of *psychological ownership* (e.g. *autonomy* or *task significance*), by manipulating their denotations, will nudge the levels of these malleable latent determents to levels more conducive to *psychological ownership*.

The results indicate that in order to influence *psychological ownership,* attempts should be made to influence levels of *task identity* (via its effect on *gaining intimate knowledge)* and *autonomy* (via its effect on *motivation to pursue the routes to psychological ownership* and its effect on *gaining control).* Therefore, it seems reasonable to suggest that job design and job crafting could be used as possible interventions to influence levels of *psychological ownership*. The goal is to craft jobs that are stimulating, challenging and meaningful.

The empirical data supported the notion that the 'root' needs or motives (*self-identity motive* and *self-efficacy motive*) influence a person's *motivation to engage in self-investment*. The evidence suggested that the influence of the self-efficacy motive (.428) has a stronger influence on a person's *motivation to engage in self-investment*. This suggests that individuals might be more motivated to engage their self in a job because of their inherent need to be the cause of something, to feel as if they are in control, rather than for the need to attach their self-identity to the job. However, the current study does not consider the *salience* of these root needs to be malleable over short periods of time. This implies that selection or promotion might be the only viable short-term interventions. The challenging question arises whether *psychological*

ownership should be the criterion (rather than a higher-order performance construct such as expected *job performance*) that these proposed competency-based interviews or psychometric tests that assess the salience of the root needs should attempt to predict. From a labour legislation perspective, it would be considered illegal and unethical to deny applicants a job opportunity based on too low expected level of *psychological ownership* (considering *salience* of root needs). Furthermore, the extent to which feelings of ownership towards a job or organisation impacts performance on the job has not been definitively demonstrated empirically.

Support was also attained for the positive effect that *autonomy* has on *gaining control*. A*utonomy* offers individuals the luxury to have freedom, independence and discretion to make job-related decisions (e.g., scheduling of work and procedures used to perform the work). Therefore, increasing an employee's level of autonomy will have a positive impact on an employee's propensity to gain control over the job thus increasing their sense of "being the cause".

The empirical data also supported the hypothesised positive relationship between *task identity* and *gaining intimate knowledge*. This implies that the opportunity to do a whole and identifiable piece of work affords employees the opportunity to become familiar with each of the tasks that are associated with completing a piece of work. Therefore, managers should improve their employees' task identity as it might increase their intimate knowledge of the job or target of ownership.

Furthermore, the empirical data also supported the affect that the process of investing the self into a target has on the extent to which the individual attempts to *gain control* over the target and the extent to which the individual attempts to *gain intimate knowledge* about the target. Therefore, it can be deduced that the act of investing the self into a target will bring about the additional routes (*gaining intimate knowledge* and *gaining control*) to *psychological ownership* and this act of investing the self into a target is influenced by the root motives (*efficacy motive* and *self-identity motive*) of psychological ownership. Therefore, self- investment is regarded as a crucial behavioural conduit towards psychological ownership, which suggests that this variable should be viewed as the cornerstone of the development of psychological ownership. The question arises whether it is possible, through additional stock interventions to enhance employees' levels of self-investment through manipulation? In order to give an informed answer to this question, additional determinants that affect levels of self-investment (or *motivation to invest the self*) should be identified through theorising. The current model only

included certain *job characteristics* and *two root needs* as well as a congruence factor between the two first-order latent variables. Therefore, the following recommendations are more tentative than they would have been if the model had more clear descriptions of additional latent determinants.

Support was also attained for the positive relationship between *self-investment* and *integration into the* self. As mentioned earlier, individuals who invest themselves (their energy, time, effort and attention) into a target causes the individual to become one with the object (Pierce et al. 2001). Consequently, the individual may start to feel that the target of ownership flows from the self.

The hypothesised relationship between *feelings of efficacy* and *psychological ownership* was also supported. Therefore, *feelings of efficacy* can be regarded as the satisfaction of the efficacy motive. According to Pierce et al. (2003) "exploration of, and the ability to control one's environment gives rise to feelings of efficacy, which arises from being the cause".

Finally, due to the cyclical nature of the self to integrate and re-integrate and maintain itself, it was found that some targets of ownership can simply not be integrated into the self because of an individual's subjective evaluation of the degree to which that target of possible ownership is an extension of the self. This implies that some jobs can simply not be tailored to fit a person, since some individuals might subjectively perceive the target of ownership/ or job as having nothing in common with their self-identity. For instance, when a vegetarian finds himself/herself in a job that involves slaughtering chickens, he/she will probably not perceive the job to be an extension of the self. Therefore, it seems reasonable to suggest that job rotation, as an intervention, can be used to influence levels of *psychological ownership,* provided that managers allow their employees to spend enough time in a given job to gain *intimate knowledge, invest the self,* and gain some *control* over the job in order to make an evaluation with regards to the degree to which the target satisfies the self-identity motive and the extent to which the target satisfies an individual's self-effectance motive.

6.6 CONCUDING COMMENTS

Work need not be a necessary unpleasant burden that man needs to endure to earn the means for living after hours and over weekends and holidays. Work can be a source of employee wellbeing in that it can be an integral part of life in which man becomes who he fundamentally is and develops an appreciation of who he is. *Psychological ownership* plays an important role in unlocking the growth potential and wellbeing potential in meaningful work. Past, current

and future research on psychological ownership holds the key to empowering the human resource function to create optimal conditions for employees to take psychological ownership of their jobs.

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Appendix 1

UNIVERSITEIT•STELLENBOSCH•UNIVERSITY
jou kennisvennoot • your knowledge partner

STELLENBOSCH UNIVERSITY

CONSENT TO PARTICIPATE IN RESEARCH

DEVEOPMENT AND EMPIRICAL TESTING OF A PSYCHOLOGICAL OWNERSHIP STRUCTURAL MODEL

You are invited to participate in a research study conducted by Francois Klopper, Master of Commerce student, from the Department of Industrial Psychology within the Faculty of Economic and management Studies at Stellenbosch University. The results of this research study will greatly contribute towards the completion of the research component of the thesis and consequently the completion of his studies. You were selected as a possible participant in this study because the study requires an investigation into employees under full-time employment, within the financial sector. Your participation would be greatly appreciated but is totally on a voluntary basis.

1. **PURPOSE OF THE STUDY**

In response to the research initiating question, why does variance exist among different employees working in different organisational contexts, the objective of this research study is to develop an explanatory psychological ownership structural model (by expanding and modifying Angela Lee's proposed psychological ownership structural model), as well as to empirically test the validity of the model. It is hoped that this model will provide a description of the psychological mechanism that regulates the level of psychological ownership that employees experience.

2. **PROCEDURES**

If you are interested in participating in this research study, we would ask you to do the following things:

2.1. Provide voluntary, informed consent

Voluntary informed consent means that you as the participant agree to partake in this research study and that you understand your rights and responsibilities. Most importantly, you understand that you can withdraw at any stage without the risk of any negative consequences. Additionally, the questionnaires will be confidential and no identifying questions (i.e. your name) will be asked. Once you have provided your informed consent (by agreeing on the online questionnaire) you will be directed to the psychological ownership questionnaire by following a weblink.

2.2. Questionnaire completion

The questionnaire will be presented in an online format (that is mobile device friendly). The questionnaire should take about 30 minutes to complete. There are no right or wrong answers and there is also no time limit. Please set aside a quiet time and place to complete this questionnaire and answer the questions as honestly as possible, bearing your current job in mind. Your responses will be captured electronically and automatically stored for processing.

3. **POTENTIAL RISKS AND DISCOMFORTS**

There are no foreseeable harmful risks for you as a participant. However, the completion of the questionnaire will entail time and energy on your account.

4. **POTENTIAL BENEFITS TO SUBJECTS AND/OR TO SOCIETY**

All participants in this study will be eligible for an entry into a lucky draw to win a 32- inch Samsung LED television. Other than this you as a participant may not directly benefit from your participation in this study. However, your participation could potentially greatly benefit the field of industrial psychology. Your participation could help to generate understanding surrounding feelings of ownership within the workplace. The development of this model of psychological ownership will create a deeper understanding of employees and how they experience psychological ownership at work. This in turn could aid in the understanding of interventions (in terms of employee wellness, incentives, job redesign and the like) aimed at increasing levels of psychological ownership for employees, benefiting both the employees and the organisation.

Your participation will also benefit the field of industrial psychological and provide a deeper understanding of working man.

5. **PAYMENT FOR PARTICIPATION**

There is no offer of payment for participation in this study. This extends to both the organisation and the employee.

6. **CONFIDENTIALITY**

Any information that is obtained in connection with this study and that can be identified with you will remain confidential and will be disclosed only with your permission or as required by law. Confidentiality will be maintained by several means, briefly described below:

- Coding and access to questionnaire data

The questionnaires utilise a system that cleans the sending information. This means that the researcher will not be able to identify the source of the questionnaire data. You will additionally not be asked for any information that directly links to your identity, such as your name or a physical address. The information you supply will therefore be done anonymously.

Furthermore, the data received will only be accessible by Francois Klopper, Professor Theron of the Industrial Psychology Department at Stellenbosch. Any access to the data will be protected by the use of a password protected computer to which access is restricted.

- Questionnaire results

Upon completion of the thesis information supplied to either the public (the thesis is available online via the Stellenbosch Library E-thesis portal) or to the organisation, which will only be supplied on an aggregate basis – again, ensuring anonymity. This information is supplied in order to uplift the research community, to inform organisational interventions and to strengthen the body of knowledge available within the academic field of Industrial psychology. Should the researcher feel that publishing results of the study, within an academic environment, is pertinent, results will also be provided in an aggregate manner and all participant information will be aggregated. The researcher will endeavour to protect all participants' confidentiality and anonymity rights at all costs.

7. **PARTICIPATION AND WITHDRAWAL**

You can choose whether to be in this study or not. If you volunteer to be in this study, you may withdraw at any time without consequences of any kind.

8. **IDENTIFICATION OF INVESTIGATORS**

If you have any questions or concerns about the research, please feel free to contact:

- Francois Klopper on francoisklop@gmail.com or 0798845513 - Professor Callie Theron, at the department of Industrial Psychology, 021 8083009 or ccth@sun.ac.za

9. RIGHTS OF RESEARCH SUBJECTS

You may withdraw your consent at any time and discontinue participation without penalty. You are not waiving any legal claims, rights or remedies because of your participation in this research study. If you have questions regarding your rights as a research subject, contact Ms Maléne Fouché [mfouche@sun.ac.za; 021 808 4622] at the Division for Research Development at Stellenbosch University.

Appendix 2

SINGAPORE STATEMENT ON RESEARCH INTEGRITY

http://www.singaporestatement.org/

PRINCIPLES

Honesty in all aspects of research

Accountability in the conduct of research

Professional courtesy and fairness in working with others

Good stewardship of research on behalf of others

RESPONSIBILITIES

1. Integrity: Researchers should take responsibility for the trustworthiness of their research.

2. Adherence to Regulations: Researchers should be aware of and adhere to regulations and policies related to research.

3. Research Methods: Researchers should employ appropriate research methods, base conclusions on critical analysis of the evidence and report findings and interpretations fully and objectively.

4. Research Records: Researchers should keep clear, accurate records of all research in ways that will allow verification and replication of their work by others.

5. Research Findings: Researchers should share data and findings openly and promptly, as soon as they have had an opportunity to establish priority and ownership claims.

6. Authorship: Researchers should take responsibility for their contributions to all publications, funding applications, reports and other representations of their research. Lists of authors should include all those and only those who meet applicable authorship criteria.

7. Publication Acknowledgement: Researchers should acknowledge in publications the names and roles of those who made significant contributions to the research, including writers, funders, sponsors, and others, but do not meet authorship criteria.

8. Peer Review: Researchers should provide fair, prompt and rigorous evaluations and respect confidentiality when reviewing others' work.

9. Conflict of Interest: Researchers should disclose financial and other conflicts of interest that could compromise the trustworthiness of their work in research proposals, publications and public communications as well as in all review activities.

10. Public Communication: Researchers should limit professional comments to their recognized expertise when engaged in public discussions about the application and importance of research findings and clearly distinguish professional comments from opinions based on personal views.

11. Reporting Irresponsible Research Practices: Researchers should report to the appropriate authorities any suspected research misconduct, including fabrication, falsification or plagiarism, and other irresponsible research practices that undermine the trustworthiness of research, such as carelessness, improperly listing authors, failing to report conflicting data, or the use of misleading analytical methods.

12. Responding to Irresponsible Research Practices: Research institutions, as well as journals, professional organizations and agencies that have commitments to research, should have procedures for responding to allegations of misconduct and other irresponsible research practices and for protecting those who report such behavior in good faith. When misconduct or other irresponsible research practice is confirmed, appropriate actions should be taken promptly, including correcting the research record. 13. Research Environments: Research institutions should create and sustain environments that encourage integrity through education, clear policies, and reasonable standards for advancement, while fostering work environments that support research integrity.

14. Societal Considerations: Researchers and research institutions should recognize that they have an ethical obligation to weigh societal benefits against risks inherent in their work.

Appendix 3

Proposed Items for Congruence Facet in The *Psychological Ownership Structural Model*

Perceived ability of job to satisfy self-identity need

1. The job allows me to deliver a piece of work that helps me understand who I am within my job role.
2. The job requires me to use a number of high-level skills that helps me explore my own identity within my job.
3. The job is very significant and important which helps me to understand my role in the organisation/society.
4. The job allows me to use personal initiative and judgment to personalise my workspace which gives me an 'at home' feeling.
5. The job gives me freedom to personalise my work methods that allows me to express my identity.
6. After I finish a job, I receive feedback on my performance that makes me feel like I belong in the organisation.

Perceived ability of job to satisfy self-efficacy need

1. The job allows me to use personal initiative and judgment to take control of different aspects of my job
2. The job gives me freedom to personalise and make changes within my job.
3. The work allows me to deliver a whole and identifiable piece of work that allows me to control job outcomes.
4. The job requires me to use different complex skills which requires me to be resourceful and solve problems within my job role.
5. The job allows me the opportunity for independent thought and action.
6. I have the power to influence things that affect me on the job.

Appendix 4

Item	Valid N	Missing N	Mean	Median	Mode	Std. Deviation	Variance	Skewness	Std. Error of Skewness	Kurtosis	Std. Error of Kurtosis	Range	Minimum	Maximum	Skewness z	# Skewness significant	# Positively skewed	# Negatively skewed	# Symmetric	Kurtosis z	# Kurtosis	# Leptokurtic	# Platikurtic	# Mesokurtic
Q8	397	0	4.86	5.00	5.00	1.13	1.28	-0.54	0.12	0.20	0.24	5.00	2.00	7.00	-4.443	1	0	1	0	0.832	0	0	0	1
Q9	397	0	5.01	5.00	6.00	1.36	1.85	-0.39	0.12	-0.32	0.24	6.00	1.00	7.00	-3.164	1	0	1	0	-1.324	0	0	0	1
Q10	397	0	5.32	5.00	6.00	1.31	1.73	-0.50	0.12	-0.42	0.24	5.00	2.00	7.00	-4.115	1	0	1	0	-1.730	0	0	0	1
Q11	397	0	5.16	5.00	6.00	1.49	2.22	-0.49	0.12	-0.66	0.24	6.00	1.00	7.00	-3.975	1	0	1	0	-2.684	1	0	1	0
Q12	397	0	5.30	6.00	6.00	1.27	1.61	-0.90	0.12	0.62	0.24	6.00	1.00	7.00	-7.402	1	0	1	0	2.537	0	0	0	1
Q13	397	0	4.82	5.00	5.00	1.48	2.20	-0.60	0.12	-0.38	0.24	6.00	1.00	7.00	-4.934	1	0	1	0	-1.557	0	0	0	1
Q14	397	0	5.17	5.00	6.00	1.37	1.87	-0.81	0.12	0.12	0.24	6.00	1.00	7.00	-6.615	1	0	1	0	0.496	0	0	0	1
Q15	397	0	5.53	6.00	6.00	1.27	1.61	-0.90	0.12	0.75	0.24	6.00	1.00	7.00	-7.344	1	0	1	0	3.086	1	1	0	0
Q16	397	0	5.23	5.00	6.00	1.29	1.67	-0.77	0.12	0.21	0.24	6.00	1.00	7.00	-6.287	1	0	1	0	0.848	0	0	0	1
Q17	397	0	5.20	6.00	6.00	1.39	1.93	-0.75	0.12	-0.25	0.24	5.00	2.00	7.00	-6.139	1	0	1	0	-1.012	0	0	0	1
Q18	397	0	4.67	5.00	5.00	1.41	1.99	-0.42	0.12	-0.72	0.24	6.00	1.00	7.00	-3.402	1	0	1	0	-2.951	1	0	1	0
Q19	397	0	5.33	6.00	6.00	1.45	2.11	-0.83	0.12	-0.03	0.24	6.00	1.00	7.00	-6.811	1	0	1	0	-0.111	0	0	0	1
Q20	397	0	5.76	6.00	6.00	0.98	0.96	-0.54	0.12	-0.39	0.24	4.00	3.00	7.00	-4.443	1	0	1	0	-1.611	0	0	0	1
Q21	397	0	5.66	6.00	6.00	1.05	1.10	-0.39	0.12	-0.57	0.24	4.00	3.00	7.00	-3.189	1	0	1	0	-2.352	0	0	0	1
Q22	397	0	5.84	6.00	6.00	0.98	0.96	-0.73	0.12	0.12	0.24	4.00	3.00	7.00	-5.951	1	0	1	0	0.480	0	0	0	1
Q23	397	0	6.02	6.00	6.00	0.97	0.94	-0.96	0.12	0.75	0.24	4.00	3.00	7.00	-7.877	1	0	1	0	3.090	1	1	0	0
Q24	397	0	5.79	6.00	6.00	1.06	1.12	-0.97	0.12	1.42	0.24	6.00	1.00	7.00	-7.918	1	0	1	0	5.807	1	1	0	0
Q25	397	0	5.36	6.00	6.00	1.20	1.44	-0.71	0.12	0.18	0.24	6.00	1.00	7.00	-5.844	1	0	1	0	0.721	0	0	0	1
Q26	397	0	5.62	6.00	6.00	1.16	1.34	-1.00	0.12	1.24	0.24	6.00	1.00	7.00	-8.197	1	0	1	0	5.094	1	1	0	0
Q27	397	0	5.61	6.00	6.00	1.23	1.52	-0.94	0.12	0.67	0.24	6.00	1.00	7.00	-7.713	1	0	1	0	2.734	1	1	0	0
Q28	397	0	4.63	5.00	4.00	1.26	1.58	-0.55	0.12	0.00	0.24	6.00	1.00	7.00	-4.475	1	0	1	0	0.012	0	0	0	1
Q29	397	0	4.53	5.00	5.00	1.48	2.19	-0.42	0.12	-0.65	0.24	6.00	1.00	7.00	-3.443	1	0	1	0	-2.676	1	0	1	0
Q30	397	0	4.61	5.00	5.00	1.47	2.15	-0.57	0.12	-0.57	0.24	6.00	1.00	7.00	-4.672	1	0	1	0	-2.336	0	0	0	1

Q31	397	0	4.14	4.00	5.00	1.62	2.64	-0.08	0.12	-1.00	0.24	6.00	1.00	7.00	-0.680	0	0	0	1	-4.107	1	0	1	0
Q32	397	0	4.59	5.00	5.00	1.33	1.78	-0.24	0.12	-0.76	0.24	5.00	2.00	7.00	-1.943	0	0	0	1	-3.111	1	0	1	0
Q33	397	0	4.42	5.00	5.00	1.60	2.55	-0.25	0.12	-0.79	0.24	6.00	1.00	7.00	-2.066	0	0	0	1	-3.250	1	0	1	0
Q34	397	0	3.64	4.00	4.00	0.85	0.72	-0.57	0.12	0.06	0.24	4.00	1.00	5.00	-4.689	1	0	1	0	0.225	0	0	0	1
Q35	397	0	3.38	3.00	3.00	1.03	1.07	-0.08	0.12	-0.70	0.24	4.00	1.00	5.00	-0.680	0	0	0	1	-2.873	1	0	1	0
Q36	397	0	3.48	4.00	4.00	0.93	0.86	-0.31	0.12	-0.71	0.24	4.00	1.00	5.00	-2.533	0	0	0	1	-2.918	1	0	1	0
Q37	397	0	3.90	4.00	4.00	0.90	0.81	-0.58	0.12	-0.25	0.24	4.00	1.00	5.00	-4.721	1	0	1	0	-1.025	0	0	0	1
Q38	397	0	3.53	4.00	4.00	0.95	0.91	-0.38	0.12	-0.51	0.24	4.00	1.00	5.00	-3.107	1	0	1	0	-2.090	0	0	0	1
Q39	397	0	3.33	3.00	4.00	0.93	0.86	-0.24	0.12	-0.39	0.24	4.00	1.00	5.00	-1.959	0	0	0	1	-1.611	0	0	0	1
Q40	397	0	3.59	4.00	4.00	0.94	0.88	-0.50	0.12	-0.09	0.24	4.00	1.00	5.00	-4.074	1	0	1	0	-0.357	0	0	0	1
Q41	397	0	3.63	4.00	4.00	0.92	0.85	-0.38	0.12	-0.51	0.24	4.00	1.00	5.00	-3.098	1	0	1	0	-2.086	0	0	0	1
Q42	397	0	3.66	4.00	4.00	0.93	0.87	-0.48	0.12	0.02	0.24	4.00	1.00	5.00	-3.959	1	0	1	0	0.082	0	0	0	1
Q43	397	0	3.46	4.00	4.00	1.07	1.14	-0.33	0.12	-0.59	0.24	4.00	1.00	5.00	-2.738	1	0	1	0	-2.398	0	0	0	1
Q44	397	0	3.42	3.00	4.00	1.00	1.00	-0.28	0.12	-0.44	0.24	4.00	1.00	5.00	-2.254	0	0	0	1	-1.795	0	0	0	1
Q45	397	0	3.13	3.00	4.00	1.06	1.13	-0.28	0.12	-0.73	0.24	4.00	1.00	5.00	-2.311	0	0	0	1	-2.975	1	0	1	0
Q46	397	0	3.72	4.00	4.00	0.87	0.75	-0.75	0.12	0.57	0.24	4.00	1.00	5.00	-6.123	1	0	1	0	2.336	0	0	0	1
Q47	397	0	2.92	3.00	3.00	1.17	1.36	-0.13	0.12	-0.88	0.24	4.00	1.00	5.00	-1.066	0	0	0	1	-3.607	1	0	1	0
Q48	397	0	3.93	4.00	4.00	0.74	0.54	-0.46	0.12	0.64	0.24	4.00	1.00	5.00	-3.803	1	0	1	0	2.615	1	1	0	0
Q49	397	0	2.95	3.00	4.00	1.22	1.50	-0.16	0.12	-1.02	0.24	4.00	1.00	5.00	-1.287	0	0	0	1	-4.172	1	0	1	0
Q50	397	0	3.15	3.00	4.00	1.02	1.03	-0.47	0.12	-0.41	0.24	4.00	1.00	5.00	-3.861	1	0	1	0	-1.660	0	0	0	1
Q51	397	0	3.62	4.00	4.00	0.76	0.58	-0.40	0.12	0.04	0.24	4.00	1.00	5.00	-3.279	1	0	1	0	0.156	0	0	0	1
Q52	397	0	3.97	4.00	4.00	0.79	0.62	-0.80	0.12	0.98	0.24	4.00	1.00	5.00	-6.533	1	0	1	0	4.025	1	1	0	0
Q53	397	0	3.97	4.00	4.00	0.70	0.49	-0.45	0.12	0.36	0.24	3.00	2.00	5.00	-3.672	1	0	1	0	1.492	0	0	0	1
Q54	397	0	4.04	4.00	4.00	0.71	0.51	-0.60	0.12	0.63	0.24	3.00	2.00	5.00	-4.893	1	0	1	0	2.566	0	0	0	1
Q55	397	0	3.26	3.00	3.00	0.88	0.78	-0.36	0.12	0.21	0.24	4.00	1.00	5.00	-2.951	1	0	1	0	0.840	0	0	0	1
Q56	397	0	3.65	4.00	4.00	0.77	0.60	-0.36	0.12	0.18	0.24	4.00	1.00	5.00	-2.975	1	0	1	0	0.721	0	0	0	1
Q57	397	0	3.89	4.00	4.00	0.76	0.59	-0.47	0.12	0.08	0.24	3.00	2.00	5.00	-3.820	1	0	1	0	0.324	0	0	0	1
Q58	397	0	3.77	4.00	4.00	0.77	0.60	-0.84	0.12	1.61	0.24	4.00	1.00	5.00	-6.861	1	0	1	0	6.590	1	1	0	0
Q59	397	0	3.98	4.00	4.00	0.65	0.42	-0.70	0.12	2.19	0.24	4.00	1.00	5.00	-5.721	1	0	1	0	8.988	1	1	0	0

Q60	397	0	3.73	4.00	4.00	0.78	0.61	-0.45	0.12	0.46	0.24	4.00	1.00	5.00	-3.705	1	0	1	0	1.881	0	0	0	1
Q61	397	0	3.78	4.00	4.00	0.69	0.47	-0.44	0.12	0.64	0.24	4.00	1.00	5.00	-3.582	1	0	1	0	2.615	1	1	0	0
Q62	397	0	3.88	4.00	4.00	0.70	0.49	-0.56	0.12	0.92	0.24	4.00	1.00	5.00	-4.557	1	0	1	0	3.766	1	1	0	0
Q63	397	0	3.85	4.00	4.00	0.67	0.45	-0.43	0.12	0.82	0.24	4.00	1.00	5.00	-3.508	1	0	1	0	3.352	1	1	0	0
Q64	397	0	3.69	4.00	4.00	0.90	0.82	-0.44	0.12	-0.35	0.24	4.00	1.00	5.00	-3.582	1	0	1	0	-1.443	0	0	0	1
Q65	397	0	3.55	4.00	4.00	0.90	0.81	-0.22	0.12	-0.25	0.24	4.00	1.00	5.00	-1.762	0	0	0	1	-1.008	0	0	0	1
Q66	397	0	3.20	3.00	3.00	1.03	1.06	-0.11	0.12	-0.62	0.24	4.00	1.00	5.00	-0.893	0	0	0	1	-2.529	0	0	0	1
Q67	397	0	3.64	4.00	4.00	0.92	0.84	-0.49	0.12	0.28	0.24	4.00	1.00	5.00	-3.984	1	0	1	0	1.143	0	0	0	1
Q68	397	0	3.38	3.00	4.00	1.07	1.16	-0.32	0.12	-0.58	0.24	4.00	1.00	5.00	-2.615	1	0	1	0	-2.357	0	0	0	1
Q69	397	0	5.73	6.00	6.00	0.84	0.70	-0.48	0.12	0.27	0.24	4.00	3.00	7.00	-3.893	1	0	1	0	1.111	0	0	0	1
Q70	397	0	5.29	5.00	6.00	1.09	1.19	-0.58	0.12	0.35	0.24	5.00	2.00	7.00	-4.730	1	0	1	0	1.418	0	0	0	1
Q71	397	0	5.50	6.00	5.00	0.97	0.95	-0.43	0.12	0.12	0.24	4.00	3.00	7.00	-3.549	1	0	1	0	0.480	0	0	0	1
Q72	397	0	5.78	6.00	6.00	0.91	0.84	-0.89	0.12	1.50	0.24	5.00	2.00	7.00	-7.303	1	0	1	0	6.143	1	1	0	0
Q73	397	0	4.59	5.00	5.00	1.61	2.58	-0.49	0.12	-0.48	0.24	6.00	1.00	7.00	-3.984	1	0	1	0	-1.984	0	0	0	1
Q74	397	0	5.48	6.00	6.00	1.10	1.22	-0.78	0.12	0.59	0.24	5.00	2.00	7.00	-6.361	1	0	1	0	2.414	0	0	0	1
Q75	397	0	5.94	6.00	6.00	0.83	0.69	-0.55	0.12	0.52	0.24	5.00	2.00	7.00	-4.541	1	0	1	0	2.139	0	0	0	1
Q76	397	0	5.95	6.00	6.00	0.85	0.73	-0.67	0.12	0.69	0.24	5.00	2.00	7.00	-5.492	1	0	1	0	2.832	1	1	0	0
Q77	397	0	5.72	6.00	6.00	0.93	0.86	-0.68	0.12	0.55	0.24	5.00	2.00	7.00	-5.533	1	0	1	0	2.250	0	0	0	1
Q78	397	0	5.79	6.00	6.00	0.81	0.66	-0.53	0.12	0.26	0.24	4.00	3.00	7.00	-4.344	1	0	1	0	1.053	0	0	0	1
Q79	397	0	5.20	5.00	6.00	1.19	1.42	-0.77	0.12	0.52	0.24	6.00	1.00	7.00	-6.287	1	0	1	0	2.135	0	0	0	1
Q80	397	0	5.35	5.00	6.00	1.10	1.21	-0.67	0.12	0.44	0.24	5.00	2.00	7.00	-5.492	1	0	1	0	1.783	0	0	0	1
Q81	397	0	5.77	6.00	6.00	0.93	0.87	-0.91	0.12	1.17	0.24	5.00	2.00	7.00	-7.459	1	0	1	0	4.783	1	1	0	0
Q82	397	0	4.81	5.00	5.00	1.43	2.05	-0.61	0.12	0.05	0.24	6.00	1.00	7.00	-4.959	1	0	1	0	0.221	0	0	0	1
Q83	397	0	5.29	5.00	6.00	1.13	1.28	-0.75	0.12	0.34	0.24	5.00	2.00	7.00	-6.107	1	0	1	0	1.393	0	0	0	1
Q84	397	0	5.90	6.00	6.00	0.84	0.71	-0.68	0.12	0.36	0.24	4.00	3.00	7.00	-5.566	1	0	1	0	1.459	0	0	0	1
Q85	397	0	5.81	6.00	6.00	0.98	0.97	-0.70	0.12	0.31	0.24	5.00	2.00	7.00	-5.762	1	0	1	0	1.275	0	0	0	1
Q86	397	0	5.40	6.00	6.00	1.07	1.15	-0.92	0.12	0.62	0.24	5.00	2.00	7.00	-7.533	1	0	1	0	2.525	0	0	0	1
Q87	397	0	4.94	5.00	6.00	1.49	2.22	-0.82	0.12	0.05	0.24	6.00	1.00	7.00	-6.730	1	0	1	0	0.189	0	0	0	1
Q88	397	0	5.34	6.00	6.00	1.35	1.82	-1.06	0.12	1.13	0.24	6.00	1.00	7.00	-8.689	1	0	1	0	4.611	1	1	0	0

Q89	397	0	5.07	5.00	6.00	1.41	1.99	-0.72	0.12	0.09	0.24	6.00	1.00	7.00	-5.910	1	0	1	0	0.348	0	0	0	1
Q90	397	0	5.41	6.00	6.00	1.18	1.39	-0.92	0.12	0.62	0.24	5.00	2.00	7.00	-7.549	1	0	1	0	2.541	0	0	0	1
Q91	397	0	5.67	6.00	6.00	0.99	0.97	-1.12	0.12	2.12	0.24	5.00	2.00	7.00	-9.189	1	0	1	0	8.689	1	1	0	0
Q92	397	0	5.79	6.00	6.00	0.99	0.98	-0.70	0.12	0.39	0.24	5.00	2.00	7.00	-5.705	1	0	1	0	1.611	0	0	0	1
Q93	397	0	5.86	6.00	6.00	0.89	0.80	-0.73	0.12	0.44	0.24	4.00	3.00	7.00	-6.000	1	0	1	0	1.807	0	0	0	1
Q94	397	0	6.05	6.00	6.00	0.85	0.72	-1.27	0.12	3.25	0.24	5.00	2.00	7.00	-10.393	1	0	1	0	13.320	1	1	0	0
Q95	397	0	3.29	3.00	3.00	0.60	0.36	-0.49	0.12	0.94	0.24	3.00	1.00	4.00	-4.016	1	0	1	0	3.844	1	1	0	0
Q96	397	0	1.98	2.00	1.00	0.95	0.89	0.64	0.12	-0.56	0.24	3.00	1.00	4.00	5.205	1	1	0	0	-2.307	0	0	0	1
Q97	397	0	3.32	3.00	3.00	0.64	0.41	-1.00	0.12	2.30	0.24	3.00	1.00	4.00	-8.156	1	0	1	0	9.414	1	1	0	0
Q98	397	0	3.29	3.00	3.00	0.62	0.39	-0.49	0.12	0.34	0.24	3.00	1.00	4.00	-4.008	1	0	1	0	1.406	0	0	0	1
Q99	397	0	1.68	1.00	1.00	0.87	0.76	1.18	0.12	0.55	0.24	3.00	1.00	4.00	9.656	1	1	0	0	2.262	0	0	0	1
Q100	397	0	1.80	2.00	1.00	0.84	0.70	0.69	0.12	-0.44	0.24	3.00	1.00	4.00	5.680	1	1	0	0	-1.787	0	0	0	1
Q101	397	0	3.38	3.00	3.00	0.60	0.36	-0.68	0.12	0.98	0.24	3.00	1.00	4.00	-5.590	1	0	1	0	4.025	1	1	0	0
Q102	397	0	2.03	2.00	2.00	0.94	0.88	0.59	0.12	-0.55	0.24	3.00	1.00	4.00	4.803	1	1	0	0	-2.238	0	0	0	1
Q103	397	0	1.50	1.00	1.00	0.82	0.68	1.69	0.12	2.10	0.24	3.00	1.00	4.00	13.820	1	1	0	0	8.619	1	1	0	0
Q104	397	0	3.28	3.00	3.00	0.63	0.40	-0.67	0.12	1.09	0.24	3.00	1.00	4.00	-5.459	1	0	1	0	4.480	1	1	0	0
Q105	397	0	5.37	6.00	6.00	1.19	1.43	-0.87	0.12	0.85	0.24	6.00	1.00	7.00	-7.098	1	0	1	0	3.500	1	1	0	0
Q106	397	0	5.42	6.00	6.00	1.25	1.55	-0.73	0.12	0.04	0.24	6.00	1.00	7.00	-5.943	1	0	1	0	0.164	0	0	0	1
Q107	397	0	5.24	5.00	6.00	1.19	1.42	-0.60	0.12	0.27	0.24	6.00	1.00	7.00	-4.943	1	0	1	0	1.094	0	0	0	1
Q108	397	0	5.42	6.00	6.00	1.16	1.35	-0.58	0.12	-0.18	0.24	5.00	2.00	7.00	-4.762	1	0	1	0	-0.721	0	0	0	1
Q109	397	0	5.58	6.00	6.00	1.20	1.44	-0.84	0.12	0.05	0.24	5.00	2.00	7.00	-6.910	1	0	1	0	0.189	0	0	0	1
Q110	397	0	5.17506	5.00000	6.000	1.344727	1.808	-0.679	0.122	-0.025	0.244	6.000	1.000	7.000	-5.566	1	0	1	0	-0.102	0	0	0	1
SUM																91	5	86	12		35	24	11	68
%																88.349	4.8543	83.495	11.651		33.981	23.301	10.680	66.019

Appendix 5

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INSTITUTIONAL PERMISSION TO PARTICIPATE IN RESEARCH

THE EXPANSION AND MODIFICATION OF THE ANGELA LEE (2017) PSYCHOLOGICAL OWNERSHIP STRUCTURAL MODEL

To whom it may concern

Letter requesting permission for a research study to be conducted within De Kuilen High School.

The purpose of this letter is to kindly ask for your permission to allow De Kuilen High to partake in a research study conducted by Francois Klopper, a master's student in Industrial Psychology at Stellenbosch University. The purpose of this research study is to develop an explanatory psychological ownership structural model (by expanding and modifying Angela Lee's proposed psychological ownership structural model), as well as to empirically test the validity of the model. It is hoped that this model will provide a description of the psychological mechanism that regulates the level of psychological ownership that employees experience.

I strongly feel that my research findings will not only be valuable for personal academic reasons, but also for De Kuilen High and its practices. This is a step towards gathering more information on complex human behaviour, and especially employees' organisational citizenship behaviour. Understanding this type of behaviour could contribute to identifying, motivating, and enhancing it in the workplace.

We hereby request your (director of the metro east education district) permission to conduct our research within De Kuilen High School. The Job-Based Psychological Ownership Questionnaire will be administered for the purpose of the study, via the Stellenbosch University web-based e-Survey service (sunSurvey).

If you (director of the metro east education district) would agree to participate in the research, I will at a later stage forward (Mr. Herman Mellet) an email with a link to the online questionnaire. I will then kindly ask him (Mr. Mellet) to forward it to as many employees in your organisation as possible. The questionnaire consists of eleven sections and will take approximately 30 minutes to complete. Participants can choose whether to be in this study or not. If they volunteer to be in this study, they may withdraw at any time without consequences of any kind. Participants are not waiving any legal claims, rights or remedies because of your participation in this research study.

Neither the organisation, nor participants will receive any payment for participating in this study. Participants in the study will however be eligible to enter in a lucky draw in order to increase the response rate. The lucky draw entails a 32-Inch Samsung LED television valued at R4000. After completing the survey, participants can voluntarily choose to enter the lucky draw by following a link to another independent electronic questionnaire that only requires one's cell phone number. There are no foreseeable risks or discomforts associated with completing this study. This study will only require employees' time and energy.

Any information that is obtained in connection with this study and that can be identified with participants will remain confidential and will be disclosed only with their permission or as required by law. Confidentiality will be maintained by means of restricting access to data to the researchers (Francois Klopper and Professor Callie Theron). The data will be stored on a password-protected computer. Only aggregate statistics of the sample will be reported. The identity of the participants will never be revealed. The identity of the participating organisation will also not be revealed.

The results will contribute to my master's thesis and to the academic field of Industrial Psychology. Moreover, the development of this Psychological Ownership structural model will potentially assist in the development of interventions aimed at enhancing employees' organisational citizenship behaviour. The planet and future generations (over the long term) will hopefully benefit from interventions aimed at enhancing psychological ownership in the workplace.

If you have any questions or concerns about the research, please feel free to contact Francois Klopper (0798845513 or francoisklop@gmail.com) or Professor Callie Theron of the Department of Industrial Psychology of Stellenbosch University (021 808 3009/ 084 273 4139 or ccth@sun.ac.za).

We trust that you will kindly grant us the institutional permission to conduct the Psychological Ownership study in your organisation. Thank you in advance.

Kind regards,
Francois Klopper & Prof Callie Theron

I,_____, [name of director of the metro east education district] hereby give institutional permission for Francois Klopper and Prof Callie Theron to conduct their Psychological Ownership research study at _____ [name of institution] in accordance with the research proposal that was submitted. If the research will substantially deviate from the undertaking given in the research proposal the undersigned will be informed.

Signature: _____ Date: _____

Appendix 6

Psychological Ownership Survey

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CONSENT TO PARTICIPATE IN RESEARCH

THE EXPANSION AND MODIFICATION OF THE ANGELA LEE (2016) PSYCHOLOGICAL OWNERSHIP STRUCTURAL MODEL

You are invited to participate in a research study conducted by Francois Klopper, Master of Commerce student, from the Department of Industrial Psychology in the Faculty of Economic and Management Sciences, at Stellenbosch University. The results of this research study will greatly contribute towards the completion of the research component of the thesis and consequently the completion of his studies. You were selected as a possible participant in this study because the study requires an investigation into employees under full-time employment, within the financial sector. Your participation would be greatly appreciated but is totally on a voluntary basis.

1. PURPOSE OF THE STUDY

The purpose of this research study is to develop an explanatory psychological ownership structural model (by expanding and modifying Angela Lee's proposed psychological ownership structural model), as well as to empirically test the validity of the model. It is hoped that this model will provide a description of the psychological mechanism that regulates the level of psychological ownership that employees experience.

2. PROCEDURES

If you are interested in participating in this research study, we would ask you to do the following things:

2.1. Provide voluntary, informed consent

Voluntary informed consent means that you as the participant agree to partake in this research study and that you understand your rights and responsibilities. Most importantly, you understand that you can withdraw at any stage without the risk of any negative consequences by simply existing your web browser. Additionally, the questionnaires will be confidential and no identifying questions (i.e. your name) will be asked. Once you have provided your informed consent (by agreeing on the online questionnaire) you may proceed with the psychological ownership questionnaire.

2.2. Questionnaire completion

The questionnaire will be presented in an online format (that is mobile device friendly). The questionnaire should take about 30 minutes to complete. There are no right or wrong answers and there is also no time limit. Please set aside a quiet time and place to complete this questionnaire and answer the questions as honestly as possible, bearing your current job in mind. Your responses will be captured electronically and automatically stored for processing.

3. POTENTIAL RISKS AND DISCOMFORTS

There are no foreseeable harmful risks for you as a participant. However, the completion of the questionnaire will entail time and energy on your account.

4. POTENTIAL BENEFITS TO SUBJECTS AND/OR TO SOCIETY

You as a participant may not directly benefit from your participation in this study. However, your participation could potentially greatly benefit the field of industrial psychology. Your participation could help to generate understanding surrounding feelings of ownership within the workplace. The development of this model of psychological ownership will create a deeper understanding of employees and how they experience psychological ownership at work. This in turn could aid in the understanding of interventions (in terms of employee wellness, incentives, job redesign and the like) aimed at increasing levels of psychological ownership for employees, benefiting both the employees and the organisation.

Your participation will also benefit the field of industrial psychological and provide a deeper understanding of working man.

5. PAYMENT FOR PARTICIPATION

There is no offer of payment for participation in this study. This extends to both the organisation and the employee. All participants in this study will, however, be eligible for an entry into a lucky draw to win a 32- inch Samsung LED television. At the end of the survey you will be given the option to click on an electronic link that will take you to a second, independent survey that will ask for your email address. Responses to the two surveys cannot be linked. One individual will be randomly selected from those that completed the second survey. The winner will be contacted via an email. There are no foreseeable risks or discomforts associated with completing this study. This study will only require employees' time and energy.

6. CONFIDENTIALITY

Any information that is obtained in connection with this study and that can be identified with you will remain confidential and will be disclosed only with your permission or as required by law. Confidentiality will be maintained by several means, briefly described below:

- Coding and access to questionnaire data

The questionnaire utilises a system that cleans the sending information. This means that the researcher will not be able to identify the source of the questionnaire data. You will additionally not be asked for any information that directly links to your identity, such as your name or a physical address. The information you supply will therefore be done anonymously.

Furthermore, the data received will only be accessible to Francois Klopper and Professor Theron of the Department of Industrial Psychology at Stellenbosch University. Any

access to the data will be protected by the use of a password protected computer to which access is restricted (restricted to Francois Klopper and Callie Theron).

- Questionnaire results

Upon completion of the thesis information supplied to either the public (the thesis is available online via the Stellenbosch Library E-thesis portal) or to the organisation, which will only be supplied on an aggregate basis – again, ensuring anonymity. This information is supplied in order to uplift the research community, to inform organisational interventions and to strengthen the body of knowledge available within the academic field of Industrial psychology. Should the researcher feel that publishing results of the study, within an academic environment, is pertinent, results will also be provided in an aggregate manner and all participant information will be aggregated. The researcher will endeavour to protect all participants' confidentiality and anonymity rights at all costs.

- Future use of the data

The collected data will be archived for possible future research use. If the data will be used in future research such research will have to be ethically cleared by the Research Ethics Committee (Humanities) of Stellenbosch University.

7. PARTICIPATION AND WITHDRAWAL

You can choose whether to be in this study or not. If you volunteer to be in this study, you may withdraw at any time by simply closing your web browser without consequences of any kind.

8. IDENTIFICATION OF INVESTIGATORS

If you have any questions or concerns about the research, please feel free to contact:

- Francois Klopper on francoisklop@gmail.com or 0798845513 - Professor Callie Theron, at the Department of Industrial Psychology, 0842734139 or ccth@sun.ac.za

9. RIGHTS OF RESEARCH SUBJECTS

You may withdraw your consent at any time and discontinue participation without penalty. You are not waiving any legal claims, rights or remedies because of your participation in this research study. If you have questions regarding your rights as a research subject, contact Ms Maléne Fouché [mfouche@sun.ac.za; 021 808 4622] at the Division for Research Development at Stellenbosch University.

VOLUNTARY CONSENT

Please indicate whether you voluntarily consent to participate in the research under the stipulated conditions or not.

- [ ] I have read and understood the information that was provided to me regarding my participation in the psychological ownership research study. I would like to participate and therefore voluntarily consent to further participation.
- [ ] I have read and understood the information that was provided to me regarding my potential participation in the psychological ownership research study. I would not

like to participate.

Thank you for your willingness to complete this Composite Job-Based Psychological Ownership Survey. Please answer the following demographic items. Please be aware that these items are filled out voluntarily - so you can decline to fill in any of these questions. Please note that these items will ONLY be used to describe the composition of the sample, and will not in ANY way be used as predictors in this study / nor as variables to compare subgroups on.

***Please indicate your age group from the drop down list.**

- 71+
- 61-70
- 51-60
- 40-50
- 35-39
- 30-34
- 25-29
- 20-24
- 16-19

***Please indicate your field of work/industry from the drop down list**

- 1. Agriculture
- 2. Communications- Marketing/Advertising
- 3. Construction
- 4. Education
- 5. Engineering
- 6. Finance
- 7. Government
- 8. Health and Fitness
- 9. I work across industries

- 10. Mining and manufacturing
- 11. Retail
- 12. Telecommunications
- 13. Tourism
- 14. Transport
- 15. Sales
- 16. Other

***Please indicate your current job level from the drop down list.**

- Entry level
- Junior Management
- Middle Management
- Senior Management
- Specialist

***Please indicate how long you have been with your current organisation from the list below.**

- Less than one year
- 1-2 years
- 3-5 years
- 6-10 years
- 11-15 years
- 16-25 years
- More than 25 years

***Please indicate how long you have occupied your current job from the list below.**

- Less than one year
- 1-2 years
- 3-5 years
- 6-10 years
- 11-15 years
- 16-25 years

- [ ] More than 25 years

***Please indicate you highest qualification achieved, from the drop down list.**

- [ ] Matric
- [ ] Diploma or certificate
- [ ] Undergraduate degree
- [ ] Post graduate diploma
- [ ] Post graduate degree
- [ ] Doctorate
- [ ] Other

The following five questions relate to how your perceive your job. They ask you to describe your job, as objectively as you can, on a scale of one to seven. Please do not use this part of the questionnaire to show how much you like or dislike your job. Instead, try to make your descriptions as accurate and as objective as you possibly can.

****How much autonomy is there in your job? That is, to what extent does your job permit you to decide on your own how to go about doing the work?**

1	2	3	4	5	6	7
Very little; the job gives me almost no personal 'say' about how and when the work is done.			Moderate autonomy; many things are standardised and not under my control, but I can make some decisions about the work			Very much; the job gives me almost complete responsibility for deciding how and when the work is done

***To what extent does your job involve doing a 'whole' and identifiable piece of work? That is, is the job a complete piece of work that has an obvious beginning and end? Or is it only a small part of the overall piece of work,**

which is finished by other people or by automatic machines?

1	2	3	4	5	6	7
My job is only a tiny part of the overall piece of work; the results of my activities cannot be seen in the final product or service			My job is only moderate-sized 'chunk' of the overall piece of work; my own contribution can be seen in the final outcome			My job involves doing the whole piece of work, from start to finish; the results of my activities are easily seen in the final product or service

***How much variety is there in your job? That is, to what extent does the job require you to do many different things at work, using a variety of your skills and talents?**

1	2	3	4	5	6	7
Very little, the job requires me to do the same routine things over and over again			Moderate variety			Very much; the job requires me to do many different things, using a number of different skills and talents

***In general, how significant or important is your job? That is, are the results of your work likely to significantly affect the lives or well-being of other people?**

Not very significant; the outcomes of my work are not likely to have important effects on other people		Moderately significant				Highly significant; the outcomes of my work can affect other people in very important ways
1	2	3	4	5	6	7

Listed below are a number of statements which could be used to describe a job. Please indicate whether each statement is an accurate or an inaccurate description of your job by choosing a number from the seven-point scale.

	Rating						
	Very inaccurate			Uncertain slightly			Very accurate
	1	2	3	4	5	6	7
The job requires me to use a number of complex or high-level skills.							
The job is arranged so that I can do an entire piece of work from beginning to end.							
The job allows me to use a number of complex or high-level skills.							
The job is one where a lot of other people can be affected by how well the work gets done.							
The job gives me a chance to use my personal initiative and judgement in carrying out the work.							
The job provides me with							

a chance to completely finish the pieces of work that I begin.	○	○	○	○	○	○	○
The job gives me considerable opportunity for independence and freedom in how I do the work.	○	○	○	○	○	○	○
The job itself is very significant and important in the broader scheme of things.	○	○	○	○	○	○	○

Listed below are a number of statements that describe how familiar you feel about your current job or more specifically know mu feel you have about your current job.

	Rating						
	Strongly disagree			Neutral			Strongly agree
	1	2	3	4	5	6	7
I am intimately familiar with what is going on with regards to my job.	○	○	○	○	○	○	○
I have a depth of knowledge as it relates to the job.	○	○	○	○	○	○	○
I have a comprehensive understanding of the work that I am asked to do.	○	○	○	○	○	○	○
I have a broad understanding of this job.	○	○	○	○	○	○	○

Listed below are a number of statements pertaining to your level of self-investment surrounding your current job. Please indicate which is most true by clicking the appropriate option from the seven -point scale.

	Rating						
	Strongly disagree			Neutral			Strongly agree
	1	2	3	4	5	6	7

I have invested a major part of 'myself' into this job.	○	○	○	○	○	○	○
I have invested many of my ideas into this job.	○	○	○	○	○	○	○
I have invested a number of my talents into this job.	○	○	○	○	○	○	○
I have invested a significant amount of my life into this job.	○	○	○	○	○	○	○

Listed below are a number of statements surrounding the control that you feel you have over your current job. Please indicate which is most true by clicking the appropriate option from the seven-point scale.

	Rating						
	Not at all			To a moderate extent			To an extreme extent
	1	2	3	4	5	6	7
To what extent do you have influence over the things that affect you on the job?	○	○	○	○	○	○	○
To what extent do you have input in deciding what tasks or parts of tasks you will do?	○	○	○	○	○	○	○
To what extent do you have the opportunity to take part in making job-related decisions that affect you?	○	○	○	○	○	○	○
To what extent can you set your own work deadlines?	○	○	○	○	○	○	○
To what extent does your job allow you the opportunity for independent thought and	○	○	○	○	○	○	○

action?							
To what extent do you control the pace and scheduling of your work?	○	○	○	○	○	○	○

Please indicate the extent to which you agree or disagree with the following statements:

	Strongly disagree		Neutral		Strongly agree
	1	2	3	4	5
The job allows me to use personal initiative and judgment to take control of different aspects of my job	○	○	○	○	○
The job gives me freedom to personalise and make changes within my job.	○	○	○	○	○
The work allows me to deliver a whole and identifiable piece of work that allows me to control job outcomes.	○	○	○	○	○
The job requires me to use different complex skills which requires me to be resourceful and solve problems within my job role.	○	○	○	○	○
The job allows me the opportunity for independent thought and action.	○	○	○	○	○
I have the power to influence things that affect me on the job.	○	○	○	○	○

Please indicate the extent to which you agree or disagree with the following statements:

	Strongly disagree		Neutral		Strongly agree
	1	2	3	4	5
The job allows me to deliver a piece of work that helps me understand who I am within my	○	○	○	○	○

job role.					
The job requires me to use a number of high-level skills that helps me explore my own identity within my job.	○	○	○	○	○
The job is very significant and important which helps me to understand my role in the organisation/society.	○	○	○	○	○
The job allows me to use personal initiative and judgment to personalise my workspace which gives me an 'at home' feeling.	○	○	○	○	○
The job gives me freedom to personalise my work methods that allows me to express my identity.	○	○	○	○	○
After I finish a job, I receive feedback on my performance that makes me feel like I belong in the organisation.	○	○	○	○	○

The following statements pertains to your level of internal locus of control. For each of the following statements, indicate the extent to which you agree or disagree by writing in the appropriate number.

	Indicate the extent to which you agree or disagree				
	Strongly disagree		Neutral		Strongly agree
	1	2	3	4	5
Whether or not I get to be a leader depends mostly on my ability.	○	○	○	○	○
Whether or not I get into a car accident depends mostly on how good a driver I am.	○	○	○	○	○
When I make plans, I am almost certain to make them work.	○	○	○	○	○

How many friends I have depends on how nice a person I am.	○	○	○	○	○
I can pretty much determine what will happen in my life.	○	○	○	○	○
I am usually able to protect my personal interests.	○	○	○	○	○
When I get what I want, it's usually because I worked hard for it.	○	○	○	○	○
My life is determined by my own actions.	○	○	○	○	○

Listed below are a number of statement pertaining to your feelings of efficacy. Please indicate to what extent you agree of disagree with the statement as it applies to you.

	Indicate to what extent you agree or disagree				
	Strongly disagree		Neutral		Strongly agree
	1	2	3	4	5
I can always manage to solve difficult problems if I try hard enough	○	○	○	○	○
If someone opposes me, I can find the means and ways to get what I want.	○	○	○	○	○
It is easy for me to stick to my aims and accomplish my goals.	○	○	○	○	○
I am confident that I could deal efficiently with unexpected events.	○	○	○	○	○
Thanks to my resourcefulness, I know how to handle unforeseen situations.	○	○	○	○	○
I can solve most problems if I invest the necessary effort.	○	○	○	○	○
I can remain calm when facing difficulties because I can rely on	○	○	○	○	○

my coping abilities.					
When I am confronted with a problem, I can usually find several solutions.	○	○	○	○	○
If I am in trouble, I can usually think of a solution	○	○	○	○	○
I can usually handle whatever comes my way.	○	○	○	○	○

Please indicate to what extent you agree or disagree with the following statements pertaining to your levels of integration with your work.

	Indicate to what extent you agree of disagree				
	Strongly disagree		Neutral		Strongly agree
	1	2	3	4	5
I feel this organization's success is my success.	○	○	○	○	○
I feel I belong in this organization.	○	○	○	○	○
I feel being a member in this organization helps define who I am.	○	○	○	○	○
I am totally comfortable being in this organization.	○	○	○	○	○
This organisation has a great deal of personal meaning for me.	○	○	○	○	○

Listed below are a number of job outcomes. How good or bad, -3 being very bad and +3 being very good, are the following outco

	Indicate how good or bad the following outcomes are:						
	-3			0			+3
	1	2	3	4	5	6	7
Being intimately familiar with your job.	○	○	○	○	○	○	○
Experiencing your job as an extension of your self.	○	○	○	○	○	○	○
Having control over your job.	○	○	○	○	○	○	○
Having a depth of knowledge that relates to your job.	○	○	○	○	○	○	○
Your job defining who you are.	○	○	○	○	○	○	○

Having the ability to decide what tasks to do.	○	○	○	○	○	○	○
Having a broad understanding of your job.	○	○	○	○	○	○	○
Seeing your effort come to fruition in your job.	○	○	○	○	○	○	○
Having the ability to decide how things are done in your job.	○	○	○	○	○	○	○

If you personally engage with your job, in the sense that you psychologically and physically invest of yourself, on a scale from one (extremely unlikely) to seven (extremely likely), how likely are the following outcomes?

	Extremely Unlikely			Neutral			Extremely Likely
	1	2	3	4	5	6	7
Being intimately familiar with your job.	○	○	○	○	○	○	○
Experiencing your job as an extension of your self.	○	○	○	○	○	○	○
Having control over your job.	○	○	○	○	○	○	○
Having a depth of knowledge that relates to your job.	○	○	○	○	○	○	○
Your job defining who you are.	○	○	○	○	○	○	○
Having the ability to decide what tasks to do.	○	○	○	○	○	○	○
Having a broad understanding of your job.	○	○	○	○	○	○	○
Seeing your effort come to fruition in your job.	○	○	○	○	○	○	○
Having the ability to decide how things are done in your job	○	○	○	○	○	○	○

Listed below are a number of statements about personal needs that you may wish to fulfill through your job.

Please indicate which is most true by clicking the appropriate option from the seven point scale.

	Strongly disagree			Neutral			Strongly agree
	1	2	3	4	5	6	7
I have a desire for my job to be an extension of me.	○	○	○	○	○	○	○
I need to understand who I am within my job role.	○	○	○	○	○	○	○
I need my job to be an expression of who I am.	○	○	○	○	○	○	○
I desire to explore my own identity within my job role.	○	○	○	○	○	○	○

Please indicate which is most true by clicking the appropriate option from the seven point scale.

	Strongly disagree			Neutral			Strongly agree
	1	2	3	4	5	6	7

I have a desire to take control of different aspects of my job.							
I want to be able to make changes within my job.							
I have a desire to have the ability to control job outcomes.							
I have a desire to be resourceful and solve problems within my job role.							

Please record the appropriate answer for each items as they would apply to the workplace, depending on whether you strongly agree (4), agree (3), disagree (2), or strongly disagree (1) with it.

	Strongly disagree			Strongly agree
	1	2	3	4
On the whole, I am satisfied with myself.				
At times I think I am no good at all.				
I feel that I have a number of good qualities.				
I am able to do things as well as most other people.				
I feel I do not have much to be proud of.				
I certainly feel useless at times.				
I feel that I'm a person of worth.				
I wish I could have more respect for myself.				
All in all, I am inclined to think that I am a failure.				
I take a positive attitude toward myself.				

Listed below are a number of statements regarding how you feel about your job. Please indicate which is most true by clicking th option from the seven point scale.

	Strongly disagree			Neutral			Strongly agree
	1	2	3	4	5	6	7

I sense that this job is mine.							
I feel a very high degree of personal ownership for this job.							
I sense that this is my job.							
I sense that the work I do as part of my job is mine.							
I feel a high degree of personal ownership for the work that I do.							
The work I do at this organisation is mine.							

Thank you for your time.

Please indicate if you would like to be entered in the lucky draw and then click on the 'finish' button to save your responses.

*LUCKY DRAW

Please indicate below whether you would like to participate in the lucky draw.

- [ ] Yes, I would like to be entered into the lucky draw for a 32-inch Samsung LED television
- [ ] No, I would not like to be entered into the lucky draw for a 32-inch Samsung LED television

Appendix 7

UNIVERSITEIT
STELLENBOSCH
UNIVERSITY

NOTICE OF APPROVAL

REC: Social, Behavioural and Education Research (SBER) - Initial Application Form

26 November 2019

Project number: 9176

Project Title: THE EXPANSION MODIFICATION AND EMPIRICAL TESTING OF THE LEE (2016) EXPLANATORY PSYCHOLOGICAL OWNERSHIP STRUCTURAL MODEL

Dear Mr Francois Klopper

Your response to stipulations submitted on 14 November 2019 was reviewed and approved by the REC: Humanities.

Please note the following for your approved submission:

Ethics approval period:

Protocol approval date (Humanities)	Protocol expiration date (Humanities)
6 November 2019	5 November 2022

GENERAL COMMENTS:

Please take note of the General Investigator Responsibilities attached to this letter. You may commence with your research after complying fully with these guidelines.

If the researcher deviates in any way from the proposal approved by the REC: Humanities, the researcher must notify the REC of these changes.

Please use your SU project number (9176) on any documents or correspondence with the REC concerning your project.

Please note that the REC has the prerogative and authority to ask further questions, seek additional information, require further modifications, or monitor the conduct of your research and the consent process.

FOR CONTINUATION OF PROJECTS AFTER REC APPROVAL PERIOD

Please note that a progress report should be submitted to the Research Ethics Committee: Humanities before the approval period has expired if a continuation of ethics approval is required. The Committee will then consider the continuation of the project for a further year (if necessary)

Included Documents:

Document Type	File Name	Date	Version
Budget	Budget 2019-2020	19/04/2019	1
Proof of permission	Distell Institutional Permission	05/08/2019	2
Default	Example of Social Media invitation post	05/08/2019	1
Default	Lucky Draw Process	05/08/2019	1
Request for permission	Revised_Institutional Permission	19/08/2019	2
Proof of permission	Research approval letter	19/08/2019	1
Proof of permission	Research approval letter	19/08/2019	Revised
Data collection tool	F. Klopper Vraelys_ Revised	19/08/2019	2
Informed Consent Form	Informed Consent Form	06/11/2019	1
Research Protocol/Proposal	_Francois_Klopper_Finale_Voorlegging_	06/11/2019	1
Default	Response Letter to REC	14/11/2019	1

If you have any questions or need further help, please contact the REC office at cgraham@sun.ac.za.