

**DEVELOPMENT AND EMPIRICAL EVALUATION OF AN EXPLANATORY  
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 2017**

## **DECLARATION**

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## ABSTRACT

A key competitive business advantage, in today's globalised world, lies not in technology and products but in its people. Numerous psychological mechanisms have been identified within applied and academic research in an attempt to understand and influence the behaviour of these people within the working world. This network of latent variables underpinning behaviour offers numerous opportunities to explicate the mechanisms behind behaviour of man and specifically working man. A recently introduced construct in this nomological network of latent variables, suggested to underpin behaviour, is *psychological ownership*. *Psychological ownership* is posited to have both psychological and behavioural effects. Within the organisational context, benefits of *psychological ownership* include increased tenure, job satisfaction, organisational commitment and organisational citizenship behaviours, as well as enhanced performance. For human resources to utilise interventions to influence levels of *psychological ownership*, to benefit both the employee and the organisation, a valid understanding of the psychological mechanism that underpin levels of *psychological ownership* is required. The current research study examined variance in levels of *psychological ownership* within employees, within different organisational contexts, with the objective of developing and empirically testing an explanatory *psychological ownership* structural model in order to answer this question.

Theorising, in this research study, culminated in a proposed explanatory *psychological ownership* structural model. This model, together with a narrow focused structural model investigating the subsequent impact of an interaction between salient individual psychological ownership needs and the ability of the job characteristics to satisfy these needs on the motivation to pursue the routes towards psychological ownership, was empirically evaluated using structural equation modelling (SEM) and polynomial regression.

A convenience sample of 329 employees from various organisations and industries participated in the study. The initial psychological ownership model failed to converge. However, a reduced psychological ownership measurement model obtained very good fit and a modified psychological ownership structural model obtained reasonable fit. Statistical support was found for all of the hypothesised paths except for the path suggested between *psychological ownership* and *motivation to pursue the routes towards psychological ownership* and the suggest path between the *psychological safety*

*motivation* interaction and *self investment*. Results show that the characteristics of the job as well as an individuals' need for a sense of belonging, self-identity and efficacy and effectance influence levels of *motivation to pursue the routes towards psychological ownership*. The results additionally indicated that feelings of ownership are impacted by *self-investment*, *intimate knowledge* and *control* afforded to employees within their jobs. This led to certain suggestions pertaining to interventions that can be applied within the work place as well as thoughts pertaining to future research endeavours.

## OPSOMMING

In vandag se globale wêreld lê die belangrikste en mededingenstebesigheidsvoordeel, nie in tegnologie en produkte nie, maar in mense. Toegepaste en akademiese navorsing het verskeie sielkundige meganismes identifiseer in 'n poging om die gedrag van mense in die werksplek beter te verstaan, asook te beïnvloed. Hierdie netwerk van latente veranderlikes wat menslike gedrag ondersteun, bied talle geleenthede om die menslike gedrag, spesifiek die gedrag van werkende individuee, te verduidelik. 'n Onlangse geskepte konstruk in dié nomologiese netwerk van latente veranderlikes, voorgestel om gedrag te verklaar, is dié van sielkundige eienaarskap. Daar word suggereer dat sielkundige eienaarskap beide sielkundige asook gedragseienskappe insluit. Verskeie voordele rakende sielkundige eienaarskap in die besigheidskonteks bestaan en sluit van die volgende in: verhoogde ampstermyn, werksbevrediging, toewyding aan die organisasie, organisatoriese burgerskap gedrag en verbeterde prestasie. Vir menslike hulpbronne om van intervensies gebruik te maak om die vlakke van sielkundige eienaarskap te beïnvloed wat beide die werknemer asook die organisasie bevoordeel, word 'n geldige begrip van die sielkundige meganisme wat die vlakke van sielkundige eienaarskap reguleer, vereis. Die huidige navorsingstudie ondersoek die verskille in die vlakke van sielkundige eienaarskap van werknemers in verskillende kontekste in die organisasie, met die doel om 'n strukturele model vir sielkundige eienskap te ontwikkel, asook empiries te toets.

Hierdie navorsingstudie stel 'n verklarende sielkundige eienaarskap-strukturele model voor. Dié model, tesame met 'n enger, meer gefokusde strukturele model, ondersoek die interaksie tussen die vernaamste individuele sielkundige eienaarskapbehoefte en die vermoë van die werkseienskappe om hierdie behoeftes te bevredig deur die empiriese toetsing van die voorgestelde strukturele model met behulp van strukturele vergelyking-modellering (SEM) en polinomiese regressie-ontleding.

'n Geriefsteekproef van 329 werknemers van verskeie organisasies en nywerhede het aan die studie deelgeneem. Die aanvanklike sielkundige eienaarskapmodel het suksesvol konvergeer maar van die waardes van die parameterskattings in die volledig gestandaardiseerde oplossing was ontoelaatbaar. 'n Gereduseerde sielkundige eienaarskap-metingmodel het goeie pasgehalte getoon terwyl die gereduseerde sielkundige eienaarskap strukturele model redelike pasgehalte getoon het. Statistiese ondersteuning is verkry vir alle hipoteses, behalwe die voorgestelde baan tussen

sielkundige eienaarskap en motivering om die roetes na sielkundige eienaarskap te volg en die voorgestelde baan tussen die interaksie tussen sielkundige veiligheid en motivering om die roetes na sielkundige eienaarskap te volg op self-investering. Die studie se resultate toon dat die eienskappe van werk sowel as die individu se behoefte om te behoort, selfidentiteit, effektiwiteit en vermoë te toon, die vlakke van motivering om die roetes na sielkundige eienaarskap na te streef, beïnvloed. Verder dui die resultate dat eienaarskapgevoelens beïnvloed word deur self-investering, intieme kennis en beheer wat aan werknemers in hul werk gebied word. Hierdie resultate lewer verskeie voorstelle wat in die werksplek toegepas kan word, sowel as voorstelle rakende toekomstige navorsing.

## ACKNOWLEDGEMENTS

Research can at times feel like a very solitary journey comprising many challenges, surprises, hurdles, unexpected turns and moments of sheer bliss (the ah ha's). However, there are several people who were instrumental in the completion of this research study and who contributed to this journey coming to its completion. For their constant guidance, love, care, mentorship and motivation I will be eternally grateful.

To my family and friends, firstly, my husband, Anton. Thank you for standing by me during the challenges that I faced and rejoicing with me during the 'ah ha' moments, no matter how big or how small. You were there, solid as a rock, by my side, through the tears and frustrations as well as the celebrations, providing much needed strength and patience – thank you! Secondly, my mom and dad, thank you for your continued support and for being my biggest cheer leaders throughout the years. I know I didn't always make that job an easy one. Thirdly, my friends, for your encouragement and support and for providing a much needed platform for venting frustrations when needed and for having the insight to, at times, not ask how the writing was going. Thank you.

To everyone who assisted me throughout the journey from an academic point of view, from the participants who completed the survey, to all of the members of staff at the Industrial Psychology Department at Stellenbosch and our wonderful librarians, Ms Strydom and Ms Tymbios, who were always willing to lend an ear, provide a supportive smile, and hunt down that illusive article or book. Additionally, to the international and local researchers who provided comments and insights at strategic points throughout the journey - thank you.

Last, but certainly not least, to my supervisors, Professor C.C. Theron and Mr Mariri, thank you for your guidance and insights. I would like to take this opportunity to extend a special thank you to Professor C.C Theron – thank you for teaching me how to think. Thank you for teaching me that striving for excellence is not a bad quality and that the question isn't answered until a certain level of comfort has been reached. Thank you for igniting an inquisitive questioning fire within my mind that I feel will play a big part in my career in future. Your mentorship has allowed my research confidence to grow and flourish and I hope to apply the lessons I have learnt, throughout this journey, to future journeys in the world of research. Without you this thesis would not be possible. I am very blessed by and will be eternally grateful for your guidance, patience and mentorship.

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## CHAPTER 1

### INTRODUCTION AND OBJECTIVES OF THE STUDY

#### 1.1 INTRODUCTION

Mouton (2012) recognises the importance of putting research into perspective. He proposed a “three world’s framework” (Mouton, 2012, p. 137) to aid in the understanding of the interplay between the world of scientific research and everyday real world problems and opportunities. This framework suggests that the research process begins by identifying a real-life problem or opportunity in World one. Finding an effective way of solving the World one problem or harvesting the opportunity is prevented by a lack of insight into the manner in which World two operates. This real-life problem or opportunity is then translated into a research initiating question that can then undergo the systematic and rigorous enquiry of World two, the world of theory and nomological networks. Valid understanding of the manner in which World two operates offers the possibility of deriving effective ways of altering World one to the benefit of man. World three, in turn, is the world of meta-theory that makes meta-theoretical assumptions about the nature of Worlds one and two and that thereby regulates the manner in which the researcher interacts with World two and World one.

The argument presented below will provide insight into a broad World one opportunity. The emphasis will initially fall on aspects, or complex variables in an even more complex web, which can potentially make the world work better. Moving the argument, in World one narrower, by zooming in on the single variable, within the complex nomological network of latent variables, of *psychological ownership*, brings about a number of questions: Why do people experience differing levels of *psychological ownership* within the work context? Why do certain individuals make their work space ‘their own’ while others do not? What psychological, as well as environmental, mechanisms are at play that influence an individual’s experience of feelings of ownership towards their job? By looking at these questions and empirically testing a model that suggests interrelationships between variables that influence *psychological ownership* we hope to aid in the development of answers to World one problems and opportunities. The valid description of the psychological mechanism that regulates differences in the level of *psychological ownership* in turn offers the possibility of deriving practical measures aimed at enhancing *psychological ownership*.



This introductory argument therefore defends the need for explanatory research aimed at explaining variance in the endogenous latent variable *psychological ownership* (Pierce, Kostova, & Dirks, 2001). This chapter will justify the research objective of developing and empirically testing a comprehensive explanatory *psychological ownership* structural model. Essentially, it is argued that organisations play a pivotal role in society, that employee work performance plays a pivotal role in organisational success; that human resource management plays a pivotal role in the management of employee work performance, and that *psychological ownership* can play a pivotal role in the management of employee work performance. It is moreover argued that the level of *psychological ownership* that any specific employee achieves is complexly determined and that purposeful and rational human resource management interventions are consequently only possible to the extent to which the nomological network of latent variables underpinning this latent variable is validly understood.

### **1.1.1 Organisations and their role in society**

Organisations, originally referred to as corporations, derived from the Latin word *corpus*, meaning 'body of people' (Berman, 1983, p. 5), exist for a purpose (Hunter, 2012). They are constructed to serve a particular end or set of objectives (Bartram, Callinan, & Robertson, 2002). As early as the 1930's Coase (1937) postulated that this purpose can be found in the division of labour. Hitt, Miller, and Collela (2009) concur with Coase (1937) and suggest that organisations are primarily social arrangements, or collections of individuals working together in a division of labour, to achieve a common goal. This division of labour, and striving towards a common purpose, is justified by the fact that organisations, or groups of people working together towards a common goal, can achieve more than the sum of the individual achievements should the individuals working within the organisation attempt to produce these working separately.

The cooperative benefit, resulting from the division of labour in organisations, therefore enables organisations to provide goods and services to society more effectively and efficiently than individual members of society can produce these goods and services for themselves (C.C. Theron, personal communication, January 28, 2015). Organisations strive to convert scarce factors of production into products and/or services<sup>1</sup> that have economic utility (De Goede & Theron, 2010) for society. This cooperative benefit, rooted

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<sup>1</sup> Products and/or services will be referred to as products from this point in the research study.

in the principle of economic utility, rests in a tacit agreement that exists between society and organisations that demands the responsible utilisation of societal resources. In terms of this tacit agreement, society will supply its most precious commodity, labour, and will allow organisations access to other scarce resources like materials, under the *proviso* that organisations will utilise this labour and transform these raw materials into products that meet societal needs, that they will do so in a rational manner and that they will do so without abusing man, as the carrier of the production factor labour, as well as the natural environment.

In recent years much attention has been devoted to the concept of “systems” and the use of “systems thinking” to frame and solve complex scientific and technological problems (Cascio & Aguinis, 2011). When applied to organisations, this systems approach firstly describes the dynamic relationship between the organisation as a system, and its sub-systems, such as departments, that create this system. It secondly also describes the dynamic relationship between the system and the supra-system within which they operate, namely the external environment (Grobler, Warnich, Carrell, Elbert, & Hatfield, 2011).

Organisations are seen as components, or a collection of interrelated parts, created to attain certain objectives in meeting the needs of society. These components include inputs, throughputs, outputs and sub-systems, which make up the system as a whole, that operate within an ever-changing larger environment that interacts with the system. Inputs within this organisational context include all resources made available by society, imported into the organisation, such as raw materials, energy, information, money, people, machinery and equipment (Hunter, 2012) which are then transformed via a conversion process (throughput) into market-satisfying products (outputs).

### **1.1.2 The external environment and its impact on organisations**

As open systems, Cascio and Aguinis (2011) note that organisations are faced with dynamic environmental conditions that have an impact on organisational effectiveness, and subsequent profitability. These include, but are not limited to, aspects such as market expectations, labour legislation, environmental legislation, a country’s political climate and governmental regulation, as well as, globalisation, information technology, union strength and influence, and diversity, for example.

South Africa faces unique human resource (HR) challenges fuelled in part by the country’s turbulent political history, increasing the plight for HR to uphold the aforementioned tacit



agreement. These issues include, but are not limited to, aspects such as skills shortages, unemployment rates as well as skill-migration, human capital flight or “brain drain” (Nadeem, Kim, & Kim, 1995) and dispossession experiences of the past.

In order to attain this main objective of sustainably producing market-satisfying products, organisations must produce products and supply them at the required quality, quantity, price, time (Hunter, 2012) and at a profit. Profitability not only acts as a measure of financial success, but acts as a marker for the successful utilisation of the scarce resources society supplies, under the above mentioned provisos. Profitability can therefore be seen as a measure of whether organisations are in fact making the best use of the scarce resources provided by society, through creating products with minimum wastage and by not combining and transforming resources into products that society does not value. As mentioned, organisations attend to the needs of society by efficiently and sustainably combining and transforming scarce inputs into products or services. Failing to make a profit implies a failure on the part of organisations to attain “the highest possible output of need-satisfying products and/or services with the lowest possible input of production factors” (De Goede & Theron, 2010, p. 30) and subsequent wastage of resources. Profit, on the other hand, points to efficient use of scarce societal resources.<sup>2</sup>

When the organisation transgresses the tacit agreement that exists between society and organisations, that demands the responsible utilisation of societal resources, the supra system reacts, in its own long-term interest, with punitive measures that threatens the continued existence of the system.

### **1.1.3 The construct of performance within an organisational context**

According to Theron and Spangenberg (2005) levels of organisational performance achieved, or the success with which organisations meet societal needs, are not chance events. Performance is “systematically determined by an intricate nomological network of latent variables” (Theron & Spangenberg, 2005, p. 15). It can therefore be suggested that improving organisational performance depends on the extent to which the “identity of the latent variables comprising this nomological network are known, as well as the manner in which they combine to affect the various organisational performance dimensions” (Theron & Spangenberg, 2005, p. 35).

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<sup>2</sup> This line of reasoning does assume a fastidious, knowledgeable, sophisticated consumer.

Although organisations differ, groups of people, as members and resources of organisations, remain the basic building blocks or ingredients of all organisations (Cascio & Aguinis, 2011; Gibson, Ivancevich, Donnelly, & Konopaske, 2009). Aguinis, (2009) states that the key competitive advantage in today's globalised world lies, not in technology and products, but in its people. De Goede and Theron (2010, p. 15) echo these sentiments and describe labour as the "life giving production factor through which the other factors of production are mobilised". Therefore, labour represents the element that determines the effectiveness and efficiency with which the other factors of production are utilised and therefore ultimately determines organisational performance (De Goede & Theron, 2010; Gibson, Ivancevich, & Donnelly, 1997). The effectiveness and efficiency with which organisational units convert scarce factors of production into products that satisfy societal needs, therefore depends, to a significant degree, on the performance of their employees, as human behaviour is weaved throughout organisational performance dimensions.

Individual employee performance, as an abstract latent variable or construct, is made up of multiple components or dimensions (Koopmans et al. 2011) and is a phenomenon unto itself (Kane, 1986). Two perspectives on individual employee performance are prevalent throughout literature (Binning & Barrett, 1989), differing in terms of their emphasis. Some scholars place relative emphasis on performance as a collection of overt job behaviours (Aguinis, 2009; Campbell, 1990; Motowidlo, Borman, & Schmidt 1997; Weick, 1979) aimed at achieving outcomes for which the job exists, whereas others place relative emphasis on outcomes or results (Ainsworth & Smith, 1993; Bernadin, Kane, Ross, Spina, & Johnson, 1995; Kane, 1986) that are achieved by performing certain actions. According to Koopmans et al. (2011) the former is motivated by concern for developing psychological theories that capture behavioural regularities important to organisational functioning. The latter recognises the importance of goal attainment to organisational functioning.

In 1979, Weick proposed that the performance of any job in any organisation is a cluster of interlocked and covariant behaviours, and this cluster consists of a subset of all possible behaviours necessary for the organisation to accomplish its broader goals and objectives. Campbell (1990) and Murphy (1989) similarly define performance from this micro-definition perspective as actions or sets of behaviours that are relevant to organisational goals. More specifically, Campbell (1990, p. 704) states that: "Performance is behavior. It is something that people do and is reflected in the actions that people take...performance is not the consequence(s) or result(s) of action; it is the action itself." Moreover, he states

that performance consists of goal-relevant actions that are under the control of the individual, regardless of whether they are cognitive, motor, psychomotor, or interpersonal. This widely endorsed definition of work performance assumes that work performance should be defined in terms of behaviour, rather than results or outcomes, and that work performance includes only those behaviours that are relevant to the organisation's goals.

Motowidlo, Borman, and Schmidt (1997) and Aguinis (2009) concur with Campbell's definition and the exclusion of results or outputs in the definition of performance. Motowidlo et al. (1997, p. 72) state that performance is the "aggregated value to the organization of the discrete behavioural episodes that an individual performs over a standard interval of time." According to this perspective performance is not about the results of employee behaviours but only the behaviours themselves. Here performance is judged by the actions undertaken by an employee in pursuit of organisational goals and would include both productive and counterproductive behaviours. However, performance defined using this narrow perspective only includes things that people actually do and aspects that can be observed. This perspective ignores outcomes or results as part of the performance construct.

Kane (1986) and others, (Ainsworth & Smith, 1993; Bernadin, Kane, Ross, Spina, & Johnson, 1995) in both academic and practitioner-orientated literature on performance management, conversely emphasise results or outcomes when defining performance. From an outcomes-based perspective performance is seen as "the outcomes achieved in carrying out the job function during a specified period," (Kane, 1986, p. 237). However, this similarly narrow, and not as well recognised, perspective on performance does not capture the complexity and intricacy of performance and ignores how an employee brings about these outcomes which are of value to the organisation, as well as other procedural and interpersonal factors that influence performance (Williams & Fletcher, 2002).

In contrast to these, equally narrow, perspectives contemporary literature focuses on a more wide-ranging definition of performance where performance consists of a performer engaging in behaviour in a situation to achieve results or outcomes relevant to the organisation. Viswesvaran and Ones (2000, p. 216) adopt this more inclusive perspective regarding performance and define it as "scalable actions, behaviour and outcomes that employees engage in or bring about that are linked with and contribute to organisational goals." Similarly, Bartram et al. (2002) and Bartram's (2005) more general macro-definition shares the emphasis between both results and behaviours to bring about these results. They (Bartram et al. 2002, p. 7) refer to performance as "sets of behaviours that

are instrumental in the delivery of desired results or outcomes". These theorists emphasise the importance of focusing on performance as a behaviour-outcome latent variable. Here performance is synonymous with results or outcomes that are favourable to organisational goal attainment and the behaviours brought about by employees within organisations to attain these outcomes. From this perspective, performance not only entails collections of overt job related behaviours required to perform a job effectively, or outcomes of job related behaviours, but rather an integrated combination of behaviour and results that are vital to effective organisational functioning. It can therefore be argued that there is an inextricable relationship between job behaviours and outcomes and that the two are structurally interlinked. Therefore, for the purpose of this study performance is seen as a richly interconnected model in which behavioural dimensions potentially affect each other as well as multiple outcomes. These outcomes in turn affect performance making these outcomes valuable to the organisation, and behaviours are the means to these valued ends (Binning & Barrett, 1989).

#### **1.1.4 HR's role in the management of work performance**

To bring about desired objectives, and optimum levels of organisational performance, organisations, as systems of interrelated functions such as finance, design and production, purchasing, sales and marketing, administration and human resources (HR) management must be structured and organised (Bartram et al. 2002). Each sub-system plays an important role in the delivery of market satisfying products. However, since employee performance is such a vital component of organisational performance, organisations wishing to remain competitive in their endeavour to satisfy societal needs must address the issue of achieving productivity through their employees. HR management, as a function within the organisational system, plays a vital role in actualising the primary objective of providing products to society with economic utility. The HR function does so by proactively and reactively enhancing the work performance of the bodies of people that make up organisations through advice, diagnosis, structuring and interventions in a manner that will benefit the quality of the product an organisation provides to the market (Myburgh, 2013).

Research (Warnich, Carrell, Elbert, & Hatfield, 2015) indicates a strong relationship between HR practises and bottom-line profits, and that the more successful companies engage in more targeted HR practises than the less successful companies do. However, the task of managing and developing an organisation's human resources is a fluid and

challenging one (Cascio & Aguinis, 2011). The beginning of the 21<sup>st</sup> century heralded a new phase in the management of people within organisations (Bronkhorst, 2011). According to Grobler et al. (2011), modern HR management is radically different from decades ago. With the decline of both the scientific management approach and the human relations approach and the emergence of the human resources perspective, Grobler et al. (2011) recognise that rather than addressing organisational and employee needs as exclusive and separate, the human resource approach holds that they are mutual and compatible. One can therefore not be gained at the expense of, or instead of, the other. This approach highlights the need for interventions employed by HR, in an attempt to improve performance, to be conducted not only to benefit the organisation, but also out of a moral and ethical obligation, to afford employees an opportunity to flourish in their organisational environment. The human resources perspective (Grobler et al. 2011) thereby formally acknowledges the tacit agreement, existing between the organisation and society, that organisations will have access to labour and natural resources with the *proviso* that they will utilise and sustainably transform these into products that meet societal needs, and that they will do so, not only without abusing man, but in a manner that acknowledges man as an abstract-thinking, self-conscious, self-actualising being.

This approach to HR management encompasses the striving of the positive psychology movement to focus on flourishing as opposed to repairing, moving away from a preoccupation with repairing the worst things in life to building upon the positive qualities of individuals and communities (Seligman & Csikszentmihalyi, 2000). This approach focuses on strengths and positive features of individuals where the emphasis, specifically within organisations, is promoting factors that allow individuals, groups and whole organisations to thrive and function optimally (Luthans, 2011). There is a wide-ranging consensus that the world in general, and our workplaces in particular, are in need of a more balanced approach that takes into consideration both the positive and the negative, both building on strengths and trying to correct weaknesses. The strategic HR management perspective aligns well with the call of positive psychologists in their study of the strengths that enable individuals and communities to thrive. With a belief that people want to lead meaningful and fulfilling lives, to cultivate what is best within themselves, and to enhance their experiences of work, organisations can become partners in their employees' striving for fulfilment, and self-actualisation, for their mutual benefit.

The effectiveness and efficiency with which employees bring life to the other factors of production, in other words the level of performance delivered by an employee, as well as

the level of psychological well-being experienced by the employee, are not random events. Rather, these are the expression of the lawful working of a complex nomological network of latent variables characterising employees, as individuals, and their work environment (Myburgh, 2013). The strategic approach to managing HR emphasises that leveraging people's capabilities is critical to achieving sustainable competitive advantage (Warnich et al. 2015). Research into the complex psychological constructs, that underpin the behaviour of working man, is therefore necessary in order to understand the complex network of latent variables that underpin employee behaviour and to inform interventions geared towards the effective and efficient use of society's most precious resource – human capital. Moreover, it emphasises the complexity of the psychological relationship between working man and the world of work. It points to an even more intricate and complex nomological network combining both employee constructs underpinning individual behaviours and organisational constructs underpinning organisational performance, moving away from a focus on one or the other. This highlights the need for sound valid theoretical explanations for the different facets of working mans' behaviour as a fundamental and indispensable, though not adequate, prerequisite for efficient HR Management (De Goede & Theron, 2010). Behavioural management advocate Daniels (2000, p. 16) echoes these sentiments and states that:

Behavior Performance Management is not a good idea to be tried for a while and then cast aside for some other good idea. It is a science that explains how people behave. It cannot go away any more than gravity can go away. In a changing world, the science of behaviour must remain the bedrock, the starting place for every decision we make, every new technology we apply, and every initiative we employ in our efforts to bring out the best in people.

Rational and purposeful HR interventions to improve employee work performance are therefore only possible to the extent that the nomological network of latent variables underpinning behaviour is validly understood.

### 1.1.5 Psychological ownership as part of the nomological network underpinning behaviour

*Psychological ownership*, or the sense of ownership without any formal or legal claims of ownership (Mayhew, Ashkanasy, Bramble, & Gardner, 2007), is one such construct<sup>3</sup> within the complex network of variables underlying individual behaviour at work that holds important implications for both employee work-performance and employee wellbeing.

According to Olckers (2014) organisations need employees that are psychologically connected with their work, or organisation, in order to survive these dynamic unpredictable times in business. Brown (1989) additionally states that it is *psychological ownership* that makes the competitive difference and goes so far to state that the key to competitive effectiveness in the 1990's will be management's knowledge of how to instill *psychological ownership*.

Feelings of ownership have important psychological and behavioural effects (Pierce & Jussila, 2011). A sense of ownership within the workplace is a "transforming sentiment" (Druskat & Kubzansky, 1995, p. 5) that can potentially be harvested from current approaches used to foster positive psychological and behavioural effects, such as work reorganisation, job redesign and enrichment and programs used to achieve employee commitment and empowerment. Druskat and Kubzansky (1995) argue that the decisive motivational dimension of *psychological ownership* enhances commitment levels and systematically guides employee activities toward organisational improvement and efficiency. "When ownership sentiments arise, the worker's relationship to the employing organization is transformed, and participation in, commitment to, empowerment by, and responsibility for that organization may be seen as increasingly probable outcomes" (Druskat & Kubzansky, 1995, p. 5). Furthermore, they argue that *psychological ownership* is at the core of organisational efforts to enhance performance and employee empowerment.

It can be argued that it is the concept of self-extension that forms the basis for the importance of the construct of *psychological ownership* in employee and performance enhancement. *Psychological ownership* has been linked to an individual's sense of self or

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<sup>3</sup> This paper focuses on *psychological ownership* as a single construct in the complex nomological network of latent variables that underpin working man's behaviour. This should not be interpreted as an argument that it is the most or only important variable in the network. But rather, that it is a latent variable that requires more attention as it seems to be a neglected area, specifically within the South African working environment.



an extension of the self (Pierce & Jussila, 2011; Pierce, et al. 2001; 2003). It has additionally been postulated that when an employee's sense of self is closely linked to the job he/she holds within an organisation, a desire to maintain, protect or enhance that identity results in an enhanced sense of responsibility for work outputs. Van Dyne and Pierce (2004), in their three field studies on predicting employee attitudes and organisational citizenship behaviour, found that *psychological ownership* added significantly to the prediction of organisation-based self-esteem.

Researchers have additionally found that *psychological ownership* may predict effects currently unaccounted for by other theoretical models and criterion variance that is unaccounted for by other psychological constructs (Pierce et al. 2001). Therefore, feelings of *psychological ownership* may be an integral part of the employee's relationship with the organisation and therefore the key to organisational competitiveness (Brown, 1989). *Psychological ownership* has also been postulated as the most important ingredient in transitioning teams from the traditional manager-led teams to self-managed teams.

Researchers (Avey et al. 2009; Baer & Brown, 2012; Mayhew et al. 2007; O'Driscoll, Pierce, & Coghlan, 2006; Peng & Pierce, 2015; Pierce & Jussila, 2011; Pierce et al. 2001; 2003) additionally provide empirical evidence of the positive effects of *psychological ownership* within the workplace. These include positive aspects from not only a behavioural perspective but also a motivational and attitudinal perspective (Pierce & Jussila, 2011). The limited research available provides some evidence of the link between *psychological ownership* and employee performance both directly and indirectly via a number of mediator variables.

Fiorito, Bozeman, Young, and Meurs (2007) state that *psychological ownership* may be one of the variables that can serve as a predictor of organisational commitment, based on their study of HR practices and other organisational characteristics that affect organisational commitment. Avey et al. (2009) concur and view *psychological ownership* as a positive resource for impacting human performance in organisations. In their exploratory study on the components of an expanded view of *psychological ownership* they found that there was a significant relationship between (promotive) *psychological ownership* and several individual level outcomes. They found a positive relationship between *psychological ownership* and desirable employee attitudes such as employee commitment, job satisfaction and intentions to stay with an organisation.



Peng and Pierce (2015) recently found evidence that organisation-based *psychological ownership* was positively related to job satisfaction and negatively related to knowledge withholding. Furthermore, they found that job-based *psychological ownership* (psychological connection to a role or job) was similarly positively related to job satisfaction and additionally organisation citizenship behaviours. They additionally found that it was negatively related to turnover intentions. These findings are supported by Van Dyne and Pierce (2004) who similarly found positive relationships between job satisfaction, organisational commitment and *psychological ownership*. O'Driscoll, Pierce and Coghlan (2006) found a significantly positive relationship between *psychological ownership* and employee affective organisational commitment ( $r=.45$  for job *psychological ownership* and  $r=.72$  for organisation-based *psychological ownership*) in their study on the mediating role of *psychological ownership* in the relationship between levels of work environment structure and employee responses. Van Dyne and Pierce (2004) found that *psychological ownership* for the organisation explained variance in organisational citizenship behaviour over and above demographic characteristics, organisational commitment and job satisfaction. They state that organisation-based *psychological ownership* increases the ability of HR management to predict and understand employee attitudes and behaviours over and above the two most commonly researched concepts namely organisational commitment and job satisfaction.

Avey et al. (2009) research results provide support that having employees who feel like owners is beneficial in terms of their work attitudes such as commitment, intentions to stay with the organisation, and job satisfaction.

Olckers and Du Plessis (2012b) after an extensive thematic analysis of literature, pertaining to the topic of *psychological ownership* and its role in retaining employees, postulate that *psychological ownership* can benefit organisations because it leads employees to feel a sense of responsibility towards organisations. They further suggest that these feelings of responsibility subsequently lead to stewardship behaviours. Furthermore, they propose that *psychological ownership* can help organisations to retain talent and influence the intentions of skilled employees to remain with their organisations.

Wagner, Parker, and Christianson (2003) found that ownership behaviours are positively linked to the financial performance of work groups. Researchers (Baer & Brown, 2012; Pierce & Jussila, 2011) postulate that *psychological ownership* helps organisations remain competitive in these constantly changing turbulent times. Baer and Brown (2012) found that it may lead to positive orientations towards change, contingent upon the type of

change involved. It is therefore imperative to have an understanding of *psychological ownership* and its relationship to change<sup>4</sup> in order to encourage or evoke the positive aspects of *psychological ownership* in the dynamic world of work, as opposed to the negative outcomes.

Hou (2010) found that a positive link exists between users' *psychological ownership* of technology and their efforts to familiarise themselves with and learn the application or software knowledge. This has implications in the world of work where technology is continually changing and in order to remain competitive organisations have to remain abreast of these changes. Therefore, enhancing levels of *psychological ownership* experienced by individuals in the work place could allow for quicker adaptation to new technological changes that provide organisations with a competitive edge.

Pierce and Jussila (2011), make several propositions surrounding the consequences of feelings of ownership in organisations in their book *Psychological ownership and the organizational context: Theory, research evidence and application*. They state that feelings of ownership lead to positive motivational effects in terms of ownership motivation, intrinsic motivation, and attitudinal effects in terms of satisfaction, organisational commitment, affective commitment, normative commitment, continuance commitment, organisational identification and internalisation, experienced responsibility and a self-concept based on organisation-based self-esteem. They propose that, from a motivational perspective<sup>5</sup> for example, individuals that experience *psychological ownership* at work will spend time and energy mentally and physically exploring the organisation and additionally use the organisation as an expression of their self identity "through the personalisation of space in and around the target; by integrating symbols and meaning of the organization into one's personal life" (p. 88). Common sense in conjunction with informal observation suggest that if employees view their organisation as an extension of themselves, or their job as an expression of who they are, that they will tend to the needs of the organisation or job better.

In addition, Bernhard and O'Driscoll (2011) point out that several studies have empirically demonstrated the importance of feelings of ownership in the absence of formal or legal

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<sup>4</sup> This statement assumes that the organisation monitors their external environment well and is well informed regarding change and the different types of change.

<sup>5</sup> The topics of motivational, attitudinal and behavioural consequences will be discussed in more detail in Chapter 2. This is merely a high-level overview to provide evidence of the positive outcomes of *psychological ownership*.

ownership rights, within organisations (Mayhew et al. 2007; O'Driscoll, Pierce, & Coghlan, 2006).

In contrast to these positive attitudinal and behavioural effects of *psychological ownership*, Brown, Lawrence, and Robinson (2005) caution that feelings of ownership can, however, have a dark side. Pierce and Jussila (2011) similarly caution against focusing exclusively on the bright side of *psychological ownership* and acknowledge that the construct can have negative effects and potentially lead to counterproductive behaviours in the workplace. They see *psychological ownership* as one of those forces at work, within an individual employee, that may be related to counterproductive organisational behaviours, such as resisting organisational change in a bid to maintain stability in the sense of self when it is too deeply intertwined with that of the organisation, or with that of the current job.

Other potential negative effects include hoarding information and not sharing resources and tools required for the job due to overwhelming feelings of ownership and resistance to relinquishing control over objects, due to feelings of strong self-identification with them. In extreme cases this strong self-identification can lead to theft, or in cases where the object of identification is lost employees may enlist in reactionary behaviours such as destruction, vandalism or sabotage in order to prevent others from attaching to the target. Furthermore, Guha (2009) states that very strong feelings of *psychological ownership* can lead to escalation of commitment where individuals continue to be committed to a chosen course of action even in the face of warning signs suggesting that it is a poor course of action.

Pierce and Jussila (2011) however explain that fruition of these negative consequences depends upon the routes to, and roots of, the feelings of ownership experienced. It is therefore evident from the above that generally the enhancement of levels of *psychological ownership* experienced by employees within an organisation serves positive ends and is therefore valuable if HR management can employ interventions to enhance these. However, interventions aimed at enhancing *psychological ownership* are not all together without danger. It is therefore imperative that *psychological ownership*, as a latent variable within the complex nomological network of latent variables that influence employee behaviour, be properly understood before interventions are used to influence levels of *psychological ownership* experienced by employees within organisations.

In understanding individuals at work and specifically the role of interventions employed to enhance employee wellness through enhanced levels of *psychological ownership*, it is important not to lose sight of the tacit agreement between organisations and society. HR managements' concern for the 'what and how' of managing people effectively, for higher performance, in today's organisations must still be conducted in a manner that not only does not abuse man, as the carrier of the production factor labour, but utilises man in a manner that offers the possibility of realising his full potential.

The aforementioned strategic HR approach stresses that managing employees as complex, almost enigmatic, abstract-thinking, interpretive, self-conscious, self-actualising people rather than psychologically primitive, physiologically motivated people that can be treated as mere factors of production, could result in real benefits to both the employee and the organisation. Here the premise is that employees are investments that can, if properly managed and developed, provide long-term rewards to organisations and benefits for themselves.

It is not enough to state that people are an organisations greatest asset. This asset must be understood and managed properly if it is to contribute to the company's bottom line and therefore satisfy the needs of society while remaining viable in terms of economic, social and environmental performance. HR management must understand the science of behaviour properly in order to predict, develop and control it, to enhance not only individual performance but additionally employee wellness. It can therefore be argued that HR management is a custodian of certain provisos of the aforementioned tacit agreement. It is a custodian in the sense that as a strategic business unit or partner, HR management has the responsibility to care for, protect and enhance the scarce human resources provided by society, while maintaining a certain level of organisational performance. Sherry, Mainiero, and Mainiero (2007) propose that managing people effectively is the most essential ingredient for organisations striving for economic power and improving the quality of life for all citizens. However, it must be conducted in a manner that serves the interests of all parties, from the organisation to the individual employee. Therefore, by developing interventions that facilitate the growth of feelings of ownership of working man, organisations offer mechanisms which satisfy this need for continual personal improvement. Therefore, it can be suggested that the goal of HR management is to enhance the human strengths and virtues, and allow individuals, organisations and in turn society to flourish.

Therefore, by concentrating on the life-giving production factor, labour, and by implementing an integrated set of HR interventions, to enhance employee work performance, as well as employee wellness, through enhanced levels of *psychological ownership*, in a manner that adds value to the organisation, HR management attempts to contribute to the rationality with which the organisation serves the needs of society and in a manner that honours the tacit agreement between the organisation and society.

#### **1.1.6 Unique South African considerations justifying the development of psychological ownership**

It could be argued that there rests a moral responsibility on South African HR management to enhance *psychological ownership*, especially in previously disadvantaged employees. The previous political dispensation of Apartheid purposefully dispossessed Black South Africans of ownership in so-called White geographical areas, prohibited access to specific so-called Whites-only areas, separated husbands from their families in so-called homeland areas, prohibited them from having citizenship and the right to vote (thereby effectively disowning their country), prohibited them from entry into skilled, meaningful jobs and restricted them to lower-level, menial jobs.

A person's identity is inextricably linked to possessions or objects owned (Pierce et al. 2001; 2003). To a large degree an individual's family, job, car and home plays a role in defining the self or personal identity. To this end, eviction from land or a home, separation from family, and being prevented from holding specific jobs, and subsequently being forced to view the self as an unwanted alien, in so-called White South Africa, strips away a significant part of an individual's personal identity. Moreover, that which Black South Africans were allowed to do and the areas where, and conditions under which, they were forced to live continuously communicated an extremely negative message pertaining to their self-worth.

Most importantly, however, Apartheid significantly restrained personal development and prevented many Black South Africans from developing to their full potential. In the post-democratic South Africa these restrictions formally no longer exist although their legacy still does. As part of this legacy valid personnel selection procedures, used without predictive bias tend to create adverse impact against Black South Africans (De Goede & Theron, 2010). In the interest of complying with the provision in the tacit agreement between organisations and society to utilise the human resources of society responsibly, the problem of adverse impact needs to be treated. The identification of learning potential

combined with aggressive affirmative development has been suggested as an intellectually honest way of alleviating the adverse impact problem without compromising the rationality with which organisations serve society (De Goede & Theron, 2010; Van Heerden & Theron, 2014).

To the extent that such affirmative development interventions will succeed the demographic profile of South African organisations will gradually start to reflect the demographic profile of the country. At least in the initial phase of transformation additional HR challenges related to the appreciation of diversity and the retention of newly developed talent will dominate. Along with these, the challenge of facilitating a sense of organisational *psychological ownership* and enhancing job-based *psychological ownership* will present itself. Both of these can be motivated in terms of the previously discussed organisational outcomes and beneficial psychological states associated with these two forms of *psychological ownership* as well as the positive impact it would have on the retention of Black talent.

Over and above these considerations, however, there exists a moral imperative to facilitate a state of organisational and job-based *psychological ownership* in Black employees as an important, but not sufficiently recognised, component of an intellectually honest interpretation of affirmative action. An intellectually honest interpretation of affirmative action has to admit and apologise for the historical wrongs committed under Apartheid, but then also has to affirm that apology, with tangible actions that attest to the sincerity of the apology. Affirmative action, when interpreted in an intellectually honest manner, should not only develop Black South Africans with potential to gain access to jobs, that they should have occupied all along, but also to feel at home in the organisation, and the job, and to authentically express who they are through the organisation they work for, and the job that they do.

### **1.1.7 Concluding remarks**

As can be seen from the above discussion, it is clear that developing HR interventions in general, and interventions aimed at enhancing *psychological ownership* in particular, is a complex task, but one that promises to produce mostly positive organisational outcomes. It seems reasonable to argue then that any motivation for research surrounding the behaviour of working man in general, and the influence of *psychological ownership* on employees in particular, resides in the premise that the level of *psychological ownership*



experienced by employees is determined by a complex nomological network of latent variables characterising the employee and the work environment.

Characterising this nomological network of latent variables as complex holds important theoretical (but also methodological and practical) implications. It is therefore important to explicate in what sense *psychological ownership* is assumed to be complexly determined. The nomological network of latent variables characterising the employee, and the work environment, can be considered to be complex in the sense that a large number of latent variables are simultaneously at work. These latent variables are richly structurally interconnected, feedback loops exist through which downstream latent variables again affect latent variables located further upstream in a causal chain, and latent interaction effects exist through which the effect of one latent variable on another is potentiated. The consequence of the combined effect of these characteristics is that the explanation of variance in *psychological ownership* is not located in any specific structural relationship but rather spread across the whole of the network (Cilliers, 1998).

In order to successfully develop and manage the levels of *psychological ownership* experienced by employees within organisations, to aid in individual flourishing and ensure optimal organisational performance, a valid understanding of the manner in which the construct of *psychological ownership* is embedded in this complex nomological network of latent variables is critical. Only to the extent that the identity of the determinants, that directly and indirectly affect the level of *psychological ownership* that employees experience, and the manner in which they structurally combine in the nomological network, is validly understood would it allow HR management to rationally and purposefully affect the well-being and work behaviour of employees and to develop appropriate interventions to harness this psychological construct within the workplace. Research surrounding the concept of *psychological ownership* therefore needs to address some unanswered questions pertaining to the processes by which *psychological ownership* develops (Dawkins, Tian, Newman, & Martin, 2017), within an individual, and how a target becomes an inherent part of an individual's identity. This, in turn, could improve organisational performance as well as employee wellbeing to better meet the needs of society.

## **1.2 RESEARCH INITIATING QUESTION**

The research initiating question is consequently the open-ended question why variance in *psychological ownership* exists across employees, jobs and organisations? The research initiating question is purposefully formulated as an open-ended question to allow the

theorising in the literature study, presented in Chapter 2, to determine the research problem and research hypotheses. It is only through prolonged, authentic, unbridled intellectual wrestling with the research initiating question that research truly stands a chance of gaining a valid understanding of the manner in which the construct of *psychological ownership* is embedded in this nomological network of latent variables. Ring-fencing a set of latent variables for inclusion in the study at the outset of the study increases the risk that latent variables will be artificially forced into the research hypothesis while crucial latent variables may be omitted. Latent variables have to earn their inclusion in the overarching substantive hypothesis that is offered as an answer to the research initiating question by being indispensable in the construction of a logically persuasive explanation for variance in *psychological ownership*.

### 1.3 RESEARCH OBJECTIVE

The objective of the research is therefore to develop, in response to the research initiating question, an explanatory *psychological ownership* structural model that provides a description of the psychological mechanism that regulates the level of *psychological ownership* that employees experience and to empirically test the validity of the model.

The manner in which the research objective is formulated and motivated creates the risk of misperceptions. In general, the research objective is rooted in the positivistic paradigm of the nature and development of knowledge. The research objective is however more specifically rooted in the *constructive alternativism* principle proposed by George Kelly (Pervin, Cervone, & John, 2005). Constructs (or latent variables) are abstract ideas, or thought objects, created by the fluid intelligence of researchers to allow them to develop explanatory structural models. The latent variables do not physically exist. The construct *psychological ownership* as such does not exist<sup>6</sup>. No actual psychological mechanism that regulates the level of *psychological ownership* exists.

The intention is to construct an explanatory *psychological ownership* structural model from constructed latent variables to offer the possibility of gaining empirical control over the behavioural denotations of the construct *psychological ownership* through an array of HR interventions. The explanatory *psychological ownership* structural model will be regarded as valid to the extent that it can successfully account for empirical observations made (e.g. the observed covariances between denotations of the latent variables comprising the

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<sup>6</sup> The behavioural denotations of the construct *psychological ownership* do, however, exist.



model). A finding of close model fit means that it is permissible to regard the structural model as a plausible description of a psychological mechanism that regulates the levels of *psychological ownership*. A finding of close model fit therefore does not mean that the model is correct. Alternative, equally plausible, constructions from different latent variables are always possible. The question should therefore not be which one of the models is correct. Rather, the question should be what useful practical suggestions each model makes to influence the level of the construct of *psychological ownership* (more specifically to influence the behavioural denotations that constitute the construct).

#### **1.4 OUTLINE OF THE STRUCTURE OF THE THESIS**

The aim of chapter one was to provide contextual background and evidence as to the importance of further studies surrounding the topic of *psychological ownership* in the world of work. Chapter two firstly provides a detailed conceptualisation of *psychological ownership* in a literature study. This includes aspects such as how it compares to and differs from other similar constructs in the field of positive psychology and organisational behaviour and the different types of *psychological ownership* experienced. Chapter 2 moreover derives an array of path specific substantive research hypotheses on the identity of person-centred and contextual latent variables that shape the level of *psychological ownership* that employees experience, and the manner in which they structurally combine, via a reasoned argument rooted in previous research on *psychological ownership*. These path-specific substantive research hypotheses are at the end of the literature study combined in a proposed *psychological ownership* structural model as an overarching substantive research hypothesis on the nature of the psychological mechanism that regulates the levels of *psychological ownership* experienced by employees. Chapter three describes and motivates the research methodology chosen to empirically test this proposed structural model and Chapter 4 explains the ethical considerations that influenced the empirical part of the study. Chapter five reports and interprets the empirical results. Chapter 6 discusses the findings on the validity of the overarching and path-specific hypotheses derived in Chapter 2, acknowledges limitations, derives managerial implications for HR practice and proposes recommendations for future research.

## CHAPTER 2

### LITERATURE STUDY

#### 2.1 INTRODUCTION

“Science tries to free itself from ideas which, though commonly accepted, tend to confusion when badly defined,” (Litwinski, 1942, p. 28). Litwinski’s words highlight the need to properly define and conceptualise the focal construct of interest, in a bid to uphold the quality of scientific theorising. With regards to the construct of *psychological ownership* Pierce et al. (2001) note that researchers have recognised that the construct may be an important organisational variable related to performance. However, literature surrounding the topic is nonetheless relatively sparse, especially from a South African perspective, and lacks a general agreed upon taxonomy.

*Psychological ownership* research has, however, to some degree, been reignited in the past decade and efforts are being made to empirically test theories surrounding the antecedents and consequences of *psychological ownership* within the work place (Asatryan & Oh, 2008; Baer & Brown, 2012; Bernhard & O’Driscoll, 2011; Hou, 2010; Mayhew et al. 2007; O’Driscoll, Pierce, & Coghlan, 2006; Olckers & Du Plessis, 2012a; 2012b; Ozler, Yilmaz, & Ozler, 2008; Van Dyne & Pierce, 2004; Wagner, et al. 2003). Despite this increase, the literature surrounding *psychological ownership* still pales in comparison to more longstanding psychological constructs, such as motivation and satisfaction. Additionally, several definitions of the *psychological ownership* construct seem to exist within the literature and it seems that not all organisational scholars working with the construct employ the same conceptualisation (Pierce & Jussila, 2011).

In order to uphold the call of academic rigour and precision, and to guide the development of a structural model, the following section will formally conceptualise the construct of *psychology ownership* as it will be employed throughout this research study. Once a constitutive definition has been established this section will outline the reflective thinking of the researcher and provide insights into the propositions surrounding the development of *psychological ownership*, gained through theorising, and culminate in the development of a proposed *psychological ownership* structural model.

#### 2.2 CONCEPTUALISING THE CONSTRUCT OF PSYCHOLOGICAL OWNERSHIP

Constructs are abstract, “in the head”, thought objects (Kerlinger & Lee, 2000) created by the abstract thinking capacity of man. It is this reflective reasoning that allows man to think

about, explain, communicate and create meaning through “heuristic hunches” (Kerlinger & Lee, 2000, p. 9) about “objects of inquiry” (Mouton, 2012, p. 138) in World two (Babbie & Mouton, 2001; Mouton, 2012). Hypotheses, models and theories, about specific World one occurrences, are created that mobilise a different grade of thinking and that aspire to explain phenomena and find meaning and truth to improve World one.

Kerlinger and Lee (2000) distinguish two dimensions of meaning, namely the connotative and denotative dimensions of meaning. The connotative dimension of meaning represents that which an individual has “in mind” when using the construct. The connotative meaning of a construct is explicated through a process of conceptualisation and captured in a constitutive definition (Kerlinger & Lee, 2000). The constitutive definition allows one to obtain an intellectual grasp of the construct. The connotative meaning of a construct lies in the internal structure of the construct and in the manner in which the construct is embedded in a larger nomological network of constructs. In the latter sense the explication of the connotative meaning of a construct is a continuously evolving process. The conceptualisation of a construct can be considered to be valid if the constitutive definition acknowledges all of the facets of the construct, that are implied by the manner in which the construct is used in theorising, and if the dimensions constituting the internal structure are mutually exclusive (Kerlinger & Lee, 2000).

The denotative dimension of meaning refers to the observable behaviours and experiences in which the construct expresses itself and the situations that bring about changes in the level of the construct. The denotations of the construct are utilised in the operational definition of the construct. The operational definition provides an empirical grasp of the construct and how it shall be measured or be experimentally manipulated.

*Psychological ownership* is a relatively new construct inspired by extensive literature on the psychology of me and mine, possession and ownership (Belk, 1988; Dittmar, 1992; Etzioni, 1991; Furby, 1976; 1991; Heider, 1958; James, 1890; Prelinger, 1959). Building upon the conventional notion that ownership, accompanied by its rights and responsibilities as stipulated by the legal system, leads to a caring and nurturing motive by the owner, Pierce and his colleagues (2001) pioneered work surrounding *psychological ownership* within organisations in the 21st century. They formally introduced the theory of *psychological ownership*. Stimulated by the work of Etzioni (1991, p. 466) who stated that ownership is a “dual creation, part attitude, part object, part in the mind, part ‘real’”, they defined *psychological ownership* 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!")" (Pierce et al. 2001, p. 299).

Although Pierce and his colleagues (Pierce et al. 2001; 2003) are prominent advocates of *psychological ownership*, and their work is most often cited, when defining the construct to date, this construct received attention in literature in the 1900's (Beaglehole, 1932; Brown, 1989; Duncan, 1981; Furby, 1976; 1980; 1991; Litwinski, 1942). Several constitutive definitions for this construct have therefore been presented. Some capture the essence of *psychological ownership* through possessive pronouns, such as Pierce et al.'s (2001) definition above, while others define *psychological ownership* in terms of sentiments, a felt concern or obligation (Brown, 1989) or an amalgamation of the above mentioned approaches (Druskat & Kubzansky, 1995; Olckers & Du Plessis, 2012a). The sections that follow describe the extant literature on *psychological ownership* to date, in an attempt to solidify a constitutive definition of *psychological ownership* for this study.

Economic psychologist Leon Litwinski (1942, p. 30) stated that "to possess means the power of becoming tied to an object". 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. Pierce et al. (2003, p. 86), stimulated by the work of Furby (1976; 1991), similarly view *psychological ownership* from this possessive pronoun perspective. They argue that the complexity of this construct is contained within the notion that it is a feeling. The word "feel" as employed by Pierce et al. (2001, 2003) points to a complex affective and cognitive state experienced by the individual. "It represents a condition of which one is aware through intellectual perception. It reflects an individual's awareness, thoughts, and beliefs regarding the target of ownership. The cognitive state, however, is coupled with an emotional or affective sensation" (Pierce et al. 2003, p. 86). At the core of *psychological ownership*, according to Pierce et al. (2001, 2003, 2011), is a level of awareness and feelings of possessiveness or of being emotionally attached to an object.

According to Van Dyne and Pierce (2004, p. 86) (organisational) *psychological ownership* asks the question, "How much do I feel this organisation is mine?" They define *psychological ownership* as "the psychologically experienced phenomenon in which an employee develops possessive feelings for the target," (Van Dyne & Pierce, 2004, p. 439). This definition takes into account the inner workings of this phenomenon at an intrapersonal level and similarly emphasises feelings of possession highlighted in Pierce's conceptualisation of *psychological ownership* as a cognitive-affective state.

Recent work on the topic of *psychological ownership* tends to adopt definitions developed by Pierce (2001; 2003) and his colleagues. Olckers and Schaap (2013), two of the few South African researchers interested in this construct, concur with the possessive pronoun and feelings approach to conceptualising this construct (Pierce et al. 2001; Van Dyne & Pierce, 2004). Olckers and Schaap (2013, p. 570) describe *psychological ownership* as a phenomenon and define it as “a psychological experience of an employee when that employee develops possessive feelings for the target of ownership.”

Bernhard and O'Driscoll (2011) cite Pierce's definition and supplement it with the notion 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*. This definition points to *psychological ownership* as not only a cognitive-affective state but also a conative state where the possessive feelings and emotions attached to the target influence an individual's motivation to behave protectively towards that target. Druskat and Kubzansky (1995), building on earlier conceptualisations (Furby, 1976; Litwinski, 1942), similarly view the psychological sense of ownership as a sentiment with behavioural inclinations. Ownership sentiments are referred to as expressions of a claim toward a target about which one uses the pronoun “my” or “mine” with greater or lesser intensity. Here *psychological ownership* is “conceptualized as a cluster of behaviours, cognitions and feelings often embodying intense affective and motivational components,” (Druskat & Kubzansky, 1995, p.4).

Ozler, Yilmaz, and Ozler (2008) similarly conceptualise feelings of possessiveness as cognitive and emotive attachment with a conative element. They define *psychological ownership* as a cognitive and emotive attachment between the individual and the object, which in turn influences an individual's conduct. Asatryan and Oh (2008) likewise point out that this psychological state has an influence on behaviours from a relational perspective. They argue that these feelings of ownership can become the foundation of a continuous relationship with an object, such as a job or organisation. These definitions again highlight both an emotional and behavioural or outcomes perspective of *psychological ownership*.

Brown, (1989, p. 15) emphasised that *psychological ownership* is about “people working as if they own the place.” At first glance this definition seems to highlight a behavioural perspective based on outcomes brought about by an employee which would normally be enacted by an owner. However, Brown additionally postulates that the motivation to behave like, or the action of working as if an employee is, an owner, is accompanied by a

shared sense of responsibility, with subsequent feelings of accountability. Researchers (Avital & Vandenbosch, 2000; O'Reilly, 2002; Parker, Wall & Jackson, 1997) concur with Brown's emphasise on responsibility and similarly focus on a felt concern and a sense of responsibility in their definitions of the construct of *psychological ownership*.

Both Parker et al. (1997) and Avital and Vandenbosch (2000) for example, define *psychological ownership* in terms of a concern for, or a felt responsibility for, a specific target. Parker et al. (1997, p. 904) employ different terminology referring rather to *production ownership* that entails the "work problems or goals that someone owns or feels responsible for." O'Reilly (2002), in contrast, looks at responsibility for long-term decision making. O'Reilly (2002, p. 9) states that (organisational) *psychological ownership* is "a feeling on the part of employees that they have a responsibility to make decisions that are in the long-term interest of the company".

Pierce and Jussila's (2011) assertions regarding *psychological ownership* differ from the thoughts of the above scholars who theorise that *psychological ownership* involves responsibility. Pierce and Jussila argue that *psychological ownership* and responsibility are two distinct states. Furthermore, they suggest that responsibility is an outcome of a sense of ownership and that the two constructs have a reciprocal relationship but that responsibility is not a dimension of, nor does it define, *psychological ownership*.

Avey, Avolio, Mhatre and Crossley (as cited in Pierce and Jussila, 2011, p. 17) see *psychological ownership* as emerging from a "set of corresponding states". They believe that *psychological ownership* develops when an employee simultaneously experiences feelings of belongingness, accountability, self-identity and self-efficacy within their job or workplace. In more recent studies Avey et al. (2009) however cite O'Reilly (2002) and Pierce et al. (2001, 2003) definitions, as provided above, and classify *psychological ownership* as a latent variable that should be considered, together with the psychological capital latent variables (Luthans & Youssef, 2004), as a positive psychological resource that fosters positive organisational behaviour.

Druskat and Pescosolido (2002, p. 291) define *psychological ownership* as "a state of mind that changes one's relationship to work by strengthening feelings of responsibility and influence over how it gets done," thereby categorising *psychological ownership* as a cognitive-affective-conative state. Asatryan and Oh (2008) concur and state that people develop attitudes that are highly possessive in nature towards items that they own. These attitudes in turn become the underpinning of a continuous relationship with the object.



Bernhard and O'Driscoll (2011) state that these strong possessive feelings and a high degree of psychological attachment to a target are key characteristics of *psychological ownership*. These definitions highlight the integrated cognitive, affective and conative nature of *psychological ownership* and the behavioural outcomes as a result of this sense of ownership.

### **2.2.1 Psychological ownership as a proposed multidimensional state**

The dimensionality of the construct of *psychological ownership*, as presented in the literature (Avey, et al. 2009; Olckers & Du Plessis, 2012a; 2012b; Olckers & Schaap, 2013), generates a sense of uneasiness and therefore requires further elaboration before a constitutive definition can be developed.

The literature on *psychological ownership* (Avey et al. 2009; Olckers & Du Plessis, 2012a; 2012b; Olckers & Schaap, 2013) suggests that it is a complex multidimensional construct. Dimensions of *psychological ownership* would refer to qualitatively distinct aspects or characteristics of the construct that vary in magnitude across individuals and that collectively constitute the level of *psychological ownership* experienced by an individual. Upon initial investigation there seem to be two approaches to the dimensionality of *psychological ownership*. Earlier work by Druskat and Kubzansky (1995) presents the dimensions of ownership as *pride and identity*, *empowerment influence*, *voice*, *information and insider status*, and *responsibility and burden-sharing*. More recent work by Avey et al. (2009), Olckers and Du Plessis (2012a; 2012b) and Olckers and Schaap, (2013), building on earlier research, presents a slightly adjusted taxonomy using the types of *psychological ownership*, namely *preventative* and *promotative*, as a classification system. These different approaches will be briefly discussed.

*Pride and identity* as a dimension proposed by Druskat and Kubzansky (1995) is seen as an aspect of *psychological ownership* whereby an individual identifies with the target and by taking ownership communicates to others, and to themselves, a certain expression of identity. This proposed dimension has evolved in the literature and is now seen as *self-identity* (Olckers & Du Plessis, 2012a).

*Empowerment influence* and *information and insider status* are two dimensions linked by the individuals need for power and a sense of entitlement to preferential status. As dimensions of *psychological ownership* Druskat and Kubzansky (1995) posit that they encompass an individuals right to authority over the target or object.



*Responsibility and burden sharing* are encapsulated in an individual's sense of possessive caring or nurturing of the target. This is seen as the defensive function of territorial claiming (Druskat & Kubzansky, 1995) whereby an individual seeks to protect the target and maintain the rights and responsibilities that accompany a sense of ownership.

Drawing on Brown's conceptual review of *territoriality* and Furby's (1991) operationalisation of ownership, Druskat and Kubzansky (1995) identified the aforementioned analytic dimensions as central to *psychological ownership*. In more recent literature these dimensions have however been renamed or set aside, as seen in studies by Avey et al. (2009) and more recently Olckers and Du Plessis (2012a; 2012b).

A simple framework developed by Avey et al. (2009) and further expanded upon by Olckers and Du Plessis, (2012a) at first glance seems to provide a satisfactory taxonomy of the dimensions of *psychological ownership*. Building on Pierce et al.'s (2001) roots of *psychological ownership*, Avey et al. put forward *territoriality* and *accountability*, as well as *belonging*, *self-efficacy* and *self-identity* as dimensions of *psychological ownership*. Olckers and Du Plessis then proposed that the dimensions of *psychological ownership* should be classified in terms of the two different types of this psychological state. Here the dimensions are divided in terms of preventative and promotative ownership<sup>7</sup>. Olckers and Du Plessis therefore similarly propose *territoriality* and *accountability* as well as *belonging*, *self-efficacy* and *self-identity* as dimensions and additionally posited *autonomy* and *responsibility* as dimensions defining *psychological ownership*. Table 1 below briefly provides an outline of these dimensions as defined by Avey et al. and Olckers and Du Plessis.

In their more recent research Olckers and Du Plessis, (2015) seem to adopt the taxonomic framework of Pierce et al.'s (2001) original research and do away with the reference to dimensions.

Upon deeper investigation, and much introspection, it therefore seems as though this framework and the proposed dimensionality of the construct of *psychological ownership* should be challenged. Revisiting the origins of the theory of *psychological ownership* suggests that *psychological ownership* should rather be conceptualised as a unidimensional, but nonetheless complex, construct.

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<sup>7</sup> The distinction between preventative and promotative *psychological ownership* will be explained and discussed in paragraph 2.2.4 below.

**Table 2.1**  
***Proposed Dimensions of Psychological Ownership Defined***

Type of psychological ownership	Dimensions of psychological ownership	Summary definition (adapted from Olckers and Du Plessis, 2012a & Avey et al. 2009)
Promotative <i>psychological ownership</i>	Self-efficacy	The ability to interact and control's one's environment or target successfully. Believe in oneself, that a task is possible due to the individuals own ability, leads the individual to feel a sense of ownership toward the task. Feelings of control therefore lead to feelings of self-efficacy. "I need to do this task, I can do it, and I therefore own the responsibility for achieving success" (Avey et al. 2009, p. 177).
	Self-identity	Possessions act as symbolic expressions of the self.
	Belongingness	The interaction between an individual and the environment and the subsequent personalisation of the environment which in turn results in the expression of the self.
	Accountability	Accountability as a dimension of <i>psychological ownership</i> is seen through (1) the expected right to hold others accountable and (2) the expectation for one's self to be held accountable for an object.
	Autonomy	Acting in accordance with one's genuine interests, values and desires.
Preventative <i>Psychological ownership</i>	Responsibility	The act of controlling and protecting tangible and intangible objects or possessions.
	Territoriality	An individual's expression of ownership for tangible and intangible objects, a form of marking.

Pierce et al. (2001) and especially Van Dyne and Pierce (2004) and Pierce and Jussila (2011) seem to interpret *psychological ownership* as a complex unidimensional psychological state in which the integrated cognitive, affective and conative nature of psychological possession is experienced. Grasping the connotative meaning of this unidimensional construct really requires lengthy reflection that includes some introspective inspection of one's own experiences of *psychological ownership*. Although *psychological ownership*, and what this construct represents to an individual, initially seems to be instinctively understandable, capturing this understanding in a clear and concise constitutive definition remains challenging. In search of a clear constitutive definition the risk of confounding antecedents and consequences of the construct with the

construct itself becomes very real. The current study would contend that perhaps Avey et al. (2009) and Olckers and Du Plessis (2012a; 2012b) fell prey to this error.

The core connotative meaning of *psychological ownership* as a construct is integrated in the cognitive, affective and conative 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*. More subtle than the cognitive and affective texts, is a conative subtext that points to an inclination/willingness to act in the best interest of the target object. A construct is the abstract theme [or themes] shared by the bundles of observable behaviours and experiences that the construct represents. In the experiences associated with psychologically possessing a material or immaterial target object cognitive, affective and conative strains of meaning exist inseparably intertwined.

Earlier foundational work by Pierce et al. (2001) and more recent publications (e.g. Pierce & Jussila, 2011) seem to argue that what is sometimes referred to as dimensions 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. This will be discussed under Section 2.4 below.

### **2.2.2 Promotion- versus prevention-orientated psychological ownership**

Avey et al. (2009) propose two types of *psychological ownership* based on regulatory focus theory (Higgins, 1997) and goal appraisal. When applying Higgins' theory to *psychological ownership* Avey et al. suggest that individuals who are more promotion oriented (pursue goals that reflect their hopes and aspirations) will approach the target differently to those that are prevention oriented (avoid punishment by following certain rules). These two self-regulatory mechanisms are seen to influence an individual's feelings towards a target. An individual with a prevention-oriented focus would, when it comes to sharing of information that could lead to change, withhold information, whereas an individual with a promotion-oriented focus would share any information which would assist in the change process. Promotion-oriented *psychological ownership* can therefore be seen as the extent to which the *psychological ownership* towards a target (an idea, information and the like) may be used for the good of the job (or organisation). Prevention-

oriented *psychological ownership* is therefore seen as the extent to which an individual who feels *psychological ownership* towards a target may withhold the target in order to maintain stability (Avey et al. 2009; Olckers & Du Plessis, 2015) and not risk losing control over the possession.

### **2.2.3 Concluding remarks on the conceptualisation of psychological ownership**

The definitions and comparisons above provide a detailed picture of the construct of *psychological ownership* and its complexity. Although differing in emphases the definitions of *psychological ownership* share a common thread. The commonality resides in the development of *psychological ownership* as a latent variable that evolves through an intrapersonal process toward an external target (material or immaterial). Some definitions emphasise merely the cognitive processes, and the subsequent feelings (affective) towards an object, while others extend the notion of awareness and feelings to their influence on motivational processes (conative) to behave in a certain way toward the target.

Certain scholars argue that the construct of *psychological ownership* can be better understood by comparing and contrasting it to that of attitudes (Wagner et al., 2003). In terms of the similarities *psychological ownership* and attitudes are both made up of multiple components including cognitive, affective and conative components, can be directed at individual or group levels and at a variety of objects, material and immaterial. Although attitudes and the psychological sense of ownership share some similarities these two constructs are, however, conceptually distinct. *Psychological ownership*, is seen as non-evaluatory in nature, as opposed to attitudes. Attitudes are seen as an evaluative tendency towards a target, whereas *psychological ownership* is seen as a sense of possession for a target that is seen as an extension of the self.

When examining Litwinski's definition it can be argued that the use of the word "power" points to Pierce et al.'s (2003) notion of the psychological interactions working within each and every individual in terms of the ability and desire to have feelings toward a target. When unpacking the concept, as defined by Furby as 'mine', earlier writings by Dittmar (1992) provide much insight. Dittmar describes possessions that are labelled as 'mine' as being part of 'me'. In this way it is then difficult to separate what is mine from me. According to Pierce and Jussila (2011) our possessions define us and are therefore an important expression of who we are both to ourselves and to others. This lends itself toward a conclusion that there is a connection between the self and possessions, both material and

immaterial in nature. Possessions are therefore seen as an extension of, or expression of, oneself. It can therefore be argued that individuals will not merely become tied to any object since the target or object should reflect a certain element of the “owner”. This line of reasoning aligns well with Etzionis’ (1991) assumption that part of the dual creation or processes involved in *psychological ownership* are ‘part object’.

Before settling on a single constitutive definition of *psychological ownership* it is important to differentiate it from ownership that is legally quantifiable. Pierce et al. (2003, p. 87) states:

Although possibly related, legal and psychological ownership differ in some significant ways. For example, legal ownership is recognized foremost by society, and hence the rights that come with ownership are specified and protected by the legal system. In contrast, psychological ownership is recognized foremost by the individual who holds this feeling. Consequently, it is the individual who manifests the felt rights associated with psychological ownership.

Formal or legal ownership therefore pertains to ownership that is quantifiable in the eyes of the law (Dawkins et al. 2017). This relates to items such as the home one owns and the car one drives, for example. Once an individual has purchased this object they receive “a bill of rights” or deed of ownership that, from a legal perspective, grants certain rights and responsibilities to the owner. Formal ownership, or ownership that is legally quantifiable, is a multidimensional phenomenon. It constitutes the above mentioned rights (or legal aspect of ownership) and responsibilities that are defined by the legal system (Pierce et al. 2003) and are the “real” aspects of ownership (Pierce & Jussila, 2011, p. 12) as well as the psychological sense of ownership and feelings toward this purchased target. Scholars (e.g. Avey et al. 2009; Furby, 1976) suggest that individuals may still experience a sense of ownership despite not satisfying the criteria of formal ownership, or having the legal connection to the target. *Psychological ownership* therefore does not necessarily presuppose the legally quantifiable component of formal ownership and can operate without legal ties toward an object or target. An individual can therefore feel a connection or attachment towards an object, and a sense that it is ‘theirs’ or ‘mine’, without legally owning it.

Although certain above mentioned scholars suggest that *psychological ownership* is a multidimensional state, when revisiting the initial theory of *psychological ownership*, while bearing the definition of dimensionality in mind, as mentioned, it seems reasonable to

argue against this train of thought. The suggested dimensions of *psychological ownership* such as *self-efficacy*, *self-identity*, *belonging*, *autonomy*, *territoriality* and the like could rather be considered as causes of *psychological ownership* (in terms of individual needs) that reside within the individual and not characteristics of the construct that could vary in magnitude and therefore influence levels of *psychological ownership* experienced by the individual. Additionally, some of these posited dimensions could be thought of as consequences, more specifically *responsibility* and *territoriality*.

Therefore, it seems reasonable to suggest that *psychological ownership* can be seen as a unidimensional intrapersonal state brought about by individual characteristics (individual needs, for example) that align with the characteristics of the target (job autonomy, for example), which are seen as an extension of the self. Therefore, the way in which an individual, views him/herself in relation to the target of ownership, feels they, as opposed to others, have a degree of control over the target and/or experiences a sense of belonging and/or stimulation, will influence the development of *psychological ownership* experienced through subsequent behaviour towards the target. These roots and routes (Pierce, et al. 2001) are, however, in the current study not regarded as dimensions of *psychological ownership* but rather as antecedents through which *psychological ownership* develops.

The notion that *psychological ownership* is a psychological state furthermore implies that this construct is an emotion “partly determined by the provocative power of specific situations” (Pervin et al. 2005, p. 245). This line of reasoning emphasises the temporal nature of feelings of ownership and subsequently the fact that this construct can be moulded or changed. *Psychological ownership* as a state, as opposed to a trait which refers to “consistent patterns in the way individuals behave, feel and think” (Pervin, et al. 2005, p. 223), is therefore seen as a temporal construct, caused by external circumstances, likely the target and the context (together with individual characteristics). Job-based *psychological ownership* for example, which refers to feelings of ownership within a specific job, implies a psychological state that reflects an individual’s current position or feelings with regards to an existing job (Mayhew et al. 2007). Should the employee change jobs these feelings of ownership would in turn change. This line of reasoning seems reasonable in that since the target has changed, different attributes within this new target could be activating and satisfying different needs within the individual. This then in turn would lead to the activation of different routes and subsequently different levels 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. This unidimensional state is characterised by not only cognitive and affective properties but additionally by conative elements. 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*. For the purposes of the current study (promotive, individual, job) *psychological ownership* will therefore be defined as:

a unidimensional integrated psychological (cognitive, conative and affective) state where an individual experiences a protective, affectionate, possessive self-defining bond or connection with a target object, in this case an employee's job, which is seen as a needs satisfying expression of the self.

### 2.3 THE QUESTION OF DISTINCTIVENESS

Within the field of organisational research there lies the real probability of concept redundancy. Responding to Morrow's (1983) plea for further research in the domain of organisational commitment to provide evidence of distinctiveness this section, drawing predominantly from the work of Pierce and Jussila (2011), outlines the characteristics of *psychological ownership* that make it distinct from other psychological constructs that find their place within the nomological network of latent variables which underpin behaviour in the workplace. Scholars (e.g. Pierce et al. 2001; 2003; Mayhew et al. 2007; Van Dyne & Pierce, 2004) posit that *psychological ownership*, as a construct, is fundamentally different from related constructs like commitment, identification, internalisation, psychological empowerment and job involvement and that it adds incremental explanatory power to these constructs to explain variance in several attitudes and behaviours relevant within the working context. These differences are suggested to revolve around the conceptual core (i.e., possession), motivational bases, development and consequences of *psychological ownership*. Pierce et al. (2001; 2003) compare *psychological ownership* to other work-related attitudes such as affective organisational commitment, identification and internalisation. Table 2.2 below outlines the summary provided by Pierce and Jussila (2011) and extends it to include attachment and job satisfaction and job involvement.



**Table 2.2**  
***Distinctiveness of Psychological Ownership from other Conceptually Related Organisational Behaviour constructs***

Dimensions of distinctiveness	Psychological ownership	Commitment	Identification	Internalization	Psychological empowerment	Job involvement
1. Conceptual core	Possessiveness	Desire to remain affiliated	Use of element of organizations identity to define oneself	Shared goals or values	Achieving orientation to work role	Identification with one's job
2. Questions answered for the individual	What do I feel is mine?	Should I maintain membership?	Who am I?	What do I believe?	Can I shape my work role?	How important is my job to me?
3. Motivational bases	Efficiency/effectance Self-identity Need for place	Security Belongingness Beliefs, values	Attraction Affiliation, holism Self-enhancement	Need to be right Belief and values	Self-efficacy Self-esteem Access to info, rewards	Importance of work Satisfying self-esteem
4. Development	Active imposition of self on organization	Desire to maintain membership	Categories of self with organization Affiliation, Emulation	Adoption of organization's goals or values	Believe in competence Autonomy Impact on outcomes	Psychological importance at work
5. Type of state	Affective/cognitive	Affective	Cognitive/perceptual	Cognitive/objective	Affective/perceptual cognitive	Affective/attitude
6. Select consequences	Rights and responsibilities Promotion of/resistance to change. Frustration, stress, refusal to share Worker integration Alienation Stewardship and OCB	OCB Intent to leave Attendance	Support for organization and participation in activities Intent to remain Frustration/stress Alienation Anomie	OCB Intent to leave In-role behaviours	Effective role performance Concentration Resilience Innovation	Intrinsic motivation Intent to remain Low level of absence
7. Rights	Right to information Right to voice	None	None	None	Meaningful work Access to information Rewards	Meaningful work Adequate supervision
8. Responsibilities	Burden sharing Active and responsible voice Becoming informed Protecting Caring for and nurturing Growing/enhancing	None	Maintaining the status of the desire attribute	Goal and value protection	Capacity to perform activities with skill	

Source: Adapted from Olckers and Du Plessis (2012b); Pierce, et al. (2001)

## 2.4 DEVELOPING A HYPOTHESIS ON THE NATURE OF THE PSYCHOLOGICAL MECHANISM REGULATING THE LEVELS OF PSYCHOLOGICAL OWNERSHIP

In an attempt to build a theory of *psychological ownership* it is important to go beyond the definition of *psychological ownership* and draw the full structure and complexity of the richly interconnected psychological mechanism that regulates the levels of *psychological ownership* that individual's experience (Swedberg, 2012). The emphasis of this section will turn to the determinants or causes of *psychological ownership*, classified by Pierce et al. (2001, 2003) as the roots of, and routes to, *psychological ownership*. Some, more indirect antecedents of *psychological ownership* will additionally be investigated in an attempt to develop detailed hypotheses of the psychological mechanism regulating feelings of ownership.

The development of these detailed hypotheses, and subsequent explanatory *psychological ownership* structural model, is however not a simple undertaking. The complexity is fuelled by the fact that the levels of *psychological ownership* that are experienced by employees are influenced by several latent variables that share interconnected relationships within the nomological network of latent variables underpinning *psychological ownership*. Furthermore, the explanation of *psychological ownership* (or the understanding of the psychological mechanism) cannot be isolated to any one specific latent variable within this model or to any single structural relationship between any two latent variables, underpinning *psychological ownership*, but is rather spread across the entire model.

This presents a challenge in that it is difficult to distil a specific starting point for the argument as to what constitutes the initial variable or point of departure within the development of feelings of ownership, experience by an individual, within the work place. It must be noted here that should the full complexity of this explanatory structural model wish to be realised it would take an immense amount of effort and time to fully capture it. Therefore, due to the constraints of conducting research within an academic timeline the intention is to capture an explanatory model that at least closely approximates reality, with the hope to expand the research in future.

Before venturing into World two, in an attempt to uncover the cunning logic and elegant design (Ehrenreich, 1991) characterising the psychological mechanism proposed to influence levels of *psychological ownership*, it is important to obtain clarity with regards to the current study's meta-theoretical position on the existence of a psychological state such

as *psychological ownership*. Therefore, a discussion on the proposed determinants or causes of *psychological ownership* would be incomplete without an examination of the role of biological, psychological or social influences that explain the existence of this psychological state. In order to understand why individuals experience varying levels of *psychological ownership* we must first grapple with why *psychological ownership* (denotatively) exists in the first place.

Several standpoints are present within the literature surrounding the emergence of psychological states in general, and feelings of ownership specifically. Some suggest that the origins of possessive feelings lie within an individual's innate genetic structure (Burk, 1900; Dittmar, 1992; Litwinski, 1942; Porteous, 1976; Weil, 1971) while others (Furby, 1976; 1980; Kline & France, 1899; Mead, 1934) postulate that this psychological human condition is brought about by socialisation practices within society.

From an inherent genetic perspective these scholars (Burk, 1900; Dittmar, 1992; Litwinski, 1942; Porteous, 1976; Weil, 1971) believe that the need to possess is genetic, hereditary and evolutionary and is therefore a product of an innate instinct (or need) within each and every one of us to have, possess and amass, what we feel is ours, which develops through the survival value of feeling attached to objects. Dittmar (1992) explains that advocates for this instinctual approach focus on the biological basis for social phenomenon, such as acquiring and retaining possessions. An individual's relationship with a material possession is seen as "the consequence of an acquisitive disposition which has biological survival value" (Dittmar, 1992, p. 23). Examples given as evidence of this innate tendency of *meum* and *tuum*<sup>8</sup> (mine and thine) include childhood possession or hoarding of toys ('my toy', 'mine'), nursery rhymes ('Read me my nursery rhyme'), ('It's time for my bed time story') and parents ('my mommy') at a very young age, as well as the universal impulse of all of mankind, and various animal species, to collect and hoard various objects (Furby, 1978). Heider (1958) observes that attitudes of ownership are common among people, pointing to genetic origins and according to McDougall (as cited in Dittmar, 1992, p. 24) this impulse "ripens naturally and comes into play independently of all training." As an instinct *psychological ownership* would therefore be seen as an unlearned tendency to respond in a possessive, protective, caring manner to objects, that emerges under certain

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<sup>8</sup> *Meum* and *tuum* refers to the acknowledgement of 'what is mine' and 'what is yours'. Baldwin (as cited in Litwinski, 1942) asserts that even animals display behaviour which recognises 'what is mine' (*meum*) and 'what is yours' (*tuum*). Some birds for example claim a nest and in so doing the whole tree becomes 'theirs'. While they ignore another birds nest and subsequently their tree. For the purposes of this study the focus is on *meum* therefore all examples refer to behaviour suggesting 'what is mine'.

stimulus situations, and functions as a motivational force behind complex human behaviours, found universally within a species (human kind) (Reber, 1985). Beaglehole (1932), however, argued that there is little evidence to support propositions of an innate possessive instinct.

Others (Furby, 1976; 1980; Kline & France, 1899; Mead, 1934) believe it to be a product of socialisation, in terms of social and cultural factors, carried out in society. While Furby (1980) agrees that the origins of possession are universal (Reber, 1985) she additionally states that it is the “interaction with environmental restriction which occasions the development of a notion of possession” (Furby, 1980, p. 36). Mead (1934) likewise asserts that when an individual claims that something is his (or hers), he (or she) is “appealing to his rights because he is able to take the attitude which everybody else in the group has with reference to property, thus arousing in himself the attitude of others”<sup>9</sup> (Mead, 1934, p. 162). Mead therefore suggests that the relationship between a person and his or her possessions is one that occurs within the context of other people or society. Furby (1980) moreover states that the complexity of possessive behaviour increases with age. She attributes this to the fact that the developmental process of possessive behaviour depends so heavily upon the social system. Ozler et al. (2008) concur and suggest that the meaning of possessions is created through social interaction and therefore possessions have no meaning when seen in isolation. Here, an individual’s feelings towards an object begins via interactions with the target as well as society or the community.

Litwinski (1942), although describing feelings of possession as innate instincts, alludes to the fact that the developmental process plays a role, suggesting a sociobiological perspective. According to Litwinski the impulse to possess “must be considered as an innate tendency though, in spite of the fact that doubtless it owes much of its strength, as well as the direction which its development takes, to example and social education” (Litwinski, 1942, p. 36). This begins to highlight a combined approach where genetics as well as social aspects play a role in the development of psychological phenomena.

After highlighting the different aspects of both the nature and nurture approaches Dittmar (1992) asserts that neither of these approaches in isolation captures the essence of the origin of a psychological state such as *psychological ownership*. Rather, it can be argued that a combination of the two is necessary. She suggests that biology potentially

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<sup>9</sup> The author notes the potentially sexist use of language in this citation. It has been included unedited for its overall contribution to the research project.

influences possessive feelings however she argues that “social and cultural factors significantly influence how people relate to their material possessions,” (Dittmar, 1992, p. 36). Pierce et al. (2001) in their attempt to theoretically answer the question, why *psychological ownership* exists, concur with Dittmar and argue that not only genetic factors play a role but that social experiences that an individual is exposed to, and surrounded by, will inevitably influence this psychological phenomenon. *Psychological ownership* from this sociobiological perspective therefore “emerges because it satisfies certain human motives, some of them genetic and others social in nature,” (Pierce et al. 2001, p. 300).

Pierce et al. (2001) highlight that an individuals’ relationship with their possessions is complex and motivated by several factors. They suggest that individual differences such as individualism versus collectivism, as well as factors such as job involvement and organisation-based self-esteem influence individual need satisfaction within the workplace, and subsequently act as evidence of the complexity of the path to *psychological ownership* and the relationship between an owner and a target. Etzionis’ (1991) proposition that possession is a dual creation points to the influence of a process facilitated by several factors, constructed through attitude, the mind, and the characteristics of the target.

In brief, Pierce et al. (2001) in their theory of *psychological ownership*, initially argue that *psychological ownership* serves the individual needs or motives of *efficacy and effectance*, *self-identity* and *having a place*. More recently, they have added a fourth motive, *stimulation* (Pierce & Jussila, 2011). These motives, or roots, facilitate the development of, but do not directly cause, the state of *psychological ownership*. Furthermore, they suggest that three basic experiences or routes namely, the *ability to control the target*, the *opportunity to procure information about the target* and the *opportunity to invest one’s energy and self into a target*, facilitate the emergence of feelings of ownership (Ozler et al. 2008; Pierce et al. 2001). These routes to *psychological ownership* are seen as the paths through which individuals, and therefore employees within organisations, begin to experience *psychological ownership*. Pierce et al. (2001) suggest that these routes answer the question “How do organisational members come to feel *psychological ownership*?”

These roots and routes will now be discussed in more detail as components of the psychological mechanism believed to influence the level of *psychological ownership* experienced.

### 2.4.1 Roots of psychological ownership – intrapersonal antecedents

In response to the question, what is the motivation or function served for the individual by this psychological state, Pierce et al. (2001) suggest four roots of *psychological ownership*. These roots are the motive of *efficacy and effectance*, the *need for self-identity*, the *need to have a place* (Pierce et al. 2001) and most recently the *need for stimulation* (Pierce & Jussila, 2011). These roots “are latent conditions that become activated at different times and to varying degrees as people interact with a variety of potential targets of ownership,” (Pierce & Jussila, 2011, p. 48).

Firstly, Pierce et al. (2001; 2003), stimulated by Furby’s (1978) control model<sup>10</sup>, propose that *efficacy and effectance* motivation is an individual’s desire to be in control of possessions and changes within that individual’s environment. According to White (1959) an individual’s desire to effectively interact with their environment is reflected by this need. This motive is satisfied by a sequence of simultaneous effects. An individual initially has the ability to influence the target and therefore influence the environment (Bandura, 1997; Pierce et al. 2001; 2003). In turn, the individual experiences pleasure producing feelings and an increased sense of efficacy at ‘being the cause’ of an altered environment (Pierce & Jussila, 2011) and as such “the desire to experience causal efficacy in altering the environment leads to attempts to take possession and to the emergence of ownership feelings” (Pierce et al. 2001, p. 300).

Furby links feelings of control to that of self-expression and believes that “possessions constitute extensions of the self primarily because they express a person’s ability to exert direct control over her or his social and physical environment” (Dittmar 1992, p. 58). This points to the second motive proposed by Pierce et al. the *need for self-identity*. Pierce et al. (2001; 2003) believe that feelings of ownership are grounded in an individuals *need for self-identity*. It is suggested that individuals, in an attempt to understand themselves, express themselves to others and maintain a sense of continuity of self-identity, will attach themselves, and create a relationship, with an object or several objects. Several scholars (Dittmar, 1992; Ferraro, Escalas & Bettman, 2011; Furby, 1978; James 1890) suggest that there is a close relationship between a person’s identity and their possessions. According to Ferraro et al. (2011) the value of possessing and possessions runs deeper than ownership and an object’s functional value (Furby, 1978). Dittmar explains that

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<sup>10</sup> Furby suggests that an individual’s relationship with possessions lies predominantly in the effectance motivation whereby an individual is driven by the desire to influence outcomes within their environment.

“possessions fulfil both instrumental and symbolic functions as self-extensions” (Dittmar, 1992, p. 57). Possessions are suggested to help an individual to ‘create themselves’ and therefore become a representation of the self (Ferraro et al. 2011). Possessions therefore act as an extension of one’s self, communicating to the world ‘this is mine, this is me’ (Hillenbrand & Money, 2015).

James (1890, pp. 279-280) points to the psychological link between possessions and the self:

a man's Self is the sum total of all that he CAN call his, not only his body and his psychic powers, but his clothes and his house, his wife and children, his ancestors and friends, his reputation and works, his lands, and yacht and bank-account. All these things give him the same emotions.

James (1890) highlights that possessions, as extensions or a part of the self, bring about certain feelings within individuals. Ferraro et al. (2011, p.170) state that “possession–self linkages develop as a consequence of a possession's ability to represent the important domains upon which a person bases self-worth”. From a biopsychosocial perspective it seems reasonable to argue that this self-worth is constructed by the interplay of meanings, created by the individual themselves, as well as society, surrounding targets/objects. In this way an individual may attach the meaning ascribed to an object by society to their own self-identity, and in turn communicate this meaning as a form of self-expression through ownership.

The third motive that acts as an underlying reason for feelings of ownership relates to the need to belong or have a place (Pierce et al. 2001, Pierce & Jussila, 2011). This refers to an individual's need to feel ‘within’ and ‘a part of’ a place. ‘Home’ provides an element of safety as well as a mechanism for self-expression, through self-invest<sup>11</sup> in terms of decorating and maintaining, for example. From a psychological perspective, objects that are considered ‘home’ are those objects that an individual has invested themselves into emotionally and physically (Pierce & Jussila, 2011). Therefore, the concept of home is not limited to a dwelling per se, but rather it can be argued that “it is an outgrowth of the need for and the location of the self in time and space” (Pierce & Jussila, 2011, p. 46). It could therefore be argued that this could extend to an employee’s job within the organisational context. The need to find one’s ‘place’ and invest one’s energy into a job that allows for

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<sup>11</sup> This route will be discussed in more detail in Section 2.4.3 and 2.4.5.



personalisation and development of the self as well as a safe place for self-expression within the job.

Lastly, a more recent addition to Pierce et al. (2001) motives for *psychological ownership* is the need for stimulation (Pierce & Jussila, 2011). Pierce and Jussila (2011) believe that it is the need for stimulation that attracts specific objects into a person's realm as they seek to remain stimulated by possessions. Here, an individual's psychological relationship with an object is said to be stimulated by action and arousal. This motive, according to Pierce and Jussila, is the reason behind seeking new possessions and creating bonds with, and searching for, new objects that offer stimulation.

It is the opinion of the author that this need for stimulation could possibly be interpreted as an individual's changing self-identity. It seems reasonable to argue that as individuals interact with their environment, within different contexts, and at different life stages, they might build upon their own self-identity. These "changes" in self-identity would therefore lead to connections to, or feelings of ownership for, new objects, as expressions of the self. It is suggested here that the stimulation produced by an object or target is not satisfying a need for arousal/stimulation but rather the satisfaction of the individual need for self-identity. For example, the case of a female employee in her 30s. In the prime of her career she is focused and career-driven, spending her time engaged in activities that involve personal and company development and enhancement. She finds her work to be a good expression of who she is – a career driven women of the 21<sup>st</sup> century. However, as she begins to focus on a new role or identity, that of a care-giver and mother, her self-identity or self-concept begins to transform. Shifting her self-identity away from being career-driven towards being a mother. She takes maternity leave and 'owns' her motherhood experience. Returning to work she finds herself seeking a new form of identity as a working mother and her sense of ownership now adjusts once again.

According to Pierce and Jussila (2011) an individual cannot experience *psychological ownership* for immaterial and material objects or targets that do not allow these, above discussed, intra-individual forces (Pierce & Jussila, 2011) to activate and be fulfilled, (Olckers & Van Zyl, 2015) should the individual experience these needs or any one of these needs as salient. Pierce and Jussila additionally suggest that only one (or any combination) of these motives needs to be aroused for subsequent feelings of ownership to develop. They, therefore, suggest that it is not necessary for all four, in the researchers opinion all three, of the motives to be activated for this psychological state to develop. They, furthermore, suggest that these motives for *psychological ownership* are not seen

as an end-in-and-of themselves, as independent variables or drivers. Rather they serve an instrumental or utilitarian function. It is through the satisfaction of these needs that the routes are engaged and subsequently *psychological ownership* develops.

From the preceding discussion it seems evident that the relationship between objects, such as an employee's job, and the self is not a simple one. Dittmar (1992) states that an owner's relationship with his or her possessions is complex and more than dyadic. It entails the meaning placed upon the object by not only the owner but also society. This meaning additionally changes through an interaction between the individual, the object and society. This implies a triadic, interactive, cyclical relationship consisting of the object, and the meaning ascribed to the object by the individual as well as the meaning ascribed to the object by society.

Additionally, throughout the literature there seems to be a dynamic interaction between these motives, hinging on the need for self-identity. It is the researchers' opinion that this self-identity motive could potentially be the strongest of the three motives served by feelings of *psychological ownership*. However, the link between effectance motivation and a need to belong, as discussed above, and self-identity is noted. Here the act of controlling, or the ability to control, brings that object into the "realm of the extended self" (Pierce & Jussila, 2011, p. 41) and one's 'place' is found in the objects "in which an individual finds a strong sense of 'identification'" (Pierce & Jussila, 2011, p. 46). This seems to signify an interactive relationship between the motive of efficacy and the need for belonging, grounded in the need for self-identity.<sup>12</sup> However, for the purposes of this study the motives described above will be treated collectively as needs<sup>13</sup>.

#### **2.4.2 The interplay between the target and the owner**

The needs, discussed above in Section 2.4.1, are viewed by Pierce and Jussila (2011) as the conative engines that motivate an individual to act upon, or engage with, a target. As alluded to earlier, ownership in general, and *psychological ownership* specifically, is a "relationship", albeit purely (or not, as the case may be with physical [material] possessions legally purchased) a psychological one, between a target (material or

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<sup>12</sup> The interplay between the motives of effectance, need for self-identity and belonging is an area that has not received much empirical attention to date and therefore remains murky.

<sup>13</sup> This is noted as a potential weakness of this study. By treating the needs collectively the model could potentially lose the essence of the strength of each of the needs and their individual influence on the development of feelings of ownership.

immaterial) and an owner. This relationship therefore consists of an owner and a target, each with their own attributes. Within the work environment, and for the purposes of this study, this relationship involves an employee, as the owner, and a job, as the target.

Pierce and Jussila (2011), as well as Furby (1978) and Dittmar (1992) suggest that target attributes play an important role in influencing the levels of ownership feelings experienced by an individual. Firstly, target attributes impact the need-satisfying potential of the target, which act as the initial stimulus for feelings of ownership. Pierce et al. (2003, p. 98) suggest that a targets attributes allow for these individual needs or motives to “operate and to be satisfied”. It is therefore reasoned here, that the above mentioned, routes to feelings of ownership will not be activated unless the routes are seen to be instrumental in the satisfaction of the individual needs. More specifically, employees will not invest the self in the job, unless doing so is perceived to likely result in outcomes that will satisfy salient needs. Therefore, should a target’s attributes or characteristics not be perceived to satisfy at least one of the roots, as an initiating mechanism, then it is reasonable to assume that the routes will not be activated and feelings of ownership will not develop. Likewise, it could be argued that if the strength/salience of the roots, as the initiating mechanisms, are low the routes to *psychological ownership* will not be activated even when the job possesses attributes that could be instrumental in satisfying the *psychological ownership* need. A roots by target attributes interaction effect is therefore implied by this line of reasoning.

Secondly, Pierce and Jussila (2011) argue that the target, or specifically certain characteristics of the target, could additionally either hinder or facilitate these routes to *psychological ownership*. Revisiting Etzionis conceptualisation of ownership as a dual creation encompassing individual emotions as well as target characteristics and elements of an individual’s psyche, this seems not an altogether unreasonable stance to hold. However, it seems more plausible to suggest that this aiding and hindering of the levels of *psychological ownership* by the characteristics of the job, is captured within the job characteristics ability to satisfy the individuals *need for belonging*, *need for self-identity* and *need for efficacy* which in turn could move the employee to engage in self-investment. It therefore seems reasonable to argue that the characteristics of the job do play a vital role in the development of *psychological ownership* through the interaction between the individual’s needs and the characteristics of the job.

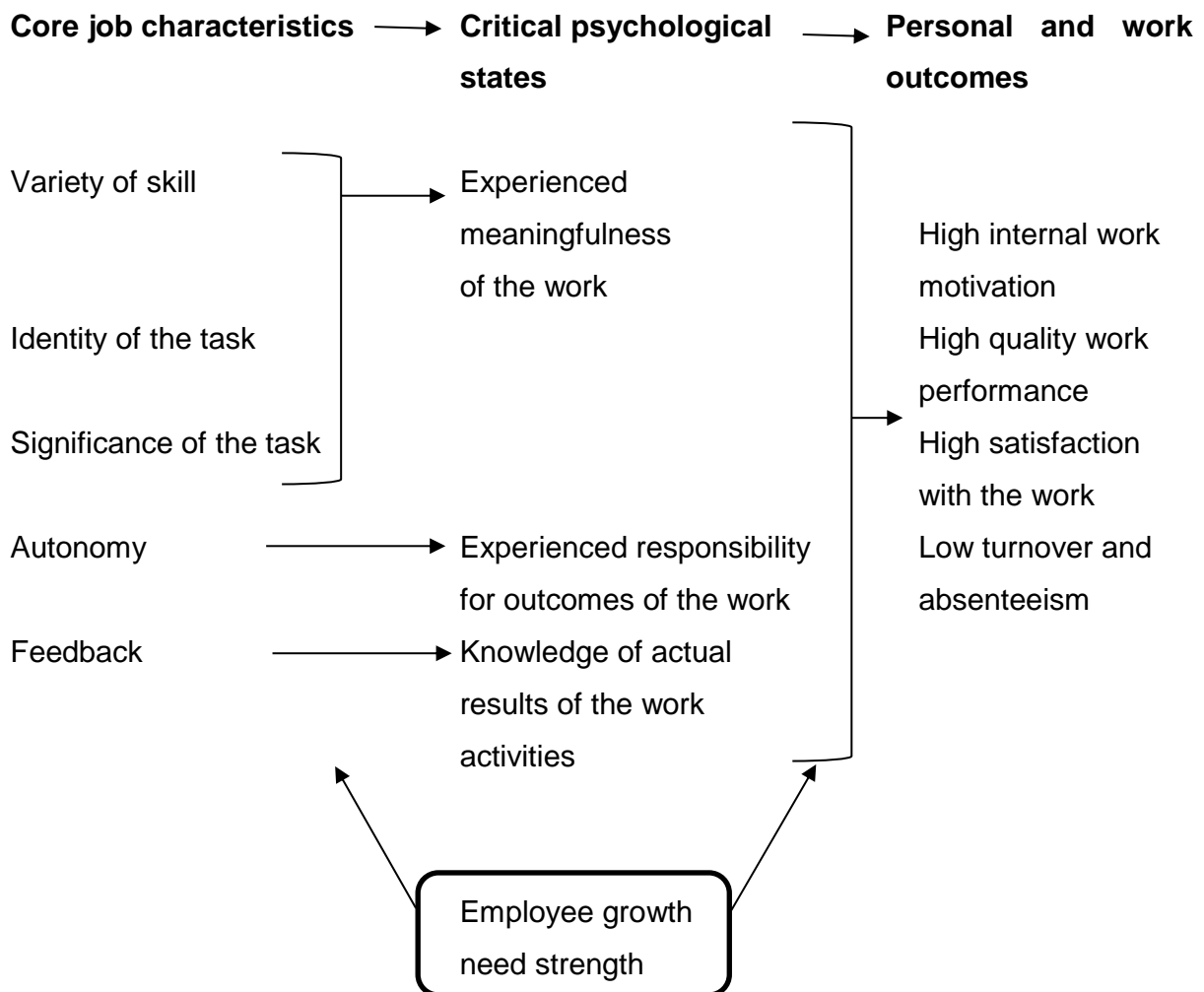
Given that the attributes of the target play an important role in influencing the levels of *psychological ownership* that the owner experiences towards the target, the question

arises as to what the identity of these attributes are? The paragraphs that follow therefore attempt to clarify this potential relationship within the complex nomological network of latent variables, which could potentially influence levels of *psychological ownership*, in greater detail.

#### **2.4.2.1 Target attributes**

Hackman-Oldham (1976) presented the Job Characteristics Model as a potential taxonomy or framework for positive work outcomes and motivated behaviour via critical psychological states. This framework is presented below in Figure 2.1. The hypothesis that the subsequent section will attempt to develop is that the Hackman-Oldham job characteristics constitute relevant job attributes which make *investing the self* in a job, that scores high on the job characteristics, instrumental in satisfying the root need through the experience of *psychological ownership*. This model will therefore be used to provide a potential framework that “specifies the conditions under which individuals will become internally motivated” (Hackman & Oldham, 1976, p. 250) to attach to and invest the self in the job.

The Hackman-Oldham Job Characteristics Model recognises that certain job characteristics play a role in contributing to certain psychological states experienced by employees which in turn influence work motivation and job outcomes. Hackman and Oldham (1976) suggest that certain core job characteristics such as *autonomy*, *feedback*, *skill variety*, *task significance* and *task identity* lead to critical psychological states. They propose that *skill variety*, *task identity* and *task significance* lead to experienced meaningfulness, *autonomy* leads to feelings of responsibility and *feedback* from job activities leads to knowledge of results.



**Figure 2.1. The Hackman-Oldham Job Characteristics Model of Work Motivation**

(Hackman & Oldham, 1976, p. 256)

The section that follows briefly outlines the definition of these Job Characteristics and Psychological States as per the Hackman and Oldham model:

*Skill variety* - "The degree to which a job requires a variety of different activities in carrying out the work, which involve the use of a number of different skills and talents of the person," (Hackman & Oldham, 1976, p. 257).

*Task identity* – "The degree to which the job requires completion of a "whole" and identifiable piece of work; that is, doing a job from beginning to end with a visible outcome," (Hackman & Oldham, 1976, p. 257).

*Task significance* – “The degree to which the job has a substantial impact on the lives or work of other people, whether in the immediate organization or in the external environment,” (Hackman & Oldham, 1976, p. 257).

*Autonomy* – “The degree to which the job provides substantial freedom, independence, and discretion to the individual in scheduling the work and in determining the procedures to be used in carrying it out,” (Hackman & Oldham, 1976, p. 258).

*Feedback* - “The degree to which carrying out the work activities required by the job results in the individual obtaining direct and clear information about the effectiveness of his or her performance,” (Hackman & Oldham, 1976, p. 258).

The three critical psychological states are defined by Hackman and Oldham (1976, pp. 256-257) as follows:

*Experienced meaningfulness of the work* - The degree to which the individual experiences the job as one which is generally meaningful, valuable, and worthwhile.

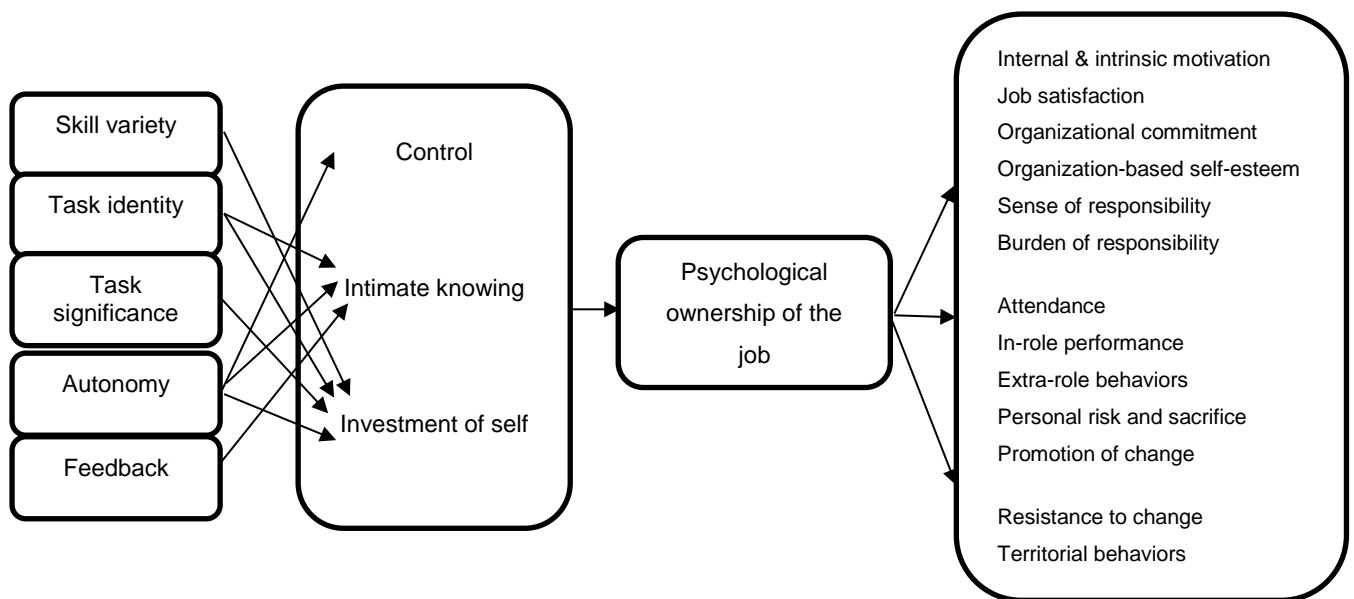
*Experienced responsibility for work outcomes* - The degree to which the individual feels personally accountable and responsible for the results of the work he or she does.

*Knowledge of results* - The degree to which the individual knows and understands, on a continuous basis, how effectively he or she is performing the job.

Research (e.g. Luthans, 2011) suggests that there is strong validity in certain claims put forward by the Job Characteristics Model. Ayandele and Nnamseh (2014) conclude that the model is valid in both European and African settings and in manufacturing and service-oriented organisations. Boonzaier (2001) found strong supporting evidence for links between job characteristics and personal outcomes however weaker evidence was attained for links between job characteristics and work outcomes. He did however confirm the five-factor nature of the Job Characteristics Model. According to Ramlall (2004) this model is one of the key employee motivation theories for organisations. Vorster, Olckers, Buys, and Schaap (2005, p. 31) concur and state that the Job Characteristics Model “is one of the most influential theories ever presented in the field of organisational psychology.”

However, the Job Characteristics Model is not without its critics. Fried and Ferris (1987) examined the extent to which Hackman and Oldham's original findings are replicable

within a relatively homogeneous group and found mixed supporting evidence. Arnold and House (1980) found little support for the hypothesis that all three psychological states were necessary for the development of specifically internal work motivation. A “flaw” initially pointed out by Hackman and Oldham’s original research (Boonzaier, Ficker, & Rust, 2001) pertains to the predictive validity which increased when only two critical psychological states were paired. Humphrey, Nahrgang and Morgeson (2007), likewise criticise the Job Characteristics Model for the inclusion of too many critical psychological processes linking work design and positive outcomes. Revisions of the Job Characteristics Model have subsequently been offered (Boonzaier, 2001; Pierce et al. 2009). Stimulated by the criticisms, specifically surrounding the inclusion of too many psychological states, Pierce et al. (2009) offer a theoretical modification to the Hackman-Oldham Model. Pierce et al. present *psychological ownership* as a plausible substitute for the three critical psychological states in the relationship between an employee and the five job characteristics.



**Figure 2.2. A Psychological Ownership-Based Revision of the Job Characteristics Model**

(Pierce, Jussila, & Cummings, 2009, p. 485)

Although an empirical study by Mayhew, et al. (2007) does suggest that autonomy is significantly related to job-based feelings of ownership and the taxonomy presented by Pierce et al. (2009) seems to explain certain mechanisms underpinning feelings of ownership, there seems to be a lack of further empirical research supporting this model.



The model additionally feels<sup>14</sup> as though it is an oversimplification of the development of *psychological ownership*. It seems to lack the full complexity of the development of this psychological state and perhaps lacks detail surrounding the interaction between the individual's needs (roots) and the target, as well as the processes behind psychologically "purchasing the job", jumping straight from the job characteristics and their influence on the routes<sup>15</sup>.

From the introductory discussion of this section it seems reasonable to suggest that the mere presence of certain job characteristics alone are not enough to fully stimulate the routes. As stated by Pierce et al. (2003) the roots of *psychological ownership* help us to understand why feelings of ownership exist. It therefore seems permissible to posit that the individual need(s) or motive(s) that is/are satisfied through certain job characteristic(s) have to be experienced to a sufficient degree which then, in turn, motivate the routes to *psychological ownership*. Taking from Hackman and Oldham's model, coupled with the conclusions of *psychological ownership* theory (Pierce et al. 2001), it seems reasonable to suggest then that investing the self in a job (as a target) that is characterised by certain job characteristics will satisfy certain individual needs, in terms of providing a sense of belonging, a sense of efficacy, and an opportunity for self-expression. The preceding argument suggests that the Hackman-Oldham (1976) job characteristics are the pertinent attributes of the job that bring about the satisfaction of these needs and in turn motivate the routes.

Pierce et al. (2009) provide theoretical justification for the argument that an enriched complex job is more likely to satisfy these specific individual needs. According to Pierce et al. (2003) and Pierce and Jussila (2011) at the very least the target, in this case the job, needs to be visible and attractive to stimulate interest. Additionally, the job should be malleable, accessible and open in order to satisfy the individual's needs. The sections that follow will cover each need separately, although it is recognised that there could be

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<sup>14</sup> It can be argued that the practise of inserting researcher opinions or feelings could be criticized as unscientific. However, it can also be argued that it is the authentic expression of feelings, within a research context, that leads to the generation of new knowledge. By following a gut feeling, in search of answers, researchers attempt to answer theoretically complex questions, bearing current theoretical knowledge in mind. If the feelings of researchers were ignored, due to their non-scientific nature, the richness of research could be lost.

<sup>15</sup> The researcher does however realise that perhaps Pierce et al. (2009) isolated this aspect to highlight the relationship between the job characteristics and the routes and have subsequently left the "missing detail" out consciously.

relationships among the needs themselves, as highlighted above in the introductory section.

In terms of the *effectance and efficacy* motive they reason that complex jobs<sup>16</sup> (those jobs high in autonomy, feedback, task significance, task identity and skill variety) allow for more stimulation, exploration and the ability to produce difference in the work environment. For example, the challenging role of a project manager necessitates the use of a wide variety of skills, high motivation levels, persistence and determination in the face of obstacles (negative feedback for the job tasks), to accomplish set outcomes – therefore success on this complex job is seen as a direct result of the employee's efforts. It therefore seems reasonable to suggest that an increased skill variety, autonomy and to a certain degree feedback from the job, will allow for the satisfaction of an individual's *need for efficacy and effectance*, should that need exist. A counter argument may provide more clarity here. For example, a less complex job, a production line worker, for example, could perhaps find it more difficult to feel a sense of control over a job in that the tasks are simple and success on the task is rather attributed to the routines of the task and not the individual's own accomplishment through their ability and skills.

Pierce et al. (2009) further suggest that complex jobs, being generally more accessible, malleable, and requiring more of the employees 'self' to accomplish job tasks, therefore allow for the expression of the self within the work tasks and environment. "Work that stems from complex jobs is more likely to reflect the individual who is performing the work, thereby contributing to self-identity through its self-revealing qualities," (Pierce et al. 2009, p. 483). It could therefore be argued that an enriched complex job that allows for high skill variety, autonomy and task identity could allow an individual to see the job as an extension of the self or a part of "who and what" the individual is. For example, an individual who is afforded the luxury of manipulating an important work flow process (task significance and autonomy) and designing different work tasks (skill variety), within a greater job role (task identity) around aspects of the self, turning the job into an element of self-expression will have their individual *need for self-identity and efficacy* satisfied by the job.

Similarly, the need to have a home or finding a sense of understanding of oneself in the work environment is posited as being influenced by job characteristics. According to Pierce et al. (2009), inspired by Porteous (1976), a sense of belonging is more likely to be

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<sup>16</sup> It should be stated here that an individual's level of skill or competence could also play a moderating role in this interaction.

satisfied in a demanding, challenging job in which the employee gains feedback, knows the impact of the task within the greater job scope and is afforded more control over how aspects of the job are conducted. According to Pierce et al. (2009) an increased level of autonomy allows an individual to leave their mark or to personalise a job or environment therefore allowing for the job to become intertwined with the individuals sense of self, personalising the job and its context – to make it home.

However, a question remains: Is the perceived probability that investing the self in the job will satisfy these needs enough to initiate the routes to feelings of ownership? It seems there is still something missing. It seems somewhat of an oversimplification to argue that the mere possibility that investing the self in the job will satisfy these needs will be sufficient to elicit the routes to *psychological ownership*. What is required in order for the individual to move from seeing the target as an element of self-expression through the satisfaction of the need for self-identity, for example, to subsequently investing themselves into said target?

Although Pierce and his colleagues (Pierce et al. 2001;2003; Pierce & Jussila, 2011) provide a framework within which the development of *psychological ownership* takes place, the above explanation does not seem to provide a fully satisfactory explication of the mechanism through which *psychological ownership* takes hold between a target and an individual. From the preceding discussion it is evident that certain personal as well as target characteristics act as antecedents to the experience of *psychological ownership*. Some of these antecedents do not all directly affect *psychological ownership*. It is argued here that the influence of more distal main effects is mediated by more proximal main effects and interaction effects reflect effects that moderate the influence of main effects. This makes the discussion and subsequent conclusions surrounding the psychological mechanism which underpins feelings of ownership a complex one to distil in a researchers mind.

Furby (1978) discusses the instrumental convenience of making something possible for enjoyment as a motivation for possession. She suggests that “possessions have an instrumental function – they make possible certain activities and pleasures...they enable one to effect desired outcomes in one’s environment,” (Furby, 1978, p. 60). Here the key to ownership seems to stem from the desire for a certain outcome. It therefore seems reasonable to posit that an explanation of the mechanism by which *psychological ownership* develops within an individual could be founded within expectancy theory. The expectancy theory was also implicit in the preceding theorising. The following section of

the literature study attempts to more explicitly describe the role of the motivation to invest the self in a job as a pivotal part of the *psychological mechanism* that regulates the level of *psychological ownership* that employees experience. The following section of the literature study therefore attempts to suggest an answer to the question: What stimulates an individual to psychologically attach themselves to a target, in this case the job? In a sense we are looking to determine what moves an individual to 'purchase' their job psychologically. What underpins the 'handing over of cash' in a psychological sense?

### **2.4.3 Expectancy theory and the routes to psychological ownership**

Vroom's (1964) Expectancy Theory is possibly one of the most accepted theories of work place motivation and behaviour and provides a plausible theoretical background to this question, when coupled with job characteristics theory as well as the roots of and routes to *psychological ownership*. Vroom (1964) posits that most human behaviour is voluntary and motivated. It can therefore be argued that an individual's behaviour within the workplace would subsequently also be motivated<sup>17</sup>. According to Vroom "choices made by a person among alternative courses of action are lawfully related to psychological events occurring contemporaneously with the behaviour," (Vroom, 1964, pp. 14-15). Three core mental components, namely valence, expectancy and instrumentality interact psychologically to create a motivational force and subsequent behaviour. These core mental components will now be discussed.

According to Vroom (1964) each and every individual holds their own preferences for certain outcomes. This preference refers to the valence an individual places on a certain outcome, according to his or her own perceived value for that outcome. The value attached to an outcome is determined by the perceived extent to which the outcome will satisfy specific salient needs. Vroom's conceptualisation 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 feels 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. Whereas the value refers to the actual satisfaction experienced by an individual from a specific outcome (Vroom,

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<sup>17</sup> This only refers to behaviour that is within the individuals control and therefore voluntary in nature. It does not include any behavior that could be classified as involuntary.

1969). “Means acquire valence as a consequence of their expected relationship to the ends” (Vroom, 1964, p. 16).

Outcomes are said to be either positively or negatively valent. An outcome that is positively valent is an outcome that an individual would prefer to have, rather than not to have, as opposed to a negatively valent outcome which an individual would prefer to avoid. 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* needs). It could further be argued that one need could be more salient than another to different individuals depending on their preferences. For example, one employee may have a preference for the satisfaction of the need for self-identity where as another may prefer to satisfy the need to belong and have a place thereby motivating different routes<sup>18</sup>. Additionally, the expected pleasure producing ‘reward’ of feelings of ownership would in turn motivate behaviour or the routes, namely self-investment, control and gaining intimate knowledge.

Expectancy Theory (VIE Theory) states 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. This is referred to as expectancy and is defined as a “momentary belief concerning the likelihood that a particular act will be followed by a particular outcome” (Vroom, 1964, p. 17). Expectancies are seen as action-outcome associations. If an employee feels, perceives or thinks he or she can achieve an outcome, via his or her actions, he or she will be more motivated to aim for it. These expectancies range in certainty from maximal strength (certainty that the preferred outcome will occur) or minimal strength (subjective certainty it will not). In relation to *psychological ownership* the actions could be seen as the routes, and specifically *investing the self* in the target, and the outcome could be posited as *psychological ownership*. It could 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/or to experience efficacy. The employee therefore feels motivated to invest

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<sup>18</sup> The essence of this relationship will however not be captured within this study as the needs will be treated collectively. This is suggested for future research.

the self, take control and gain intimate knowledge if he or she believes this could lead to attachment to that specific target and the subsequent message to others of “this is mine, this is me”.

Vroom (1964) further posits that in order to explain what determines the valence of certain outcomes, to certain employees, instrumentality should be examined. This refers to the probability belief linking one outcome to other outcomes. For example, an individual may attach themselves to an object through self-investment or gaining intimate knowledge and taking control (route “performance” that is achieved as a first level outcome) and in turn experience feelings of ownership as a second-order outcome and communicate a message of “this is me” to others within the organisation.

Vroom states that “the force on a person to perform an act is a monotonically increasing function of the algebraic sum of the products of the valences of all outcomes and the strength of his experiences that the act will be followed by the attainment of these outcomes” (Vroom, 1969, p. 18). It is therefore evident that motivation is not a single construct, but rather refers to a psychological mechanism comprising several interacting components.

Vrooms (1964) theory is not without its critics and it has undergone some refinement. Porter and Lawler (1968), through the use of empirical testing, propose a slightly different perspective, although heavily inspired by the work of Vroom. According to Porter and Lawler (1968) effort is jointly determined by the value that an individual places on a certain performance outcomes as well as an individual’s belief that this performance outcome will lead to reward (positively valenced second-level outcome). They suggest that individuals must positively value outcomes and perceive that it was due to their efforts (efficacy) that the outcomes were attained, for there to be additional effort. Effort may or may not lead to performance in this model. Porter and Lawler argue that the effect of effort on performance and satisfaction are moderated by an individual’s level of ability and clarity surrounding the role. Employees therefore need to have the skills to, do their job/ task/ attain a desired outcome, as well as an accurate understanding of how to attain the outcome/do the job in order to ‘perform’.

Although this research and theory focuses on remuneration and the role of remuneration in employee motivation, it could be argued that there are links to the development of *psychological ownership*, if one examines the Porter and Lawler model diagrammatically (lending from notions presented by Vroom above) it seems reasonable to argue that the

ultimate reward is *psychological ownership*. Therefore, in order to engage in behaviour (self-investment) that could facilitate the development of these psychological feelings, an employee must value the reward (feelings of ownership), expect that any effort of investing the self into the job will lead to this reward, and by successfully engaging in the routes to *psychological ownership* (performance) will experience the reward of feeling psychologically tied to the job.

It could therefore be suggested that in order for an individual to exert effort to tie him-/herself to an object he/she must:

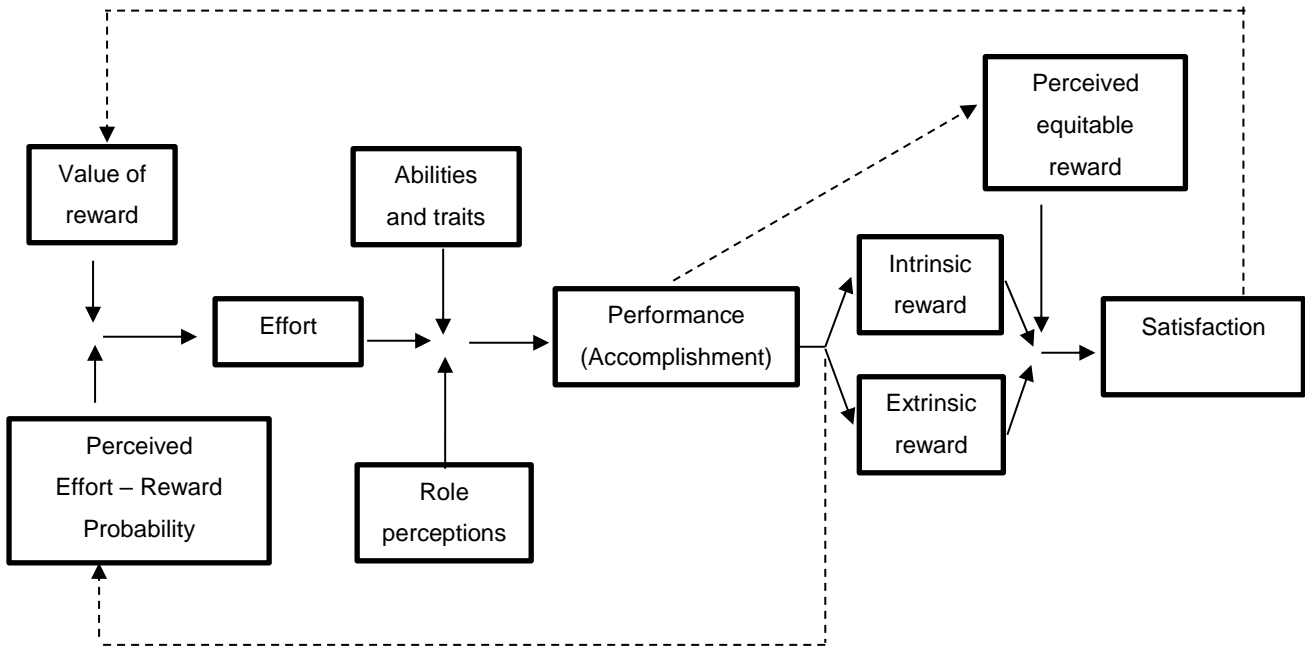
1. Experience a positive valence towards the (second-level) outcome which refers to *psychological ownership* because it satisfies the *need for self-identity, self-efficacy, having a place or sense of belonging* (valence) via the job characteristics.
2. Have the perception or belief that exerting effort to attach one's self to an object will result in successful route<sup>19</sup> performances (expectancy).
3. Have the perception or belief that successful route performance will be instrumental in achieving *psychological ownership* (due to the nature of the job).
4. Have the skills or ability to self-invest, take control and gain intimate knowledge of the target job.
5. Have the opportunity to self-invest, take control and gain intimate knowledge of the target job (the target should be accessible and malleable).
6. Attain intrinsic rewards in terms of the satisfaction of the roots of *psychological ownership* as well as the extrinsic rewards in terms of public self-expression and in turn potential for societal acceptance.

The dynamic characteristics of this model seen in the feedback loops point to the ongoing nature of motivation in general and when applied to *psychological ownership* this thinking points to the process by which individuals seek out new objects of self-expression. It could therefore be argued that the psychological mechanism of "handing over the cash" is therefore more of a continued investment rather than a once off purchase, which the individual continues to invest the self in the target due to the perceived valence, expectancies and instrumentality of attaching to an object (the reward).

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<sup>19</sup> The routes to feelings of ownership will be elaborated upon in Section 2.4.4 and 2.4.5 below.





**Figure 2.3. The Revised Porter-Lawler Model**

(Luthans, 2011, p. 168)

Kemp and Cook (1983) report that the job characteristics strongly correlate with motivation within the work place, therefore, an example within the organisational context could provide further clarity here. It seems reasonable to argue that a grade nine teacher, with a high need for self-identity, who experiences autonomy and skill variety, within her job role, by being afforded the luxury of changing the environment (painting the classroom, putting up posters) and deciding upon the format in which the teaching material for a subject (stipulated by the education department) is presented to students, could experience satisfaction of the need for self-identity.

This in turn could lead to feeling motivated through the expectation of positive outcomes (especially after receiving positive feedback via her job/the students) and he or she could subsequently engage in the routes to *psychological ownership* namely *investment of the self*, *taking control* of the work tasks (perhaps suggesting revision to the department when weak areas are identified for example) and *gaining an intimate knowledge* of not only the work but also perhaps the students – perhaps tailoring aspects of the teaching aids to students with specific needs.

It is suggested that a teacher, in a teaching position that is characterised by a lack of autonomy (who possesses a high need for efficacy and self-identity), who is merely presenting study material as handed down by a department head, may for example not

feel a sense of self within the material (needs not satisfied) and therefore not be motivated to follow the routes to ultimately develop feelings of ownership.

For the purposes of the current study the individual elements that influence levels of motivation, and subsequent behaviour, will be represented collectively within the model as motivation. It is recognised that the different motives could interact differently with the elements of motivation. The fact that this dynamic interplay is not captured by the model is recognised as a limitation of this study.

From the above discussion it seems reasonable to present the following hypothesis:

***Hypothesis 2<sup>20</sup>: In the proposed psychological ownership structural model<sup>21</sup> it is hypothesised that job characteristics (more specifically the perceived ability of the job to satisfy salient psychological ownership needs) have a positive influence on motivation to engage in the routes towards psychological ownership.***

#### **2.4.4 The role of fit in the development of psychological ownership**

As discussed above, a critical element in the nomological network of latent variables that underpin feelings of ownership is the anticipated satisfaction of the motives namely, the *efficacy and 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. A positive relationship between *psychological ownership* and these two main effects seems reasonable. In addition to this, however, it seemed reasonable to argue that the effect of the job characteristics on *psychological ownership* will be more aggressive when the needs that form the roots of *psychological ownership* are highly salient. This line of reasoning is somewhat supported by interactional psychology in that “interaction theory asserts that neither personal characteristics nor

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<sup>20</sup> Hypothesis 1 refers to the overarching substantive hypothesis, namely, that the *psychological ownership* structural model provides a valid account of the psychological mechanism underpinning levels of *psychological ownership*. This overarching research hypothesis can be dissected into more detailed, direct-effect substantive research hypotheses. Therefore, the first path specific substantive research hypothesis therefore represents the second substantive research hypothesis formulated thus far.

<sup>21</sup> The phrase “in the proposed psychological ownership structural model” is used on purpose in the formulation of each of the path-specific substantive hypotheses as an acknowledgement that the hypothesis strictly speaking hypothesises that the latent effect explains unique variance in the endogenous latent variable that is not explained by the other latent effects that are structurally linked to the endogenous latent variable in question.

situational constraints determine the lion's share of variance in behavioral and attitudinal variables," (Muchinsky & Monahan, 1987, p. 268) but rather it is the interaction between the individual and the environment that leads to certain outcomes. Since the relationship and subsequent needs satisfaction, is posited between the individual and their job, it seems reasonable to investigate the role of person-job fit<sup>22</sup>, as a category of person-environment fit, as an influence in the psychological process towards needs satisfaction and the subsequent development of feelings of ownership for that job.

Person-environment fit (PE fit) has been the focus of several studies within organisational research. These studies highlight the psychological, physical and performance benefits of congruence between the organisation and its employees on several levels. Broadly speaking, fit refers to congruence, compatibility or a match. PE fit therefore refers to a compatibility between an employee and the work environment. More specifically, this fit can be studied from several elements, for example, the degree of fit between an employee's abilities and job demands, personal interests and vocational characteristics, individual preferences and organisational systems and individual values and organisational culture.

Harrison (as cited in Kristof-Brown & Guay, 2011, p. 3) offers the following definition:

Fit is a state of compatibility of joint values of one or more attributes, a, b, c, . . . j, of a focal entity (P), and a commensurate set of attribute values, a, b, c, . . . j, of the entity's environment (E). In algebraic terms, fit is about  $[(Pa, Pb, Pc, \dots Pj) \cap (Ea, Eb, Ec, \dots Ej)]$ .

According to Kristof-Brown and Guay (2011) this definition allows for there to be fit between a variety of personal attributes (needs, traits, skills and values) and organisational or environmental aspects (job characteristics, job demands, working conditions, climate etc). PE fit, according to Kristof (1996, pp.4-5), refers to ". . . the compatibility between people and organizations that occurs when: (a) at least one entity provides what the other needs, or (b) they share similar fundamental characteristics, or (c) both". This implies a 'relationship' between and individual's characteristics or attributes and the environments characteristics or attributes. Kristoff-Brown and Guay (2011) state

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<sup>22</sup> This aspect has been added to the study as it strengthens the claims made surrounding the relationship between the employee and the job and the subsequent needs satisfaction experienced, which in turn engages the routes. It is believed that this relationship between the individual and the job therefore requires further attention in light of new technologies available to researchers to investigate fit. It is hoped that this investigation will provide more clarity regarding the influence of fit (individual needs satisfied by the job) on levels of motivation to follow the routes – a vital component in the model.

that job satisfaction is merely one affective response of many that may arise from this form of congruence. Fit has been postulated to produce various additional vocational outcomes, from psychological benefits to physical health improvements including increased creativity, motivation, performance, occupational success, commitment, tenure, job satisfaction, and work morale (Kristof-Brown & Guay, 2011).

Determining the exact interactions to include as PE fit subsets poses a challenge to fit researchers (Kristof-Brown & Guay, 2011). However, after an extensive literature review Kristof-Brown and Guay compiled several conditions for PE fit. They postulate that a universally agreed upon condition is that a constellation of personal and environmental attributes influence outcomes. An additional condition for PE fit is that the personal and environmental dimensions should be commensurate. However, there seems to be much debate among the fit scholars (Edwards, Caplan, Harrison, 1998; Kristoff-Brown & Guay, 2011; Schneider, 2001) surrounding the benefits or necessity of commensurate attributes in measuring fit.

We can, therefore, ask the question: would the relationship between the target and the owner, when considered in an organisation context, be classified as PE fit? From the above, it seems reasonable to suggest that the relationship between the employee and the job could pose a fit or misfit scenario. 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. *Motivation to pursue* the *psychological ownership* routes is therefore seen to be dependent on the degree of fit between the *extent to which the employee experiences the roots as salient* and the *degree to which the job offers the opportunity to satisfy the needs*. The challenge is to understand the manner in which *motivation to pursue* the *psychological ownership* routes changes as the degree of person-job fit changes.

Different aspects of fit, as well as types of fit, are outlined in the literature and to answer this question they require further explanation. Therefore, the following section will briefly discuss the two traditions of fit namely supplementary, or complementary fit, as well as one specific category of fit namely that of Person-Job fit (PJ fit). It seems reasonable to limit the literature study to PJ fit as the relationship under investigation pertains to the satisfaction of individual needs by the job characteristics. Four types of fit in terms of needs-supplies, demands-abilities and objective and subjective fit will also be outlined.

Supplementary, sometimes termed similarity-based fit, and complementary fit refers to two distinct psychological mechanisms that underlie the effect of PE fit on a response variable. In terms of supplementary fit the response variable is positively influenced when the individual and the environment or job are congruent because the individual “supplements, embellishes, or possesses characteristics which are similar to other individuals in this environment” (Muchinsky & Monahan, 1987, p. 269). Individuals are said to match their environment if they see themselves as being similar to the individuals already in that environment.

Complementary congruence on the other hand refers to a deficiency within the environment, or organisation, that is filled by certain characteristics within the individual, when viewed from an environmental perspective. According to Muchinsky and Monahan (1987) and Kristof-Brown and Guay (2011) this form of compatibility occurs when the environment lacks something and that deficiency is ‘made whole’ by the individual. Arthur, Bell, Villado, and Doverspike (2006, p. 787) however state that “...when there is fit, the environment affords individuals the opportunity to fulfil their needs... Need fulfilment results in favorable attitudes, such as job satisfaction and organizational commitment”. Kristof-Brown and Guay (2011) concur and suggest that when viewed from a individual perspective complementary fit also reflects the role of the environment in making an “individual whole” and therefore how the environment meets the individuals needs. Fit from this perspective branches out into two broad streams of research namely needs-supplies and demands-abilities fit (Caplan, 1987)

As their titles imply these two distinct types of fit refer to the individual needs an employee possesses and degree to which the job or environment supply’s aspects that will satisfy these needs. As well as the behaviours certain jobs demand in order to complete tasks effectively, and whether the employee has the relevant abilities, skills and knowledge to complete the job. According to Caplan these two types of fit pose different questions within the exchange process. “...needs-supplies fit may represent the perspective of the employee asking ‘what can I get out of this job?’ and of the employer asking ‘ what do I have to provide...? On the other hand, demands-abilities fit represents the perspective of the employee asking ‘what am I expected to provide...’ and the employer asking ‘ what do I want of the employee?’” (Caplan, 1987, p. 250).

Need-supplies fit concerns the relation of employee desires to job supplies. This type of fit has been the emphasis of various theories of adjustment, well-being, and satisfaction (Caplan, 1987; French, Caplan, & Harrison, 1982; Harrison, 1978; Locke, 1960; Porter,

1961; 1962). Employee desires are variously characterised as “needs,” “goals,” “values,” and “interests”. Cable and Edwards (2004) in their investigation of complimentary versus supplementary fit, integrated literature surrounding need fulfilment and value congruence. They noted what the researcher has noticed here, that there is some conceptual overlap and potential for confusion surrounding the terminology.

Needs-supplies fit, which seems to make logical sense here, would imply a position of incongruency attached to higher levels of *psychological ownership*. Here the employee would experience deficiency in the satisfaction of a specific need, perhaps for example, the need to belong, and the job would satisfy this need by, for example, offering the autonomy for self-expression and finding a home within the role. This implies a -- situation.

However, it should rather be argued that an employee would find it more pleasurable (experience higher levels of *motivation to pursue the routes to psychological ownership*) to work in an organisation where the things that are most important to that employee (Cable & Edwards, 2004) (the need to belong, the need for self-identity and the need for efficacy and effectance) are also important and captured within the job. Positive attitudes and behaviours result from the congruence between attributes of the person and the environment. According to Cable and Edwards an individual’s needs are centred on an individual’s self-image. Therefore, if congruency between the individual’s needs (an attribute of the employee) and the job characteristics (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. Here, the behaviours necessary or valued by the job, are valued and needed by the employee, and congruent with the employee’s self-identity. This implies a “have”, “have” or ++ scenario and not a deficit, credit scenario as implied by needs-supplies fit. Therefore, the current research study focus is on supplementary fit between the employee needs and the job characteristics. More specifically, the employee endorses certain needs in terms of a *need to belong*, a *need for self-identity* and a *need for efficacy and effectance*, the job in turn is characterised by features that additionally “endorse” these same needs.

In the proposed *psychological ownership* structural model, if conventional logic is applied, the above discussion could imply a positive relationship between fit (congruence between the needs and job characteristics) and the outcome of motivation to engage in the routes to *psychological ownership*. However, this does not seem to grasp the full complexity of the relationship between the *job characteristics*, the individual *psychological ownership needs* and the *motivation to pursue the routes*.



As argued above, fit within the context of this research study refers to an employees' salient *psychological ownership needs* and the perceived ability of the *job characteristics* to satisfy the employees salient *need for efficacy and effectance, need to belong* and/or *need for a sense of identity*<sup>23</sup>. The above argument presented thus far implies that motivation is influenced by two separate predictor latent variables namely the *level of salient individual needs* and the *ability of the job characteristics to satisfy these salient needs*, rather than a single latent variable, namely, congruence. As such, it can be argued that the manner in which *motivation to pursue the routes* changes, to changes in *job characteristics* and to *need strength*, is captured by a response surface or regression plane that describes the expected *motivation to pursue the routes* given specific *job characteristics* and *need strength*. In addition, it could be argued that the manner in which *motivation to pursue the routes* responds to changes in *job characteristics* and to *need strength* need not necessary be linear, but could rather be curvilinear so as to allow for the interaction between *job characteristics* and *need strength* to have a more complex effect on the *motivation to pursue the routes*. The discussion, as yet, does not fully capture this complexity and consequently the danger therefore exists that subsequent hypotheses would fail to adequately reflect this complexity.

The question therefore must be asked: How can the full complexity of this relationship be analysed or even captured? Put differently, how do we evaluate the influence of fit between two predictors ( $X_1$  and  $X_2$ ) on the endogenous outcome variable ( $Y$ )? Recent developments in the field of data analysis, specifically surrounding PE fit, have led to the introduction of polynomial regression and response surface analysis (Edwards, 1993; 1994; 1996 as cited in Edwards, 2008). This was in response to the disadvantages experienced when using alternatives, such as difference scores, when analysing how an endogenous latent variable, such as motivation, responds to changes in the relationship between two additional latent variables, i.e. the influence described above.

The advantages and disadvantages of these different approaches will be highlighted in Chapter 3, however, in order to formulate relevant hypotheses, one particular advantage of polynomial regression and response surface analysis needs to be considered and

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<sup>23</sup> The researcher acknowledges the semantic confusion that this argument could imply, specifically due to the use of the words needs and satisfies. It could be interpreted from two perspectives 1) that this implies that the employee's needs are deficient and the job satisfies these needs 2) that an employee endorses certain needs and the characteristics of the job also endorse certain needs. The argument in this case is for the latter. An employee values having a sense of belonging, having efficacy and effectance and having a sense of self-identity within the work role and the work role is characterised by features that endorse the employee's value or importance of these needs.



discussed here, namely the possibility of describing more intricate relationships and therefore response surfaces using polynomial regression.

As reasoned above, the manner in which these two predictor latent variables affect *motivation to pursue the routes* ought to be described in a manner that allows the response surface to be non-linear. In order to create a non-linear model, of the influence of the two predictor variables upon *motivation to pursue the routes*, three additional terms have to be created. This constitutes the second-order polynomial regression equation.

This equation is depicted below as Equation 1.

$$E[\eta_2 | \xi_1, \xi_2] = b_0 + b_1\xi_1 + b_2\xi_2 + b_3\xi_1^2 + b_4\xi_1*\xi_2 + b_5\xi_2^2 \dots \dots \dots \text{Equation 1}$$

where:

- $\eta_2$  represents the *motivation* to pursue the routes to *psychological ownership*;
- $\xi_1$  represents the *perceived ability of the job characteristics to satisfy the salient individual needs*; and
- $\xi_2$  represents the *level of salient individual psychological ownership needs (roots to psychological ownership)*.

Equation 1 above mathematically represents the hypothesis that the level of *motivation to engage in the routes to psychological ownership* is influence by five effects. Each of these five effects explains unique variance in *motivation to engage in the routes to psychological ownership* that is not explained by the other four latent effects. Therefore, each effect must be represented as an individual latent variable within the proposed *psychological ownership* structural model. These five effects will therefore been introduced into the model as phantom variables. According to Bentler and Raykov (2000) phantom constructs are artificial latent variables that have no measured indicators. These phantom variables are “introduced into a model solely to achieve a specialized purpose” (Bentler & Raykov, 2000, p. 128). They have been added here to investigate the influence of congruence within the full complexity of the comprehensive structural model. The following hypotheses can therefore be formulated:

***Hypothesis 3: In the proposed psychological ownership structural model it is hypothesised that the strength/salience of an individuals’ psychological***

***ownership root needs<sup>24</sup> positively influences motivation to engage in the routes towards psychological ownership.***

***Hypothesis 4: In the proposed psychological ownership structural model it is hypothesised that squared salient individual needs positively influences motivation to engage in the routes towards psychological ownership.***

***Hypothesis 5: In the proposed psychological ownership structural model it is hypothesised that salient individual needs \* perceived ability of the job characteristics to satisfy salient needs positively influences motivation to engage in the routes towards psychological ownership.***

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

Theron (2014) states that polynomial regression offers the possibility of describing more intricate response surfaces and thereby the possibility of more accurately describing the behaviour of a response variable to changes in two predictor variables. Shanock et al. (2010) concur and explain that this technique can provide a nuanced view of relationships between combinations of two predictor variables and an outcome variable. Therefore, this technique has more explanatory potential 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. In this three-dimensional space congruence and incongruence can vary in nature. On the one hand, the employee experiences a *root need* as salient and the *job characteristics* are such that they provide satisfaction of these *needs* [+ +]. On the other hand, 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 [- +]. Moreover in this three-dimensional space congruence and incongruence can also vary in magnitude (Theron, 2014b). Therefore, the position in the congruence/incongruence space (- -, + +, - +, + -) is hypothesised to affect the response variable (*motivation to pursue the routes to*

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<sup>24</sup> Sometimes referred to as individual needs/needs for the purpose of improving reading quality.

*psychological ownership*). Stated differently, movement along the line of congruence (from - - to + +) and movement along the line of incongruence (from - + to + -, or alternatively from 0 0 outward to - + and to + -) is hypothesised to affect the value of the response variable (*motivation to pursue the routes*) in a specific manner. This affect is captured by the response surface. The response surface along the lines of congruence and incongruence is characterised by a specific (positive or negative) slope and by a specific (convex or concave) curvature (Shanock et al. 2010).

For the current study, the essential questions that arise are consequently what the slope and curvature of the response surface describing the level of the *motivation to pursue the routes of psychological ownership* is when moving along the lines of congruence and incongruence? In terms of earlier theorising, *motivation to pursue the routes of psychological ownership* is hypothesised to be higher when the job is characterised by certain features that will allow the *needs* to be satisfied, when psychologically occupying or taking ownership of the job. However, according to *psychological ownership* theory (Pierce et al. 2001) certain psychological *needs* or motives must be elicited in order to instigate the process of *psychological ownership* development. It therefore seems reasonable to suggest that should an employee possess these motives or *needs* and the job possesses certain features or characteristics that fuel these motives (+ +) *motivation to pursue the routes to psychological ownership* would be high. When considering the “opposite scenario”, a situation where the employee does not possess the root *needs* and the job is not characterised by features that fuel the motives, this is still a congruent scenario but it is a - - scenario. This situation, according to *psychological ownership* theory should result in a really low *motivation to pursue the routes to psychological ownership*.

The temptation is to erroneously argue, under the conventional thinking about congruence, that a linear relationship exists between congruence and the response variable and that similarity, congruence or common understanding, therefore should, irrespective of the nature of the congruence, always result in high (or low) response variable values. In terms of the more nuanced thinking, the manner in which congruence, and the lack of it, affects a response variable, both the magnitude of the congruence and incongruence (i.e. how far out on the lines of congruence and incongruence one has moved from the 0 0 position) and the nature of the congruence (whether one moves towards - - or towards + + or whether one moves towards - + or towards + -) are accounted for.

Therefore, it is hypothesised here that in a situation where the employees *psychological ownership needs* are non-salient (the employees does not endorse *psychological ownership needs*) and the job is not perceived to satisfy non-salient *needs*, this will lead to a low level of *motivation to pursue the routes to psychological ownership*.

Therefore, when 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) and low perceived ability of the *job characteristics* to meet these salient needs (- -) to high salient *needs* and high perceived ability of *job characteristics* to meet salient needs (+ +). The slope of the response surface along the line of congruence is therefore positive. The question regarding the curvature of the response surface along the line of congruence still has not been answered by the preceding argument. It does not seem altogether unreasonable to hypothesise a linear response surface. A somewhat more compelling argument would, however, be that initial increases in employee *need* salience and the perceived ability of the *job characteristics* to satisfy these needs would result in only modest increases in the *motivation to pursue the routes towards psychological ownership*. As further increases in *need* salience and the perceived ability of the *job characteristics* to satisfy these *needs* occur, it seems plausible that the increase in the *motivation to pursue the routes to psychological ownership* will gradually accelerate. *Motivation* to engage in the routes could therefore be said to change in a curvilinear fashion (convexly) along the line of congruence moving from - - (low employee *needs* and low perceived ability of the *job characteristics* to satisfy need) to + + (high salient employee *need* levels and high perceived ability of the *job characteristics* to satisfy high salient needs). The foregoing line of reasoning therefore suggests that along the line of congruence the response surface will display a skateboard ramp-like structure with *motivation to pursue the routes towards psychological ownership* at its highest when salient *needs* are experienced and the job is perceived to be able to satisfy these needs due to its *job characteristics* [+ +].

The discussion above pertains to a situation of agreement or congruency. What occurs when there is in fact disagreement or incongruence? It seems reasonable to suggest 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*. 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 towards psychological ownership* will also be low. However, they will be somewhat higher in the former scenario, where the needs are salient and the job is not perceived to be characterised by features that satisfy these salient needs.

It seems reasonable to argue that high root *need* strength might still move an employee to commit the self to the job even though doing so would be frustrating in that it would not satisfy the root needs. By way of analogy; a hungry man might still be moved to nibble at an unappetising plate of food. Therefore, it seems reasonable to hypothesise that *motivation to pursue the routes towards psychological ownership* could increase as incongruence moves along the line of incongruence from low employee *needs* and high perceived ability of the *job characteristics* to satisfy needs (- +) to high employee salient *needs* and low perceived ability of the *job characteristics* to satisfy salient needs (+ -). The slope of the response surface along the line of incongruence is therefore positive. Despite the convex, ramp-like response surface that was hypothesised along the line of congruence, *motivation to pursue the routes towards psychological ownership* is hypothesised to change in a linear fashion along the line of incongruence moving outward from 0 0, decreasing towards low employee salient *needs* and high perceived ability of the *job characteristics* to satisfy salient needs (- +) and increasing towards high employee salient *needs* and low perceived ability of the *job characteristics* to satisfy salient needs (+ -). From the above discussion the following hypothesis can therefore be suggested:

***Hypothesis 7: 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 salient needs combined with low salience of the employee's needs (- -) to the perception that the job does allow the satisfaction of the salient needs combined with high salience of the needs (+ +); 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 needs combined with low salience of the needs to the perception that the job does allow the satisfaction of the needs combined with high salience of the needs.***

***Hypothesis 8: 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 needs (- +) to the perception that the job does not allow the satisfaction of the needs combined with high salience of the needs; 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 needs to the perception that the job does not allow the satisfaction of the needs combined with high salience of the needs.***

The above discussion has highlighted the influence of the target characteristics and the owner's needs within the nomological network of latent variables which influence the *motivation to pursue the routes to psychological ownership* which in turn influence the levels of *psychological ownership* experienced within the work place.

The proceeding discussion will investigate the routes to *psychological ownership*, borrowing heavily from the work of Pierce et al. (2001, 2003).

#### **2.4.5 Routes to feelings of ownership**

Pierce et al. (2001; 2003) state that *psychological ownership* is seen as the product of certain routes, paths or experiences. To answer the question why *psychological ownership* comes into existence Pierce et al. (2001) propose that the *opportunity to have control over a target*, the *opportunity to gain knowledge about the target* and the opportunity to immerse one's self into the target, through *self-investment*, leads to feelings of ownership. The preceding argument raises the question whether the *motivation to pursue the routes* manifests in the pursuit of a single specific route that then in turn incurs investment in the other routes or whether the *motivation to pursue the routes* manifests directly in the pursuit of all three routes.

As previously argued, certain contextual factors and target characteristics, through these paths, initiate the feelings of ownership. The routes can therefore be seen as the transport system or the behavioural components that, after an initial introduction to a target (and subsequent needs satisfaction), 'carry' the feelings of ownership within the self (Pierce & Jussila, 2011). In terms of the Porter-Lawler (Steers & Porter, 1983) interpretation of the expectancy theory of motivation these three routes to *psychological ownership* could be seen as behavioural performance dimensions. Before discussing the link between the



*motivation to pursue the routes and psychological ownership* it is necessary to discuss and describe the individual routes.

The first path to *psychological ownership* posited by Pierce et al. (2001) is that of *investment of the self into the target*. According to Pierce et al. (2001) *investment of the self* is demonstrated in various forms “including investment of one's time, ideas, skills' and physical, psychological and intellectual energies” (Pierce et al. 2001, p. 302). Over time, as a result of this investment the target begins to feel as if it flows from the self. According to Pierce et al.'s theory of *psychological ownership*, the more an individual invests the self into a target the more he or she will experience feelings of ownership towards that target.

Inspired by the works of Locke (1960), Sartre (1943/1969), Csikszentmihalyi and Rochberg-Halton (1981), who provide much insight surrounding *psychological ownership* and the world of work, Pierce et al. (2001, 2003) and Pierce and Jussila (2011) emphasise the fact that work, as a target of ownership, should flow from the self in order for an employee to experience feelings of ownership for the job.

Csikszentmihalyi and Rochberg-Halton (1981) concur with this line of reasoning and suggest that self-investment involves spending time, energy, effort and attention on a target. This in turn leads to a feeling or a sense of oneness with the target (a relationship between the self and the target). This oneness emerges due to the fact that the target has emerged from the self. This is in line with reasoning provided by Kahn (1990). Kahn states that the more engrossed an employee becomes with his or her job the more they draw on their selves and therefore the more “stirring are their performances” (Kahn, 1990, p. 692).

Beaglehole, (1932) and Mayhew et al. (2007) concur with Csikszentmihalyi and Rochberg-Halton (1981) and state that within the organisational context feelings of ownership can develop between the employees and their machinery, their tasks, ideas, work space and additionally their work. This path to feelings of ownership is therefore characterised by work being the fruit of an employee's own labour and therefore 'theirs' or flowing from the self-region (Sartre, 1943/1969).

Locke (1960) posits that once someone has “inserted” themselves (their energy – both physically and psychologically as well as expended time and effort), or become one with an element provided by the earth, that it then belongs to that individual and he or she is therefore the only person who may lay claim to this object. Locke writes that:



Though the earth and all inferior creatures be common to all men, yet every man has a “property” in his own “person”. This nobody has any right to but himself. The “labour” of his body and the “work” of his hands, we may say, are properly his. Whatsoever, then, he removes out of the state that Nature hath provided and left it in, he hath mixed his labour with it, and joined to it something that is his own, and thereby makes it his property. It being by him removed from the common state Nature placed it in, it hath by this labour something annexed to it that excludes the common right of other men. For this “labour” being the unquestionable property of the labourer, no man but he can have a right to what that is once joined to, at least where there is enough, and as good left in common for others (Locke, 1960, p. 116).

Kahn (1990) discusses this “removal from the common state nature place(d) it in” as the self-in-role behaviours and states that employees bring-in and leave-out aspects of themselves throughout the work day. Kahn additionally states that employees become involved in their roles (jobs) “in ways that display what they think and feel, their creativity, their beliefs and values...” (Kahn, 1990, p. 700). This self-investment or “putting the self out-there” elicits a certain degree of vulnerability within an employee. By, for example, using creativity, suggesting ideas, sharing opinions (investing the self) within a work role or job, an employee is risking aspects of the self, by exposing the self to others (through the work role or job) and revealing the self within the job. This risk could potentially have negative consequences should, for example, another employee not agree with opinions shared, or perhaps a project fails that an employee has invested in. According to Kahn, employee engagement (which includes aspects of self-investment<sup>25</sup>) is positively influenced by felt levels of *psychological safety*. Kahn defines psychological safety as the employees’ “sense of being able to show and employ one's self without fear of negative consequences to self-image, status, or career” (p. 708).

Brown and Leigh (1996) posit that should employees feel that management is supportive and provides the flexibility for them to have control over their work and how it is accomplished, and the freedom to express their true feelings, and core aspects of their self-concepts in their work roles, employees will experience increased *psychological safety*.

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<sup>25</sup> Kahn (1990) interprets (personal) engagement as a psychological act of investing the self in a task in contrast to the more popular view that *engagement* is “a positive, fulfilling, work-related state of mind that is characterized by vigour, dedication, and absorption” (Schaufeli, Salanova, Gonzalez-Roma, & Bakker, 2002, p. 74).

Employees who experience a sense of safety, in that they feel they will not experience negative consequences, such as to the above mentioned self-image, status and career, would therefore be more willing to take the risk of self-expressing within their job. It therefore seems reasonable to argue that an employee would be more willing to act upon a high *motivation to pursue* the route of self-investment should that employee experience a sense of *psychological safety* within the job. It therefore seems reasonable to put forward that *perceived psychological safety* could moderate the effect of *motivation to pursue the routes*, on the extent to which the employee invests the self in the job.

*Control of a target* is additionally posited as a vital component in the psychological mechanism that constitutes the phenomenon of ownership (Pierce et al. 2001) and regulates the strength of the feelings of ownership that develops (Csikszentmihalyi & Rochberg-Halton, 1981; Dixon & Street, 1957; Isaacs, 1933; Sartre, 1943/1969; White, 1959). Isaacs (1933), in a study of child development, stated that young children felt that nursery rhymes belonged to them if they had heard or used them first. They would subsequently exercise control over 'their' nursery rhymes by not allowing others to sing them or listen to them without their permission, thereby further controlling the target, in this case a nursery rhyme, and stating that it is "mine". In so doing, they would bring the target into the self-realm. McClelland (1951) developed the idea that much like body parts, which individuals have control over, other targets that have the potential to be controlled come to be regarded as part of the self.

The ability to use, and to control the use of, a target (or object) by others is said to define ownership (Ellwood, 1927). Control over an object allows an individual to feel the rights and responsibilities associated with an ownership relationship between the individual and the target object (Furby, 1991; Pierce et al. 2001). According to Ellwood (1927) use of a target may be key to feelings of ownership. It is suggested that it is those objects which are habitually used by an individual which become "assimilated into the domain of the self of the user," (Pierce & Jussila, 2011, p. 79).

Furby (1976) proposed that the relationship between the amount of control over a target and the experience of that target being a part of the self is highly positive. Therefore, the more control an individual has over a target, the more they experience that target as an extension of the self, and subsequently experience feelings of ownership. Researchers (Ellwood, 1927; Furby, 1991) agree and posit that aspects within an individual's environment that can be controlled by an individual are more likely to be experienced as "mine". Additionally, it is posited that through the exercising of control objects become

more associated with an individual's self-concept and targets that are not within an individual's control are therefore not regarded as part of the individual's sense of self (Seligman, 1975).

The argument above points to a link between control and a sense of ownership. It however does not explicitly describe the psychological mechanism at play that brings about the behaviours of taking control. The examples above provided by Isaacs (1933) and Ellwood (1927) could provide some clarity here. Isaacs stated that young children took ownership of nursery rhymes that they had heard first. This action of investing the time to listen to the nursery rhyme, learn it and use it, can be seen as an investment of the self by the young child. Through this self-investment the child begins to take control of the nursery rhyme. Similarly, habitual use, as per the example showcased above by Ellwood, requires an element of investment such as decisions surrounding why to use the object, maintaining the object so that it can be used, for example, which require physical and psychological time and energy.

As mentioned above, in Section 2.4.1, Furby suggests that the effectance motivation is what predominantly drives the relationship between an individual and his or her possessions. An individual is driven by the desire to influence outcomes within their environment through investing the self and in turn being the "cause" of the outcome. It was also noted in the same discussion, surrounding the roots of *psychological ownership*, that Furby associates feelings of control to that of self-expression. A job constitutes an extension of the employee's self, by investing the self (as a form of self-expression) and taking control of the job. The job therefore constitutes an extension of the self primarily because it acts as an expression of the employee's ability to exert direct control over it. This implies that *motivation to pursue the routes* will not directly manifest itself in the action of taking control. Rather, an individual may take the risky psychological step to *invest the self in the target*, if the employee experiences feelings of *psychological safety*, to commit to give the self to the target. This in turn may lead the individual to *take control* (through further *self-investment*). Only once the employee has surrendered the self to the job can he/she start taking control of what they have given themselves to. It therefore seems reasonable to hypothesise 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) and Satre (1943) suggest that a target can feel as though it belongs to an individual purely by association and familiarity. Pierce et al. (2001)

cite the example by Weil of the gardener who after working with his tools<sup>26</sup> in a garden comes to feel as if the garden is his. The gardener learns to respond to the gardens' needs after becoming familiar with it intimately. It seems reasonable to suggest then, from the preceding example, that mere association is not enough. It is the act of working, and becoming intimately familiar with, the garden that entices feelings of ownership to develop, within the gardener. Weil refers to this as active association. It is through this process of active association that an individual is said to gain knowledge about the target and subsequently begins to develop feelings of ownership. James calls this phenomenon the "law of mental association by contiguity," (James, 1890, p. 561).

Pierce et al. (2001) refer to this as active participation and engagement with a target. The more involved an individual is with a target (through the expenditure of time, energy, and effort), the more an individual knows about a target, and therefore the more information there is available to facilitate the building of a connection with said target. James (1980) and Beaglehole (1932) posit that feelings of ownership emerge through a living relationship with a target. Through knowing the target intimately it is suggested that it then becomes a part of the self. The attractiveness of the target, and the targets' ability to act as an extension of the self, could therefore be said to motivate an individual to invest time and energy getting to know the target intimately in order to experience a sense of ownership. It is therefore suggested here that *self-investment* as a route to *psychological ownership* additionally acts as a mediator between the *motivation to pursue* the routes towards *psychological ownership* and *gaining intimate knowledge*.

When applied to the world of work it seems reasonable to suggest that after investing time, energy, thought and one's self into the job, an employee may experience the job as an extension of the self, and feel a sense of ownership towards the job. For example, a project manager who is tasked with managing the production of a product. This project manager will be involved in the entire project (high task identity) from conceptualisation with product developers, to marketing the final product (potentially high task significance depending on the product). This will require the use of a variety of skills and abilities (skill variety) and a level of autonomy, as suggested above, that motivate the employee to invest time, energy and psychological resources into the project. "The individual who has created objects owns them in much the same way as he/she owns him/herself" (Pierce & Jussila, 2011,

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<sup>26</sup> These tools could refer to the gardener's expertise and knowledge, his time and effort, his energy and psychological efforts and skills, not merely the actual gardening tools such as rakes, lawnmowers and water.

p. 82). This project manager could therefore potentially feel a sense of *psychological ownership* towards this product, upon completion of the project, due to the time and energy and skills invested into it.

Furthermore, it seems reasonable to suggest that the exercising of *control* over the job, would therefore lead to feelings of ownership of the job. It therefore seems reasonable to argue that a production worker, for example, who is not afforded the luxury of controlling aspects of the job (limited autonomy), may not be motivated to (as the characteristics of the environment do not allow for the necessary satisfaction of the need for effectance) take *control*, thereby limiting the rights and responsibilities attached to “owning” the target and therefore not experience feelings of ownership. Based on the above discussion it seems reasonable to suggest that there is a positive relationship between the amount of control that an individual has over the job, and is afforded within the job, and feelings of ownership for that job. Additionally, it seems reasonable to argue that should an employee experience higher levels of control within the job he/she could gain more intimate knowledge surrounding aspects of the job. By being afforded the luxury of controlling all aspects of an advertising campaign, for example, an advertising executive will have knowledge about every aspect of the campaign from costing to deadlines. It therefore seems reasonable to suggest that an employee’s level of control could have a positive influence on gaining *intimate knowledge* as a route to *psychological ownership*.

Within the work context, or even the writing of a thesis, for example, the more time you spend researching, discovering all of the intricacies of the topic, and getting to know the topic under investigation intimately, the more you feel a sense of ownership towards that topic in terms of “My thesis is about...”, “My topic is...”. Therefore, by spending the time and energy gathering information, and subsequently having intimate knowledge about a job, the job then becomes an extension of the self, and an employee may feel a sense of ownership towards the job. In light of the above description of the routes to *psychological ownership* and subsequent application to the world of work, it seems reasonable to suggest the following hypotheses:

***Hypothesis 9: In the proposed psychological ownership structural model it is hypothesised that motivation to invest in the psychological ownership routes has a positive influence on the extent to which an investment is made in self-investment as a route to psychological ownership.***

***Hypothesis 10: In the proposed psychological ownership structural model it is hypothesised that the extent to which an employee feels psychologically safe within their work environment will moderate the effect of motivation to pursue the routes towards psychological ownership on the extent to which an investment is made in self-investment as a route to psychological ownership.***

***Hypothesis 11: In the proposed psychological ownership structural model it is hypothesised that self-investment positively affects investment in control of the job.***

***Hypothesis 12: In the proposed psychological ownership structural model it is hypothesised that the extent to which an investment is made in gaining intimate knowledge, as a route to psychological ownership, is positively influence by control of the job.***

***Hypothesis 13: In the proposed psychological ownership structural model it is hypothesised that the extent to which an investment is made in self-investment, as a route to psychological ownership, has a positive influence on psychological ownership.***

***Hypothesis 14: In the proposed psychological ownership structural model it is hypothesised that the extent to which an investment is made in control of the job has a positive influence on psychological ownership.***

***Hypothesis 15: In the proposed psychological ownership structural model it is hypothesised that the extent to which an investment is made in gaining intimate knowledge has a positive influence on psychological ownership.***

Returning to Weill's example of the gardener it additionally seems reasonable to suggest that should the flowers flourish under his care and the grass remain green and lush that the gardener will take great pride in the results, inserting further energy and effort into maintaining this state, and feel a further sense of ownership towards the success of the garden. The feedback from the garden (I need more water as it's a hot day, my flowers are wilting in the heat of the sun) provides information to the gardener, who in turn reacts to this information by investing more effort, time and energy into the garden, deepening understanding surrounding the garden's needs. Therefore by gaining intimate knowledge and investing oneself into the target thereby gaining even deeper knowledge about the target one becomes more deeply engrained into the target. It seems reasonable then to



suggest that there is a positive reciprocal relationship (reciprocal causation) between self-investment and intimate knowledge.

***Hypothesis 16: In the proposed psychological ownership structural model it is hypothesised that self-investment affects the extent to which an employee invests in gaining intimate knowledge.***

***Hypothesis 17: In the proposed psychological ownership structural model it is hypothesised that the extent to which an investment is made in gaining intimate knowledge has a positive influence on the extent to which an investment is made in self-investment.***

#### **2.4.6 Motivational effects of psychological ownership**

Pierce and Jussila (2011) and several others (Avey et al. 2009; Baer & Brown, 2012; Brown, 1989; Druskat & Kubzansky, 1995; Fiorito et al. 2007; Mayhew et al. 2007; O'Driscoll et al. 2006; Olckers, 2014; Peng & Pierce, 2015; Pierce & Jussila, 2011; Pierce et al. 2001; 2003), suggest various positive work outcomes associated with feelings of ownership within the workplace. A number of these have been highlighted within the introductory section of this research study. One important effect of *psychological ownership* hypothesised by Pierce and Jussila seems important to discuss here as a latent variable that could potentially play a role in the long term attachment to a target, namely *motivation*.

Pierce and Jussila (2011, p.87-88) make three<sup>27</sup> propositions surrounding the role of *psychological ownership* within motivational effects, in their recent book on the topic of *psychological ownership*. They propose that:

- For those individuals for whom the ownership (possessive) motive of 'effectance' is operative, the individual who feels a strong sense of *psychological ownership* for the organisation, for example, will spend time and energy mentally and physically exploring the organisation.
- For those individuals for whom the ownership (possessive) motive of 'self-identity' is operative, the individual who feels a strong sense of *psychological ownership* for the organisation, for example, will spend time and energy using the target of ownership as an expression of their self-identity

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<sup>27</sup> The researcher acknowledges that they in fact make four propositions surrounding the motivational effects of psychological ownership in their book. However, since the fourth proposition relates to the motive of stimulation, which the researcher has argued relates to a changing sense of self-identity, rather than an additional motive in its own right, it has been excluded.



- For those individuals for whom the ownership (possessive) motive of 'having a home-my place' is operative, the individual who feels a strong sense of *psychological ownership* for the organisation, for example, will direct a great deal of activity/energy (mental and/or physical) and time immersing themselves into the target of ownership.

Although their focus rests within the realm of organisational *psychological ownership* it seems reasonable to argue here that these assumptions can also be applied within the job context. It, therefore, seems reasonable to argue that should an employee experience a sense of need/motive satisfaction within the job and thereby experience feelings of ownership for the job that employee will additionally be motivated (or will be motivated afresh) to spend time and energy mentally and physically exploring the job, using the target as an expression of their self-identity and immersing themselves into the target. More specifically, should an employee experience satisfaction of the need for self-identity, the need to belong or have a home and/or the need to control the job, and in turn after being motivated to follow the routes to *psychological ownership* therefore experience feelings of ownership, or an attachment to the job, it is hypothesised that the employee could then in turn be motivated to expend more time and energy (physically and psychologically) on the job. The following feedback hypothesis can be suggested from the above discussion:

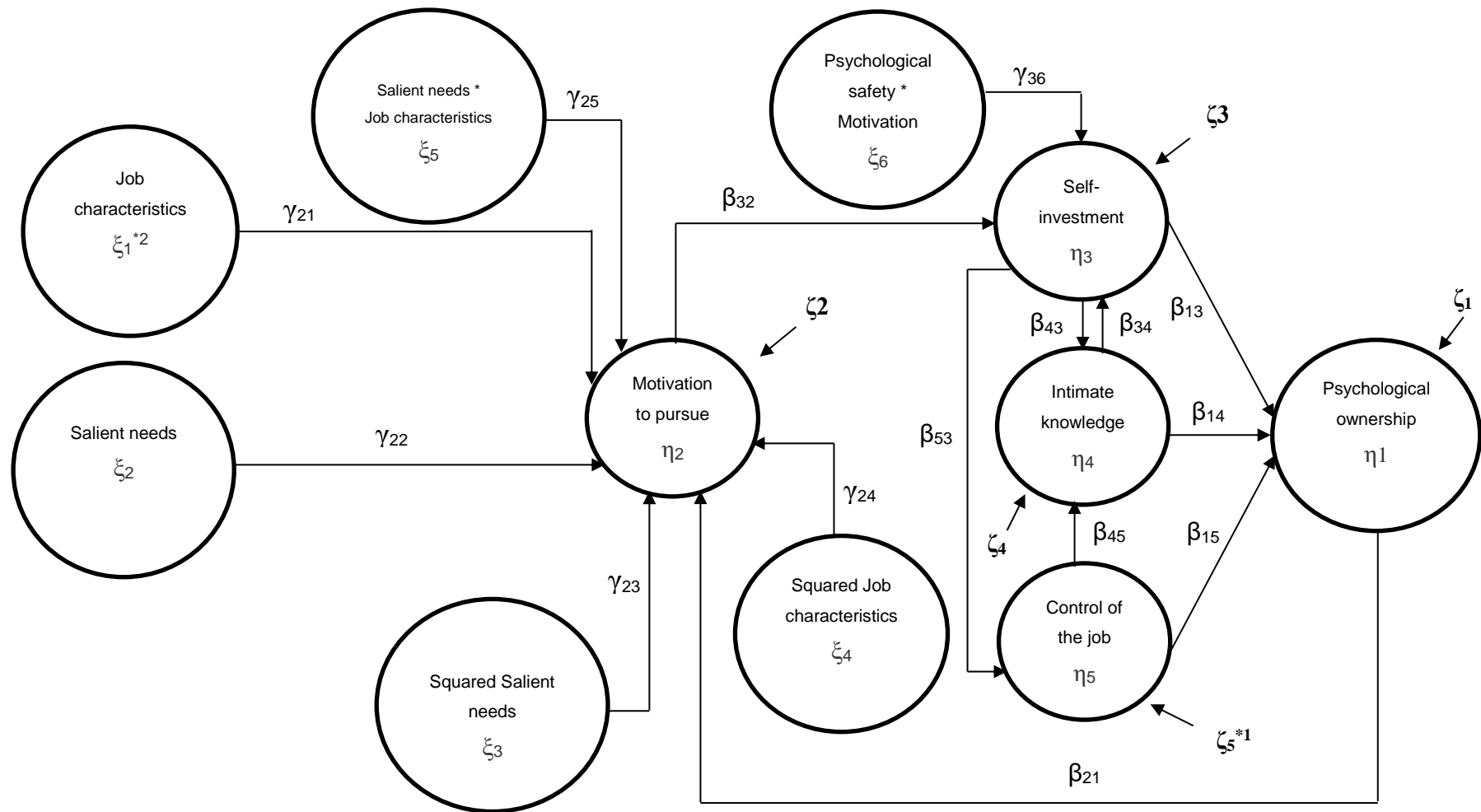
***Hypothesis 18: In the proposed psychological ownership structural model it is hypothesised that the extent to which feelings of psychological ownership are felt will have a positive influence on levels of the motivation to pursue the routes towards psychological ownership.***

The above theorising has highlighted several possibly relationships within the network of latent variables that possibly underpin levels of *psychological ownership*. The following section will attempt to present these hypotheses diagrammatically in a proposed *psychological ownership* structural model.

## **2.5 THE PROPOSED PSYCHOLOGICAL OWNERSHIP STRUCTURAL MODEL**

The sense of ownership in general, and in the workplace specifically, is a psychologically complex phenomenon, or state, within an individual. The proposed explanatory structural model below represents an overarching substantive research hypothesis on the manner in which the latent variables identified in the preceding theorising, are causally related to each other (Theron, 2015) and to *psychological ownership*. The path diagram in Figure 2.4 below represents the researchers' design of a psychological mechanism that could

provide a conceivable account for differences in the level of *psychological ownership* experienced by employees. This, in turn, can be translated into structural equations needed for further analysis. It must be acknowledged that this proposed structural model posits one particular explanation for differing levels of *psychological ownership* within individuals. It does not claim that this *is* the only explanation, as more than one structural explanation of the same covariance matrix is possible (Theron, 2015). The proposed *psychological ownership* structural model presented in Figure 2.4 below is an attempt to present a plausible account of the latent variables, and the structural linkages between them, that are involved in the process of developing feelings of ownership, while bearing the complexity of this phenomenon in mind.



\*1 Psi is a diagonal matrix.

\*2 All off-diagonal elements in phi are freed to be estimated but for  $\phi_{23}$ ,  $\phi_{15}$ ,  $\phi_{14}$ ,  $\phi_{25}$  that are set to zero

**Figure 2.4. The Proposed Psychological Ownership Structural Model**

## CHAPTER 3

### RESEARCH METHODOLOGY

#### 3.1 INTRODUCTION

Researchers and scientists, in their quest to generate a truthful, valid or plausible understanding of the world, seek to discover unambiguous evidence to support (or to refute) claims or representations of specific phenomenon (Babbie & Mouton, 2014). In order to be deemed valid or plausible these descriptions and/or explanations of phenomena have to withstand rigorous testing. As such, researchers, and the research process in general, attempt to uphold a commitment to true and valid knowledge as an epistemic imperative (Babbie & Mouton, 2014). This is accomplished by subjecting all hypotheses to an attempt at disconfirmation. The purpose of this chapter is to outline, and justify, the methods that were used to uphold the intrinsic contract of the epistemic imperative throughout this research process in so far as it outlines the practical details of the research undertaken.

The theorising in Chapter two culminated in the development of a comprehensive structural model describing the hypothesised psychological mechanism underpinning feelings of ownership. A distinctive feature of this model is the manner in which it incorporated the fit or congruence between the target (the perceived ability of the *job characteristics* to satisfy salient employee needs) and the self (the salient *psychological ownership needs*), as a vital component of the psychological mechanism regulating the development of *psychological ownership*.

This explanatory model of *psychological ownership* therefore acts as a tentative answer to the research initiating question “Why variance in *psychological ownership* exists amongst different employees working in different organisational contexts?” This model depicts the overarching substantive research hypothesis and the path-specific substantive research hypotheses. In order to provide convincing empirical evidence to support the claims outlined in Chapter two, this tentative structural model of *psychological ownership* must endure rigorous empirical testing in an objective, rational, manner that reduces error so as to optimise the probability of coming to a valid verdict on the validity of the research hypotheses. This error reduction facilitated an increase in the likelihood that the eventual verdict on the validity of these substantive claims will be valid. The probability of coming to a valid verdict on the validity of the research hypotheses firstly lies in the objectivity of the method used to empirically test the research hypotheses (Babbie & Mouton, 2014).

The subsequent outline of the method used to test the overarching and path-specific substantive research hypotheses begins with the presentation of the substantive research hypotheses, a decision with regards to the research design chosen, development of statistical hypotheses to allow for empirical testing, a description of the sampling methodology and concludes with a description of the statistical produces used to test the statistical hypotheses. Emphasis was placed on those phases in the quantitative explanatory research process where the epistemic ideal had a higher risk of derailing.

The probability of coming to a valid verdict on the validity of the research hypotheses secondly lies in the rationality of the method used to empirically test the research hypotheses (Babbie & Mouton, 2014). Scientific rationality requires the research methodology to be opened up for critical inspection by knowledgeable peers. A necessary prerequisite for scientific rationality to operate is a sufficiently detailed description of the methodological choices that were made and the motivation underpinning them so as to provide knowledgeable peers sufficient clarity as to the methodology that was used.

This chapter therefore comprehensively describes the methodological choices that were made to test the *psychological ownership* structural model, which resulted from the theorising conducted in the literature review in Chapter 2, and argue why the particular choices were made.

### **3.2 SUBSTANTIVE RESEARCH HYPOTHESES**

Hypotheses are the “working instruments of theory” (Kerlinger & Lee, 2000, p. 27) and are vital to the process of scientific research. They act as the link between existing literature and theory, researcher beliefs and empirical testing. The intention of the hypothesis is to clearly articulate the researchers’ belief, in terms of the hypothesised relationship between latent variables, in such a manner as to clarify the nature of the relationship. This relational assumption allows for hypothesis testing in order to determine whether these ‘educated guesses’ or assumptions are valid.

The facts are allowed a chance to speak to the validity of the presented relations. These hypotheses therefore aid in “taking man out of himself, so to speak...because although formulated by man, they can be tested and shown to be correct or incorrect apart from man’s values and beliefs” (Kerlinger, 1979, p. 35). It is this purpose that allows for the advancement of knowledge as each hypothesis represents an explanation of the dependent variable that affords researchers the luxury of testing it against empirical

evidence. A satisfactory explanatory hypothesis should contain at least two variables, express a causal or cause-effect relationship between these variables, be expressed as an expected future outcome, logically flow from or be linked to the research question and be falsifiable (Neuman, 1997).

Substantive research hypotheses are an imperative part of positivist research (Kerlinger & Lee, 2000). They are, however, not directly testable *per se* via research designs that utilise conventional statistical analysis techniques like correlation analysis, regression analysis and analysis of variance to test the statistical hypotheses associated with the design. When utilising conventional statistical analysis techniques substantive research hypotheses have to be translated to operational hypotheses to allow their indirect empirical testing. The overarching substantive research hypothesis in the current study and the path-specific substantive hypotheses into which it dissects are, however, testable. This can be done via an *ex post facto* correlational research design, via structural equation modelling, without formulating operational hypotheses in as far as estimates of the freed structural model parameters are obtained that describe the strength of the hypothesised relationships between the latent variables themselves rather than between operational indicators of the latent variables<sup>28</sup>.

The literature review in Chapter 2 culminated in a *psychological ownership* structural model or schematic representation of hypotheses. The hypotheses provided below therefore act as declarative statements of the direction of the relationship or relations between the variables contained within this *psychological ownership* structural model. These in turn allowed for statistical hypothesis to be generated and empirical tested (Kerlinger & Lee, 2000).

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<sup>28</sup> The conventional approach deduces an empirically testable operational hypothesis via a deductive argument from the substantive hypothesis. The structural equation modelling approach also deduces testable implications from the overarching substantive hypothesis via a deductive argument. In the latter case, however, the conclusion is of a statistical nature and on the discrepancy between an observed and an estimated covariance matrix rather than on the relationship between two (or more) observed variables.

Substantive research hypothesis: *The structural model provides a valid account of the psychological mechanism that regulates the levels of  $\eta_j$  comprising the to-be-explained phenomena.*

Premise 1:  *$Y_i$  provide valid, reliable and unbiased empirical measures of  $\eta_i$ .*

Premise 2:  *$X_i$  provide valid, reliable and unbiased measures of  $\eta_i$ .*

Conclusion: *The comprehensive model provides a valid account of the process that brought about the observed correlation matrix and therefore estimates of the freed comprehensive model parameters can be obtained that will allow the estimation of the observed sample variance-covariance matrix  $S^{\wedge}$  that reproduces the observed sample variance-covariance matrix  $S$  with a degree of accuracy that can be explained in terms of sampling error only under  $H_0$ .*

It therefore needs to be conceded that in both instances the substantive hypotheses are tested indirectly via empirically testable inferences that are derived via a deductive argument from the substantive hypothesis.

The overarching substantive research hypothesis, namely, that the *psychological ownership* structural model provides a valid account of the psychological mechanism underpinning the levels of *psychological ownership* (**Hypothesis 1**), were dissected into the following more detailed, path-specific substantive research hypotheses:

**Hypothesis 2:** In the proposed *psychological ownership* structural model it is hypothesised that *job characteristics* ( $\xi_1$ ) (more specifically the perceived ability of the job characteristics to satisfy salient psychological ownership needs) have a positive influence on *motivation to engage in the routes towards psychological ownership* ( $\eta_2$ ).

**Hypothesis 3:** In the proposed *psychological ownership* structural model it is hypothesised that the strength/salience of an employee's root needs ( $\xi_2$ ) positively influences *motivation to engage in the routes to psychological ownership* ( $\eta_2$ ).

**Hypothesis 4:** In the proposed *psychological ownership* structural model it is hypothesised that *squared salient individual needs* ( $\xi_3$ ) positively influences the *motivation to engage in the routes towards psychological ownership* ( $\eta_2$ ).

**Hypothesis 5:** In the proposed *psychological ownership* structural model it is hypothesised that *salient individual needs \* perceived ability of the job characteristics to satisfy salient needs* ( $\xi_5$ ) positively influences *motivation to pursue the routes towards psychological ownership* ( $\eta_2$ ).

**Hypothesis 6:** In the proposed *psychological ownership* structural model it is hypothesised that *squared perceived ability of the job characteristics to satisfy salient needs* ( $\xi_4$ ) positively influences *motivation to pursue the routes towards psychological ownership* ( $\eta_2$ ).

**Hypothesis 9<sup>29</sup>:** In the proposed *psychological ownership* structural model it is hypothesised that *motivation to invest in the psychological ownership routes* ( $\eta_2$ ) has a positive influence on the extent to which an investment is made in *self-investment* as a route to *psychological ownership* ( $\eta_3$ ).

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<sup>29</sup> Hypothesis 7 and hypothesis 8 refer to assumptions surrounding the response surface analyses with regards to the influence of congruence between two latent variables (salience of employee root needs and the perceived ability of the job to satisfy these salient root needs) and a single dependent variable (motivation to pursue the routes to psychological ownership). These hypotheses have therefore been presented separately, after the 16 path-specific hypotheses.



**Hypothesis 10:** In the proposed *psychological ownership* structural model it is hypothesised that the extent to which an employee feels *psychologically safe* within their work environment will moderate the effect of *motivation to pursue the routes* towards *psychological ownership* ( $\xi_6$ ) on the extent to which an investment is made in *self-investment* as a route to *psychological ownership* ( $\eta_3$ ).

**Hypothesis 11:** In the proposed *psychological ownership* structural model it is hypothesised that *self-investment* ( $\eta_3$ ) positively affects investment in *control* of the job ( $\eta_5$ ).

**Hypothesis 12:** In the proposed *psychological ownership* structural model it is hypothesised that the *extent to which an investment is made in gaining intimate knowledge*, ( $\eta_4$ ) as a route to *psychological ownership*, is positively influenced by *control* of the job ( $\eta_5$ ).

**Hypothesis 13:** In the proposed *psychological ownership* structural model it is hypothesised that the *extent to which an investment is made in self-investment* ( $\eta_3$ ), as a route towards *psychological ownership*, has a positive influence on *psychological ownership* ( $\eta_1$ ).

**Hypothesis 14:** In the proposed *psychological ownership* structural model it is hypothesised that the *extent to which an investment is made in control* of the job ( $\eta_5$ ) has a positive influence on *psychological ownership* ( $\eta_1$ ).

**Hypothesis 15:** In the proposed *psychological ownership* structural model it is hypothesised that the *extent to which an investment is made in gaining intimate knowledge* ( $\eta_4$ ) has a positive influence on *psychological ownership* ( $\eta_1$ ).

**Hypothesis 16:** In the proposed *psychological ownership* structural model it is hypothesised that *self-investment* ( $\eta_3$ ) affects the *extent to which an employee invests in gaining intimate knowledge* ( $\eta_4$ ).

**Hypothesis 17:** In the proposed *psychological ownership* structural model it is hypothesised that the *extent to which an investment is made in gaining intimate knowledge* ( $\eta_4$ ) has a positive influence on the *extent to which an investment is made in self-investment* ( $\eta_3$ ).

**Hypothesis 18:** In the proposed *psychological ownership* structural model it is hypothesised that the extent to which feelings of *psychological ownership* ( $\eta_1$ ) are felt will have a positive influence on levels of *motivation to pursue* the routes towards *psychological ownership* ( $\eta_2$ ).

Additional hypotheses were developed through theorising in Chapter 2. These relate to the response surface analysis outlining the aspect of congruence and its influence on *motivation to pursue the routes towards psychological ownership*.

These are presented as follows:

**Hypothesis 7:** 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 salient needs combined with low salience of the employees needs to the perception that the job does allow the satisfaction of the salient needs combined with high salience of the needs; b) *Motivation to pursue* the routes towards *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 needs combined with low salience of the needs to the perception that the job does allow the satisfaction of the needs combined with high salience of the needs.

**Hypothesis 8:** In the proposed *psychological ownership* structural model it is hypothesised that a) *Motivation* to pursue the routes towards *psychological ownership* changes negatively as incongruence changes from the perception that the job does allow the satisfaction of the needs combined with low salience of the needs to the perception that the job does not allow the satisfaction of the needs combined with high salience of the needs; b) *Motivation to pursue* the routes towards *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 needs to the perception that the job does not allow the satisfaction of the needs combined with high salience of the needs.

Latent polynomial regression with response surface analysis should therefore be conducted to analyse these hypotheses.

### 3.3 RESEARCH DESIGN

In order to provide clarity on the manner in which the hypothesised relationships, identified above in Section 3.2, were tested, and to additionally improve the quality of the outcomes of the research, it is important to follow a strategic plan or framework. This plan, namely the research design, addresses certain aspects of the scientific inquiry (Babbie & Mouton, 2014) and “suggests the direction of observation making and analysis” (Kerlinger & Lee, 2000, p. 451).

The research design should therefore enable the research to be conducted in a valid, objective and accurate manner. According to Kerlinger and Lee (2000) a research design’s main technical function is to assist in the controlling of (dependent variable) variance, such as experimental/systematic, extraneous and error variance, in a study. The aim of constructing an efficient research design that controls independent variable variance is threefold. Firstly, it should attempt to maximise the variance in the dependent variables that are due to the independent variables that according to the substantive research hypotheses affect the dependent variables. This refers to maximising the systematic variance in the dependent variable. This is important because there is little chance of separating the variance due to the independent variables of interest from the total variance in the dependent variable should the independent variables not differ considerably. Secondly, it should also attempt to minimise error variance due to non-relevant sources of systematic and random error variance. This can be attained through the reduction of errors through the use of controlled conditions, an increased reliability in the measures used to operationalise the latent variables within the nomological network and controlling for systematic variance brought about by non-relevant variables through matching or the use of covariates. Lastly, the research design should aim to control for variance caused by extraneous or unwanted variables that could potentially be confounded with the systematic variance (Kerlinger & Lee, 2000). This is achieved through randomisation, eliminating the variable as a variable or by building it into the design as an independent variable. Randomisation is the best way to control extraneous variable nuisances according to Kerlinger and Lee (2000).

Following an appropriate research design increases the likelihood that the manner in which the hypotheses are empirically tested brings about unambiguous results (Theron, 2014a). Behavioural and social sciences however pose a challenge to researchers specifically in terms of the selection of this appropriate research design. Some argue that studying human behaviour requires a certain degree of flexibility, while others advocate the use of fixed, technical blueprints, specifically from a control point of view. There has

been much debate surrounding the best type of research design for the social sciences (Durrheim, 2011). However, there are certain rules of thumb that can be followed when considering the different design options available. What remains important is that the researcher be guided at all times by the research initiating question.

The research design chosen must therefore be fit for purpose. The kind of research conducted must, as mentioned, meet the needs of the research initiating question as well as maximise the probability of arriving at a valid verdict on the validity of the hypothesis (Theron, 2014a). In this way, the research design chosen will aid in upholding the epistemic imperative of research. It is essential to understand the intricacies of research design options and how each design can influence the outcome of research and the logical errors that could arise when developing explanations for phenomenon (Neuman, 1997). This section will outline, the purpose of the current study, potential design options suitable for this purpose, as well as rules of thumb that aid in the research design dilemma. Furthermore, the rules of thumb will be applied to the current study to justify the chosen research design. This will be done in order to allow the research approach to withstand professional scrutiny from peers or replication of research efforts within other contexts.

According to De Vaus (2001) researchers ask two types of question: 'What is going on?' And 'Why it is happening?' These questions point to the three most common research purposes, which influence research designs: exploration, description (to answer questions pertaining to the current situation) and explanation (to gain insights as to why a certain situation occurs).

Exploratory research aims to explore a relatively new area, topic or construct on which there is currently no well-developed body of literature or knowledge. According to Babbie and Mouton (2014) exploratory studies are undertaken for six reasons. These are to:

- 1) Satisfy the researchers curiosity and desire for understanding
- 2) Test the feasibility of undertaking a more extensive study
- 3) Develop the methods to be employed in any subsequent study
- 4) Explicate the central concepts and constructs of a study
- 5) Determine priorities for future research
- 6) Develop new hypotheses about an existing phenomenon

Descriptive research, as its name suggests, provides an accurate description or profile of events, situations, phenomenon and the like. This type of research is used when the aim

of research is to define. Descriptive research is often extended and goes on to examine why the observed (average) levels of the variables that constitute the described phenomenon exist. This results in diagnostic research that aims to explain the levels of the variables that constitute the described phenomenon in terms of the level of one or more of the variables that act as determinants of those variables. Descriptive research is also often extended to examine why variance in the observed levels of the variables that constitute the described phenomenon exist (Babbie & Mouton, 2014), namely explanatory research. This type of research is used to answer “why” questions with the aim of indicating causality between constructs or variables.

In order to decide upon a design appropriate to explain the variance in the levels of *psychological ownership* experienced by different employees in different organisational contexts, the following questions must be answered:

- Can the exogenous latent variable within the structural model be manipulated by the researcher?
- How many exogenous and endogenous latent variables are captured or investigated within the structural model?
- Are there proposed causal linkages hypothesised between the endogenous latent variables within the structural model, if the model contains two or more endogenous latent variables?

As mentioned, the research problem and purpose suggests or points to a specific research design (Kerlinger & Lee, 2000). Identifying the variables that explain why certain individuals within certain organisational contexts experience differing levels of *psychological ownership*, involves explanation. Therefore, since the underlying purpose of the current research 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; Saunders, Lewis, & Thornhill, 2009) or stated otherwise to understand the relationships between the identified latent variables *job characteristics*, *motivation to pursue the routes*, *psychological ownership needs* and *routes*, as well as *psychological safety* and *psychological ownership*.

Since the purpose of this study is to explain the relationships or causal influences between variables within the *psychological ownership* structural model two approaches could be applicable: experimental and non-experimental. Experimental research and non-experimental research share the same purpose, namely to study relations between latent

variables. Furthermore “their scientific logic is also the same: to bring empirical evidence to bear on the conditional statements of the form If  $p$ , then  $q$ ,” (Kerlinger & Lee, 2000, p. 559). An important distinction between these two approaches, however, lies within the element of manipulation or control. Experimental research on the one hand, affords the researcher the luxury of control in that the independent variable can be manipulated in order to determine the effect of this change on the dependent variable. Non-experimental research, on the other hand, does not allow for this element of control or manipulation. Furthermore, non-experimental research does not allow for the random assignment of subjects “because the nature of the variables is such as to preclude manipulation” (Kerlinger, 1986, p. 293).

Kerlinger (1986, p.348) describes non-experimental research as:

Systematic empirical inquiry in which the scientist does not have direct control of independent variables because their manifestations have already occurred or because they are inherently not manipulable. Inferences about relations among variables are made, without direct intervention, from concomitant variation of independent and dependent variables.

Since this study involves investigating an overarching *psychological ownership* structural model, as presented in Figure 2.1, it is important to look at the most appropriate design. The factors discussed above will now be investigated as they pertain to the proposed *psychological ownership* structural model.

### **3.3.1 Assessing the research design for the proposed psychological ownership structural model**

The research ideal is a controlled experiment, if this type of design is fit for purpose. However, many research questions do not lend themselves towards this type of research design, thereby necessitating the use of a non-experimental design. Taking the above *psychological ownership* structural model, as well as the stipulated questions into account, the following can be deduced:

Firstly, considering the fact that the six exogenous latent variables (*job characteristics, salient needs, squared salient needs, perceived ability of the job to satisfy salient needs, squared perceived ability of the job to satisfy salient needs, salient needs\*perceived ability of the job to satisfy salient needs as well as psychological safety\*motivation*), contained

within the model, cannot be experimentally manipulated<sup>30</sup>, the use of a non-experimental design seems appropriate. More specifically, in cases where the researcher does not use manipulation of variables, nor the random assignment of the sample, an *ex post facto* non-experimental design is suggested. This is due to the fact that the researcher wishes to (after the fact) seek the underlying psychological mechanisms that influenced or determined the levels of a psychological state, namely *psychological ownership*, after these feelings of ownership have (or have not) developed in an individual.

Two design options are available for *ex post facto* research studies namely, a type II quasi experimental design or a correlational design. The purpose of this research study is to empirically test the overarching substantive hypothesis, as it is described in the structural model depicted in Figure 2.1, which contains hypothesised causal paths between the endogenous latent variables. The *psychological ownership* structural model a) contains five endogenous latent variables<sup>31</sup>, namely, *motivation to pursue* the routes towards *psychological ownership*, the three routes to *psychological ownership* namely; *self-investment*, *control of the job*, *intimate knowledge*; and *psychological ownership* that b) are affected by six exogenous latent variables. Additionally, causal relations do exist between the endogenous latent variables<sup>32</sup>, *self-investment*, *intimate knowledge*, *control*, *motivation to pursue* the routes and *psychological ownership*. It is therefore suggested that since this study is looking at cause and effect of phenomena, namely the latent variables that influence levels of *psychological ownership*, after the fact, at a single point in time, without manipulation of the independent variables, as mentioned, the use of a non-experimental *ex post facto* cross sectional correlational design is applicable.

The only way to test an explanatory structural model, in which causal paths are hypothesised between the endogenous latent variables, as an integrated whole, is through structural equation modelling (SEM) (Diamantopoulos & Siguaw, 2000). The use of SEM implies an *ex post facto* correlational design with two or more indicators per latent variable.

An *ex post facto* research design is useful here as it is impractical to make use of an experimental design, the factors necessary to analyse cause-and-effect directly cannot be controlled, and the independent variable is outside the researcher's control. This approach is however not without its limitations. As mentioned above, this type of research design

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<sup>30</sup> This provides an answer to question 1 in Section 3.3.

<sup>31</sup> This provides an answer to question 2 in Section 3.3.

<sup>32</sup> This provides an answer to question 3 in Section 3.3.



does not permit manipulation or control of the independent variable, due to that fact that the cause-effect phenomenon has already occurred. Additionally, it makes randomisation illogical, due to the fact that it is impossible to produce systematic difference in levels of  $\xi_j$  through experimental manipulation after participants have been randomly assigned to groups. Furthermore, it does not allow for proper interpretations, or more specifically the research runs the risk of making improper interpretations, due to the lack of control (Kerlinger & Lee, 2000). When using an *ex post facto* design it is therefore potentially difficult to determine the direction of causality, the *post hoc* lack of control means it is difficult to isolate variables and the fact that there is a correlation between variables does not necessarily point to cause (Theron, 2015). The lack of control points to the lack of internal validity experienced by *ex post facto* design. Of the several threats to internal validity such as history, selection, maturation, testing and mortality, this design type can potentially suffer from selection (Giuffre, 1997).

However, the use of a non-experimental design is often unavoidable (and sometimes valuable) in behavioural sciences due to the fact that manipulation of, or control of, the variables (a prerequisite for an experimental design) is not possible (Kerlinger & Lee, 2000) and sometimes not wanted. The manipulation of variables within a research study is sometimes seen as a negative aspect of experimental research. It is viewed as being less real, therefore a non-experimental design could be said to provide a truer sense of reality, where situations are more real and not contrived. Here it can be argued that there is value in looking at the “variable of interest in situ” (Giuffre, 1997, p. 193). According to Theron (2015) this type of design can also still maximise systematic error variance, minimise error variance and control for extraneous variance, through the researcher’s attempts to select diverse samples, the use of reliable indicator variables and the use of control variables. These limitations will be kept in mind throughout the research process and specifically when making inferences or conclusions surrounding causality.

As is seen in the theorising in Chapter 2 the relationship between the variables underpinning levels of *psychological ownership* is not simple. In terms of the method of analysis it therefore seems reasonable to argue that a valid understanding of the latent variables within the model and how they interact, to in turn influence the behaviour of working man, is only possible if the method of inquiry used acknowledges this complexity (Theron, 2015). Therefore, it seems reasonable to suggest that this complex explanatory structural model, in which causal-linkages are hypothesised between endogenous and exogenous latent variables, and phantom variables have been added to provide an

enriched interpretation, should be tested as an integrated whole via SEM with response surface methodology (Shanock, Baran, Gentry, Pattison, & Heggestad, 2010). The *ex post facto* correlational design as it applied to the current study is depicted in Figure 3.1<sup>33</sup>.

[X <sub>11</sub> ]	...	[X <sub>1j</sub> ]	...	[X <sub>1,18</sub> ]	Y <sub>11</sub>	...	Y <sub>1j</sub>	...	Y <sub>1,10</sub>
[X <sub>21</sub> ]	...	[X <sub>2j</sub> ]	...	[X <sub>2,18</sub> ]	Y <sub>21</sub>	...	Y <sub>2j</sub>	...	Y <sub>2,10</sub>
:	...	:	...	:	:	...	:	...	:
[X <sub>i1</sub> ]	...	[X <sub>ij</sub> ]	...	[X <sub>i,18</sub> ]	Y <sub>i1</sub>	...	Y <sub>ij</sub>	...	Y <sub>i,10</sub>
:	...	:	...	:	:	...	:	...	:
[X <sub>n1</sub> ]	...	[X <sub>nj</sub> ]	...	[X <sub>n,18</sub> ]	Y <sub>n1</sub>	...	Y <sub>nj</sub>	...	Y <sub>n,10</sub>

**Figure 3.1. Ex Post Facto Correlation Design of the Proposed Psychological Ownership Structural Model**

According to Theron (2014a) the *ex post facto* correlation design sheds light on the validity of the overarching and path specific substantive research hypotheses by determining if the proposed structural model offers an acceptable explanation for the observed covariance matrix. The observed covariance matrix is developed by obtaining at least two measures on each of the observed variables. Estimates for the freed structural and measurement model parameters are then acquired in an iterative fashion. The objective is to reproduce the observed covariance matrix as closely as possible (Theron, 2014a).

The assumption is that the observed covariances among the measured variables arose because of the relationship between the variables, identified in the comprehensive LISREL model<sup>34</sup> (Tabachnick & Fidell, 2014). It can be concluded that the proposed structural model does not provide an acceptable explanation for the observed covariance matrix should the fitted model fail to accurately reproduce it. Should this be the case, it is then assumed that the observed covariances among the measured variables did not occur because of the relationships between the variables, identified in the proposed comprehensive LISREL model. One would assume that the opposite would be true – that if the fitted comprehensive LISREL model accurately reproduced the observed covariance matrix that the comprehensive model would provide a true account for the observed

<sup>33</sup> The manner in which the latent variables have been operationalised when fitting the structural model, and therefore the number of exogenous and endogenous indicator variables, are indicated in paragraph 3.6. Table 3.4 that summarises the manner in which the latent variables comprising the structural model were operationalised, indicates a total of 28 indicator variables.

<sup>34</sup> The comprehensive LISREL model refers to the structural model, describing the nature of the structural relations that are hypothesised to exist between the latent variables, combined with the measurement model, describing the hypothesised relationships between the latent variables and the observed/indicator variables.

covariance matrix. However, this is not the case. According to Van Deventer (2015) a well-fitted model that accurately depicts the covariance matrix merely means that the model provides *one* plausible explanation for the phenomenon under study. It is important to bear this in mind when making conclusions and inferences based on the proposed *psychological ownership* model.

### 3.4 STATISTICAL HYPOTHESES

The overarching substantive hypothesis (**Hypothesis 1**), states that the *psychological ownership* structural model provides a valid account of the psychological mechanism underpinning levels of *psychological ownership*. Should this hypothesis be believed to provide a perfect account of this psychological mechanism then the following exact fit null hypothesis can be presented:

$H_{01a}: RMSEA=0$

$H_{a1a}: RMSEA>0$

It is, however, acknowledged that this is a very rare scenario. Rather, structural models are developed to closely represent reality as far as possible. Therefore, perfect representation, in all likelihood is impossible. In this case, this structural model depicting the psychological mechanism underpinning levels of *psychological ownership* could then rather be interpreted as a close approximation. The overarching substantive hypothesis that the structural model provides a valid account of the psychological mechanism underpinning levels of *psychological ownership* should then be presented as the following close fit null hypothesis:

$H_{01b}: RMSEA<.05$

$H_{a1b}: RMSEA>.05$

In addition to the overall fit of the *psychological ownership* structural model, the following, more detailed, path-specific hypotheses were tested:

**Hypothesis 2:** In the proposed *psychological ownership* structural model it is hypothesised that *job characteristics* ( $\xi_1$ ) (more specifically the perceived ability of the job characteristics to satisfy salient psychological ownership needs) have a positive influence on *motivation to engage in the routes towards psychological ownership* ( $\eta_2$ ).

$$H_{02}: \gamma_{21}=0$$

$$H_{a2}: \gamma_{21}>0$$

**Hypothesis 3:** In the proposed *psychological ownership* structural model it is hypothesised that the strength/*salience of an employee's root needs* ( $\xi_2$ ) positively influences *motivation to engage in the routes towards psychological ownership* ( $\eta_2$ ).

$$H_{03}: \gamma_{22}=0$$

$$H_{a3}: \gamma_{22}>0$$

**Hypothesis 4:** In the proposed *psychological ownership* structural model it is hypothesised that *squared salience of the individual needs* ( $\xi_3$ ) positively influences the *motivation to engage in the routes towards psychological ownership* ( $\eta_2$ ).

$$H_{04}: \gamma_{23}=0$$

$$H_{a4}: \gamma_{23}>0$$

**Hypothesis 5:** In the proposed *psychological ownership* structural model it is hypothesised that *salient individual needs \* perceived ability of the job characteristics to satisfy salient needs* ( $\xi_5$ ) positively influences *motivation to pursue the routes towards psychological ownership* ( $\eta_2$ ).

$$H_{05}: \gamma_{25}=0$$

$$H_{a5}: \gamma_{25}>0$$

**Hypothesis 6:** In the proposed *psychological ownership* structural model it is hypothesised that *squared perceived ability of the job characteristics to satisfy salient needs* ( $\xi_4$ ) positively influences *motivation to pursue the routes towards psychological ownership* ( $\eta_2$ ).

$$H_{06}: \gamma_{24}=0$$

$$H_{a6}: \gamma_{24}>0$$

**Hypothesis 9:** In the proposed *psychological ownership* structural model it is hypothesised that *motivation to invest in the psychological ownership routes* ( $\eta_2$ ) has a positive influence on the extent to which an investment is made in *self-investment*, as a route to *psychological ownership* ( $\eta_3$ ).

$$H_{09}: \beta_{32}=0$$

$$H_{a9}: \beta_{32}>0$$

**Hypothesis 10:** In the proposed *psychological ownership* structural model it is hypothesised that the extent to which an employee feels *psychologically safe* within their work environment will moderate the effect of *motivation to pursue the routes towards psychological ownership* ( $\xi_6$ ) on the extent to which an investment is made in *self-investment*, as a route to *psychological ownership* ( $\eta_3$ ).

$$H_{010}: \gamma_{36}=0$$

$$H_{a10}: \gamma_{36}>0$$

**Hypothesis 11:** In the proposed *psychological ownership* structural model it is hypothesised that *self-investment* ( $\eta_3$ ) positively affects investment in *control of the job* ( $\eta_5$ ).

$$H_{011}: \beta_{53}=0$$

$$H_{a11}: \beta_{53}>0$$

**Hypothesis 12:** In the proposed *psychological ownership* structural model it is hypothesised that the *extent to which an investment is made in gaining intimate knowledge* ( $\eta_4$ ), as a route to *psychological ownership*, is positively influenced by *control of the job* ( $\eta_5$ ).

$$H_{012}: \beta_{45}=0$$

$$H_{a12}: \beta_{45}>0$$

**Hypothesis 13:** In the proposed *psychological ownership* structural model it is hypothesised that the *extent to which an investment is made in self-investment* ( $\eta_3$ ), as a route towards *psychological ownership*, has a positive influence on *psychological ownership* ( $\eta_1$ ).

$$H_{013}: \beta_{13}=0$$

$$H_{a13}: \beta_{13}>0$$

**Hypothesis 14:** In the proposed *psychological ownership* structural model it is hypothesised that the *extent to which an investment is made in control of the job* ( $\eta_5$ ) has a positive influence on *psychological ownership* ( $\eta_1$ ).

$$H_{014}: \beta_{15}=0$$

$$H_{a14}: \beta_{15}>0$$

**Hypothesis 15:** In the proposed *psychological ownership* structural model it is hypothesised that the *extent to which an investment is made in gaining intimate knowledge* ( $\eta_4$ ) has a positive influence on *psychological ownership* ( $\eta_1$ ).

$$H_{015}: \beta_{14}=0$$

$$H_{a15}: \beta_{14}>0$$

**Hypothesis 16:** In the proposed *psychological ownership* structural model it is hypothesised that *self-investment* ( $\eta_3$ ) affects the *extent to which an employee invests in gaining intimate knowledge* ( $\eta_4$ ).

$$H_{016}: \beta_{43}=0$$

$$H_{a16}: \beta_{43}>0$$

**Hypothesis 17:** In the proposed *psychological ownership* structural model it is hypothesised that the *extent to which an investment is made in gaining intimate knowledge* ( $\eta_4$ ) has a positive influence on the *extent to which an investment is made in self-investment* ( $\eta_3$ ).

$$H_{017}: \beta_{34}=0$$

$$H_{a17}: \beta_{34}>0$$

**Hypothesis 18:** In the proposed *psychological ownership* structural model it is hypothesised that the extent to which feelings of *psychological ownership* ( $\eta_1$ ) are felt will have a positive influence on levels of *motivation to pursue* the routes towards *psychological ownership* ( $\eta_2$ ).

$$H_{018}: \beta_{21}=0$$

$$H_{a18}: \beta_{21}>0$$

The following two statistical hypotheses represent the assumptions surrounding congruence as theorised as an essential element within the complex model. They have

therefore been dealt with separately as they do not represent path-specific hypotheses *per se*.

**Hypothesis 7:** In the proposed *psychological ownership* structural model it is hypothesised that a) *Motivation to pursue* the routes towards *psychological ownership* changes positively as congruence moves from the perception that the job does not allow the satisfaction of the salient needs combined with low salience of the employees needs to the perception that the job does allow the satisfaction of the salient needs combined with high salience of the needs; b) *Motivation to pursue* the routes towards *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 needs combined with low salience of the needs to the perception that the job does allow the satisfaction of the needs combined with high salience of the needs.

H<sub>07a</sub>:  $a_1=0$

H<sub>a7a</sub>:  $a_1>0$

H<sub>07b</sub>:  $a_2=0$

H<sub>a7b</sub>:  $a_2>0$

**Hypothesis 8:** In the proposed *psychological ownership* structural model it is hypothesised that a) *Motivation to pursue* the routes towards *psychological ownership* changes negatively as incongruence changes from the perception that the job does allow the satisfaction of the needs combined with low salience of the needs to the perception that the job does not allow the satisfaction of the needs combined with high salience of the needs; b) *Motivation to pursue* the routes towards *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 needs to the perception that the job does not allow the satisfaction of the needs combined with high salience of the needs.

H<sub>08a</sub>:  $a_3=0$

H<sub>a8a</sub>:  $a_3<0$

H<sub>08b</sub>:  $a_4=0$

H<sub>a8b</sub>:  $a_4\neq 0$



The specific response surface hypotheses formulated above ( $H_{08a} - H_{09b}$ ) were tested via latent score polynomial regression with response surface analysis. This will be discussed in more detail in Section 3.7.4.

The *psychological ownership* structural model depicted in Figure 2.5 above defined the psychological mechanism regulating the levels of *psychological ownership* such that the structural error terms are uncorrelated. Psi was therefore defined as a 5 x 5 diagonal matrix. Only the structural error variances were freed to be estimated.

$H_{0p}$ :  $\psi_{jj}=0$ ;  $p= 19, 20, 21, 22, 23$ ;  $j=1, 2, 3, 4, 5$

$H_{a19}$ :  $\psi_{jj}>0$ ;  $p= 19, 20, 21, 22, 23$ ;  $j=1, 2, 3, 4, 5$

Moreover, the *psychological ownership* structural model depicted in Figure 2.5 defined the psychological mechanism regulating the levels of *psychological ownership* such that the exogenous latent variables are correlated but for the correlation between  $\xi_1$  and the squared and product latent variables in which it was involved and the correlation between  $\xi_2$  and the squared and product latent variables in which it was involved, Phi was therefore defined as a full 6 x 6 matrix in which all off-diagonal elements were estimated but for  $\phi_{32}$ ,  $\phi_{41}$ ,  $\phi_{51}$ ,  $\phi_{52}$ ,  $\phi_{53}$  and  $\phi_{54}$  which were fixed to zero in acknowledgement of the orthogonalising procedure used to operationalise the latent squared and product terms. The main diagonal of  $\Phi$  was fixed to unity.

$H_{0p}$ :  $\phi_{ij}=0$ ;  $p=24, 25, \dots, 32$ ;  $i=1, 2, \dots, 6$ ;  $j=1, 2, \dots, 6$ ;  $i \neq j$

$H_{ap}$ :  $\phi_{ij}=0$ ;  $p=24, 25, \dots, 32$ ;  $i=1, 2, \dots, 6$ ;  $j=1, 2, \dots, 6$ ;  $i \neq j$

### 3.5 SAMPLING

Prior to engaging in theory testing it is important to determine if the sample arises from a population that is relevant to the theoretical ideas being evaluated (Bentler & Chou, 1987). Therefore, in an attempt to answer the research question: “Why variance on levels of *psychological ownership* exists among employees in different organisational contexts?” it is important to clarify the specific population under study, by defining the target population and sampling population, the sampling procedures that will be used and the appropriate sample size.

### 3.5.1 Target population, sampling procedure and the sample group

In the current study the phrases “employees” and “different organisational contexts” can be interpreted very broadly. However, it implies that the target population is limited to people who are currently employed, full-time. The target population therefore includes all full-time employees, from different cultural backgrounds, with various demographic characteristics, at different managerial levels (skilled and semi-skilled), who work for any type of organisation on a full-time basis.

The phrase “within different organisational contexts” implies the inclusion of various types of organisations, such as for-profit organisations and not-for-profit organisations. This would include organisations ranging from large-scale public and private entities to government agencies and smaller corporate organisations. Of particular interest to this study is *psychological ownership* from a South African perspective, necessitated by the country's previous political history and the fact that South Africa seems to be a neglected area in the domain of *psychological ownership* research in general. Therefore, the target population or units of analysis was defined as employees, of differing skill levels, working in profit and non-profit organisations, in both the public and the private sectors, within the borders of South Africa.

Lacking the ability to observe the whole population within the South African organisational landscape necessitates the question: Who/what to observe and who/what not to observe? (Babbie & Mouton, 2014) This refers to the process of sampling.

The aim of sampling is to select a small sub-group from the target population that the researcher will then consider to be representative of the target population (Durrheim, 2011; Kerlinger, 1986). This representativeness allows for conclusions to be generalised to the target population. The principle here is that it is possible to make inferences about the target population without the need to collect data from each member of the population. This enables a reduction in collected data, which should allow for cost and time-saving benefits, without reducing the accuracy of the findings. Drawing a representative sample from this target population clearly presents arduous logistical challenges.

### 3.5.2 Sampling procedure

There are several sampling techniques available, each with their own benefits and challenges. It is important to be guided by certain principles when deciding on the specific technique to use. Here it is important to bear the research purpose, the research question

and the type of data that would answer this question as well as sampling error, and the availability of resources, in mind. The research design should therefore enable the research to be conducted in a valid, objective and accurate manner. It is important that the chosen technique minimises sampling error, in terms of the difference between sample and population characteristics (Miller & Salkind, 2002) so that the sample best represents the population of interest, and generalisability is possible.

Two types of sampling methods can be used in research, namely probability and nonprobability sampling techniques (Babbie & Mouton, 2014). The former involves techniques used to select a random sample where there is a known chance or probability of each population element (or final sampling unit) being chosen, and it is not zero. The latter involves situations where probability sampling would be inappropriate or even impossible, and the chance or probability is not known (Saunders et al. 2009). Here, members of the population or sub-group do not have known probabilities of being chosen for the sample. Olsen (2012) argues that strictly speaking this method of sampling should not be called sampling, but rather selection of participants.

Non-probability sampling, or selection of participants, will be used for the purposes of this research study. More specifically, a technique of nonprobability sampling called convenience sampling was used. As suggested by its name, this technique involves selecting participants based on their convenient accessibility and proximity to the researcher (Babbie & Mouton, 2014). This technique, although popular in the social sciences, is not without its drawbacks and authors caution against its haphazard use (Durrheim, 2011; Kerlinger, 1986; Kerlinger & Lee, 2000) and some say it should be avoided where possible. This form of sampling is risky and does not share the virtues of probability sampling due to the involvement of the discretion of the researcher in the sampling process. Furthermore, since the sample is not chosen at random some factor(s) unknown to the researcher may predispose the researcher to select a biased sample. These weaknesses can to some extent be mitigated by research knowledge, expertise, the care taken in selecting samples and statistical techniques.

These limitations have been acknowledged and inferences during analysis and interpretation were therefore made with caution and circumspection.

*LinkedIn*<sup>35</sup> was used as an online platform<sup>36</sup> for the dissemination of the Composite Job-based Psychological Ownership Survey. This platform allowed a variety of individuals to be sampled from a variety of organisations and industries. It is however acknowledged that this technique poses some additional challenges, and possible limitations in terms of the diversity of the sample (this is limited to individuals within the researchers contact group/network), and could therefore be less representative than one would like.

Upon completion of the research study a summary profile of the sample group, presented in Table 3.1 below, was compiled.

It is evident from the summary profile that the sample of 329 participants was somewhat diverse, spread across several industries and age groups, but also somewhat biased<sup>37</sup>. This can be seen in both the gender and race summary profiles in that a large percentage 64.5% were female and 75.7 % of the sample group was White. The representativeness of the sample group therefore comes into question, specifically in terms of age and race. However, in terms of tenure, industry, job level and age there seems to be an even spread across the different demographics.

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<sup>35</sup> This online platform was used post several attempts to gain access to a sample population via large South African corporates. Unfortunately, these attempts were not fruitful, even after gaining consent. Reasons cited were, trying economic times, changes in organisational structuring and organisational uncertainty.

<sup>36</sup> This online platform allows researchers to gain access to employed individuals from a wide variety of industries, with varying demographics. Yuan, Bare, Johnson and Saberi, (2014, p.1) found that “online recruitment is a feasible and efficient tool” to attract survey participants. Casler, Bickel, and Hackett, (2013, p. 2156) concur and state that for “some behavioral tests, online recruitment and testing can be a valid—and sometimes even superior—partner to in-person data collection”.

<sup>37</sup> It is acknowledged here that this could be due to the researchers own demographic and, as mentioned, the fact that the convenience sample was a collection of LinkedIn contacts – which would undoubtedly share some common aspects with the researcher. This limitation is acknowledged and conclusions were there made with caution and circumspection as a generalisability of the results is in question.

**Table 3.1**  
**Summary Profile of the Sample Group**

	<b>Frequency</b>	<b>Percentage</b>
<b>Gender</b>		
Male	117	35.6%
Female	212	64.5%
<b>Race</b>		
Black	26	7.9
Coloured	30	9.1
Indian	20	6.1
White	249	75.7
Other	4	1.2
<b>Industry</b>		
Communications: Marketing	24	7.3%
Construction	5	1.5%
Education	31	9.4%
Engineering	28	8.5%
Finance	57	17.3%
Government	14	4.3%
Health and fitness	10	3.0%
I work across industries	25	7.6%
Mining and manufacturing	5	1.5%
Retail	7	2.1%
Telecommunications	4	1.2%
Tourism	2	.6%
Transport	7	2.1%
Sales	10	3.0%
Other	100	30.4%
<b>Age</b>		
71+	2	.6%
61-70	11	3.3%
51-60	35	10.6%
40-50	61	18.5%
35-39	76	23.1%
30-34	68	20.7%
25-29	62	18.8%
20-24	14	4.3%
<b>Job level</b>		
Entry level	44	13.4%
Junior management	53	16.1%
Middle management	85	25.8%
Senior management	63	19.1%
Specialist	84	25.5%
<b>Tenure</b>		
Less than one year	48	14.6%
1-2 years	73	22.2%
3-5 years	75	22.8%
6-10 years	58	17.6%
11-15 years	35	10.6%
16-25 years	26	7.9%
More than 25 years	14	4.3%

### 3.5.3 Sample size

Another important consideration, relevant to the selection of a sample, is the appropriate sample size. A *priori* determination of appropriate sample size can avoid wastage of resources, as well as the conducting of low powered studies. Furthermore, it can improve the quality of generalisations from the sample to the population. The ideal sample size is influenced by several factors pertaining to aspects such as the type of study, statistical criteria and practical constraints (Durrheim, 2011; Kerlinger & Lee, 2000). According to Saunders et al. (2009) three factors govern the choice of sample size. Firstly, the level of confidence the researcher needs to have in the data, secondly, the margin of error that can be tolerated and lastly, the type of analyses that will be conducted and to a lesser degree the size of the target population.

When dealing with structural models, the use of particular analysis procedures and certain model characteristics, such as the number of latent variables within the model and the number of freed model parameters, additionally influence minimum sample sizes. The flexibility afforded to the researcher when using SEM, which allows for complex association analysis, the use of different types of data and comparison of various alternative models, makes it difficult to follow more general guidelines regarding sample size calculations (MacCallum, Widaman, Zhang, & Hong, 1999). According to Hair, Black, Babin, and Anderson (2010) there are several factors that can influence sample size, when using SEM specifically, like the complexity of the model, availability of resources and practical constraints (*a priori*), the multivariate normality of data, the amount of missing data, and the average error variance among the reflective indicators (*post priori*), as well as the estimation techniques used.

When assuming that the multivariate normality assumption made by SEM has been satisfied, a generally accepted, albeit somewhat demanding, ratio is 15 respondents for each parameter estimated in the model (Saunders et al. 2009). Using this guideline a sample size of 1200<sup>38</sup> was indicated to be appropriate for this study. Statistical estimation procedures can also be used to deal with non-normal data however. Therefore, estimation techniques must also be kept in mind when deciding on an appropriate sample size. Maximum likelihood estimation, a popular estimation procedure in SEM can provide valid results with a sample size as small as 50. Aspects such as missing data and sampling

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<sup>38</sup> 80 x 15 = 1200

error necessitate the use of larger samples and between 200 and 400 observations have been suggested (Hair et al. 2010). This number, however, varies depending on the model complexity.

Stutley (as cited in Saunders, Lewis, & Thornhill, 2009) proposes that a sample of at least 30 observations is sufficient. However, Hair et al. (2010) contend that this is only suitable if dealing with analysis by simple regression, with a single independent variable. Complex models require far larger samples. The increased number of indicator variables calls for a larger sample. Moreover, a model containing more constructs means more parameters to be estimated. Bentler and Chou (1987) provide, what they in their own words term, an oversimplified guideline, or rule of thumb, regarding the trustworthiness of solutions and parameter estimates. They suggest that a ratio of sample size to freed parameters of 10:1 is appropriate, but a ratio as low as 5:1 can be used. Therefore, ratios between 5:1 and 10:1 could be considered appropriate, depending on the model. The more complex the model, the larger the required sample size. From this guideline, it could be suggested that a sample size of between 400 and 800 (80<sup>39</sup> freed parameters in the proposed structural model) would be appropriate for this study.

Additional scholars<sup>40</sup> provide further rules of thumb for deciding on a suitable sample size. However, Hair et al (2010) cautions against using any rules of thumb when it comes to sample sizes in SEM as they should not follow a “one size fits all” approach. Hair et al. (2010, p. 662) does however provide the following suggestions for minimum samples sizes, bearing model complexity and measurement characteristic in mind, when conducting SEM:

- Minimum sample size-100: Models containing five or fewer constructs, each with more than three items (observed variables), and with high item communalities (.6 or higher<sup>41</sup>).
- Minimum sample size-150: Models with seven or fewer constructs, modest communalities (.5), and no under identified constructs.
- Minimum sample size-300: Models with seven or fewer constructs, lower communalities (below.45), and/or multiple under identified (fewer than three items) constructs.

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<sup>39</sup> The comprehensive LISREL model comprises of the following number of freed parameters: 6  $\gamma$ , 9  $\beta$ , 5  $\psi$ , 18  $\lambda^X$ , 5  $\lambda^Y$ , 18  $\theta\delta$ , 10  $\theta\epsilon$  and 9  $\phi$ . Six elements of the  $\Phi$  matrix were fixed to zero due to the orthogonalising procedure used to calculate the indicators for the latent interaction terms and the latent squared terms.

<sup>40</sup> A detailed discussion pertaining to the different rules of thumb is beyond the scope of this research project. However, some rules of thumb have been used to provide evidence of the difficulty in using these guidelines when conducting analysis via SEM.

<sup>41</sup> Communalities here refer to the squared factor loading ( $\lambda_{ij}^2$ ) of indicator variables on the latent variables they were tasked to reflect. High communalities therefore mean that large proportions of the variance in the indicators can be explained in terms of the latent variable they were tasked to reflect.



- Minimum sample size-500: Models with large numbers of constructs, some with lower communalities, and/or having fewer than three measured items.

Additionally, Hair et al. (2010) state that the sample size should increase if data deviates from multivariate normality or missing data exceeds 10 percent.

Table 3.2 below outlines a summary of the proposed appropriate sample sizes per scholar/approach according to the above and below mentioned rules of thumb.

**Table 3.2**  
**Summary of Proposed Sample Sizes**

Scholar or approach <sup>42</sup>	Sample size guideline summary	Proposed sample size
Bentler and Chou (1987)	Suggested guideline using number of freed model parameters in the model	400 - 800
Hair et al. (2010)	Suggested guidelines using model complexity and measurement characteristics	500+
Stutley	Suggested guideline/rule of thumb	30
Preacher and Coffman (2006)	Software packaged used to compute sample size	21

The effects of sample size are seen most directly in the statistical power of the significance testing and the generalisability of results, necessitating further consideration.

Statistical power in the context of SEM refers to the probability of rejecting the null hypothesis of close fit ( $H_0: RMSEA \leq .05$ ) when in fact it should be rejected (i.e., the model fit actually is mediocre,  $H_a: RMSEA > .05$ ). The probability of rejecting the null hypothesis in favour of the alternate hypothesis, should that hypothesis be true, is heavily influenced by sample size. On the one hand, attempts to empirically verify the validity of the model with excessively high statistical power are pointless, as small deviations from close fit would result in a rejection of the close fit null hypothesis. On the other hand, models with excessively low power lead to a situation where the close fit null hypothesis would still not be rejected even if the model really fits poorly in the parameter. Thereby not providing very convincing evidence surrounding the validity of the model. To come to valid conclusions on the validity of the model a sufficiently large sample that provides adequate statistical power is required.

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<sup>42</sup> These have been provided in alphabetical order. The chosen order of presentation show no corresponding level of importance of the approach.

Stated differently, sample size influences the exceedance probability associated with a test statistic (Saunders et al. 2009). A larger sample can make weaker relationships and smaller differences already significant. Almost any relationship is significant in an extremely large sample that is very close to the size of the population (Hair et al. 2010; Saunders et al. 2009). In contrast, a smaller sample makes it more difficult to obtain a significant test statistic. The critical question to ask is: How large a sample is needed to obtain trustworthy results? In general, SEM requires bigger sample sizes in comparison to more conventional statistical analysis techniques.

Preacher and Coffman (2006) compiled software in R that was used in the current study to aid in estimating an appropriate sample size for the test of close fit. According to Preacher and Coffman's (2006) software a sample size of 20.94727 would be necessary to allow for a statistical power of .80 when testing the *psychological ownership* structural model null hypothesis of close fit. This is given a RMSEA of .05 assumed under  $H_0$  and an RMSEA value of .08 assumed under  $H_a$ , a significance level ( $\alpha$ ) of .05, a power level of .80 and degrees of freedom of 2390.<sup>43</sup>

Additional, practical or logistical, considerations include aspects such as the availability of resources as well as participants and the willingness of the organisation to afford participants the time to fill in questionnaires. Bearing the above in mind, the ideal sample size is therefore a matter of judgement as well as calculation. It is therefore suggested that a sample size of 350 could be sufficient to obtain valid results for this study.

The risk of low response rates is a challenge when eliciting voluntary responses from employees within organisational contexts. In a bid to increase the number of employees who accepted the invitation to become involved in this research study, and thereby increase the sample size, participants were invited to provide their cellphone numbers in order for them to participate in a lucky draw. This participation was purely voluntary and it was not a prerequisite for completing the questionnaire. Participants who did not wish to be entered into the lucky draw could still complete the survey. The option to be entered into the lucky draw, by supplying a cellphone number, was included at the end of the survey as part of a second survey which was in no way linked to the participants' Composite Job-

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<sup>43</sup>  $(\frac{1}{2}[(p+q)(p+q+1)]-t) = (1/2 [(71)(72)]-166 = (1/2[5112]-166) | 2556 - 166= 2390$

Where p is the number of exogenous indicator variables, q is the number of endogenous indicator variables and t is the number of parameters in the comprehensive LISREL model that were freed to be estimated.

based Psychological Ownership Survey results. Additionally, an opt-out option was included for those who do not wish to proceed to the second survey and provide their cellphone number. A randomly selected participant was then be awarded a Samsung Tablet<sup>44</sup> and the remaining cellphone numbers were all deleted. The anonymity of the participants has been taken into consideration and is still being respected throughout this process and no other participants were contacted other than the winner.

### 3.6 MEASUREMENT INSTRUMENTS/OPERATIONALISATION

In order to test the statistical hypothesis, the latent variables comprising the overarching substantive research hypothesis had to be quantifiable. However, *psychological ownership*, as well as the other related variables within the proposed structural model, are abstract phenomenon that rest within the mind of the researcher. Therefore, in order to test the validity of the claims outlined in the substantive hypothesis, and subsequent statistical hypotheses, the construct of *psychological ownership*, and the latent variables which were proposed to influence its levels, had to be operationalised. This involved determining the level of employees' standing on the constructs comprising the model or in other words measurement of the latent variable. Measurement involves "the assigning of numbers to observations in order to quantify phenomena" (Kimberlin & Winterstein, 2008, p. 2276). This involves operationalisation of the latent variables via effect/reflective indicator variables or put differently the use of "proxies for variables that we cannot directly observe," (DeVellis, 2012, p. 17). This in turn involves the development or use of existing instruments or tests to quantify these variables.

It was vital, however, that the decision surrounding which instruments to use in order to operationalise, or quantify, constructs was made carefully. The possible indicator variables had to be evaluated in terms of their reliability, validity and applicability to the latent variables under question. Existing literature showcases evidence of key indicators of the quality of different measuring instruments, in terms of their reliability and validity. In light of this evidence several instruments were chosen or modified to operationalise the constructs presented in the proposed *psychological ownership* structural model.

For certain latent variables within the model, however, academic literature had as yet not identified any suitable measures available. This was due to the fact that either the

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<sup>44</sup> The value of this prize is between R1000.00 and R3000.00. It is the opinion of the researcher that this is a suitable prize of an appropriate value. It affords the participants an incentive to participate without feeling as though it is a bribe or unethical means of coercion to participate.

conceptualisation of the constructs that they were developed to measured differed from that in this current study, or simply because no measure currently exists. This therefore necessitated the development of several scales specifically for the current study. The latent variables for which new scales had to be developed were the three roots of *psychological ownership* namely, the *need for self-identity*, the *need for a sense of belonging* and the *need for self-effectance*, as well as the *motivation to pursue the routes towards psychological ownership*. The Delphi technique was subsequently used to assess the applicability of suggested items proposed for inclusion in the Composite Job-based Psychological Ownership Survey.

The Delphi technique refers to a flexible research method used to turn opinion into group consensus (Hsu & Sandford, 2007; Landeta, 2006). According to Hsu and Sandford (2007, p. 1.) "The Delphi technique is a widely used and accepted method for gathering data from respondents within their domain of expertise". This technique is valuable in the use of gathering opinions from a group of subject matter experts in order to guide decision making. A questionnaire (or questionnaires, depending on the depth of the study) is used to collect data (expert opinion) from a panel of experts or selected subjects. The Delphi technique additionally employs a multistage or iterative process in order to gain consensus. This process typically consists of three stages, namely round one which consists of an open-ended questionnaire, round two which consists of a structured questionnaire where the subject matter experts are required to rate or rank-order items, and round three where a list of items as well as their rankings are supplied with certain information pertaining to minority opinion, and items achieving consensus. This final stage allows participants to review their judgements.

In terms of selecting the subject matter experts certain criteria do exist within the literature, however consensus surrounding explicit criterion for inclusion are ambiguous.

Hsu and Sandford (2007) suggest that for inclusion individuals should have related backgrounds and experience, be able to contribute valuable insights and knowledge and be willing to reconsider initial judgements in order to reach consensus. A list of the subject matter experts has not been included within this study as certain members of the group wished to remain anonymous.

A modified version of the Delphi technique was used for the purposes of the research study, specifically as the development of a new measuring instrument was not the pivotal focal point of this study. However, the researcher acknowledges that in order to ensure

that the items measure what they are meant to measure, consensus with regards to their applicability, rather than merely researcher opinion alone, is extremely valuable. This modified version entailed an invitation to participate in this Delphi process, followed by a combination of a closed-ended and an open-ended questionnaire. Participants were invited to rank each item in terms of applicability as well as provide further comments or recommendations. This information was collated. Findings were not re-sent to the participants for final comment. The Delphi Questionnaire is shown in Appendix 1.

An additional consideration, when operationalising the latent variables comprising the proposed *psychological ownership* structural model, is whether the individual items of the multi-indicator instruments used to measure the various latent variables should be used to represent the latent variables or whether two or more composites of the individual items should be formed to represent the latent variables. According to Theron (2014a) there are four options with regards to determining indicator variables for latent variables within the model via the instrument used. These are firstly, using the individual items themselves to represent the latent variables. Secondly, calculating the mean of the even and uneven items for each subscale/latent variable and creating item parcels to form composite indicator variables. Thirdly, total (or mean) scores could be used where applicable to represent each sub-dimension comprising the latent variable, and lastly, calculating a single score to represent the latent variable. Holt (2004) highlights certain considerations that must be made surrounding the use of item parcels. These will briefly be discussed before operationalisation of the latent variables is covered.

According to Holt (2004) the factor structure is important. It is imperative that the researcher consider the dimensionality of the latent variable – is it unidimensional or multidimensional? If it is unidimensional then random methods for combining items may be used (determining the mean of the even and uneven items, for example). However, if the variable under investigation is multidimensional, isolated parcelling strategies should be used to determine the appropriate item parcels. These techniques must enable the different facets to be combined within the same item parcel. Holt suggests that when dealing with a unidimensional variable having more items per parcel, rather than more parcels, is better, as long as the unidimensionality is preserved. If the underlying structure is not known, do not parcel.

The measurement instruments used in this research study, evidence of their statistical quality, as well as the manner in which the items of the multi-indicator scales were used

to represent the latent variables comprising the model, are presented in the sections that follow.

### 3.6.1 Psychological ownership

Although *psychological ownership* is a relatively new construct within the social sciences a number of scales have been developed to measure it. Pierce, Van Dyne and Cummings (1992) developed the first *psychological ownership* scale using an exploratory study. Since their initial development, several additional scales have been put forward (Avey et al. 2009; Avital & Vandenbosch, 2000; Brown, Pierce, & Crossley, 2011; Druskat & Kubzansky, 1995; Pierce et al. 1992; Van Dyne & Pierce, 2004). However, the conceptualisation of *psychological ownership* varies, with certain scholars advocating its unidimensionality and others arguing multidimensionality. Therefore, the use of the scales that conceptualise *psychological ownership* as a multidimensional construct came into question in the current study. The current study conceptualised *psychological ownership* as a uni-dimensional construct. Several of the measures of *psychological ownership* additionally focus on organisational *psychological ownership* as opposed to job-based *psychological ownership*, as is the emphasis of this research study.

Therefore, for the purposes of the current research study a measure of job-based *psychological ownership* developed by Brown et al. (2011), based on the measure of organisational-based *psychological ownership* developed by Van Dyne and Pierce (2004) was used. Brown et al.'s (2011) job-based *psychological ownership* scale is a six-item instrument, which uses a 7-point Likert response scale ranging from strongly disagree to strongly agree. Cronbach alpha values of .96 and .93 are reported for this instrument (Pierce & Jussila, 2011).

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.

### 3.6.2 Routes to psychological ownership

The *routes* to *psychological ownership* were measured using items developed and adapted by Brown et al. (2014). Brown et al. combined six *control* items from a study by Tetrik 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 et al. 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. (2014) 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 knowledge* .83 and *investment of the self* .86.

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

### 3.6.3 Roots of psychological ownership

The roots of *psychological ownership* posed a challenge in terms of their measurement. Previous literature surrounding the development of *psychological ownership*, through the routes, has been mostly theoretical, with little empirical data available. When empirical testing was in fact carried out it was on the roots of *psychological ownership* conceptualised as dimensions of this construct rather than psychological mechanisms within an individual that ignite the process towards feelings of ownership.

It was initially proposed that the roots of *psychological ownership* would best be measured using a variety of scales, borrowing from work by Avey et al. (2009) and Olckers et al. (2013). However, Olckers (2011) identifies certain limitations of the scale developed by Avey et al. (2009). According to Olckers, this scale uses only three items each per dimension for four out of their five dimensions within the scale. Olckers points out that this can influence the accuracy with which the subscales reflect the underlying latent structure of the *psychological ownership roots* construct. Idaszak, Bottom, and Drasgow (1988) provide support for Olckers concerns and point out that four or more indicators are needed per variable as alpha coefficients will tend to be lower with fewer items in the scale.

Another important consideration, affecting this decision, was the conceptualisation of *psychological ownership*, and specifically the conceptualisation of the needs or roots as dimensions of *psychological ownership*. Both Avey et al. (2009) and Olckers et al (2013) define the roots as dimensions of the construct of *psychological ownership* and not



antecedents. Therefore, it was decided that new items which align with the proposed unidimensional definition of *psychological ownership* were needed. A pool of items was generated, and subject matter experts were tasked with determining the appropriateness of each item depending on the supplied definition of the dimension. Appendix 1 contains a copy of the item analysis sheet. Items which according to the subject matter experts were relevant, were maintained. Several were re-worded and certain suggestions were incorporated.

The psychometric quality of these items was assessed as part of the current research study. Since the latent variable *psychological ownership needs/roots* refers to three separate individual needs (making this construct multi-dimensional) the ideal would have been to use the mean scores of each subscale to represent each sub-dimension, namely the *need for self-identity*, the *need for self-efficacy* and the *need to belong*, comprising this latent variable. The current study, however, choose to rather calculate two item parcels from the items of the three subscales. This was done to keep the number of indicator variables as low as possible, especially for latent variables involved in the latent interaction effects and/or the squared latent effects. This is since an increased number of indicator variables would lead to an increased number of freed measurement model parameters which in turn would create the need for a larger sample. *Psychological ownership roots or salient psychological ownership needs*<sup>45</sup> was therefore also represented by two indicator variables.

#### **3.6.4 Job characteristics**

Hackman and Oldham (1975), based on their Job Characteristics Model, developed the Job Diagnostic survey (JDS). This survey measures the five core job characteristics, namely, *skill variety*, *task identity*, *task significance*, *feedback* and *autonomy*, the three psychological states, as well as the core personal and work outcomes. The Job Characteristics Model has undergone some revisions in recent years and therefore so has the JDS. Specifically, a revision to the original JDS has been developed by Idaszak and Drasgow (1987), the JDS-R, where certain reverse ordered items were rewritten. The JSD-R is a 30-item scale that elicits responses on a seven-point Likert scale response system, ranging from disagree strongly (1) to agree strongly (7). Buys, Olckers, and

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<sup>45</sup> These terms will be used interchangeably throughout the remainder of this research study.

Schaap (2007) recently conducted a study to assess the construct validity of the JDS-R and found acceptable results. They report alpha coefficients ranging between .67 and .79 for the various subscales confirming that the measure is reasonably reliable<sup>46</sup>. Van Loggerenberg (2012) similarly found evidence of acceptable fit and reliability within the South African context after testing the construct validity of the revised job diagnostic survey within the diverse South African context.

The revised version has furthermore been proven to be more psychometrically sound with regards to the *Job Characteristics* items (Boonzaier, 2001). Boonzaier (2001) tabulated reliability coefficients of the Job Characteristics subscales of different studies which utilised the JDS and JDS-R, see Table 3.3 below.

**Table 3.3**  
**Boonzaier's (2001) Tabulated Reliability Coefficients of the Job Characteristics**

Researchers	Skill Variety	Task Identity	Task Significance	Autonomy	Feedback
Bhagat & Chassie (1980)	.68	.78	.72	.66	.73
Birnbaum, Farh & Wong (1986)	.79	.72	.81	.84	.71
Brief & Aldag (1976)	.47	.47	.6	.55	.30
Champoux (1992)	.78	.67	.54	.70	.64
Cordery & Savastos (1993)	.72	.65	.69	.72	.73
Cordery & Savastos (1993)*	.80	.77	.75	.79	.78
Dunham (1976)	.76	.72	.72	.73	.75
Dunham, Aldag & Brief (1977)	.68	.70	.68	.69	.69
Evans, Kiggundu & House (1979)	.53	.52	.50	.53	.38
Forshaw (1985)	.64	.6	.58	.6	.48
Fried & Ferris (1987)	.69	.69	.67	.69	.70
Hackman & Oldham (1975)	.71	.59	.66	.66	.71
Hogan & Martell (1987)	.68	.66	.64	.61	.81
Johns, Xie & Fang (1992)	.64	.77	.61	.67	.74
Kiggundu (1980)	.78	.62	.59	.63	.70
Kim & Schuler (1979)	.8	.69	.73	.67	.73
Munz, Huelsman, Konold & McKinney (1996)	.77	.74	.72	.77	.81
Oldham, Hackman & Stepina (1979)	.68	.61	.58	.64	.68
Renn & Vandenberg (1995)*	.76	.76	.77	.79	.74
Spector & Jex (1991)*	.70	.81	.74	.87	.83
Xie & Johns (1995)	.76	.67	.64	.74	.73
Yeh (1996)	.68	.64	.63	.66	.74
<b>Mean JDS</b>	<b>.69</b>	<b>.65</b>	<b>.64</b>	<b>.67</b>	<b>.67</b>
<b>Mean JDS-R</b>	<b>.75</b>	<b>.78</b>	<b>.75</b>	<b>.81</b>	<b>.78</b>

\*Used the JDS-R

(Boonzaier, 2001)

Since it is the job characteristics items that are of particular importance in this study and

<sup>46</sup> "These results are important to construct validation, as an instrument cannot be deemed valid if it is not reliable," (Buys, et al. 2007, p. 37)

the psychometric quality of the JDS-R is superior, the subscales pertaining to the five core job characteristics namely, sections one and two of the JDS-R, were therefore used to measure *job characteristics* for the purposes of this study. These sections include 15 items, measuring the five subscales. Again, the ideal would have been to use mean scores to represent each sub-dimension, namely *skill variety*, *task identity*, *autonomy*, *task significance* and *feedback*. The current study, however, choose to rather calculate two item parcels for these subscales. This was again done to constrain the overall number of indicator variables. The use of the five dimension scores would have meant that the *squared perceived job characteristics* latent variable would have been represented by ten indicators and the *salient needs\*perceived job characteristics* interaction effect by fifteen indicators. *Job characteristics* was therefore similarly represented by two indicator variables.

### **3.6.5 Motivation to pursue the routes towards psychological ownership**

The psychological construct of motivation is a well-studied phenomenon within social and psychological research. However, the measurement thereof seems somewhat complex. Several scales exist to measure aspects of the concept of motivation, such as goal achievement drive, as well as different types of motivation specifically learning motivation.

Since the construct of motivation in this specific research study refers to the *motivation to pursue the routes towards psychological ownership* finding an existing scale was a challenge. Therefore, new items were developed to operationalise the construct of *motivation to pursue the routes towards psychological ownership* for the purposes of the current research study. The operationalisation of the *motivation to pursue the routes towards psychological ownership* latent variable was grounded in the expectancy theory of motivation (Vroom, 1964). In terms of the expectancy theory of motivation, motivational effort is determined by the multiplicative combination of the *expectancy* that some action will result in outcome *j* and the *valence* of outcome *j* summed over the set of salient outcomes (Vroom, 1964).

Seven items were initially suggested and presented to subject matter experts, as can be seen from Appendix 1. Relevant suggested changes were implemented according to the subject matter expert analysis. These suggestions lead to the drafting of several new items and the final compilation of 18 items within this subscale. Nine of the items were designed to measure the expectancies associated with *routes towards psychological ownership* and nine were designed to measure the valence associated with the same outcomes. The

psychometric quality of the items were evaluated in the current research study. Two item parcels were calculated for *motivation to pursue the routes towards 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.

### 3.6.6 Psychological safety

There seem to be several mechanisms for measuring *psychological safety* within the workplace. However, these scales measure several different variations of *psychological safety* ranging from team psychological safety to climate psychological safety. Therefore, it is important to identify a scale that purports to measure the type of *psychological safety* defined in this research study. The definition employed here as borrowed from Kahn (1990, p. 708) is that *psychological safety* refers to “feeling able to show and employ one’s self without fear of negative consequences to self-image, status, or career.” This points to an individual’s perceived safety, whereby he or she feels that self-expression will not negatively affect the job or the self. Van Deventer (2014) utilised and adapted nine items from three psychological safety scales (Brown & Leigh, 1996; Liang, Farh, & Farh, 2012; May et al. 2004) already in use.

Psychometric analysis of the items, by Van Deventer (2014), showed good results. However, Van Deventer’s dimensionality analysis did suggest the extraction of two factors, instead of a single factor. After examining the nature of the items she points out that six of the items represent a ‘free to be authentic’ factor and the further three represent ‘supervisory support’ as elements of *psychological safety*. Since the focus of this study is a perceived feeling of safety to be oneself, and how this influences motivation to then engage in *self-investment* and ultimately influences levels of *psychological ownership*, only the six items that represent Van Deventer’s “free to be authentic” factor were used as a measure of *psychological safety* in this study. These items are endorsed on a five-point Likert scale, anchored at extreme values of 1 and 5. The psychometric quality of these items was empirically examined in this study. Two item parcels were calculated for *psychological safety* using the mean of the even and uneven items of the *psychological safety* subscale. This led to two indicator variables for this construct.

### 3.6.7 Latent interaction effects within the structural model

In the past, there was a subtle reluctance or resistance to allow theorising to introduce interaction effects into an overarching hypothesis because of the anticipated problem it would bring when testing the model via SEM. Statistical approaches have been suggested to mitigate these drawbacks. Subsequently, the proposed *psychological ownership* structural model not only contained main effects but additionally hypothesised certain interaction effects, namely two latent interaction effects as well as two latent squared effects.

The first latent interaction effect and two latent squared effects have been included in the proposed *psychological ownership* model in an attempt to attain more meaningful results surrounding the effect of congruence between two independent variables and its subsequent influence on a third dependent variable. This increase in meaningfulness within the model was attained by making provision for curvilinearity in the response surface depicting the reaction of *motivation to pursue the routes towards psychological ownership* to the congruence between an *employee's salient root needs* and the *perceived ability of the job to satisfy an employee's salient root needs*.

In contrast to the inclusion of these phantom variables, to allow for latent score polynomial regression, a theoretical argument constructed through theorising in Chapter 2 lead to the inclusion of the second latent interaction effect within the model. It was assumed, and therefore hypothesised, that the extent to which an employee feels *psychologically safe* within their work environment will moderate the effect of *motivation to pursue the routes* on the extent to which an investment is made in *self-investment* (i.e. the perceived *psychological safety*\**motivation to pursue the routes* to *psychological ownership* influences *self-investment* by the employee).

Several approaches for addressing latent variable interactions have been proposed (Mahembe, 2013) including the Kenny and Judd (1984) technique, the constrained approach, mean centering (Algina & Moulder, 2001) and the unconstrained approach (Marsh, Wen, & Hau, 2004). More recently, a technique called orthogonalising, or residual centering, suggested by Little, Bovaird, and Widaman (2006) has been adopted for dealing with latent interaction and latent squared effects. This technique provides a way for researchers to include latent interaction, and powered effects, in models and according to Little et al. (2006, p. 500) is a “comparable alternative to mean centering that also serves to eliminate nonessential multicollinearity in regression analyses.” Specifically,

orthogonalising allows the researcher to derive the needed indicator variables for the latent interaction and latent squared effects (Van Deventer, 2015) from the measures of the latent variables included in these effects when such interaction and squared effects are included in the model.

The process of residual centering, essentially a two-stage ordinary least squared regression procedure (Little et al. 2006), involves calculating the product terms from the latent variable indicators involved in the interaction (or squared) effect and then the regressing of these product terms onto their respective first-order effects. It is the residuals of this regression that are subsequently used as a representation of the interaction effect variables. The advantages of this approach for dealing with interaction effects within structural models are (Little et al. p. 497):

First, latent variable interaction is derived from the observed covariation pattern among all possible indicators of the interaction. Second, no constraints on particular estimated parameters need to be placed. Third, no recalculations of parameters are required. Fourth, model estimates are stable and interpretable.

Table 3.4 below outlines the summary of the representation of the latent variables via indicators variables for the entire *psychological ownership* structural model, including the latent interaction effects and squared interaction effect within this model.

**Table 3.4**  
***Summary of the Representation of Latent Variables via Indicator Variables***

Latent effect	Number of indicators
Psychological ownership	2
Self-investment	2
Job control	2
Gaining intimate knowledge	2
Roots	2
Job characteristics	2
Motivation	2
Psychological safety <sup>47</sup>	2
<i>Saliency of individual employee root needs</i> * perceived ability of the job characteristics to satisfy salient needs interaction	4
<i>Squared saliency of individual employee root needs</i>	3
Squared perceived ability of the job characteristics to satisfy salient needs interaction	3
Perceived <i>psychological safety</i> * <i>motivation to pursue</i> the routes to <i>psychological ownership</i> interaction	4
Total number of indicator variables	30

<sup>47</sup> This latent variable is measured and represented via two item parcels but is as such not included as a main effect in the structural model. It only serves to moderate the effect of *Motivation to pursue* on *Self-investment*.

### 3.7 STATISTICAL ANALYSIS

Various statistical analysis techniques are available in order to analyse data. As previously highlighted, in the research design and methodology introductory section, the statistical or data analysis techniques are similarly guided by the research initiating question. To answer the question whether the hypothesised psychological mechanism described in Figure 2.4 provides a valid explanation for the variance in levels of *psychological ownership* across different employees and different organisations, a combination of analysis techniques were applicable. These included, but at this stage were not limited to item analysis, to identify any poor items within the scales used to operationalise the latent variables comprising the model, and dimensionality analysis, using exploratory factor analysis to assess the unidimensionality assumptions underpinning the scales or subscales used to operationalise the latent variables comprising the model. Structural equation modelling, with response surface analysis, was appropriate in order to assess measurement and structural model fit and polynomial regression with response surface analysis to describe how the levels of congruence and the nature of congruence between an individual's *need for self-expression, belonging and self-efficacy* and the job's (in terms of the job characteristics) ability to satisfy these needs affect the *motivation to pursue the routes to psychological ownership*.

#### 3.7.1 Missing values

Before moving on to the statistical analysis it is important to deal with a problem that often plagues research – the problem of missing data or values. The seriousness of this challenge depends upon the pattern and quantity of the missing data, and the reason behind the missing data (Tabachnick & Fidell, 2014). Missing values in and of themselves, as well as the patterns which they form, can communicate a message to the researcher. As such, missing data can be classified as either missing completely at random (MCAR), missing at random (MAR) or missing not at random (MNAR; Allison, 2001; Osborne, 2013; Schafer & Graham, 2002; Tabachnick & Fidell, 2014). An important first step in dealing with missing data is to determine the “mechanism of missingness” (Osborne, 2013, p. 109) or the characteristics of the missing data pointing to the hypothesised reasons for the missing data. If missing data is random (MAR or MCAR) it is ignorable (it has power implications in terms of sample size but will not bias results). However, missing data classified as MNAR can have a biasing influence on results and is therefore not ignorable.



There are, as yet, no specific guidelines for the tolerance levels of missing data per given sample size (Tabachnick & Fidell, 2014). It is however vital to deal with missing data before the above mentioned statistical analysis can be undertaken. Technology and statistical packages, although opening up a world of opportunities to the social sciences, occasionally perpetuates the problem of missing values. Statistical packages generally presume complete data in their analysis. The general way in which these packages deal with missing variables is to exclude any cases where data is missing (Allison, 2001). This has sample size and inferences implications. There are several methods or techniques by which missing data can be treated (Osborne, 2013). These techniques or methods can be categorised as deletion techniques, namely, pairwise or listwise deletion, single imputation methods such as mean/mode substitution and model-based methods such as maximum likelihood and multiple imputation (Allison, 2001; Du Toit & Du Toit, 2001). These will briefly be discussed before highlighting and justifying the chosen method.

Deletion methods, as mentioned, are frequently the default method used by modern statistical packages. It is therefore important to be mindful of this when progressing through a statistical analysis. Listwise deletion, sometimes referred to as complete case analysis, refers to the analysis of cases with available data on each variable. This would therefore involve the systematic exclusion of cases (or respondents) that do not fulfil the criteria of full data sets. In other words, if a survey is incomplete that specific participant's survey or results are excluded from the statistical analysis in their entirety. This method is attractive due to its simplicity and comparability across analyses. It can however lead to the exclusion of a large portion of the sample and subsequently significantly reduce the study's statistical power. Pairwise deletion, sometimes referred to as available case analysis, is a special type of listwise deletion method. Here, only cases relating to each pair of variables with missing data involved in an analysis are deleted. This allows for the inclusion of as many cases as possible, however comparison is complicated as the sample could be different each time.

Mean or mode substitution, as a single imputation method, involves using the average of the observed values as a replacement for each missing value. Available data is used to determine the means and then replace missing values prior to further analysis (Tabachnick & Fidell, 2014). This method unfortunately distorts correlations and reduces variability. Although mean substitution does not change the mean for the distribution as a whole, the variance of the variable is compromised. Furthermore, correlation of the

variable towards other variables is subsequently reduced as relationships between variables are ignored.

Model-based methods, such as maximum-likelihood estimation and multiple imputation have become more popular of late. Using an expectation maximisation algorithm, maximum likelihood estimation “treats the missing data as random variables to be removed from (i.e., integrated out of) the likelihood function as if they were never sampled” (Schafer & Graham, 2002, p. 148). Multiple imputation involves replacing each missing value with  $m > 1$  simulated values prior to analysis (Schafer & Graham, 2002; Tabachnick & Fidell, 2014). This is a complex process involving several steps to estimate missing data but has the advantage of maintaining sampling variability. Although model-based methods can at times demand a substantial investment of time 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 Theron (2014a) imputation by matching normally appears to be the most conservative, safe procedure for the treatment of missing values.

Schafer and Graham (2002) state that deciding on a method for the treatment of missing values cannot be considered in isolation, but must be evaluated in terms of the modelling, estimation or testing procedure in which it is embedded. Allison (2001) on the other hand argues that the only really good way of dealing with missing data is to not have any. Therefore, for the purposes of this study an online assessment was used which only allowed a respondent to continue once the preceding questions have been answered. This to some degree negated the need for the treatment of missing values. Participants were free to close the browser to leave the questionnaire at any time should they not wish to continue. The ideal would have been to make provision for the response option “unable to respond”. In fact, the question should be asked whether scales administered electronically should not routinely include this response option so as to prevent forced, artificial responses in circumstances where respondents are really unable to respond meaningfully.

### **3.7.2 Item analysis and evaluation**

The purpose of a measuring instrument is to inform the research of a respondents standing on the specific latent variable of interest. Items comprising the measurement tool should therefore function as stimuli to which respondents respond with behaviour that is by and large an expression of a specific underlying latent variable (Theron, 2014a). The

operationalisation of the latent variables via items of the scale, discussed under Section 3.6, therefore must be evaluated to determine whether the items comprising the measurement instrument do in fact properly represent the latent variable, as defined by the constitutive definition. Therefore, the psychometric integrity of the scale must be evaluated to determine if the items within the measurement tool are indeed working correctly.

What is meant by working correctly? According to Theron (2014a, p. 111) this refers to the extent to which these “premeditated operational designs succeed in providing a comprehensive and uncontaminated empirical grasp on the constructs they intend to reflect”. This implies that the items within the scale do in fact capture and measure (an individual’s standing on) the latent variables they are suggested to represent, as provided in the constitutive definitions in Chapter 2. To be working correctly an item must possess a high correlation with the true score of the latent variable (DeVellis, 2012), assessed through inferences derived from the correlations among items (as we cannot assess true scores themselves).

By examining the extent to which scale items reflect the latent variables they were tasked to reflect it is possible to identify and treat or eliminate poor items. Poor items are items that are insensitive or are not aligned to the observed results of the majority of the scale items (Theron, 2014a). Additionally, poor items, by their very nature, will not reflect the same underlying factor and will not share a reasonable proportion of variance, (Theron, 2014a) with the other items comprising the scale.

A variety of classical measurement theory item statistics were calculated to provide the basket of evidence needed to determine if the items comprising each subscale sufficiently sensitively describe the underlying latent variables, defined in Chapter 2. Additionally, this analysis determined if the items elicited consistent responses and identified differences across people with differing levels of the identified attributes that underpin levels of *psychological ownership*. These item statistics include the 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 mean and standard deviation. No single statistic was allowed to influence the decision surrounding inclusion or exclusion of an item; rather an integration of the statistical evidence informed the treatment of poor items.

### 3.7.3 Dimensionality analysis using exploratory factor analysis

The variables contained in the current study are latent variables, which cannot be measured directly. Therefore, in order to enable measurement a researcher uses research participants' observable behavioural responses to multiple measurable variables (items within a measurement tool/scale or subscales) to determine an individual's levels or standing on latent variables. This was presented under Section 3.6 where the latent variables were operationalised using multi-indicator measures of each construct. Reliability and validity evidence has been presented for the chosen measures, where available. However, a further consideration is that of dimensionality. An assumption of classical measurement theory is that these items, within a scale or subscales, as is the case here, which represent the latent variables under study, are unidimensional. This means that the subscales would tap only a single underlying construct or latent variable. Therefore, it is important to ask: Do the items comprising each subscale designed to reflect a unidimensional latent variable all reflect a single underlying (indivisible) latent variable, and do they all provide relatively uncontaminated measures of this single underlying latent variable?

A statistical technique, called exploratory factor analysis (EFA), is generally used to evaluate whether the unidimensionality assumption associated with the subscales within a scale is in fact satisfied<sup>48</sup>. This analysis determines how many latent variables underlie a subscale to thereby allow the researcher to decide whether the items comprising each subscale do in fact reflect the single latent variable they are presumed to reflect (DeVellis, 2012). According to Hair et al. (2010) factor analysis plays a vital role in making an empirical assessment of the dimensionality of a set of items by determining the number of factors and the loading of each variable on the factors. In other words, factor analysis enables a researcher to identify whether each subscale consists of items loading highly on a single latent variable (or factor) and therefore is an indication of the success with which the indicator variables represent the latent variables within the *psychological ownership* structural model (DeVellis, 2012; Hair et al. 2010; Tabachnick & Fidell, 2014).

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<sup>48</sup> The current study concedes that a hypothesis-testing, confirmatory factor-analytic approach in which single-factor measurement models are fitted would have aligned better with the objective of the unidimensionality analysis than the exploratory factor-analytic approach that had been used. The decision to use EFA, on all of the subscales that purported to measure a unidimensional latent variable, rather than CFA was based on the practical challenges that the relative large number of CFA analyses would present.

EFA therefore makes it possible to identify and bring inter-correlated variables together under more general, underlying variables. Hair et al. (2010) state that common factor analysis is an appropriate factor analytical technique to use when the primary objective is to identify latent variable representation. Advantages of this approach include more restrictive assumptions and the use of only shared variance. Principal axis factor analysis (with oblique rotation) was used as an extraction method. Here the objective was to remove items with inadequate factor loadings (and rerun the item analysis) and/or split heterogeneous sub-scales into two or more homogenous subsets of items where necessary (Theron, 2015).

### **3.7.4 Structural equation modelling and response surface methodology**

Structural equation modelling (SEM), as a combination of several statistical techniques, allows researchers to examine sets of relationships between several latent independent variables and several inter-related latent dependent variables (Hair et al. 2010; Tabachnick & Fidell, 2014). According to Hair et al. (2010) the distinguishing characteristics of SEM are that it allows for the estimation of multiple and interrelated dependence relationships, it enables the representation of unobserved concepts in these relationships (and accounts for measurement error within the estimation process) and allows for the defining of a model to explain the entire set of relationships. SEM is the only analysis technique which allows for the complete and simultaneous testing of all relationships within a model (Tabachnick & Fidell, 2014). This is an important advantage of SEM, specifically as phenomena of interest within Industrial Psychology research are complex and multifaceted and isolating a relationship<sup>49</sup> could dilute the interpretation and meaning of the complexity captured within a model. Hence the researcher's decision to include the five polynomial terms (the two main effects, namely the *psychological ownership salient needs* and the *ability of the job characteristics to satisfy these needs*, the product terms and the two squared terms) as latent variables within the full structural model rather than isolating the congruence relationship and then performing observed score polynomial regression with response surface methodology. Essentially, the same polynomial regression process has been undertaken but instead of isolating the analysis of congruence we have included the polynomial terms into the existing model.

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<sup>49</sup> It is however acknowledged by the researcher that this 'isolation' is sometimes necessary and also sometimes the topic under study – this would depend upon the research initiating question.

The family of statistical analysis techniques which comprise SEM, and have been undertaken in this study, will now be discussed.

#### **3.7.4.1 Variable type**

The use of continuous variables, measured on an interval level, as opposed to discrete variables, will be used for the purposes of this research study. This is due to the fact that composite indicator variables were used to represent the latent variables within the proposed *psychological ownership* structural model (Burger, 2012). The use of continuous variables implies a possible infinite number of values attached to each of the composite indicators. Millsap and Maydeu-Olivares (2009, p. 78) suggest that “when all variables are continuous, it is typical to assume a multivariate-normal model”. This assumption must however first be tested. The proceeding section will therefore discuss multivariate normal distribution as a critical assumption when using SEM.

#### **3.7.4.2 Multivariate normality**

Multivariate statistics in general, and SEM<sup>50</sup> specifically, hinge on certain critical statistical assumptions. One such assumption is that the (continuous) indicator variables used to operationalise the latent variables follow a multivariate normal distribution. Prior to proceeding with further analyses, it was crucial to assess the extent to which the data complied with these statistical assumptions. It was vital to not only examine univariate values of skewness and kurtosis but also to assess multivariate normality (before and after normalisation). The test for univariate normality evaluated each indicator individually with regards to the standardised coefficients of skewness and kurtosis, and whether these were significantly different from zero. Departures from normality were indicated by significant skewness and/or kurtosis values. Should the analysis continue with non-normal data, and the default parameter estimation technique (maximum likelihood estimation), this could lead to incorrect chi-square estimates and incorrect standard errors. The univariate and multivariate normality of the composite indicator variables were therefore assessed using PRELIS (Jöreskog & Sörbom, 1996; Theron, 2014a). Decisions surrounding the most appropriate estimation technique to use were made subsequent to testing normality. Possible approaches that were considered included weighted least

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<sup>50</sup> Multivariate normality is assumed due to the use of maximum likelihood as the default method of estimation when fitting both measurement and structural models to continuous data.

squares (WLS), diagonally weighted least squares (DWLS) and robust maximum likelihood (RML) should the data be found to be non-normal data.

### 3.7.4.3 *Confirmatory factor analysis*

Confirmatory factor analysis (CFA) was used to test the overarching substantive measurement hypothesis that the composite indicator variables earmarked to represent specific latent variables (but not any other latent variables) provide valid and reliable measures of the designated latent variables. According to Hair et al. (2010, p. 693) the measurement model “specifies a series of relationships that suggest how measured variables represent a latent construct that is not measured directly.” In order to fully specify and test the *psychological ownership* structural model it is imperative that it be determined whether or not the conceptual constructs within the measurement model have been operationalised successfully and are therefore validly represented by the indicator variables.

In other words, CFA examines whether the *psychological ownership* structural model is validly operationalised by the measurement model (Diamantopoulos & Siguaaw, 2009) by assessing measurement model fit and the statistical significance and magnitude of the (completely standardised) measurement model parameter estimates. Successful operationalisation can therefore be concluded if the measurement model fits closely, all of the estimated factor loadings are statistically significant ( $p < .05$ ), the completely standardised factor loadings are large and the measurement error variances are statistically significant ( $p < .05$ ) but small (Burger, 2012). Kline (1998) states that when using SEM it is imperative that researchers first test the measurement model, underlying the full structural equation model. If model fit is found to be acceptable only then can an SEM researcher proceed to the next step, namely testing the structural model. The measurement model was fitted by testing the exact and close fit null hypotheses indicated below.

$H_{039a}$ : RMSEA=0

$H_{a39a}$ : RMSEA>0

$H_{039b}$ : RMSEA<.05

$H_{a39b}$ : RMSEA>.05

If the exact or close fit would be found (i.e.  $H_{019a}$  or  $H_{019b}$  would not be rejected), or alternatively if the measurement model would at least demonstrate reasonable model fit



(as indicated by the basket of fit indices produced by LISREL), the following 28 null hypotheses on the slope of the regression of item parcel  $j$  on latent variable  $k$  will be tested:

$$H_{0i}: \lambda_{jk}=0; i=40, 41, \dots, 67; j=1, 2, \dots, 28; k=1, 2, \dots, 11$$

$$H_{ai}: \lambda_{jk}=0; i=40, 41, \dots, 67; j=1, 2, \dots, 28; k=1, 2, \dots, 11$$

If the exact or close fit would be found (i.e.  $H_{039a}$  or  $H_{039b}$  would not be rejected), or alternatively if the measurement model would at least demonstrate reasonable model fit, the following 42<sup>51</sup> null hypotheses would be tested with regards to the freed elements in the variance-co-variance matrix  $\Theta_{\delta}$ . It must be noted here that the measurement model was fitted with specific measurement error terms that were allowed to be correlated. The measurement error terms associated with each corresponding indicator variable of the latent interaction and the latent squared effects that contain the same first-order indicator were allowed to correlate (Theron, 2014b).

$$H_{0i}: \Theta_{\delta ij} = 0; i = 68, 69, \dots, 110; i=1, 2, \dots, 28; j=1, 2, \dots, 28$$

$$H_{ai}: \Theta_{\delta ij} > 0; i = 68, 69, \dots, 109; i=1, 2, \dots, 28; j=1, 2, \dots, 28$$

If the exact or close fit would be found (i.e.  $H_{039a}$  or  $H_{039}$  would not be rejected), or alternatively if the measurement model would at least demonstrate reasonable model fit, the following 49 null hypotheses would be tested with regards to the freed elements in the variance-co-variance matrix  $\Phi$ . The *psychological ownership* measurement model allowed the exogenous latent variables to be correlated but for the correlation between  $\xi_1$  and the squared and product latent variables in which it was involved and the correlation between  $\xi_2$  and the squared and product latent variables in which it was involved, Phi was therefore defined as a full 11 x 11 matrix in which all off-diagonal elements were estimated but for  $\phi_{32}$ ,  $\phi_{41}$ ,  $\phi_{51}$ ,  $\phi_{52}$ ,  $\phi_{53}$  and  $\phi_{54}$  which were fixed to zero, in acknowledgement of the orthogonalising procedure used to operationalise the latent squared and product terms. The main diagonal of  $\Phi$  was fixed to unity

$$H_{0i}: \phi_{jk} = 0; i = 110, 113, \dots, 158; j=1, 2, \dots, 11; k=1, 2, \dots, 11; j \neq k$$

$$H_{ai}: \phi_{jk} > 0; i = 110, 113, \dots, 158; j=1, 2, \dots, 11; k=1, 2, \dots, 11; j \neq k$$

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<sup>51</sup> The 28 variances in the main diagonal of  $\Theta_{\delta}$  were estimates as well as 14 covariances between measurement error terms of the latent squared and latent product terms.

#### **3.7.4.4 Interpreting the measurement model fit and parameter estimates**

The measurement model acts as a representation of the structural linkages that were hypothesised to exist between the indicator variables and the latent variables, captured within the *psychological ownership* structural model. In terms of measurement model fit the focus is on the relationships between the latent variables and their indicators, or manifest variables, with the aim of determining the validity and reliability of the measures used to represent the construct of interest. Measurement model fit refers to whether the model successfully reproduces the observed covariance matrix.

The model is considered to fit well if the reproduced covariance matrix approximates the observed covariance matrix (Theron, 2014a). If there is doubt about the quality of the measurement model (therefore the model's ability to produce an estimated covariance matrix that approximates the observed covariance matrix is questionable, or the parameter estimates are statistically insignificant or have inappropriate magnitudes) any assessment of the substantive relations of interest (Diamantopoulos & Siguaw, 2009) will be problematic. It is therefore imperative to assess the fit of the measurement model and the statistical significance and magnitude of the parameter estimates (assuming that at least close fit has been attained) before a detailed evaluation of the structural model is undertaken. A broad spectrum of goodness of fit statistics were used to assess the fit of the measurement model. Goodness of fit statistics refer to the degree to which the variance and covariance values in the observed variance and covariance matrix, predicted by the model, agree with the empirically observed variances and covariances. The verdict on measurement model fit is more credible if it is derived from a combination of a variety of fit indices. Additionally, the quality of the model fit will be assessed using the magnitude and distribution of the standardised residuals and the magnitude of model modification indices calculated for  $\Lambda^X$  and  $\Theta_\delta$ .

After these analyses, it was concluded whether the designed instrument displays the degree of validity desired and if the model fits.

#### **3.7.4.5 Fitting the psychological ownership structural model**

Fitting of the structural model, as mentioned above, is only possible if the measurement model fits closely or reasonably well and the quality of the model is found to be satisfactory (the magnitude of the completely standardised factor loading estimates are therefore

equal to, or greater than .71, Hair et al. 2010). Subsequent to this finding, the fitting of the structural model was undertaken.

According to MacCallum and Austin (2000) every structural model is incorrect to a certain degree. "The best one can hope for is to identify a parsimonious, substantively meaningful model that fits observed data adequately well," (MacCallum & Austin, 2000, p. 218). They additionally proceed to state that researchers may find models that fit similarly well. This therefore implies that a good fitting model only offers one possible plausible answer to the research initiating question but it cannot be concluded that the model, and therefore the hypotheses, are correct or true. The fact that a hypothesised model fitted adequately and thus presents a valid (i.e. permissible) explanation for the observed covariance matrix does not mean that there are no other models that fit equally well or even better. This must be kept in mind when drawing conclusions surrounding model fit.

With this in mind, fitting of the proposed *psychological ownership* structural model entails assessing the validity of the overarching statistical hypothesis, and subsequent path-specific hypotheses by examining how the estimated covariance matrix corresponds to the observed sample covariance matrix (Hair et al. 2010). It is good practice to also assess the structural model fit using a variety of goodness-of-fit statistics (Diamantopoulos & Siguaw, 2009). According to MacCallum and Austin (2000) this is due to the fact that the numerous fit measures or indices available to assess model fit capture different elements of the fit of a model. The quality of the model fit is in addition assessed by also examining the magnitude and distribution of the standardised variance-covariance residuals and model modification indices (for covariances among the endogenous disturbances [ $\Psi$ ], for the entire set of causal relationships between two endogenous constructs [ $\mathbf{B}$ ] and for the entire set of relationships between the exogenous and endogenous constructs with the model [ $\Gamma$ ]). The aim of this process is to determine whether the theoretical relationships specified in the research are supported by the data.

#### **3.7.4.6 *Interpreting the psychological ownership structural model and parameter estimates***

In terms of assessing the statistical significance of the parameter estimates, and the decision whether to reject the path-specific null hypotheses, it is crucial to assess whether the signs of the parameters representing the paths between the latent variables are in agreement with the nature of the causal effects hypothesised to exist between the latent variables (positive or negative) under  $H_a$ . Additionally, it is important to assess whether

the parameter estimates are statistically significant ( $p < .05$ ). When parameter estimates have been found to be statistically significant, it is vital to evaluate the magnitude of the parameter estimates showing the strength of the hypothesised relationships. This was subsequently done within the current research study

Furthermore, it was important to assess the squared multiple correlation ( $R^2$ ) for each of the endogenous latent variables in the model, which provided an indication of the amount of variance in each endogenous latent variable that was accounted for by the latent variables that are structurally linked to it in the model. The higher the squared multiple correlation, the greater the joint explanatory power of the hypothesised antecedents, therefore larger  $R^2$  values were considered desirable.

Since the *psychological ownership* structural model includes two latent interaction effects and two squared interaction effects additional response surface analysis was undertaken (see paragraph 3.7.4.7) to test these moderating variables.

#### **3.7.4.7 Calculating the response surface test values, drawing and interpreting the response surface graph**

In order to determine the influence of congruence and incongruence between the salient *needs* of an employee and the perceived ability of the *job characteristics* to satisfy the salient needs of the employee on the outcome or endogenous variable (*motivation to pursue the routes*), the response surface had to be estimated, drawn and examined. To examine the response surface, the response surface test values ( $a_1 - a_4$ ) had to be calculated. The  $b_i$  coefficients were extracted from the structural model output file in order to calculate the four response surface test values. This was done by transferring the partial regression coefficients ( $b_i$ ), the standard errors, the sample size and the covariances between the partial regression coefficients<sup>52</sup> from the structural model output file<sup>53</sup> into the Cunningham Excel Macro (if  $R^2$  is found to be significant)<sup>54</sup>. In order to investigate and analyse the relationship a three-dimensional response surface graph is then plotted, defined by  $Y$ ,  $X_1$ ,  $X_2$ , and interpolation, via the Cunningham Excel macro (Theron, 2014b).

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<sup>52</sup> The LISREL output can provide estimates of the covariance between the partial regression coefficients via the `EC=filename.TXT` command on the LISREL OUTPUT line.

<sup>53</sup> A special LISREL syntax file had to be compiled to read the covariance estimates for the partial regression coefficients from the text file that was created via the EC command.

<sup>54</sup> The constant/intercept will be zero due to the fact that the latent intercepts have not been estimated

The effect of the degree and the nature of the congruence on the response variable is then described by the nature of the response surface in a three-dimensional space as one alters the  $X_1$ ;  $X_2$  coordinates/moves around on the floor of the three-dimensional space/along the lines of congruence and incongruence specifically (C.C. Theron, personal communication, January 26, 2016).

Once created, there were four characteristics of the response surface that were of particular importance namely, the slope (positive or negative) =  $a_1 [b_1 + b_2]$ , and curvature (either concave or convex) =  $a_2 [b_3 + b_4 + b_5]$ , of the line of congruence as well as the slope (positive or negative) =  $a_3 [b_1 - b_2]$  and curvature (either concave or convex) =  $a_4 [b_3 - b_4 + b_5]$  along the line of incongruence (Shanock, Baran, Gentry, Pattison, & Heggestad, 2010; Theron, 2014b). These characteristics allowed for the examination of how the outcome variable will respond as the two exogenous variables (the salient needs of an employee and the perceived ability of the job characteristics to satisfy the salient needs) move along both the line of congruence and incongruence. This therefore allowed for an explanation of how *motivation to pursue the routes to psychological ownership* will respond as employee salient root needs and perceived ability of the job characteristics to meet these salient root needs move along the line of incongruence, as well as the line of congruence. Several important factors were interpreted when analysing the response surface plot. This included:

- How agreement relates to the outcome, namely how congruence between the employees' salient root needs and the perceived ability of the job characteristics to satisfy salient needs influences *motivation to pursue the routes to psychological ownership*.
- How the degree of discrepancy relates to the outcome, namely what occurs to *motivation to pursue the routes to psychological ownership* if the employee displays salient root needs and the job characteristics are not perceived to satisfy these salient needs
- How the direction of discrepancy relates to the outcome, namely how the direction of the discrepancy between employee salient root needs and perceived ability of the job characteristics to satisfy these salient root needs affect *motivation to pursue the routes to psychological ownership*.

These aspects were examined by formally testing  $H_{07a}$ ,  $H_{07b}$ ,  $H_{08a}$  and  $H_{080b}$ .

## **CHAPTER 4**

### **ETHICAL CONSIDERATIONS AND RISK EVALUATION**

#### **4.1 INTRODUCTION**

Scientific considerations, and upholding the epistemic imperative, outlined in Chapter 3, are not the only important considerations when conducting research, and specifically research involving individuals. Ethical issues arise from a researcher's interaction with participants in the research process (Babbie & Mouton, 2014) and therefore due thought had to be given, prior to conducting research, to any potential ethical pitfalls that could arise. These included, but were not limited to, aspects such as informed consent, anonymity, confidentiality, voluntary participation, accountability, harm, responsiveness and responsibility, plagiarism and ethical reporting. Sound ethical practises in research, specifically within the social sciences, are important. These principles protect the research participants, lay the foundation for better quality research and ensure compliance with relevant legislation. They additionally ensure the preservation of honour within and of the industry. These potential ethical issues, and the benefits of ethically conducted research, highlight the importance of reflecting upon the potential ethical risk factors that could be associated with the specific research study, throughout the process. Additionally, this ensures that the research adheres to rigorous ethical and moral requirements.

By swapping seats and putting yourself in the shoes of the research participant and reflecting on potential ethical pitfalls, a researcher, armed with ethical guidelines, can uphold ethical standards and ensure an ethical sound research process (Kerlinger & Lee, 2000). The aim of upholding ethical standards while conducting research is to protect participants. It is vital that all aspects of the research process protect the participant's rights, interests, dignity, privacy, safety and wellbeing. The purpose of this chapter is therefore to outline and investigate any ethical risk factors that might have given cause for concern throughout the current research study. Moreover, this chapter outlines ethical standards, defined in various codes of conduct, to ensure adherence throughout the research process.

#### **4.2 GUIDING PRINCIPLES AND LEGISLATIVE COMPLIANCE**

To date there seems to be no specific legislation pertaining directly to research involving human participants within the South African governmental framework (Horn, Graham, Prozesky, & Theron, 2015). There are however several pieces/sections, within different legislative documents, pertaining to ethical research, which vary depending on the nature

of the research. Of particular interest to this research study is the National Health Act, 2003 (Act no 61 of 2003) and regulations relating to research involving human participants.

This legislation (Department of Health, 2013) outlines certain obligations of researchers conducting research involving people namely, that ethical approval must be obtained, any funding, and the source thereof, must be declared, the safety of participants must be monitored and any risk of harm minimised and that research results be timeously disseminated to all relevant parties or stakeholders.

An important mandatory aspect, outlined in this legislation, is informed consent. The following rights of participants involved in social science research<sup>55</sup> are outlined in section six (Department of Health, 2013, p. 9):

6. Persons with whom research is to be conducted, or their legally authorised representative, have the right to be informed of:
  - (a) The purpose of the research;
  - (c) Methods and procedures to be followed or used during research;
  - (d) Alternatives apart from participating in the research;
  - (e) Potential harms and risks involved in participation;
  - (f) Expected benefits to the participant and other persons in the research;
  - (g) Extent to which confidentiality and privacy will be maintained;
  - (i) Details of the contact person in the event of a query or research related injury;
  - (j) Reimbursement and/or incentives given for participation;
  - (m) Their freedom to decline or withdraw from the research without prejudice;  
and
  - (n) Proof of ethics committee approval or MCC approval, where relevant.

The importance of informed consent is also stressed in the Ethical Rules of Conduct for Practitioners Registered under the Health Professions Act (Act no. 56 of 1974) which, under Annexure 12, states that:

89.

- (1) A psychologist shall use language that is reasonably understandable to the research participant concerned in obtaining his or her informed consent.

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<sup>55</sup> Only relevant rights have been outlined here. Additional rights, such as those rights attached to individuals involved in a study that involves treatment, have not been included as they are not applicable here. However, the researcher acknowledges that she is aware of the rights attached to different research studies, depending upon the purpose of the research.



- (2) Informed consent referred to in subrule (1) shall be appropriately documented, and in obtaining such consent the psychologist shall –
- (a) Inform the participant of the nature of the research;
  - (b) Inform the participant that he or she is free to participate or decline to participate in or to withdraw from the research;
  - (c) Explain the foreseeable consequences of declining or withdrawing;
  - (d) Inform the participant of significant factors that may be expected to influence his or her willingness to participate (such as risks, discomfort, adverse effects or exceptions to the requirement of confidentiality);
  - (e) Explain any other matters about which the participant enquires;
  - (f) When conducting research with a research participant such as a student or subordinate, take special care to protect such participant from the adverse consequences of declining or withdrawing from participation;
  - (g) When research participation is a course requirement or opportunity for extra credit, give a participant the choice of equitable alternative activities; and;
  - (h) In the case of a person who is legally incapable of giving informed consent, nevertheless –
    - (i) Provide an appropriate explanation;
    - (ii) Obtain the participants assent; and
    - (iii) Obtain appropriate permission from a person legally authorized to give such permission.

### 4.3 POTENTIAL ETHICAL RISK FACTORS

This section focuses on aspects such as voluntary participation, informed consent, anonymity and confidentiality, harm and deceitfulness as areas that could potentially be cause for concern. Additionally, a risk-benefit analysis was conducted to ascertain the level of risk associated with participation in the study.

The research process and the products of research are identified as two broad areas that could be cause for concern surrounding research ethics (Shrader-Frechette, 1994). The process, according to Shrader-Frechette (1994), is harmful if participants are not provided relevant information to allow them to provide truly informed consent, and additionally if the participants are deceived in any way<sup>56</sup> throughout the entire research process, from sample selection to results. If the end result of the research study leads to a harmful

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<sup>56</sup> It is acknowledged that deception is sometime an unavoidable methodological necessity. In such cases, however, thorough debriefing of participants after completion of the data collection is mandatory.

environment for anyone in contact with it, then proceeding with the research study, and the product of the research is said to be problematic, and therefore unethical in nature.

It is vital that, prior to the commencement of research, all participants are aware that their participation is on a voluntary basis, free from any form of coercion and that they are free to withdraw at any stage throughout the research process, without penalty or negative repercussions. Additionally, their decision to become involved in the research study should be taken from a fully informed standpoint. This refers to informed consent. It is important to note here that informed consent is not merely a formality, in terms of filling in a mandatory informed consent form. But rather, it is a process that must be undertaken by each and every researcher in a manner that authentically offers the invited participants with sufficiently comprehensive information to allow them to make a truly informed decision. Horn et al. (2015) outline this process, as well as important aspects of it, as follows:

- Participants must be competent to give both their legal and mental consent.
- Participants must give their consent voluntarily, i.e. without any undue influence or incentive.
- The researcher must fully disclose information about the research.
- Participants must sufficiently understand all the information provided in order to make an informed decision.

According to Kerlinger and Lee (2000) it is important that, prior to engaging in research, participants and the researcher should be in agreement as to their obligations, and rights and responsibilities. Therefore, prior to the commencement of data collection the researcher should endeavour to provide details surrounding the credentials of the researchers, the purpose and objectives of the research study, who will have access to the results of the research study, how their anonymity will be protected and what measures will be put in place to protect confidentiality of results. Specifically, within an organisational context, participants should be aware of aspects such as who will receive results and in what format. This is particularly important when conducting research within organisational contexts as participants could see a potential for a conflict of interest between the researcher, the organisation and the employee. An employee could also fear persecution should the study be of a sensitive nature.

These aspects were formally considered in the informed consent formulation that was developed for the current study. A copy of the informed consent formulation used in the current study is available in Appendix 2

Another important consideration, outlined in legislation, when conducting research within organisational contexts is institutional approval. According to (Department of Health, 2013, p. 93) the following rules apply:

87. A psychologist shall –
- (a) Obtain written approval from the host institution or organisation concerned prior to conducting research;
  - (b) Provide the host institution or organisation with accurate information about his or her research proposal; and
  - (c) Conduct research in accordance with the research protocol approved by the institution or organisation concerned.

A copy of the institutional consent form<sup>57</sup>, compiled for use should any organisations have shown interest in involvement in the current research study, is available in Appendix 3.

Participation in any form of research can produce a certain level of stress within participants and the researcher is obligated to protect the participant from any harm. Therefore, the researcher should consider and attempt to remove any “undesirable consequences of participation” (Kerlinger & Lee, 2000, p. 445).

Should a researcher wish to offer a possible incentive or reward for participation the following stipulation in the Ethical Rules of Conduct for Practitioners Registered under the Health Professions Act (Act no. 56 of 1974) should be adhered to:

92. In offering professional psychological services as an inducement to obtain the participation of a person in research, a psychologist shall –
- (a) Explain the nature of such services, as well as the risks, obligations and limitations involved; and
  - (b) Not offer excessive or inappropriate financial or other inducements to obtain the person’s participation, particularly when such inducement might tend to exert undue influence on that person to participate.

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<sup>57</sup> This consent form was compiled when the initial intention was to gain access to a sample population through a large South African organisation. Several failed attempts, to partner with at least three South African organisations, resulted in the use of online media in survey distribution.

For the purposes of this research study interested participants were entered into a lucky draw for a chance to win a mobile tablet device. It is acknowledged here that this is not an offering of psychological services in lieu of participation but rather a reward, incentive or inducement. It is furthermore argued here that the cost of this device was not excessive and should not be seen to constitute a bribe for participation but rather as a benefit to the participants.

Protection extends to the area of confidentiality. All attempts must be made to safeguard the personal information of all participants as well as the host institution, if so requested. Here it is vital that the information collected not be disclosed to outside parties in any way that could leave the participants vulnerable to detection i.e. participants should not be identifiable from any data collected. Steps that were taken, throughout this research study, to uphold the above-mentioned principles of ethical research are outlined below and in Table 4.1.

In a bid to uphold the fundamental principles of equity, participation, transparency, service, tolerance and mutual respect, dedication, scholarship, responsibility and academic freedom (Stellenbosch University, Division for Research Development, 2013, pp. 3-4) and for the promotion of responsible conduct the researcher strove to maintain the four core principles outlined in section six: of Stellenbosch University's policy for responsible research conduct at Stellenbosch University:

#### 6.2 Justice

The principle of justice ensures the fair distribution of both the burdens and benefits of research and is of particular relevance when research involves human participants.

#### 6.3 Academic freedom and dissemination of research results

Stellenbosch University supports the principle of academic and intellectual freedom. Researchers have an obligation to report research results accurately and transparently in the public domain (also where appropriate to the target group of the study) and should not allow funders or other stakeholders to influence research publications. Any specific or explicit decision to withhold or delay the publication of research results e.g. because the publication of results could produce some harm or because of issues regarding patents or intellectual property and/or certain corporate claims, should be reviewed and accepted by the ethics review committee or research committee that originally approved the research or InnovUS, whichever is most appropriate. This ethics committee (in the case of sensitive or harmful results) or InnovUS (in the case of patents or intellectual property and/or

corporate claims) must place a balance on the dissemination of results and the placement of moratoriums on the dissemination of certain data.

#### 6.4 Ethics approval of research

It is the responsibility of all researchers (including students) to ensure that they obtain ethics approval for their research when required to do so by this policy, or by generally accepted norms and standards for ethical research. Stellenbosch University has established various research ethics committees to review, provide ethics approval and monitor research.

Moreover, since the research study involves interaction with human participants, the following seven additional principles, stipulated in the Stellenbosch's Research Ethics Policy and outlined below in Table 4.1 describing how they will be adhered to additionally apply.

**Table 4.1**  
***Ethical Principles and How They are to be Upheld***

Ethical principle	Application method
Be relevant to the needs and interests of the broader community	The relevance of this study to the needs and interests of organisations and employee's, as well as the greater society, was outlined in detail in the introductory section of Chapter 1.
Have a valid scientific methodology	The methodology was identified, described and justified in Chapter 3. Validity and reliability of measures used were outlined and the choice of sampling and research design options was highlighted.
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 2 for a detailed informed consent form that will precede the online questionnaire. This will require the participant to acknowledge understanding of their rights and responsibilities, as well as important aspects of the process (such as voluntary participation and withdrawal), and require agreement before the participant can continue with the online survey.
Ensure research participants' rights to privacy and confidentiality are protected	Participant names will not be requested in the biographical data section. Summary information supplied for publication or to any interested relevant parties, will be aggregated and therefore individual participants will be unidentifiable.
Ensure the fair selection of research participants	The selection of participants was outlined in Chapter 3.
Be preceded by a thorough risk-benefit analysis Thorough care must be taken to ensure that research in communities is effectively coordinated and does not place an unwarranted burden on such communities	See risk-benefit analysis below in Section 4.4 This research was conducted within an organisational context. However, measures were still taken to relieve the burden to filling in a time-consuming questionnaire. This was done by using an online survey with the minimum number of items that would still provide good psychometric quality.

#### 4.4 RISK-BENEFIT ANALYSIS

The empirical execution of the behavioural research methodology outlined above required the involvement of people. Although every possible step was taken to protect participants involved in any form of research there still remained a possibility that participation may “result in the dignity, rights, safety and well-being of the research participants being compromised to some degree” (Du Toit, 2014). It was therefore vital for the researcher to investigate whether the end justified the means. In this case, this entailed determining whether the purpose of the research study justified the compromise. Although no formula exists to examine the cost-benefit relationship of behavioural science research, researchers must still be sensitive to possible consequences of participation and safeguard against any predictable ill effects.

The critical question was therefore whether the costs that research participants had to incur were balanced by the benefits that potentially could accrue to society (Stellenbosch University, 2012). It seems reasonable to argue that an individual’s time and energy to fill in a questionnaire should not induce any unnecessary harm upon the participants. Saying this, the researcher still endeavoured to make certain that participants did not experience any unnecessary risk. This was done through the above mentioned precautionary measures (specifically surrounding confidentiality and anonymity aspects of the research study). As is highlighted in Chapter 1, this research study wishes to contribute to the wellbeing of the ‘society of working man’. It is envisaged that this research study will afford the researcher the luxury of determining how levels of *psychological ownership* are influenced and in turn leverage the benefits of feelings of ownership within the workplace, for the benefit of both organisations and employees. It was therefore argued that this research study possesses an element of social value due to the fact that it contributes to the body of knowledge available in the academic, and applied fields, and it is hoped that this contribution will aid in improving understanding surrounding the social processes (Horn et al. 2015) underpinning working man.

## CHAPTER 5

### RESEARCH RESULTS

#### 5.1 INTRODUCTION

In order to answer the research initiating question, a *psychological ownership* structural model was developed. From the theorising, outlined in Chapter 2, path-specific substantive and statistical hypotheses were developed and presented in Chapter 3. Chapter 3 outlined the operationalisation of the latent variables comprising the overarching substantive research hypothesis. Chapter 3 also developed statistical hypotheses relating to the reliability and validity of the operationalisation. Moreover, Chapter 3 outlined and justified the specific statistical analyses that were performed in order to test the validity of the suggested hypotheses. The aim of this chapter is to present the research results obtained subsequent to following the steps outlined in Chapter 3. This chapter therefore outlines the treatment of missing values, the results of the item analysis, factor analysis and the analysis of the measurement model conducted in order to determine the psychometric quality of the indicator variables, as well as the evaluation of the fit of the structural model and the significance of the model parameter estimates. This chapter will conclude with a report on the findings of the analysis of the response surface post polynomial regression analyses.

#### 5.2 MISSING VALUES

Missing values often plague research studies. Prior to conducting statistical analysis it is therefore important to deal with any of the missing data. Technological advances have opened up a world of opportunities in terms of the mechanisms available to eliminate the necessity for the treatment of missing variables. In line with Allison's (2001) rational, with regards to dealing with missing variables, this research study introduced 'required fields' to each and every item within the electronic online questionnaire. The online survey therefore only allowed participants to continue through the survey if they had completed all of the preceding questions<sup>58</sup>. This therefore negated the necessity for dealing with any missing data.

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<sup>58</sup> The researcher recognises that the forced nature of questioning could also have an undesirable side-effect in that it could have resulted in artificial, fabricated responses in cases where respondents were truly unable to respond. However, it is suggested here that if a participant did not want to continue completing the question he or she could merely close the browser and not continue – this approach comes with its own pro's and con's which is beyond the scope of this research study, however they are acknowledged.



### 5.3 ITEM ANALYSIS APPROACH

In order to determine whether the indicator variables that make up the Composite Job-based Psychological Ownership Scale (CJBPOS) do indeed capture the essence of the latent variables that they were developed to represent, classical measurement theory item analysis was conducted. According to Theron (2014a, p. 109) “item analysis...allows one to identify and eliminate items not contributing to an internally consistent description of the various latent dimensions comprising the construct in question”.

Descriptive item statistics were used to identify and eliminate any poor items. Poor items refer to those items that are insensitive to relatively small differences on the latent variable they were tasked to reflect and/or do not reflect the same underlying latent variable. They will additionally not share a reasonable portion of variance when compared across the remaining items within the scale (Theron, 2014a).

Several statistics were used to inform conclusions on the quality of each individual item within the CJBPOS, namely the item mean, the item standard deviation, the change in the scale Cronbach's alpha if the item would be deleted, the change in the scale variance if an item would be deleted, the inter-item correlations, the item-total correlations and the squared multiple correlations. According to Theron (2014) it is imperative that decisions surrounding the integrity of items and scales should be based on a collection of statistics forming a basket of evidence. These will briefly be described prior to presenting the analysis results and interpretation.

In terms of item mean statistics and item standard deviation, Theron (2014a) states that the absence of extreme item means and small item standard deviations provides evidence of the absence of questionable, insensitive 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 curtails 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. It could also result from the slope of the regression of the item on the latent variable being small. Relatively small differences on the latent variable then would translate to almost no difference on the item response. A low standard deviation is therefore problematic because it provides evidence that an item lacks sensitivity and does not discriminate between relatively small differences on the latent variable that it is meant to reflect.

Cronbach's alpha is a "measure of the average strength of association between all possible pairs of items contained within a set of items" (Zedeck, 2014, p. 71) or the homogeneity of a scale (or subscales). A level of .8 for internal consistency, in terms of Cronbach alpha, was considered satisfactory (Theron, 2014a) in the current study. Cronbach alpha if deleted, refers to the increase or decrease in internal consistency of the scale should a single item be deleted. When an increase in Cronbach alpha occurs upon deletion of an item this suggests that the item is not aligned to the rest of the items within the specific scale, or subscale of the CJBPOS to which it belongs, and therefore does not reflect the same latent variable.

The pattern of inter-item correlations reflects the internal consistency of the scale or subscale. To the degree that the items in the scale or subscale are all at least moderately correlated it would suggest that they all, to a reasonable degree, share a common source of variance and therefore by implication all reflect the same underlying latent variable (or latent variables) (Theron, 2014a). It should be noted that moderate to high inter-item correlations do not necessarily mean that the items only measure a single underlying latent variable nor that the common source of variance is necessarily the latent variable of interest. This same caveat applies to a high Cronbach alpha. An item that consistently returns low inter-item correlations with the remaining items in the scale/subscale would indicate that an item does not measure the same underlying construct as the remaining items (or that it does but that it fails to discriminate between small differences on the focal latent variable). There is however some debate surrounding what constitutes a low inter-item correlation and some propose that the inter-item correlation range should depend upon the specificity of the construct under investigation (Netemeyer, Bearden, & Sharma, 2003). For the purposes of this study an inter-item correlation of higher than .3 was considered as acceptable.

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, et al. 2003, p. 144) or the degree to which scores of a single item relate to the total score. Low item-total correlations could indicate that that item does not in fact measure the same construct as the remaining items (or that it does but that it fails to discriminate between small differences on the focal 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 that item does not measure the same latent variable as the remaining items.

The classical measurement theory item statistics are influenced by the characteristics of the sample from which the data has been obtained. Scale length, in terms of the number of items in the rating scale, also affects some of the item statistics like the item-total correlation and the squared multiple correlation when regressing the item on the remaining items and the internal consistency reliability coefficient (Netemeyer et al. 2003).

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 comprising the proposed *psychological ownership* structural model, if the items of each scale or subscale elicited consistent responses and whether they succeeded in identifying differences across people with differing levels of the identified attributes. 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. These statistical procedures were conducted using the reliability procedure of SPSS version 23 (<http://www.ibm.com/za/en/>).

To ensure consistency in the manner in which correlation coefficients were interpreted the convention proposed by Guilford (Tredoux & Durrheim, 2002, p. 184) was adopted. This convention is described in Table 5.1 below.

**Table 5.1**  
***Guidelines for the Interpretation of Correlation Coefficients***

<b>Absolute value of r</b>	<b>Interpretation</b>
< .19	Slight; almost no relationship
.20 – .39	Low correlation; definite but small relationship
.40 – .69	Moderate correlation; substantial relationship
.70 – .89	High correlation; strong relationship
.90 – 1.00	Very high correlation; very dependable relationship

#### **5.4 ITEM ANALYSIS RESULTS**

The above mentioned statistical analyses were performed for each of the scales and subscales in the CJBPOS. Table 5.2 below outlines the results of these statistical evaluations before the deletion of any items within the scale or subscale.

**Table 5.2**  
**Summary of Reliability Results for the Composite Job-based Psychological Ownership Survey Scales**

Scale	Sample size	Number of items	Mean	Variance	Standard deviation	Cronbach's alpha
JC_A	329	3	16.69	13.088	3.618	.854
JC_TI	329	3	16.34	13.702	3.702	.775
JC_SV	329	3	16.77	11.869	3.445	.770
JC_TS	329	3	17.10	11.611	3.408	.781
JC_FB	329	3	15.79	13.306	3.648	.814
IK	329	4	24.72	9.207	3.034	.868
SI	329	4	23.94	16.000	4.000	.867
C	329	6	30.47	52.226	7.227	.909
PS	329	5	18.33	17.809	4.220	.888
PO	329	6	35.11	55.496	7.450	.942
PO Need_SI	329	4	22.19	19.314	4.395	.835
PO Need_SOB	329	4	23.15	15.627	3.953	.813
PO Need_SE	329	4	24.55	9.657	3.108	.828
MOT_EXP	329	9	51.37	72.947	8.541	.900
MOT_VAL	329	9	53.29	53.665	7.326	.871

JC=Job Characteristics, JC\_A=Autonomy, JC\_TI=Task Identity, JC\_SV=Skills Variety, JC\_TS=Task Significance, JC\_FB=Feedback, IK=Intimate Knowledge, SI=Self Investment, C=Control, PS=Psychological Safety, PO=Psychological Ownership, PO\_Needs=Psychological Ownership Individual Needs, PO\_Need\_SI=Self Identity, PO\_Need\_SOB=Sense of Belonging, PO\_Need\_SE=Self efficacy/effectance, MOT\_EXP=Motivation Expectancy, MOT\_VAL=Motivation Valency

The results for each individual subscale are presented in the sections that follow.

### 5.4.1 Job characteristics

The 15-item *job characteristics* scale is divided into five subscales, each containing three items, measuring *autonomy*, *task identity*, *skill variety*, *task significance* and *feedback* respectively.

One could expect that there would be some degree of correlation between these subscales, however the intention is that they measure qualitatively distinct latent variables. Therefore, an individual can be expected to score high on *autonomy*, for example, and lower on *task significance*. It was therefore decided to evaluate each of these subscales individually in terms of their psychometric quality.

#### 5.4.1.1 Autonomy

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

**Table 5.3**  
**Item Analysis Results for the Autonomy Subscale**

Cronbach's Alpha	Cronbach's Alpha Based on Standardised Items		N of Items		
.854	.855		3		
	Mean	Std. Deviation	N		
JC_A1	5.36	1.357	329		
JC_A2	5.81	1.296	329		
JC_A3	5.52	1.455	329		
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
JC_A1	11.33	6.496	.687	.472	.831
JC_A2	10.88	6.510	.741	.558	.784
JC_A3	11.17	5.719	.755	.578	.769

JC\_A=Autonomy

Table 5.3 indicates a Cronbach's alpha of .854. The Cronbach's alpha value fell above the critical cut-off value of .80. Therefore, approximately 86% of the variance in the items can be classified as true score variance. The absence of extreme means (means range from 5.36 to 5.81 on a 7-point Likert scale) and the absence of small standard deviations (1.296 to 1.455) additionally suggested an absence of poor, insensitive items for the *autonomy* subscale.

The squared multiple correlations were all above .45 and no outliers were evident towards the lower end of the distribution of values. It is evident from Table 5.3 that the Cronbach's alpha would not increase (it would actually decrease) should any of the items be deleted from the subscale. Furthermore, the corrected item-total correlations were all above .50 and no outliers were evident towards the lower end of the distribution of values.

Table 5.4 indicates the inter-item correlations and corroborates the findings above in that all items display similar moderate to high correlations (all above .50). Therefore, it was decided that all items should be retained for the *autonomy* subscale and none were deleted.

**Table 5.4**  
**Inter-item Correlation Matrix: Autonomy**

	JC_A1	JC_A2	JC_A3
JC_A1	1.000	.625	.647
JC_A2	.625	1.000	.716
JC_A3	.647	.716	1.000

JC\_A=Autonomy

#### 5.4.1.2 Task identity

The *task identity* subscale of *job characteristics* similarly consists of three items. The results of the detailed item analysis are depicted below in Table 5.5 and Table 5.6 respectively.

**Table 5.5**  
**Item Analysis Results for the Task Identity Subscale**

Cronbach's Alpha	Cronbach's Alpha Based on Standardised Items		N of Items		
.775	.775		3		
	Mean	Std. Deviation	N		
JC_TI1	5.46	1.377	329		
JC_TI2	5.22	1.664	329		
JC_TI3	5.67	1.398	329		
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
JC_TI1	10.88	7.907	.504	.261	<b>.805</b>
JC_TI2	11.12	5.457	.704	.524	.589
JC_TI3	10.68	6.957	.649	.476	.659

JC\_TI=Task Identity

From Table 5.5 it is evident that this subscale's Cronbach's alpha was .775. This fell just below the stipulated critical cut-off of .80. At first glance this initially raised concern. Upon further inspection of additional statistics it was clear that there were no extreme means (means range from 5.22 to 5.76 on a 7-point Likert scale) nor were there small standard deviations (1.377 to 1.664).

**Table 5.6**  
**Inter-item Correlation Matrix: Task Identity**

	JC_TI1	JC_TI2	JC_TI3
JC_TI1	1.000	.500	.417
JC_TI2	.500	1.000	.684
JC_TI3	.417	.684	1.000

JC\_TI=Task Identity

From Table 5.6 above it is evident that JC\_TI1 correlated marginally lower with the other items, with a correlation of .417 between JC\_TI3 and JC\_TI1. This raised a red flag. Moreover, the fact that the Cronbach's alpha would increase if JC\_TI1 was deleted also

pointed to the fact that responses to JC\_T11 were somewhat out of step with responses to the other two items. The subscale is, however, quite short and the evidence against JC\_T11 was not overwhelmingly negative. It therefore seemed prudent to retain all three of these items representing *task identity*. Therefore, none of the items within the *task identity* subscale were deleted.

#### 5.4.1.3 Skill variety

Three items comprise the *skill variety* subscale. The results of the item analysis are depicted below in Table 5.7 and 5.8 respectively.

**Table 5.7**  
**Item Analysis Results for the Skill Variety Subscale**

Cronbach's Alpha .770	Cronbach's Alpha Based on Standardised Items .788		N of Items 3		
	Mean	Std. Deviation	N		
JC_SV1	5.41	1.563	329		
JC_SV2	5.71	1.222	329		
JC_SV3	5.64	1.356	329		
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
JC_SV1	11.36	6.144	.423	.185	.915
JC_SV2	11.05	6.101	.708	.721	.596
JC_SV3	11.12	5.400	.734	.733	.542

JC\_SV=Skills Variety

As can be seen in Table 5.7, a Cronbach's alpha of .770 was reported for the *skills variety* subscale. This fell below the .80 critical cut-off point suggested for this research study and raised initial concerns. This means that merely 77% of the variance in the items is systematic variance and 23% is random error variance. When taking this into consideration with the overall view of the remaining statistics, namely the lack of extreme means (5.41 to 5.71 on a 7-point Likert scale), absence of small standard deviations (1.222 to 1.563) and the inter-item correlations represented in Table 5.8, the initial inclination was to delete JC\_SV1. This was further fuelled by the substantial increase in Cronbach's alpha, if this item is deleted (from .770 to .915) and the fact that JC\_SV1's correlated item-total correlation was lower than .50 (.423) and the squared multiple correlation was substantially below .30 (.185).



**Table 5.8**  
**Inter-item Correlation Matrix: Skill Variety**

	JC_SV1	JC_SV2	JC_SV3
JC_SV1	1.000	.383	.428
JC_SV2	.383	1.000	.849
JC_SV3	.428	.849	1.000

JC\_SV=Skills Variety

It is evident from Table 5.8 that JC\_SV1 additionally correlated relatively poorly with JC\_SV2 and, albeit to a slightly lesser degree, also JC\_SV3. It therefore seemed fair to consider the deletion of JC\_SV1 to improve the homogeneity of the subscale. However, deletion is only conducted after the basket of all available evidence has been duly considered, and it was the researcher's opinion that EFA should be conducted before items are deleted. This cautious approach has been taken due to factors such as scale length (the CJBPOS contains only 79 items) and a concern that this subscale is only operationalised by three items. This approach was likewise followed by Van Deventer (2015), however the offending item was subsequently deleted in her research study surrounding work engagement.

#### 5.4.1.4 Task significance

Three items comprise the *task significance* subscale. The results of the item analysis are depicted below in Table 5.9 and 5.10 respectively.

**Table 5.9**  
**Item Analysis Results for the Task Significance Subscale**

Cronbach's Alpha	Cronbach's Alpha Based on Standardised Items		N of Items		
.781	.781		3		
	Mean	Std. Deviation	N		
JC_TS1	5.61	1.381	329		
JC_TS2	5.83	1.300	329		
JC_TS3	5.66	1.401	329		
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
JC_TS1	11.49	5.873	.572	.341	.756
JC_TS2	11.27	6.065	.602	.389	.723
JC_TS3	11.44	5.235	.688	.477	.625

JC\_TS=Task Significance

Table 5.9 displays a Cronbach's alpha of .781. This fell just below the .80 critical cut-off value, which could again be cause for concern. However, there was no evidence of extreme means (5.61 to 5.66 on a 7-point Likert scale) nor small standard deviations (1.300 to 1.401) which would indicate problematic items. Moreover, the Cronbach's alpha

values for all of the items would decrease if any of the *task significance* items were to be deleted.

**Table 5.10**  
***Inter-item Correlations Matrix: Task Significance***

	JC_TS1	JC_TS2	JC_TS3
JC_TS1	1.000	.456	.567
JC_TS2	.456	1.000	.609
JC_TS3	.567	.609	1.000

JC\_TS=Task Significance

Table 5.10 indicates satisfactory inter-item correlations. Moreover, the corrected item-total correlations were all above .50 with no outliers evident towards the lower end of the distribution of values and similarly the squared multiple correlations were all above .30 with no outliers evident towards the lower end of the distribution of values. Taking all of the above statistical evidence into consideration, especially the fact that deletion of any items would negatively impact the internal consistency of this subscale, it was decided that none of the items operationalising *task significance* should be deleted. All three of these items were therefore retained in this subscale.

#### 5.4.1.5 *Feedback*

The *feedback* subscale is similarly made up of three items. The results of the item analysis for these three items have been depicted below in Table 5.11 and Table 5.12 respectively.

**Table 5.11**  
***Item Analysis Results for the Feedback Subscale***

Cronbach's Alpha	Cronbach's Alpha Based on Standardised Items		N of Items		
.814	.813		3		
	Mean	Std. Deviation	N		
JC_FB1	5.12	1.383	329		
JC_FB2	5.18	1.471	329		
JC_FB3	5.49	1.417	329		
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
JC_FB1	10.67	7.003	.600	.387	.809
JC_FB2	10.61	5.805	.753	.570	.650
JC_FB3	10.30	6.582	.649	.468	.761

JC\_FB=Feedback

A Cronbach's alpha of .814 was reported for the *feedback* subscale. This was above the critical cut off of .80. Additionally, there were no extreme means (5.12 to 5.49 on a 7-point Likert scale) nor were there any small standard deviations (1.383 to 1.471). Furthermore, the Cronbach's alpha would decrease if any of the items in this subscale were to be

deleted. All of the squared multiple correlations were above .30 and similarly all of the corrected item-total correlations were above .50, providing supporting evidence that there may be no poor items within the *feedback* subscale. With regards to the standard deviations, item-total correlations and squared multiple correlations no outliers were evident towards the lower end of the distribution of values.

**Table 5.12**  
***Inter-item Correlations Matrix: Feedback***

	JC_FB1	JC_FB2	JC_FB3
JC_FB1	1.000	.616	.481
JC_FB2	.616	1.000	.679
JC_FB3	.481	.679	1.000

JC\_FB=Feedback

Table 5.12 provides supporting evidence for this initial evaluation. Although the correlation between JC\_FB1 and JC\_FB3 was slightly lower than would be expected (<.50) the respondents generally tended to respond in unison to the three items. They therefore do tend to reflect the same underlying (although not necessarily unidimensional) factor. Given the basket of available statistical evidence, it was concluded that no items should be deleted from this subscale.

#### **5.4.2 Individual needs**

The construct of *psychological ownership individual needs* (roots) is considered to be a multi-dimensional construct within the proposed *psychological ownership* structural model. It is therefore defined as a high-order latent variable consisting of three lower-order variables (*need for self-identity, a sense of belonging and self-efficacy or effectance*) each operationalised by four items within the survey questionnaire.

Table 5.13 and Table 5.14 outlines the item analysis of the first *psychological ownership individual need* namely the *need for self-identity*.

**Table 5.13****Item Analysis Results for the Individual Psychological Ownership Need for Self-Identity Subscale**

Cronbach's Alpha	Cronbach's Alpha Based on Standardised Items		N of Items		
.835	.834		4		
	Mean	Std. Deviation	N		
PO_Need_SI_1	5.55	1.301	329		
PO_Need_SI_2	5.67	1.306	329		
PO_Need_SI_3	5.49	1.386	329		
PO_Need_SI_4	5.48	1.379	329		
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
PO_Need_SI_1	16.64	12.012	.622	.427	.810
PO_Need_SI_2	16.53	12.079	.609	.376	.815
PO_Need_SI_3	16.70	10.394	.783	.635	.735
PO_Need_SI_4	16.71	11.365	.650	.509	.798

PO\_Need\_SI=Self Identity

From Table 5.13 it is evident that there were no extreme means (5.48 to 5.67 on a 7-point Likert scale) nor small standard deviations (1.301 to 1.386). Furthermore, a Cronbach's alpha of .835 was reported, which was above the critical cut-off suggested for this research study. The Cronbach's alpha additionally would not increase if any of the items were to be deleted from this subscale. This means that the internal consistency of the sub-scale would not improve (on the contrary it would actually worsen) should any of these four items be removed. The corrected item-total correlations were all above .50 and the squared multiple correlations were additionally all above .30. With regards to the standard deviations, item-total correlations and squared multiple correlations no outliers were evident towards the lower end of the distribution of values. This suggests that there are no problematic items in the subscale. This conclusion was corroborated by Table 5.14 which outlines the inter-item correlations.

**Table 5.14****Inter-item Correlation Matrix: Self-Identity**

	PO_Need_SI_1	PO_Need_SI_2	PO_Need_SI_3	PO_Need_SI_4
PO_Need_SI_1	1.000	.515	.623	.449
PO_Need_SI_2	.515	1.000	.566	.480
PO_Need_SI_3	.623	.566	1.000	.707
PO_Need_SI_4	.449	.480	.707	1.000

PO\_Need\_SI=Self Identity

All of the correlations were above .50 except for the correlation between PO\_Need\_SI\_1 and PO\_Need\_SI\_4. Nonetheless the inter-item correlation matrix suggests that respondents did tend to respond in unison to the four items in the subscale. It was

therefore decided that none of the items presented enough evidence to warrant deletion. Therefore, all four items were retained.

Table 5.15 outlines the item analysis statistics for the second *psychological ownership individual need*, namely that of a *sense of belonging*. This subscale similarly consists of four items. The Cronbach's alpha value reported was .813, which was above the critical cut-off of .80. There were additionally no extreme means (5.55 to 5.93 on a 7-point Likert scale), nor small standard deviations (1.151 to 1.183) indicating an absence of insensitive items.

**Table 5.15**  
**Item Analysis Results for the Individual Psychological Ownership Need for a Sense of Belonging Subscale**

Cronbach's Alpha	Cronbach's Alpha Based on Standardised Items		N of Items		
.813	.818		4		
	Mean	Std. Deviation	N		
PO_Need_SOB_1	5.55	1.414	329		
PO_Need_SOB_2	5.83	1.183	329		
PO_Need_SOB_3	5.84	1.174	329		
PO_Need_SOB_4	5.93	1.151	329		
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
PO_Need_SOB_1	17.60	8.734	.586	.371	.796
PO_Need_SOB_2	17.32	9.164	.707	.501	.731
PO_Need_SOB_3	17.31	9.591	.641	.435	.761
PO_Need_SOB_4	17.22	9.865	.614	.398	.774

PO\_Need\_SOB=Sense of Belonging

Table 5.16 below outlines the inter-item correlations and it was evident that the four items correlated moderately. This indicates that they did reflect the same underlying (but not necessarily unidimensional) factor.

**Table 5.16**  
**Inter-item Correlation Matrix: Sense of Belonging**

	PO_Need_SOB_1	PO_Need_SOB_2	PO_Need_SOB_3	PO_Need_SOB_4
PO_Need_SOB_1	1.000	.584	.457	.439
PO_Need_SOB_2	.584	1.000	.584	.547
PO_Need_SOB_3	.457	.584	1.000	.563
PO_Need_SOB_4	.439	.547	.563	1.000

PO\_Need\_SOB=Sense of Belonging

Therefore, it was decided that none of the *sense of belonging* items provided cause for concern and therefore all of the items were retained.

Table 5.17 outlines the last *psychological ownership individual need*, namely the need for a sense of self-efficacy. This subscale consists of four items and a Cronbach's alpha of .828 was reported, according to Table 5.17, which was above the critical cut-off value suggested for this research study.

**Table 5.17*****Item Analysis Results for the Individual Psychological Ownership Need for a Self-Efficacy or Effectance Subscale***

Cronbach's Alpha	Cronbach's Alpha Based on Standardised Items		N of Items		
.828	.830		4		
	Mean	Std. Deviation	N		
PO_Need_SE_1	6.07	1.003	329		
PO_Need_SE_2	6.04	1.029	329		
PO_Need_SE_3	6.05	.971	329		
PO_Need_SE_4	6.39	.808	329		
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
PO_Need_SE_1	18.47	5.640	.632	.406	.794
PO_Need_SE_2	18.51	5.488	.645	.460	.789
PO_Need_SE_3	18.50	5.391	.737	.558	.743
PO_Need_SE_4	18.16	6.457	.620	.410	.801

PO\_Need\_SE=Self efficacy/effectance

No extreme means (6.04 to 6.39 on a 7-Likert scale) were evident, nor were there any small standard deviations (.808 to .1029), suggesting that there were no insensitive items in this subscale. This finding is corroborated by the Cronbach's alpha values that would decrease if any items were deleted from the subscale, indicating that internal consistency would be negatively affected if items were to be deleted. Table 5.18 outlines the inter-item correlation matrix and it is evident that all four items correlated moderately. Respondents' responses to the four items therefore tended to be reasonably in unison. Taken in conjunction with the rest of the item statistics it was therefore decided to retain all items in this subscale.

**Table 5.18*****Inter-item Correlation Matrix: Need for Self-Efficacy or Effectance***

	PO_Need_SE_1	PO_Need_SE_2	PO_Need_SE_3	PO_Need_SE_4
PO_Need_SE_1	1.000	.505	.560	.540
PO_Need_SE_2	.505	1.000	.657	.452
PO_Need_SE_3	.560	.657	1.000	.586
PO_Need_SE_4	.540	.452	.586	1.000

PO\_Need\_SE=Self efficacy/effectance

### 5.4.3 Psychological safety

The *Psychological safety* subscale consists of five items. The item analysis is depicted below in Table 5.19 and Table 5.20 respectively.

**Table 5.19**  
**Item Analysis Results for the Psychological Safety Subscale**

Cronbach's Alpha	Cronbach's Alpha Based on Standardised Items		N of Items		
.888	.891		5		
	Mean	Std. Deviation	N		
PS_1	3.87	.914	329		
PS_2	3.53	1.021	329		
PS_3	3.65	.945	329		
PS_4	3.62	1.136	329		
PS_5	3.67	1.046	329		
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
PS_1	14.47	12.378	.714	.569	.868
PS_2	14.81	11.383	.781	.644	.851
PS_3	14.68	12.205	.714	.552	.868
PS_4	14.71	11.680	.623	.511	.892
PS_5	14.67	10.937	.835	.711	.838

PS=Psychological Safety

Table 5.19 indicates a Cronbach's alpha of .888 therefore almost 90% (88%) of the variance in the items is true variance and only 10% is random error variance. When looking at the item statistics it seems evident that there were no extreme means (3.53 to 3.87 on a 5-point Likert scale) and additionally no small standard deviations (.914 to 1.136) therefore providing no evidence that any of the items could potentially be insensitive items. Corrected item-total correlations were all above .50 and the squared multiple correlations were all above .30 providing further corroboration for the reliability of these items.

Table 5.19 does however suggest that PS\_4 could be cause for concern due to the corrected item-total correlation that tends to fall somewhat away from the typical value returned for the other items, and the increase in Cronbach's Alpha (.888 to .892) if this item were to be deleted. However, this increase is somewhat marginal and further investigation was necessary to determine if this item should in fact be deleted.

Table 5.20 below presents the inter-item correlations matrix which presents moderate to high correlations between all five items. This therefore suggests that these items reflect to a reasonable degree the same source of variance. Whether the common source of variance is a single factor and whether it is the underlying factor that the scale intended



to measure – *psychological safety* – cannot be inferred from the available item analysis results.

**Table 5.20**  
***Inter-item Correlation Matrix: Psychological Safety***

	<b>PS_1</b>	<b>PS_2</b>	<b>PS_3</b>	<b>PS_4</b>	<b>PS_5</b>
PS_1	1.000	.710	.627	.447	.658
PS_2	.710	1.000	.685	.528	.707
PS_3	.627	.685	1.000	.461	.666
PS_4	.447	.528	.461	1.000	.712
PS_5	.658	.707	.666	.712	1.000

PS=Psychological Safety

In light of the above basket of evidence it was decided that none of the items would be deleted, including PS\_4, as the internal consistency met the cut-off value even when this item was included. Therefore, all of the items in this subscale were retained. However, the potentially problematic item was flagged for inspection during the factor analysis.

#### **5.4.4 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 will be analysed separately below.

##### **5.4.4.1 Motivation to pursue the routes to psychological ownership – Valence subscale**

This subscale consists of nine items and the item analysis is depicted below in Table 5.21 and 5.22 respectively. Table 5.21 indicates a Cronbach's Alpha of .871. This is above the critical cut-off value suggested for this study and means that more than 87% of variance is due to true or systematic variance and just more than 10% is due to random error variance. It is additionally evident that no extreme means (4.81 to 6.35 on a 7-point scale) or small standard deviations were present, indicating that no insensitive items exist in this subscale.

**Table 5.21****Item Analysis Results for the Motivation to Pursue the Routes to Psychological Ownership Valence Subscale**

Cronbach's Alpha	Cronbach's Alpha Based on Standardised Items		N of Items
.871	.888		9
	Mean	Std. Deviation	N
Mot_1	6.12	.960	329
Mot_2	5.56	1.365	329
Mot_3	5.98	1.066	329
Mot_4	6.35	.828	329
Mot_5	4.81	1.684	329
Mot_6	5.85	1.198	329
Mot_7	6.33	.874	329
Mot_8	6.34	1.042	329
Mot_9	5.94	1.175	329

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Mot_1	47.17	45.034	.598	.474	.859
Mot_2	47.73	40.576	.646	.528	.854
Mot_3	47.31	42.094	.754	.644	.845
Mot_4	46.94	46.667	.558	.484	.863
Mot_5	48.48	42.031	.403	.411	<b>.891</b>
Mot_6	47.44	41.540	.692	.610	.849
Mot_7	46.96	45.200	.655	.611	.856
Mot_8	46.95	43.616	.651	.496	.854
Mot_9	47.35	41.003	.750	.666	.844

Mot=Motivation to pursue the routes towards psychological ownership

The inter-item correlation matrix, presented below in Table 5.22, indicated several items that correlated below .50.

**Table 5.22****Inter-item Correlation Matrix: Motivation to Pursue the Routes to Psychological Ownership Valence Subscale**

	Mot_1	Mot_2	Mot_3	Mot_4	Mot_5	Mot_6	Mot_7	Mot_8
Mot_1	1.000	<b>.372</b>	.530	.557	<b>.232</b>	.426	.633	<b>.477</b>
Mot_2	.372	1.000	.515	<b>.336</b>	.612	.440	<b>.397</b>	<b>.432</b>
Mot_3	.530	.515	1.000	.526	<b>.283</b>	.687	.580	.580
Mot_4	.557	<b>.336</b>	.526	1.000	<b>.154</b>	<b>.371</b>	.652	<b>.449</b>
Mot_5	<b>.232</b>	.612	<b>.283</b>	<b>.154</b>	1.000	<b>.316</b>	<b>.147</b>	<b>.214</b>
Mot_6	<b>.426</b>	<b>.440</b>	.687	<b>.371</b>	.316	1.000	<b>.497</b>	.553
Mot_7	.633	<b>.397</b>	.580	.652	<b>.147</b>	<b>.497</b>	1.000	.579
Mot_8	<b>.477</b>	<b>.432</b>	.580	<b>.449</b>	<b>.214</b>	.553	.579	1.000
Mot_9	<b>.450</b>	<b>.487</b>	.710	<b>.436</b>	<b>.336</b>	.739	.554	.625

Mot=Motivation to pursue the routes towards psychological ownership

However, as per Table 5.21, only the deletion of Mot\_5 would have a positive impact on the internal consistency (increase in Cronbach's alpha from .871 to .891). This influence was however negligible and the internal consistency was already acceptable. Therefore,

it was decided that the item should be retained. Further analysis in terms of EFA was additionally used to provide corroboratory evidence for this decision.

#### 5.4.4.2 *Motivation to pursue the routes to psychological ownership – Expectancy subscale*

This subscale similarly consists of nine items and the item analysis is depicted below in Table 5.23 and 5.24. Table 5.23 indicates a Cronbach's alpha of .900. This was above the critical cut-off value suggested for this study and meant that more than 90% of variance is due to true or systematic variance and just more than 10% is due to random error variance. It is additionally evident that no extreme means (4.96 to 6.17 on a 7-point scale) or small standard deviations were present, indicating that similarly there were no insensitive items in this subscale.

**Table 5.23**

#### ***Item Analysis Results for the Motivation to Pursue the Routes to Psychological Ownership Expectancy Subscale***

<b>Cronbach's Alpha</b>	<b>Cronbach's Alpha Based on Standardised Items</b>		<b>N of Items</b>
.900	.906		9
	<b>Mean</b>	<b>Std. Deviation</b>	<b>N</b>
Mot_10	6.04	1.076	329
Mot_11	5.33	1.453	329
Mot_12	5.60	1.296	329
Mot_13	6.07	1.020	329
Mot_14	4.96	1.622	329
Mot_15	5.53	1.343	329
Mot_16	6.17	.967	329
Mot_17	6.02	1.167	329
Mot_18	5.66	1.375	329

	<b>Scale Mean if Item Deleted</b>	<b>Scale Variance if Item Deleted</b>	<b>Corrected Item-Total Correlation</b>	<b>Squared Multiple Correlation</b>	<b>Cronbach's Alpha if Item Deleted</b>
Mot_10	45.33	61.216	.628	.612	.892
Mot_11	46.04	57.136	.624	.659	.893
Mot_12	45.77	55.981	.788	.742	.879
Mot_13	45.30	61.521	.649	.686	.891
Mot_14	46.41	56.224	.580	.617	.899
Mot_15	45.84	56.219	.741	.769	.883
Mot_16	45.20	61.811	.671	.662	.890
Mot_17	45.35	59.044	.699	.544	.886
Mot_18	45.71	56.085	.727	.753	.884

Mot=Motivation to pursue the routes towards psychological ownership

The inter-item correlation matrix, however, did not provide corroboratory evidence for an unproblematic subscale. It is evident from Table 5.24 below that several items correlated poorly as they did not meet the .50 criteria, as highlighted below.

**Table 5.24*****Inter-item Correlation Matrix: Motivation to Pursue the Routes to Psychological Ownership Expectancy Subscale***

	Mot_10	Mot_11	Mot_12	Mot_13	Mot_14	Mot_15	Mot_16	Mot_17
Mot_10	1.000	.507	<b>.485</b>	.701	<b>.373</b>	<b>.352</b>	.677	.507
Mot_11	.507	1.000	<b>.464</b>	<b>.344</b>	.769	<b>.425</b>	<b>.396</b>	.400
Mot_12	<b>.485</b>	<b>.464</b>	1.000	.542	<b>.441</b>	.810	.554	.620
Mot_13	.701	<b>.344</b>	.542	1.000	<b>.306</b>	<b>.460</b>	.776	.575
Mot_14	<b>.373</b>	.769	<b>.441</b>	<b>.306</b>	1.000	<b>.457</b>	<b>.321</b>	<b>.376</b>
Mot_15	<b>.352</b>	.425	.810	<b>.460</b>	<b>.457</b>	1.000	<b>.468</b>	.597
Mot_16	.677	.396	.554	.776	<b>.321</b>	<b>.468</b>	1.000	.578
Mot_17	.507	.400	.620	.575	<b>.376</b>	.597	.578	1.000
Mot_18	<b>.371</b>	<b>.398</b>	.788	<b>.434</b>	<b>.422</b>	.833	<b>.464</b>	.643

Mot=Motivation to pursue the routes towards psychological ownership

These poor correlations seem problematic at first glance. However, upon further inspection of the subscale and the individual items it seems evident that the subscale contains elements of each of the routes and therefore there is some element of difference within the individual items as well as a general level of expectancy that is being measured. The import finding, however, was that none of the items correlated consistently lower with the remaining items. This would have indicated that the variance in that particular item tends to be produced by a different source of systematic variance than that underpinning the remaining items. This, coupled with the fact that the internal consistency would not improve if any of the items were to be deleted, lead to the decision to retain all of the items within this subscale.

#### **5.4.5 Routes to psychological ownership – gaining intimate knowledge, self-investment, and ability to take control**

Three routes to *psychological ownership* were suggested in the model namely, *intimate knowledge*, *self-investment* and *control of the job*. The item analyses of each of these routes will be discussed separately below.

Table 5.25 describes the item analysis for the first route to *psychological ownership*, *intimate knowledge*. A Cronbach's alpha of .868 was reported for this subscale. This fell above the critical cut-off value of .80. It is additionally evident from Table 5.25 that no extreme means (6.12 to 6.33 on a 7-point Likert scale) nor small standard deviations exist (.817 to .977). Furthermore, the Cronbach's alpha values would decrease if any items were to be deleted from this subscale.

**Table 5.25**  
**Item Analysis Results for the Route of Intimate Knowledge Subscale**

Cronbach's Alpha	Cronbach's Alpha Based on Standardised Items		N of Items		
.868	.870		4		
	Mean	Std. Deviation	N		
IK_1	6.12	.977	329		
IK_2	6.12	.883	329		
IK_3	6.15	.899	329		
IK_4	6.33	.817	329		
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
IK_1	18.60	5.125	.707	.541	.840
IK_2	18.60	5.430	.728	.587	.829
IK_3	18.58	5.318	.743	.611	.822
IK_4	18.39	5.751	.712	.552	.837

IK=Intimate Knowledge

The reliability of this subscale was further corroborated by evidence from Table 5.26 below, which outlines the inter-item correlations. All of the inter-item correlation values were above .50 which indicated that the items, to a sufficient degree, reflect a common source of variance. The common source of variance is, however not necessarily the latent variable of interest nor necessarily a unidimensional underlying factor. However, there seemed to be no evidence to suggest any problematic items and all six items were therefore retained.

**Table 5.26**  
**Inter-item Correlation Matrix: Intimate Knowledge**

	IK_1	IK_2	IK_3	IK_4
IK_1	1.000	.629	.563	.660
IK_2	.629	1.000	.714	.538
IK_3	.563	.714	1.000	.652
IK_4	.660	.538	.652	1.000

IK=Intimate Knowledge

The second route to *psychological ownership* is *self-investment*. This subscale consists of four items and details pertaining to the items' psychometric qualities are outlined in Table 5.27 and 5.28 respectively.

**Table 5.27**  
**Item Analysis Results for the Route of Self Investment Subscale**

Cronbach's Alpha	Cronbach's Alpha Based on Standardised Items		N of Items		
.867	.869		4		
	Mean	Std. Deviation		N	
SI_1	6.14	1.080		329	
SI_2	5.82	1.243		329	
SI_3	6.03	1.139		329	
SI_4	5.95	1.262		329	
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
SI_1	17.81	9.773	.749	.585	.819
SI_2	18.12	9.034	.726	.582	.826
SI_3	17.91	9.520	.737	.604	.822
SI_4	17.99	9.274	.668	.504	.852

SI=Self Investment

The results indicate a Cronbach's alpha of .867 for this subscale. This fell above the critical cut-off of .80 suggested for this research study. This suggests that there might not be any problematic items within the subscale. Upon further investigation of the item statistics, this was substantiated. When considering the standard deviations and means there were no small standard deviations (1.080 to 1.262) evident nor were there any extreme means (5.82 to 6.14 on a 7-point Likert scale), according to Table 5.27. Furthermore, the correlated item-total and squared multiple correlation values were above .50 and .30 respectively. Cronbach's alpha values would additionally decrease if any of the six items were to be deleted from the subscale. The inter-item correlation matrix outlined in Table 5.28 below additionally shows that the items correlate well with the other items within this subscale (all above .50).

**Table 5.28**  
**Inter-item Correlation Matrix: Self-Investment**

	SI_1	SI_2	SI_3	SI_4
SI_1	1.000	.597	.643	.687
SI_2	.597	1.000	.734	.555
SI_3	.643	.734	1.000	.529
SI_4	.687	.555	.529	1.000

SI=Self Investment

There was therefore no evidence of poor items within this subscale and all items were subsequently retained.

Table 5.29 below details the item analysis for the six items which constitute the third, and final, route to *psychological ownership* namely, *control of the job*.

**Table 5.29**  
**Item Analysis Results for the Route of Control Subscale**

Cronbach's Alpha	Cronbach's Alpha Based on Standardised Items		N of Items		
.909	.909		6		
	Mean	Std. Deviation	N		
C_1	4.94	1.288	329		
C_2	5.01	1.467	329		
C_3	5.05	1.439	329		
C_4	4.84	1.637	329		
C_5	5.40	1.363	329		
C_6	5.22	1.505	329		
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
C_1	25.53	39.488	.685	.506	.901
C_2	25.47	36.622	.758	.647	.891
C_3	25.42	36.799	.765	.641	.889
C_4	25.63	34.423	.787	.711	.887
C_5	25.07	37.391	.779	.608	.888
C_6	25.25	36.865	.716	.657	.897

C=Control

A Cronbach alpha of .909 was reported which falls above the critical cut-off of .80. It is also evident that there are no extreme means (4.84 to 5.40 on a 7-point scale) and nor are there any small standard deviations (1.288 to 1.637). The corrected item-total correlations and squared multiple correlation values were all above the relevant thresholds of .50 and .30 respectively. Furthermore, Cronbach's alpha would decrease if any of the six items were to be deleted. This therefore alludes to a group of psychometrically soundly operating items.

**Table 5.30**  
**Inter-item Correlation Matrix: Control of the Job**

	C_1	C_2	C_3	C_4	C_5	C_6
C_1	1.000	.641	.634	.544	.616	.479
C_2	.641	1.000	.755	.617	.650	.516
C_3	.634	.755	1.000	.612	.647	.555
C_4	.544	.617	.612	1.000	.684	.797
C_5	.616	.650	.647	.684	1.000	.641
C_6	.479	.516	.555	.797	.641	1.000

C=Control

Table 5.30 corroborates this and indicates that all of the items satisfactorily reflected the same underlying latent variable (or variables). In light of the combination of item statistics it was decided that all of the six *control* items should be retained as deletion of any of the items would have had a negative impact on the internal consistency.



### 5.4.6 Psychological ownership

*Psychological ownership* is measured by a six-item subscale in the CJBPOS. Table 5.31 and Table 5.32 below outline the detailed item analysis.

**Table 5.31**  
**Item Analysis Results for the Psychological Ownership Subscale**

Cronbach's Alpha	Cronbach's Alpha Based on Standardised Items		N of Items
.942	.943		6
	Mean	Std. Deviation	N
PO_1	5.83	1.453	329
PO_2	5.97	1.353	329
PO_3	5.74	1.537	329
PO_4	5.85	1.351	329
PO_5	6.10	1.305	329
PO_6	5.61	1.446	329

	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	29.28	38.508	.825	.773	.931
PO_2	29.15	39.405	.839	.733	.930
PO_3	29.37	36.861	.872	.811	.926
PO_4	29.26	39.009	.869	.774	.926
PO_5	29.01	40.454	.804	.714	.934
PO_6	29.50	39.671	.754	.602	.940

PO=Psychological Ownership

A Cronbach's alpha value of .942 was reported for this subscale. This means that almost 95% of the variance is true/systematic variance and only 5% is random error variance. When examining the means and standard deviations it is evident that there were no extreme means (5.61 to 6.10 on a 7-point scale) nor small standard deviations (1.305 to 1.537). Furthermore, the corrected item-total correlations were all above .50 and the squared multiple correlations were well above .30. Additionally, the Cronbach alpha would decrease if any of the items were to be deleted. Table 5.32 provides further corroboratory evidence of the psychometric quality of this subscale in that all of the inter-item correlations are above .50. Therefore, none of the items within the *psychological ownership* subscale seem to be problematic and all of the items were retained.

**Table 5.32**  
**Inter-item Correlation Matrix: Psychological Ownership**

	PO_1	PO_2	PO_3	PO_4	PO_5	PO_6
PO_1	1.000	.775	.857	.742	.628	.643
PO_2	.775	1.000	.793	.739	.756	.648
PO_3	.857	.793	1.000	.800	.717	.663
PO_4	.742	.739	.800	1.000	.792	.750
PO_5	.628	.756	.717	.792	1.000	.693
PO_6	.643	.648	.663	.750	.693	1.000

PO=Psychological Ownership

## 5.5 DIMENSIONALITY ANALYSIS VIA EXPLORATORY FACTOR ANALYSIS (EFA) AND CONFIRMATORY FACTOR ANALYSIS (CFA)

According to Barendse, Oort, and Timmerman (2015) dimensionality analysis is critical in the evaluation of surveys used within behavioral and social sciences. This is because dimensionality aids in determining the structure that underlies the research participant's responses to the manifest variables. The CJBPOS operationalised each latent variable in the proposed *psychological ownership* structural model via multiple effect indicators. The expectation was that each indicator would provide a relatively uncontaminated reflection of each research participants standing on the latent variables of interest and that each scale or subscale would measure a unidimensional latent variable. Factor analysis was the statistical technique used to evaluate the validity of the operationalisation of latent variables. Both exploratory and confirmatory factor analysis was used for this purpose.

EFA is a multivariate statistical technique used to model the covariance structure of the manifest variables by three parameters namely factor loadings of latent variables, residual or unique variances and factor correlations (Hayasbi & Yuan, 2010) with the aim of determining the number of factors required to explain correlations among observed variables (Reio & Shuck, 2015) or more precisely the factor structure of the various indicators.

EFA was performed on all subscales that purported to measure a unidimensional latent variable, or a unidimensional dimension of a multi-dimensional latent variable. If the unidimensional assumption held a single extracted factor would provide a satisfactory explanation for the observed inter-item correlation matrix in as far as the residual correlations would generally be small (Hair et al. 2010). Moreover, if each indicator did provide a relatively uncontaminated reflection of each research participants standing on the unidimensional latent variable, or a unidimensional dimension of a multi-dimensional latent variable of interest, the factor loadings on the single extracted factor should be generally high ( $\lambda_{j1} \geq .50$ ).

Confirmatory factor analysis, used to test priori hypotheses on the covariance structure (Hayasbi & Yuan, 2010), was used to further examine the validity of the operationalisation of the multi-dimensional latent variables. In the case of the multi-dimensional latent variables the constitutive definition of each latent variable afforded a specific internal structure to the latent variable. A number of effect indicators were developed for each dimension of the latent variable that the constitutive definition made provision for. In

combination the constitutive definition and the creation of the effect indicators for each latent dimension implied a measurement model. The scale provided a valid measure of a multi-dimensional latent variable if the measurement model reflecting the constitutive definition and the design intention of the scale fitted data, the factor loadings were statistically significant and the completely standardised factor loadings were large ( $\lambda_{ij} \geq .50$ ).

The scales in the CJBPOS were predominately used to measure unidimensional constructs, namely *psychological ownership*, *intimate knowledge*, *control of the job* and *self-investment*. However, there are three multi-dimensional constructs within the proposed structural model resulting in three multidimensional scales in the CJBPOS, namely, *job characteristics*, *motivation to pursue the routes to psychological ownership*<sup>59</sup> and *psychological ownership individual needs*. The assumption of unidimensionality stands true for the subscales which make up these scales, but not the scales themselves. These multi-dimensional scales of the CJBPOS are depicted below in Table 5.33.

**Table 5.33**  
**Multi-dimensional Constructs**

Scale	First order dimension
Job Characteristics scale	<ol style="list-style-type: none"> <li>1. Autonomy</li> <li>2. Task Identity</li> <li>3. Task Significance</li> <li>4. Skill Variety</li> <li>5. Feedback</li> </ol>
Motivation to pursue the routes	<ol style="list-style-type: none"> <li>1. Expectancy</li> <li>2. Valence</li> </ol>
Psychological Ownership Needs Scale	<ol style="list-style-type: none"> <li>1. Need for a sense of belonging</li> <li>2. Need for a sense of self-efficacy/ effectance</li> <li>3. Need for self-identity</li> </ol>

In order to evaluate the unidimensionality assumptions unrestricted principal axis factor analysis, with oblique rotation, was performed on each scale as well as each of the subscales. The Kaiser, Meyer, Olkin measure of sampling adequacy (KMO) and Bartlett's Test of Sphericity were used from a statistical perspective to determine factor

<sup>59</sup> It must be acknowledged here that the *motivation to pursue the routes* construct was operationalised as a two-dimensional construct in the CJBPOS. The operationalisation of the construct was grounded in the expectancy theory of motivation. The eighteen items comprising the scale were designed to measure the expectancies and valences associated with the three routes to psychological ownership. The two subscales of this scale can nonetheless strictly speaking not be regarded as unidimensional subscales because it cannot be assumed that the expectancies associated with the outcomes of each route would necessarily correlate and neither could the assumption be made with regards to the valences. The two sets of expectancy and valence items were nonetheless treated as if it could be expected that they approximate two unidimensional subscales.

analysability. A KMO that approaches unity ( $>.60$ ) and the rejection of the Bartlett null hypothesis that the inter-item correlation matrix is an identity matrix in the parameter were the criteria used in determining factoranalysability of the observed correlation matrix. The determination of the number of factors to extract was based on Kaiser-Guttman criterion (Wang, Watts, Anderson, & Little, 2013), the scree-test as well as the percentage of large residual correlations ( $>.05$ ). The Kaiser-Guttman criterion stipulates that factors with an eigenvalue greater than one should be retained. Therefore, the number of factors equals the number of eigenvalues of the sample correlation matrix that are greater than one (Hayasbi & Yuan, 2010). The scree-plot is a visual plot “with the ordered eigenvalues (from large to small) of the sample correlation matrix in the vertical axis and the ordinal number in the horizontal axis” (Salkind, 2010, p. 461). Here the location of the elbow (position on the plot where the eigenvalues taper off into a more linear format) is used as a guide for factor retention (Tabachnick & Fidell, 2014).

Factor loadings were considered to be satisfactory if they exceeded  $.71$  and acceptable if a factor loading value on an individual item fell above  $.50$  (Hair et al. 2010). Table 5.34 below provides a summary of the factor analysis results before moving on to each construct separately.

**Table 5.34**  
**Summary Factor Analyses Results for the Composite Job-Based Psychological Ownership Survey (CJBPOS) Scales/Subscales before Deletion of Items**

Scale/subscale	KMO	Bartlett's Test	Maximum loading	Minimum loading	Number of factors extracted
JC_A	.725	442.892 ( $p<.05$ )	.860	.752	1
JC_TI	.648	304.460 ( $p<.05$ )	.903	.553	1
JC_SV	.594	482.029 ( $p<.05$ )	.970	.440	1
JC_TS	.670	286.995 ( $p<.05$ )	.868	.652	1
JC_FB	.673	361.493 ( $p<.05$ )	.930	.661	1
IK	.747	673.035 ( $p<.05$ )	.825	.772	2
SI	.770	674.132 ( $p<.05$ )	.819	.728	2
C	.868	1310.209 ( $p<.05$ )	.829	.725	2
PS	.839	981.141 ( $p<.05$ )	.891	.659	1
PO	.889	1842.500 ( $p<.05$ )	.906	.779	1
PO Need_SI	.759	538.894 ( $p<.05$ )	.913	.665	1
PO Need_SOB	.787	447.364 ( $p<.05$ )	.816	.659	1
PO Need_SE	.780	494.623 ( $p<.05$ )	.851	.692	1
MOT_VAL	.876	1591.422 ( $p<.05$ )	.821	.024	2
MOT_EXP	.875	2170.589 ( $p<.05$ )	.834	.010	3

JC\_A=Autonomy, JC\_TI= Task Identity, JC\_SV=Skills Variety, JC\_TS= Task Significance, JC\_FB=Feedback, IK=Intimate Knowledge, SI=Self Investment, C=Control, PS= Psychological Safety, PO=Psychological Ownership, PO\_Need\_SI=Self Identity, PO\_Need\_SOB=Sense of Belonging, PO\_Need\_SE=Self efficacy/effectance, MOT\_VAL=Motivation to pursue the routes to psychological ownership Valence, MOT\_EXP=Motivation to pursue the routes to psychological ownership Expectancy

### 5.5.1 Job characteristics

As previously stated, dimensionality analysis was conducted on each of the *job characteristics* separately namely *autonomy*, *task identity*, *skill variety*, *task significance* and *feedback*. The results of this analysis are presented below.

#### 5.5.1.1 *Autonomy*

Dimensionality analysis was conducted via EFA on the three items in the *autonomy* subscale of the *job characteristics* scale. The .30 cut-off value within the correlation matrix was obtained for all three of the inter-item correlations and they were additionally all statistically significant ( $p < .05$ ). A KMO of .725 was obtained which pointed to the factor analysability of the subscale. This is further corroborated by the Bartlett Test of Sphericity (442.892;  $p = .00$ ) which indicated that the null hypothesis that the correlation matrix is an identity matrix in the population could be rejected ( $p < .05$ ) (Hair et al. 2010). The eigenvalue greater than one rule (2.326) and scree-plot both indicated the extraction of one factor only, substantiating the unidimensionality assumption. The factor matrix is presented below in Table 5.35.

**Table 5.35**  
**Factor Structure for the Autonomy Subscale**

	Factor 1
JC_A1	.860
JC_A2	.832
JC_A3	.752

JC\_A=Autonomy

The factor matrix, shown in Table 5.35, indicates that the items loaded satisfactory on a single factor ( $> .50$ ). There were additionally no nonredundant residual correlations with absolute values greater than .05. The evidence lead in support of unidimensionality was therefore regarded as credible. Similar findings were presented by Van Deventer in her 2015 study of work engagement.

#### 5.5.1.2 *Task identity*

Dimensionality analysis was conducted on the three items in the *task identity* subscale of the *job characteristics* scale. Similar to the findings for the autonomy subscale the .30 cut-off value in the correlation matrix was obtained for all three of the inter-item correlations and they were additionally all statistically significant ( $p < .05$ ). A KMO of .648 was obtained which indicated the factor analysability of the subscale inter-item correlation matrix. This

is corroborated by the Bartlett Test of Sphericity (304.460;  $p=.00$ ) which indicated that the null hypothesis that the correlation matrix is an identity matrix in the population could be rejected ( $p<.05$ ) (Hair et al. 2010).

The eigenvalue greater than one rule (2.076) and the scree-plot both indicated the extraction of one factor only, substantiating the unidimensionality assumption. The extracted factor solution is presented below in Table 5.36

**Table 5.36**  
***Factor Structure for the Task Identity Subscale***

	<b>Factor 1</b>
JC_T11	.903
JC_T12	.757
JC_T13	.553

JC\_TI=Task Identity

The factor matrix, shown in Table 5.36, moreover indicated that the items loaded satisfactory on the single factor ( $>.50$ ). There were additionally no nonredundant residuals with absolute values greater than .05. The evidence lead in support of unidimensionality was therefore regarded as credible. Similar findings were presented by van Deventer in her 2015 study of work engagement. The item analysis identified JC\_T11 as a potentially problematic item. However, this is not corroborated by the factor analysis results shown within Table 5.36 therefore all items were retained for this subscale.

### **5.5.1.3 Skills variety**

Dimensionality analysis was conducted on the three items in the *skills variety* subscale of the *job characteristics* scale. Similar to the findings for the autonomy and task identity subscales the .30 cut-off value within the correlation matrix was obtained for all three of the inter-item correlations<sup>60</sup> and they were additionally all statistically significant ( $p<.05$ ). A KMO of .594, only marginally smaller than the set cut-off value of .60, was obtained and pointed to a situation where this subscale may not be factor analysable due to a lack of (or very little) common variance. This is however not corroborated by the Bartlett Test of Sphericity (482.029;  $p=.00$ ) which indicated that the null hypothesis that the correlation matrix is an identity matrix in the population could be rejected ( $p<.05$ ) (Hair et al. 2010).

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<sup>60</sup> The researcher acknowledges that the correlation between JC\_SV\_2 and JC\_SV\_1 narrowly met this criterion however this inter-item correlation still did meet the cut-off  $>.30$ .

Therefore, it was still considered worthwhile conducting factor analysis to determine the number of factors to retain.

The eigenvalue greater than one rule (2.138) and scree-plot both indicated the extraction of one factor only, substantiating the unidimensionality assumption. The extracted factor matrix is presented below in Table 5.37

**Table 5.37**  
**Factor Structure for the Skill Variety Subscale**

	<b>Factor 1</b>
JC_SV1	.970
JC_SV2	.875
JC_SV3	<b>.440</b>

JC\_SV=Skills Variety

The factor matrix, shown in Table 5.37, however indicated that JC\_SV3 loaded poorly on the single underlying factor with a factor loading of .440. The item analysis did not indicate JC\_SV\_3 as a problematic item. In fact if it was deleted the Cronbach alpha decreased, negatively impacting the internal consistency of this subscale. The item analysis additionally indicated that JC\_SV\_1 was potentially a problematic item, however, this was similarly not corroborated by the factor analysis results shown within Table 5.37. Therefore, both of these items were retained. There were no nonredundant residuals with absolute values greater than .05. This indicated that a credible explanation for the observed inter-item correlation matrix was provided by the 1-factor solution thereby convincingly confirming the unidimensionality assumption for the skill variety subscale.

#### **5.5.1.4 Task significance**

Dimensionality analysis was conducted on the three items in the *task significance* subscale of the *job characteristics* scale. Similar to the findings above for the previous three Job Characteristic subscales, the .30 cut-off value in the correlation matrix was obtained for all three of the inter-item correlations and they were additionally all statistically significant ( $p < .05$ ). A KMO of .679 was obtained that suggested that the subscale may be factor analysable. This was corroborated by the Bartlett Test of Sphericity (286.995;  $p = .00$ ) which indicated that the null hypothesis that the correlation matrix is an identity matrix in the population could be rejected ( $p < .05$ ) (Hair et al. 2010).

The eigenvalue greater than one rule (2.090) and scree-plot both indicated the extraction of one factor only, substantiating the unidimensionality assumption.



The single-factor factor structure is presented below in Table 5.38.

**Table 5.38**  
**Factor Structure for the Task Significance Subscale**

	<b>Factor 1</b>
JC_TS1	.868
JC_TS2	.701
JC_TS3	.652

JC\_TS=Task Significance

The factor matrix, shown in Table 5.38, indicates that the items loaded satisfactory on the single factor ( $\lambda_{i1} > .50$ ). There were additionally no nonredundant residuals with absolute values greater than .05 indicating that this solution provided a credible explanation for the observed inter-item correlation matrix.

#### 5.5.1.5 Feedback

Dimensionality analysis was conducted on the three items in the *feedback* subscale of *job characteristics* scale. Similar to the findings above, for the previous four job characteristic subscales, the .30 cut-off value within the correlation matrix was obtained for all three of the inter-item correlations and they were additionally all statistically significant ( $p < .05$ ). A KMO of .673 was obtained that suggested that the subscale may be factor analysable. This is corroborated by the Bartlett Test of Sphericity, (361.493;  $p = .00$ ) which indicated that the null hypothesis that the correlation matrix is an identity matrix in the population could be rejected ( $p < .05$ ) (Hair et al. 2010).

The eigenvalue greater than one rule (2.188) and scree-plot both indicated the extraction of one factor only, substantiating the unidimensionality assumption. The extracted factor solution is presented below in Table 5.39.

**Table 5.39**  
**Factor Structure for the Feedback Subscale**

	<b>Factor 1</b>
JC_FB1	.930
JC_FB2	.730
JC_FB3	.661

JC\_FB=Feedback

The factor matrix, shown in Table 5.39, indicated that the items loaded satisfactory on the single factor ( $\lambda_{i1} > .50$ ). There were additionally no nonredundant residuals with absolute values greater than .05 indicating that this solution provided a highly credible explanation for the observed inter-item correlation matrix. The item analysis identified JC\_FB\_3 as a

potentially problematic item, however, it loaded satisfactorily on the single factor and it would negatively affect the Cronbach alpha if it were to be deleted. Therefore, this item was retained and no items were deleted from this subscale.

## 5.5.2 Individual needs

All of the items that operationalise the latent variable *individual needs* were retained after the item analysis, even though certain items showed signs of being problematic<sup>61</sup>. The dimensionality analysis was therefore conducted on all of the items in the scale. However, the items were similarly treated as effect indicators of individual *psychological ownership* need dimensions, as above with the *job characteristics*. Therefore, the *need for a sense of belonging*, the *need for a sense of self efficacy* and the *need for self-identity* subscales were each analysed separately.

### 5.5.2.1 The psychological ownership need for self-identity

Dimensionality analysis was conducted on the four items in the need for a *sense of self-identity* subscale. All of the item pairs in the correlation matrix obtain correlations larger than .30. They were all additionally statistically significant ( $p < .05$ ). A KMO of .759 was obtained and suggested that this subscale may be factor analysable. This is corroborated by the Bartlett Test of Sphericity (538.894;  $p = .00$ ) which indicated that the null hypothesis that the correlation matrix is an identity matrix in the population could be rejected ( $p < .05$ ) (Hair et al. 2010). The correlation matrix was subsequently considered to be factor analysable.

The eigenvalue greater than one rule (2.678) and scree-plot both indicated the extraction of only one factor, substantiating the unidimensionality assumption. The single-factor factor matrix is presented below in Table 5.40.

**Table 5.40**  
**Factor Structure for the Need for a Sense of Self-identity Subscale**

	Factor 1
PO_Need_SI_3	.913
PO_Need_SI_4	.729
PO_Need_SI_1	.685
PO_Need_SI_2	.665

PO\_Need\_SI=Self Identity

<sup>61</sup> These items were PO\_NeedSI\_1 and PO\_NeedSI\_4

The factor matrix, shown in Table 5.40, indicates that all of the items satisfactorily loaded on a single factor ( $\lambda_{i1} > .50$ ). There were however 2 (33%) nonredundant residuals with absolute values greater than .05. This indicated that the 1-factor structure provided a plausible, but somewhat questionable, explanation for the observed inter-item correlation matrix. The extraction of a second factor was therefore forced. The pattern matrix is presented below in Table 5.41.

**Table 5.41**

***Rotated Factor Structure (Pattern Matrix) for the Need for a Sense of Self-identity Subscale***

	Factor	
	1	2
PO_Need_SI_3	.882	-.090
PO_Need_SI_4	.774	-.338
PO_Need_SI_1	.732	.342
PO_Need_SI_2	.655	.079

PO\_Need\_SI=Self Identity

It is evident from the pattern matrix that although the single factor presented some possible problems the items all loaded significantly higher on the first factor. This provided supporting evidence of the unidimensionality of this subscale.

The item analysis for the need for a sense of self-identity did however allude to two problematic items, namely PO\_Need\_SI\_2 and PO\_Need\_SI\_4, which could be a contributor to the potential problems with this subscales dimensionality. However, given the fact that the deletion of these items negatively impacted the internal consistency of the scale, (Cronbach alpha would decrease if either of these items were to be deleted) and that all four items load satisfactorily on the single factor, all of the items were retained.

### ***5.5.2.2 The psychological ownership need for a sense of belonging***

Dimensionality analysis was conducted on the four items in the need for a *sense of belonging* subscale. All of the item pairs in the correlation matrix obtained correlations larger than .30. The inter-item correlations were all additionally statistically significant ( $p < .05$ ). A KMO of .787 was obtained that suggested that this subscale may be factor analysable. This was corroborated by the Bartlett Test of Sphericity (447.364;  $p = .00$ ) which indicated that the null hypothesis that the correlation matrix is an identity matrix in the population could be rejected ( $p < .05$ ) (Hair et al. 2010). The correlation matrix was subsequently considered to be factor analysable.

The eigenvalue greater than one rule (2.590) and scree-plot both indicated the extraction of only one factor, substantiating the unidimensionality assumption. The extracted factor structure is presented below in Table 5.42.

**Table 5.42****Factor Structure for the Need for a Sense of Belonging Subscale**

	<b>Factor 1</b>
PO_Need_SOB_2	.816
PO_Need_SOB_3	.737
PO_Need_SOB_4	.700
PO_Need_SOB_1	.659

PO\_Need\_SOB=Sense of Belonging

Table 5.42 indicates that all of the items loaded satisfactorily on the single factor ( $\lambda_1 > .50$ ). There were no (0%) nonredundant residuals with absolute values greater than .05 indicating that the single-factor solution provided a highly credible explanation for the observed inter-item correlation matrix.

### 5.5.2.3 Psychological ownership need for a sense of self-efficacy and effectance

Dimensionality analysis was conducted on the four items in the need for *self-efficacy and effectance* subscale. Similar to the findings above, all of the item pairs in the correlation matrix obtain correlations larger than .30. All inter-item correlations were additionally statistically significant ( $p < .05$ ). A KMO of .780 was obtained that suggested that the subscale may be factor analysable. This was corroborated by the Bartlett Test of Sphericity (494.623;  $p = .00$ ) which indicated that the null hypothesis that the correlation matrix is an identity matrix in the population could be rejected ( $p < .05$ ) (Hair et al. 2010).

The eigenvalue greater than one rule (2.653) and scree-plot both indicated the extraction of one factor only, substantiating the unidimensionality assumption. The extracted factor structure is presented below in Table 5.43.

**Table 5.43****Factor Structure for the Need for a Sense of Self-efficacy and Effectance Subscale**

	<b>Factor 1</b>
PO_Need_SE_3	.851
PO_Need_SE_2	.723
PO_Need_SE_1	.704
PO_Need_SE_4	.692

PO\_Need\_SE=Self efficacy/effectance

Table 5.43 indicates that all of the items satisfactorily loaded on the single factor ( $>.50$ ). There was only 1 (16%) nonredundant residual with an absolute value greater than .05 indicating that this solution provides a plausible explanation for the observed inter-item correlation matrix.

### 5.5.3 Psychological safety

Dimensionality analysis was conducted on all five of the *psychological safety* items. Correlations larger than .30 were obtained for all of the items pairs and all correlations were statistically significant ( $p<.05$ ). The *psychological safety* subscale obtained a KMO of .839 indicating that the subscale could be factor analysable ( $>.60$ ). This assumption is corroborated by the Bartlett Test of Sphericity (981.141;  $p=.00$ ) which indicated that the null hypothesis that the correlation matrix is an identity matrix in the population could be rejected ( $p<.05$ ). The eigenvalue greater than one rule (3.493) and scree-plot both indicated the extraction of one factor only, substantiating the unidimensionality assumption. The factor matrix presented in Table 5.44 below indicated that all the items satisfactorily load onto the single extracted factor ( $\lambda_{i1}>.50$ ).

**Table 5.44**  
***Factor Structure for the Psychological Safety Subscale***

	Factor 1
PS_5	.891
PS_2	.849
PS_1	.773
PS_3	.771
PS_4	.659

PS=Psychological Safety

There were however 3 (30%) nonredundant residuals with an absolute value greater than .05 indicating that this 1-factor solution is a satisfactorily plausible, but somewhat questionable solution. The extraction of a second factor was therefore forced. The rotated factor structure is presented below in Table 5.45.

**Table 5.45**  
***Rotated Factor Structure (Pattern Matrix) for the Psychological Safety Subscale***

	Factor	
	1	2
PS_1	<b>.847</b>	-.047
PS_2	<b>.843</b>	.036
PS_3	<b>.743</b>	.052
PS_4	-.051	<b>.825</b>
PS_5	.293	<b>.690</b>

PS=Psychological Safety

There were no (0%) nonredundant residuals with absolute values greater than .05 indicating that the solution provided a highly credible explanation for the observed inter-item correlation matrix. The pattern matrix highlighted that items PS\_1, PS\_2 and PS\_3 loaded on the first factor and PS\_4 and PS\_5 loaded on a second factor. This did not align with the original unidimensional conceptualisation of this latent variable in Chapter 2. However, upon deeper investigation of the wording of the individual items it was deduced that the first factor resembled aspects of an individual's ability to express true feelings within the workplace and the second factor spoke to the expression of thoughts and opinions without ridicule. It was therefore decided that these factors perhaps relate to nuanced aspects of *psychological safety* and since the items do still load satisfactorily on a single factor it can be deduced that these items successfully measure *psychological safety* as a second order factor<sup>62</sup>.

The item analysis indicated that PS\_4 could potentially be a problematic item. However, as can be seen from Table 5.44 it loads satisfactorily on the single factor<sup>63</sup> (>.50) and was therefore retained. PS\_4 could possibly have come to the fore as a potentially problematic item in the item analysis because it quite strongly reflects the second, less dominant, factor and only to a very limited degree the first factor.

#### **5.5.4 The three routes to psychological ownership**

Dimensionality analysis was similarly conducted on each of the three *routes to psychological ownership* separately namely *self-investment*, *intimate knowledge* and *control*. The results of this analysis are presented below.

##### **5.5.4.1 Self-investment**

Dimensionality analysis was conducted on the four-item *self-investment* sub-scale. Correlations larger than .30 were obtained for all of the items pairs and they were additionally all statistically significant ( $p < .05$ ). A KMO of .770 (>.60) (Tabachnick & Fidell, 2014) confirmed that the correlations in the correlation matrix were suitable for factor analysis. The factor analysability assumption was further corroborated by the Bartlett Test of Sphericity (674.132;  $p = .00$ ) which indicated that the null hypothesis that the correlation matrix is an identity matrix in the population could be rejected ( $p < .05$ ). The eigenvalue

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<sup>62</sup> The ideal would have been to explicitly fit a second-order measurement model via LISREL and to test the significance of the first-order ( $\lambda_{ij}$ ) and second-order factor loadings ( $\gamma_{j1}$ ).

<sup>63</sup> The researcher does acknowledge that it is the lowest loading.

greater than one rule (2.874) and scree-plot both indicated the extraction of one factor only, substantiating the unidimensionality assumption. The factor matrix presented in Table 5.46 below indicated that all the items satisfactorily load onto the single factor ( $\lambda_{i1} > .50$ ).

**Table 5.46**  
**Factor Structure for the Self-investment Subscale**

	Factor 1
SI_1	.819
SI_3	.814
SI_2	.800
SI_4	.728

SI=Self Investment

There were however 4 (66%) nonredundant residuals with an absolute value greater than .05 indicating that this 1-factor solution failed to provide a plausible explanation for the observed covariance matrix. The eigenvalue of the second factor was .560. The extraction of a second factor was consequently forced. The rotated pattern matrix is presented in Table 5.47.

**Table 5.47**  
**Rotated Factor Structure (Pattern Matrix) for the Self-investment Subscale**

	Factor	
	1	2
SI_3	<b>.949</b>	-.054
SI_2	<b>.713</b>	.126
SI_4	-.056	<b>.870</b>
SI_1	.173	<b>.700</b>

SI=Self Investment

There were no (0%) nonredundant residuals with absolute values greater than .05 indicating that the solution provided a highly credible explanation for the observed inter-item correlation matrix. It is evident from the pattern matrix that SI\_3 and SI\_2 loaded on the first factor and SI\_4 and SI\_1 loaded on a second factor. Upon investigation of the wording of these items it became apparent that the first factor could relate to the investment of talents and ideas and the second factor spoke to the investment of an individual's life and the giving of one's self through actions.

This therefore meant that this scale failed the unidimensional assumption hypothesised in Chapter 2. The factor fission did, however, result in theoretically meaningful facets of the self-investment latent dimension. Moreover, all of the items in the subscale loaded



satisfactorily onto the single factor. It is suggested that the subscale items could be interpreted as successfully reflecting *self-investment* seen as a second-order factor<sup>64</sup>

#### 5.5.4.2 *Intimate knowledge*

Dimensionality analysis was conducted on the four-item *intimate knowledge* sub-scale. Correlations larger than .30 were obtained for all of the items pairs and all of the inter-item correlations were additionally statistically significant ( $p < .05$ ). A KMO of .747 (Tabachnick & Fidell, 2014) confirmed that the correlation matrix was suitable for factor analysis ( $> .60$ ). The factor analysability assumption was further corroborated by the Bartlett Test of Sphericity (673.035;  $p = .00$ ) which indicated that the null hypothesis that the correlation matrix is an identity matrix in the population could be rejected ( $p < .05$ ).

The eigenvalue greater than one rule (2.879) and scree-plot both indicated the extraction of one factor only, substantiating the unidimensionality assumption. The factor matrix, presented in Table 5.48 below, indicates that all the items satisfactorily loaded onto a single factor ( $> .50$ ).

**Table 5.48**  
**Factor Structure for the Intimate Knowledge Subscale**

	<b>Factor 1</b>
IK_3	.825
IK_2	.796
IK_4	.773
IK_1	.772

IK=Intimate Knowledge

There were however 4 (66%) nonredundant residuals with an absolute value greater than 0.05 indicating that this 1-factor solution failed to provide a plausible explanation for the observed covariance matrix. The eigenvalue of the second factor was .497. The extraction of a second factor was therefore forced. The rotated pattern matrix is presented in Table 5.49.

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<sup>64</sup> The ideal would have been to explicitly fit a second-order measurement model via LISREL and to test the significance of the first-order ( $\lambda_{ij}$ ) and second-order factor loadings ( $\gamma_{j1}$ ).

**Table 5.49**  
**Rotated Factor Structure (Pattern Matrix) for the Intimate Knowledge Subscale**

	Factor	
	1	2
IK_2	<b>1.014</b>	-.063
IK_3	<b>.511</b>	.354
IK_4	-.049	<b>.991</b>
IK_1	<b>.355</b>	<b>.461</b>

IK=Intimate Knowledge

There were no (0%) nonredundant residuals with absolute values greater than .05 indicating that the solution provided a highly credible explanation for the observed inter-item correlation matrix. It was evident from the pattern matrix that IK\_2 and IK\_3 loaded satisfactorily on the first factor while IK\_4 and IK\_1 loaded on the second (with IK\_1 loading somewhat poorly). Upon deeper investigation of the wording of these items it can be deduced that the first factor relates to aspects of broader understanding of a job while the second factors speaks to a depth of knowledge and deep understanding of the work that is required. This therefore meant that this scale failed to corroborate the unidimensional assumption hypothesised in Chapter 2.

The factor fission did, however, result in theoretically meaningful facets of the intimate knowledge latent dimension. Moreover, all of the items in the subscale load satisfactorily onto the single factor. This similarly suggested that the subscale items could still be interpreted as successfully reflecting *intimate knowledge* seen as a second-order factor<sup>65</sup>

#### 5.5.4.3 Control

Dimensionality analysis was conducted on the six-item *control* sub-scale. Correlations larger than .30 were obtained for all of the items pairs and all of the inter-item correlations were additionally statistically significant ( $p < .05$ ). A KMO of .747 ( $> .60$ ) (Tabachnick & Fidell, 2014) confirmed that the correlations in the correlation matrix were suitable for factor analysis ( $> .60$ ). The factor analysability assumption was further corroborated by the Bartlett Test of Sphericity (1310.209;  $p = .00$ ) which indicated that the null hypothesis that the correlation matrix is an identity matrix in the population could be rejected ( $p < .05$ ).

The eigenvalue greater than one rule (4.133) and scree-plot both indicated the extraction of one factor only, substantiating the unidimensionality assumption. The factor matrix

<sup>65</sup> The ideal would have been to explicitly fit a second-order measurement model via LISREL and to test the significance of the first-order ( $\lambda_{ij}$ ) and second-order factor loadings ( $\gamma_{j1}$ ).

presented in Table 5.50 below indicated that all the items loaded satisfactorily onto the single factor ( $\lambda_{11} > .50$ ).

**Table 5.50**  
**Factor Structure for the Control Subscale**

	<b>Factor 1</b>
C_4	.829
C_5	.824
C_3	.813
C_2	.807
C_6	.750
C_1	.725

C=Control

There were however 9 (60%) nonredundant residuals with an absolute value greater than .05, indicating that this 1-factor solution failed to provide a plausible explanation for the observed covariance matrix. The eigenvalue of the second factor was .702. The extraction of a second factor was therefore forced. The rotated pattern matrix is presented in Table 5.51.

**Table 5.51**  
**Rotated Factor Structure (Pattern Matrix) for the Control Subscale**

	<b>Factor</b>	
	<b>1</b>	<b>2</b>
C_2	<b>.915</b>	.062
C_3	<b>.843</b>	-.013
C_1	<b>.731</b>	-.027
C_5	<b>.514</b>	-.354
C_6	-.063	<b>-.946</b>
C_4	.147	<b>-.782</b>

C=Control

There were no (0%) nonredundant residuals with absolute values greater than .05 indicating that the solution provided a highly credible explanation for the observed inter-item correlation matrix. It is evident from the pattern matrix, in Table 5.51 above, that C\_2, C\_3, C\_1 and C\_5 load on the first factor and C\_6 and C\_4 load on the second factor. Upon deeper inspection of the individual items it became clear that the differences pertained to 'what' and 'how' versus 'when', in terms of an individual's control of the job or work. Items C\_2, C\_3, C\_1 and C\_5 pertain to an element of control in terms of how tasks were done and an individual's sense that they could provide input into decisions pertaining to how the job should be done. C\_6 and C\_4 on the other hand refer to aspects of scheduling and pace and therefore relate more to controlling the timing of tasks as opposed to controlling of tasks themselves.

This therefore meant that this scale failed to corroborate a unidimensional assumption hypothesised in Chapter 2. However, since all the items loaded satisfactorily onto the single factor, this similarly suggested that the subscale items could be interpreted as successful indicators of *control* seen as a second-order factor<sup>66</sup>

### 5.5.5 Psychological ownership

Dimensionality analysis was conducted on the six-item *psychological ownership* subscale. Correlations larger than .30 were obtained for all of the items pairs and all of the inter-item correlations were additionally statistically significant ( $p < .05$ ). A KMO of .889 ( $> .60$ ) (Tabachnick & Fidell, 2014) confirmed that the correlation matrix was suitable for factor analysis. The factor analysability assumption was further corroborated by the Bartlett Test of Sphericity (1842.500;  $p = .00$ ) which indicated that the null hypothesis that the correlation matrix is an identity matrix in the population could be rejected ( $p < .05$ ).

The eigenvalue greater than one rule (4.671) and scree-plot both indicated the extraction of one factor only, substantiating the unidimensionality assumption. The factor matrix presented in Table 5. 52 below indicates that all the items satisfactorily load onto the single extracted factor ( $> .50$ ).

**Table 5.52**  
***Factor Structure for the Psychological Ownership Subscale***

	<b>Factor 1</b>
PO_3	.906
PO_4	.900
PO_2	.869
PO_1	.853
PO_5	.832
PO_6	.779

PO=Psychological Ownership

There were additionally only 2 (13%) nonredundant residuals with an absolute value greater than .05 indicating that the 1-factor solution provided a satisfactorily plausible explanation for the observed inter-item correlation matrix.

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<sup>66</sup>The ideal would have been to explicitly fit a second-order measurement model via LISREL and to test the significance of the first-order ( $\lambda_{ij}$ ) and second-order factor loadings ( $\gamma_{j1}$ ).

### 5.5.6 Motivation to pursue the routes to psychological ownership subscales

Dimensionality analysis was lastly conducted on the two *motivation to pursue the routes* subscales, namely, *motivation to pursue the routes towards psychological ownership expectancy* and *valence*, each consisting of nine items. For the *valence* subscale correlations larger than .30 were obtained for most of the item pairs except for Mot\_1 and Mot\_5, Mot\_3 and Mot\_5, Mot\_4 and Mot\_5, Mot\_7 and Mot\_5 as well as Mot\_8 and Mot\_5. This seemed to suggest that there may be a problem with Mot\_5 in that it was the common denominator within all of the correlations. However, all of the inter-item correlations were statistically significant ( $p < .05$ ). A KMO of .876 (Tabachnick & Fidell, 2014) confirmed that the correlations in the correlation matrix were suitable for factor analysis ( $> .60$ ). The factor analysability assumption was further corroborated by the Bartlett Test of Sphericity (1591.422;  $p = .00$ ) which indicated that the null hypothesis that the correlation matrix is an identity matrix in the population could be rejected ( $p < .05$ ).

The eigenvalue greater than one rule (4.844; 1.224) and scree-plot both indicated the extraction of two factors. This does not corroborate the unidimensionality assumption made for this subscale. The pattern matrix presented in Table 5.53 below indicates these factor loadings ( $\lambda_{i1} > .50$ ).

**Table 5.53**

***Rotated Factor Structure (Pattern Matrix) for the Motivation to Pursue the Routes to Psychological Ownership Valence Subscale***

	Factor	
	1	2
Mot_7	<b>.894</b>	-.159
Mot_4	<b>.741</b>	-.122
Mot_3	<b>.721</b>	.189
Mot_1	<b>.704</b>	-.026
Mot_8	<b>.681</b>	.089
Mot_9	<b>.651</b>	.269
Mot_6	<b>.591</b>	.263
Mot_5	-.056	<b>.755</b>
Mot_2	.239	<b>.659</b>

MOT=Motivation

MOT\_5 and MOT\_2 loaded on the second factor. The remaining seven items loaded on the first factor. Upon examining the wording of the individual items it became clear that the first factor could relate to aspects of broader understanding and subsequent control taken, whereas the second factor speaks to intrapersonal aspects in terms of the job providing a platform for self-expression and being an extension of the self. Mot\_2 and Mot\_5 seem to relate to the self-investment (route) whereas the remaining items seem to

speak to forms of effort in terms of understanding and control. The fact that the third route item (Mot\_8) of self-investment did not load sufficiently on the second factor was a surprise to the researcher<sup>67</sup>. There were additionally 18 (50.0%) nonredundant residuals with absolute values greater than .05 pointing to the failure of this 2-factor solution to provide a plausible explanation for the observed covariance matrix.

A three-factor solution was subsequently forced. The resultant pattern matrix is shown in Table 5.54.

**Table 5.54**

***Rotated 3-Factor Factor Structure (Pattern Matrix) for the Motivation to Pursue the Routes to Psychological Ownership Valence Subscale***

	Factor		
	1	2	3
Mot_7	<b>.810</b>	-.057	-.106
Mot_4	<b>.786</b>	.008	.043
Mot_1	<b>.691</b>	.087	-.016
Mot_5	-.073	<b>.831</b>	.026
Mot_2	.157	<b>.691</b>	-.091
Mot_6	-.088	.012	<b>-.893</b>
Mot_9	-.024	.029	<b>-.886</b>
Mot_3	.231	.053	<b>-.627</b>
Mot_8	.296	.006	<b>-.484</b>

MOT=Motivation

Three items loaded on the first factor (MOT\_7, MOT\_4 and MOT\_1), two items loaded on factor 2 (MOT\_5 and MOT\_2) and four items loaded on factor 3 (MOT\_6, MOT\_9, MOT\_3 and MOT\_8). Inspection of the wording of these three sets of items highlighted that the first factor seems to relate to the intimate knowledge valence component of motivation (being intimately familiar with one's job, having depth of knowledge). The second factor relates to the self-investment valence component of motivation, in that the items attempt to determine if an individual experiences the job as an extension of who they are. The third factor relates to aspects of control and attempts to determine an individual's level of or ability to control and make decisions pertaining to how the job is done. It comes as a surprise to the researcher that Mot\_8 did not fall under the second factor. However, upon closer inspection of the wording it does seem to point towards aspects of control in that in exerting effort and seeing it come to fruition one could posit that this effort might require a certain degree of control, hence its loading on the third factor.

<sup>67</sup> The trend within the factor loadings and the wording of the individual items speaks to the three factor model.

None (0%) of the residual correlations were large. The three-factor factor solution therefore provided a credible explanation for the observed inter-item correlation matrix.

A one factor solution was subsequently forced to determine if all of the items could load satisfactorily onto the single factor, thereby providing evidence that the subscale items could be interpreted as indicators of *Motivation to Pursue the Routes to Psychological Ownership Valence*. The results of which are presented below in Table 5.55.

**Table 5.55**

***Factor Structure (Forced One Factor) for the Motivation to Pursue the Routes to Psychological Ownership Valence Subscale***

	<b>Factor 1</b>
Mot_3	.830
Mot_9	.812
Mot_7	.750
Mot_6	.749
Mot_8	.724
Mot_1	.666
Mot_4	.635
Mot_2	.616
Mot_5	<b>.388</b>

Mot=Motivation

There were 17 (47.0%) nonredundant residuals with absolute values greater than 0.05, indicating that this 1-factor solution failed to provide a plausible explanation for the observed covariance matrix. It is evident from Table 5.55 above that all of the items load satisfactorily on a single factor, except for Mot\_5. This item was identified as a problematic item during the item analysis however further analysis was necessary before taking a decision pertaining to its deletion.

The statistics were a lot more promising for the *motivation to pursue the routes to psychological ownership expectancy* subscale. All correlations were larger than .30 and all inter-item correlations were additionally statistically significant. A KMO of .857 (Tabachnick & Fidell, 2014) confirmed that the correlations in the correlation matrix were suitable for factor analysis (>.60). The factor analysability assumption was further corroborated by the Bartlett Test of Sphericity (2170.589;  $p=.00$ ) which indicated that the null hypothesis that the correlation matrix is an identity matrix in the population could be rejected ( $p<.05$ ).

The eigenvalue greater than one rule (5.172, 1.198, and 1.114) and scree-plot both indicated the extraction of three factors (the amount of variance explained by each factor was 53%, 13% and 9% respectively). This did not corroborate the unidimensionality



assumption made for this subscale. The factor matrix presented in Table 5.56 below indicates these factor loadings ( $\lambda_{i1} > .50$ ).

**Table 5.56**

***Factor Structure for the Motivation to Pursue the Routes to Psychological Ownership Expectancy Subscale***

	Factor		
	1	2	3
Mot_12	.834	.144	-.244
Mot_15	.802	.299	-.335
Mot_18	.795	.279	-.364
Mot_16	.750	-.428	.027
Mot_13	.744	-.498	.010
Mot_17	.736	-.062	-.127
Mot_10	.692	-.369	.225
Mot_11	.680	.313	.629
Mot_14	.604	.329	.403

Mot=Motivation

Table 5.57 below presents the pattern matrix.

**Table 5.57**

***Pattern Matrix for the Motivation to Pursue the Routes to Psychological Ownership Expectancy Subscale***

	Factor		
	1	2	3
Mot_18	<b>.937</b>	.041	.005
Mot_15	<b>.927</b>	.056	.047
Mot_12	<b>.757</b>	-.153	.056
Mot_17	.462	-.368	.029
Mot_13	.057	<b>-.898</b>	-.084
Mot_16	.087	<b>-.824</b>	-.025
Mot_10	-.096	<b>-.768</b>	.190
Mot_11	-.059	-.056	<b>.979</b>
Mot_14	.131	.038	<b>.744</b>

Mot=Motivation

It is evident from the pattern matrix that Mot\_18, 15 and 12 loaded on the first factor. Upon deeper inspection of these items it is evident that they relate to the *control* route of the expectancy subscale. Mot\_13, 16 and 10 loaded on the second factor and relate to the route *intimate knowledge* of the expectancy subscale. Mot\_11 and 14 relate to the *self-investment* expectancy subscale and loaded on the third factor. Mot\_17 also relates to this same subscale however it did not load satisfactorily on any of the three factors. This is however not a complete surprise to the researcher since there does seem to be an element of *self-investment* – perhaps captured more strongly by the wording in this question – throughout all of the routes. Moreover, for this three factor model none (0%) of

the nonredundant residuals obtained absolute values greater than .05. Therefore, this model provides a very convincing explanation for the observed correlation matrix.

A one factor solution was subsequently forced to determine whether the items in question may be considered to be successful indicators of a higher-order *motivation to pursue the routes to psychological ownership expectancy* factor. The 1-factor, factor structure, is shown in Table 5.58.

**Table 5.58**  
**Factor Structure (Forced One Factor) for the Motivation to Pursue the Routes to Psychological Ownership Expectancy Subscale**

	Factor 1
Mot_12	.843
Mot_15	.784
Mot_18	.776
Mot_17	.755
Mot_16	.736
Mot_13	.719
Mot_10	.676
Mot_11	.612
Mot_14	.574

Mot=Motivation

It is evident from Table 5.58 above that all of the items loaded satisfactorily on the single factor. However, 47% of the nonredundant residuals still obtained absolute values greater than .05. Again failing to provide a very convincing explanation of the covariance matrix.

It seemed possible to suggest that another, perhaps more general factor, was influencing this model and that it might be more prudent to investigate the *routes* as individual unidimensional constructs within the two motivational areas of valence and expectancy. This factor structure would therefore point to a six factor construct<sup>68</sup>. Further analysis in the form of CFA was conducted to provide corroboratory evidence for the factor structure of this complex construct. The following section presents the results of the CFA analysis on the multidimensional constructs within the proposed *psychological ownership* structural model.

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<sup>68</sup> This six factor structure would therefore represent the *motivation to pursue the routes to psychological ownership valence* (Mot\_Val) and *expectancy* (Mot\_Exp) subscales, coupled with the routes, namely *self investment*, *control* and *intimate knowledge* (Mot\_Val\_SI, Mot\_Val\_C and Mot\_Val\_IK as well as Mot\_Exp\_SI, Mot\_Exp\_C and Mot\_Exp\_IK).

## 5.6 CONFIRMATORY FACTOR ANALYSIS ON MULTI-DIMENSIONAL MEASUREMENT SCALES

Confirmatory factor analysis (CFA) is a very sophisticated technique used to “test a theory about latent processes” (Tabachnick & Fidell, 2014, p. 662). The above item and dimensionality analysis conducted on the *job characteristics*, *individual’s psychological ownership needs* (roots) and the *routes towards psychological ownership*<sup>69</sup>, as well as *motivation to pursue the routes towards psychological ownership* subscales did not allow for the testing of the assumption that the 15-item, 12-item, 14-item and 18-item scales, developed to reflect these latent variables, adequately operationalised them given their multi-dimensional constitutive definitions. This therefore meant that the foregoing analyses were not sufficient in testing the assumptions theorised in Chapter 2.

This subsequently lead to the conclusion that it would be prudent to conduct CFA on the *job characteristics*, both the *roots* and the *routes* subscales as well as the *motivation to pursue the routes subscales*, to provide further indications as to the psychometric quality of these scales, prior to fitting the measurement model explicating the operationalisation of the structural model. Therefore, although Fabrigar, MacCallum, Wegener, and Strahan, (1999) caution against the use of CFA post EFA (with the purpose of confirming EFA results) the CFA results<sup>70</sup> will be presented for each scale below in sections 5.6.1 to 5.6.4 respectively.

### 5.6.1 Measurement model fit for the job characteristics scale

The measurement model fit in this case refers to the quality of the operationalisation of the five job characteristics namely *autonomy*, *task identity*, *task significance*, *skill variety* and *feedback* by the 15-item job characteristics scale developed to represent this latent variable *job characteristics*. Figure 5.1 displays a visual representation of the fitted *job characteristics* measurement model. Furthermore, the overall fit statistics are presented below in Table 5.63. The goodness-of-fit statistics provided an opportunity to test the exact fit and the close fit null hypothesis for the measurement model.

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<sup>69</sup> The researcher acknowledges that the *routes* are treated as separate latent variables within the proposed *psychological ownership* model. However they are treated as a single subscale within the CJBPOS and therefore the researcher felt that conducted CFA would be prudent.

<sup>70</sup> These results have been reported very succinctly and a more detailed discussion pertaining to the fit statistics and the theoretical basis for their use and cut-offs will be provided during the interpretation of the fitting of the *psychological ownership* measurement and structural models.

For various theoretical reasons<sup>71</sup> it was important to assess the extent to which the data complied with the multivariate normal distribution statistical assumption, a critical statistical assumption in SEM (Diamantopoulos & Siguaaw, 2009), prior to proceeding with further analyses. The proceeding sections will therefore present findings pertaining to both the reported meeting of these statistical assumptions (data screening) and then continue with the fitting of the measurement model.

Table 5.59 below displays the sample skewness and kurtosis statistics for each item within the *job characteristics* scale before normalisation.

**Table 5.59**  
***Test of Univariate Normality for Job Characteristics before Normalisation***

Variable	Skewness		Kurtosis		Skewness and Kurtosis	
	Z-Score	P-Value	Z-Score	P-Value	Chi-Square	P-Value
JC_A1	-5.749	0.000	2.044	0.041	37.225	0.000
JC_TI1	-4.909	0.000	0.479	0.632	24.330	0.000
JC_SV1	-5.774	0.000	0.551	0.581	33.644	0.000
JC_TS1	-6.669	0.000	2.549	0.011	50.967	0.000
JC_FB1	-3.698	0.000	-0.456	0.648	13.886	0.001
JC_SV2	-8.935	0.000	5.349	0.000	108.444	0.000
JC_TI2	-5.811	0.000	-1.595	0.111	36.308	0.000
JC_FB2	-6.577	0.000	1.855	0.064	46.696	0.000
JC_SV3	-8.483	0.000	4.433	0.000	91.614	0.000
JC_TS2	-8.642	0.000	4.675	0.000	96.542	0.000
JC_A2	-9.354	0.000	5.439	0.000	117.073	0.000
JC_TI3	-8.409	0.000	4.170	0.000	88.106	0.000
JC_FB3	-7.160	0.000	2.699	0.007	58.547	0.000
JC_A3	-8.498	0.000	4.132	0.000	89.286	0.000
JC_TS3	-7.791	0.000	3.557	0.000	73.353	0.000

JC\_A=Autonomy, JC\_TI=Task Identity, JC\_SV=Skills Variety, JC\_TS=Task Significance, JC\_FB=Feedback

From Table 5.59 it is clear that the assumption of univariate normality was not met for all item distributions. In the absence of univariate normality satisfying the multivariate normality assumption was an unlikely outcome. This was corroborated by Table 5.60 below.

<sup>71</sup> These reasons will be outlined in full in Section 5.8 and Section 5.9 when discussing the fitting of the psychological ownership measurement and structural model, since this is the main focus of this research study. This has been done to reduce the repetition within this paper.

**Table 5.60**  
**Test of Multivariate Normality for Job Characteristics before Normalisation**

Skewness			Kurtosis			Skewness and Kurtosis	
Value	Z-Score	P-Value	Value	Z-Score	P-Value	Chi-Square	P-Value
55.786	36.017	0.000	356.207	17.706	0.000	1610.735	0.000

From Table 5.59 and Table 5.60 it is clear that the necessary assumptions of univariate and multivariate normality were not met. The chi-square for skewness and kurtosis indicated that all items failed the univariate normality assumption ( $p < .05$ ). Moreover, the null hypothesis that the data follows a multivariate normal distribution also had to be rejected ( $X^2 = 1610.735$ ;  $p < .05$ ). Therefore, the composite indicator variable distribution was normalised using PRELIS. The results are shown in Table 5.61 and Table 5.62.

**Table 5.61**  
**Test of Univariate Normality for Job Characteristics after Normalisation**

Variable	Skewness		Kurtosis		Skewness and Kurtosis	
	Z-Score	P-Value	Z-Score	P-Value	Chi-Square	P-Value
JC_A1	-1.727	0.084	-2.270	0.023	8.136	0.017
JC_TI1	-2.339	0.019	-3.191	0.001	15.651	0.000
JC_SV1	-2.686	0.007	-3.901	0.000	22.438	0.000
JC_TS1	-2.798	0.005	-3.245	0.001	18.362	0.000
JC_FB1	-1.309	0.190	-2.011	0.044	5.761	<b>0.056</b>
JC_SV2	-2.018	0.044	-1.406	0.160	6.049	0.049
JC_TI2	-1.814	0.070	-2.678	0.007	10.463	0.005
JC_FB2	-1.288	0.198	-1.483	0.138	3.857	<b>0.145</b>
JC_SV3	-2.254	0.024	-2.075	0.038	9.387	0.009
JC_TS2	-3.120	0.002	-2.679	0.007	16.914	0.000
JC_A2	-2.664	0.008	-1.991	0.046	11.059	0.004
JC_TI3	-2.488	0.013	-2.387	0.017	11.889	0.003
JC_FB3	-2.105	0.035	-2.349	0.019	9.948	0.007
JC_A3	-1.926	0.054	-1.825	0.068	7.042	0.030
JC_TS3	-2.777	0.005	-2.909	0.004	16.178	0.000

JC\_A=Autonomy, JC\_TI=Task Identity, JC\_SV=Skills Variety, JC\_TS=Task Significance, JC\_FB=Feedback

**Table 5.62**  
**Test of Multivariate Normality for Job Characteristics after Normalisation**

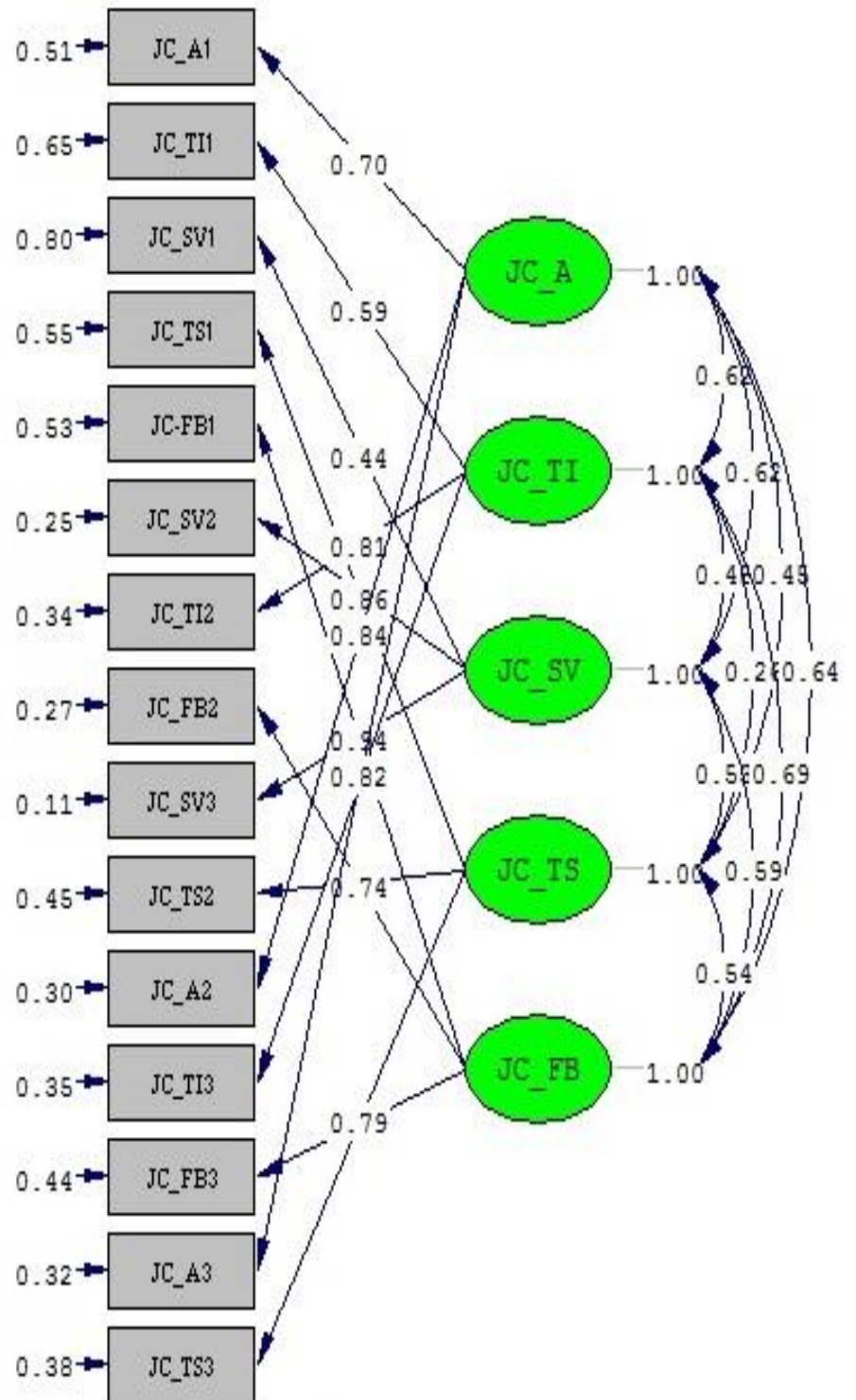
Skewness			Kurtosis			Skewness and Kurtosis	
Value	Z-Score	P-Value	Value	Z-Score	P-Value	Chi-Square	P-Value
22.203	11.871	0.000	286.714	9.157	0.000	224.759	0.000

The attempt at normalising the composite indicator variable distribution did however not result in the multivariate normality assumption being met as the normalisation attempt was

not fully successful. It did result in an improvement in the symmetry and kurtosis of the indicator variable distributions, but did not completely salvage the situation. The normalisation succeeded in reducing the extent to which all the individual item distributions deviated from univariate normality. However, they still all failed the test of univariate normality except for JC\_FB1 ( $p=0.056$ ) and JC\_FB2 ( $p=0.145$ ). Table 5.62 provided further corroboratory evidence of the failure of this scale to meet the critical statistical assumption of multivariate normality in that, although the procedure did result in a reduction of the deviation of the observed indicator distribution from the theoretical multivariate normal distribution (chi-square decreased from 1610.735 to 224.759), the null hypothesis that the data follows a multivariate normal distribution still had to be rejected ( $X^2 = 224.759$ ;  $p < .05$ ).

Since the normalisation led to a reduction in the chi-square statistics, robust maximum likelihood was used as an alternative estimation technique. The fact that the data used is continuous and does not satisfy the multivariate normality assumption critical for the multivariate statistical analysis to follow made this estimation technique an applicable technique to use (Mels, 2003).

A visual representation of the *job characteristics* measurement model is displayed in Figure 5.1, followed by the overall fit statistics in Table 5.63. These statistics provided an opportunity to test the exact fit and the close fit null hypothesis for the measurement model.



Chi-Square=277.75, df=80, P-value=0.00000, RMSEA=0.087

Figure 5.1. Visual Representation of the Job Characteristics Measurement Model



**Table 5.63**  
**Goodness of Fit Statistics for the Job Characteristics Measurement Model**

<b>Statistic</b>	<b>Value</b>
Degrees of Freedom	80
Minimum Fit Function Chi-Square	288.038 (P = 0.00)
Normal Theory Weighted Least Squares Chi-Square	313.146 (P = 0.00)
<b>Satorra-Bentler Scaled Chi-Square</b>	<b>277.751 (P = 0.00)</b>
Chi-Square Corrected for Non-Normality	201.106 (P = 0.00)
Estimated Non-centrality Parameter (NCP)	197.751
90 Percent Confidence Interval for NCP	(150.774 ; 252.324)
Minimum Fit Function Value	0.878
Population Discrepancy Function Value (F0)	0.603
90 Percent Confidence Interval for F0	(0.460 ; 0.769)
<b>Root Mean Square Error of Approximation (RMSEA)</b>	<b>0.0868</b>
90 Percent Confidence Interval for RMSEA	(0.0758 ; 0.0981)
<b>P-Value for Test of Close Fit (RMSEA &lt; 0.05)</b>	<b>0</b>
Expected Cross-Validation Index (ECVI)	1.091
90 Percent Confidence Interval for ECVI	(0.947 ; 1.257)
ECVI for Saturated Model	0.732
ECVI for Independence Model	15.153
Chi-Square for Independence Model with 105 Degrees of Freedom	4940.124
Independence AIC	4970.124
Model AIC	357.751
Saturated AIC	240
Independence CAIC	5042.065
Model CAIC	549.594
Saturated CAIC	815.527
Normed Fit Index (NFI)	0.944
Non-Normed Fit Index (NNFI)	0.946
Parsimony Normed Fit Index (PNFI)	0.719
Comparative Fit Index (CFI)	0.959
Incremental Fit Index (IFI)	0.959
Relative Fit Index (RFI)	0.926
Critical N (CN)	133.655
Root Mean Square Residual (RMR)	0.123
Standardized RMR	0.0607
Goodness of Fit Index (GFI)	0.887
Adjusted Goodness of Fit Index (AGFI)	0.831
Parsimony Goodness of Fit Index (PGFI)	0.591

A relatively good indication of fit, given the models multivariate normality nature, is given by the Satorra-Bentler scaled chi-square statistic. The null hypothesis that the model fits the population data perfectly is tested by the  $X^2$  test statistic:

$$H_{0159}: RMSEA=0^{72}$$

$$H_{a159}: RMSEA>0$$

Table 5.63 indicates that this model achieved a Satorra-Bentler scaled chi-squared statistic of 277.751 ( $p=.000$ ). The null hypothesis of exact fit was therefore rejected ( $p<.05$ ). This was not surprising as the assumption that a model could fit exactly in the population is rather ambitious and somewhat unrealistic. A more realistic assumption is that this model could fit well or reasonably well and therefore the hypothesis of close fit was rather tested, namely:

$$H_{0160}: RMSEA=0^{73}$$

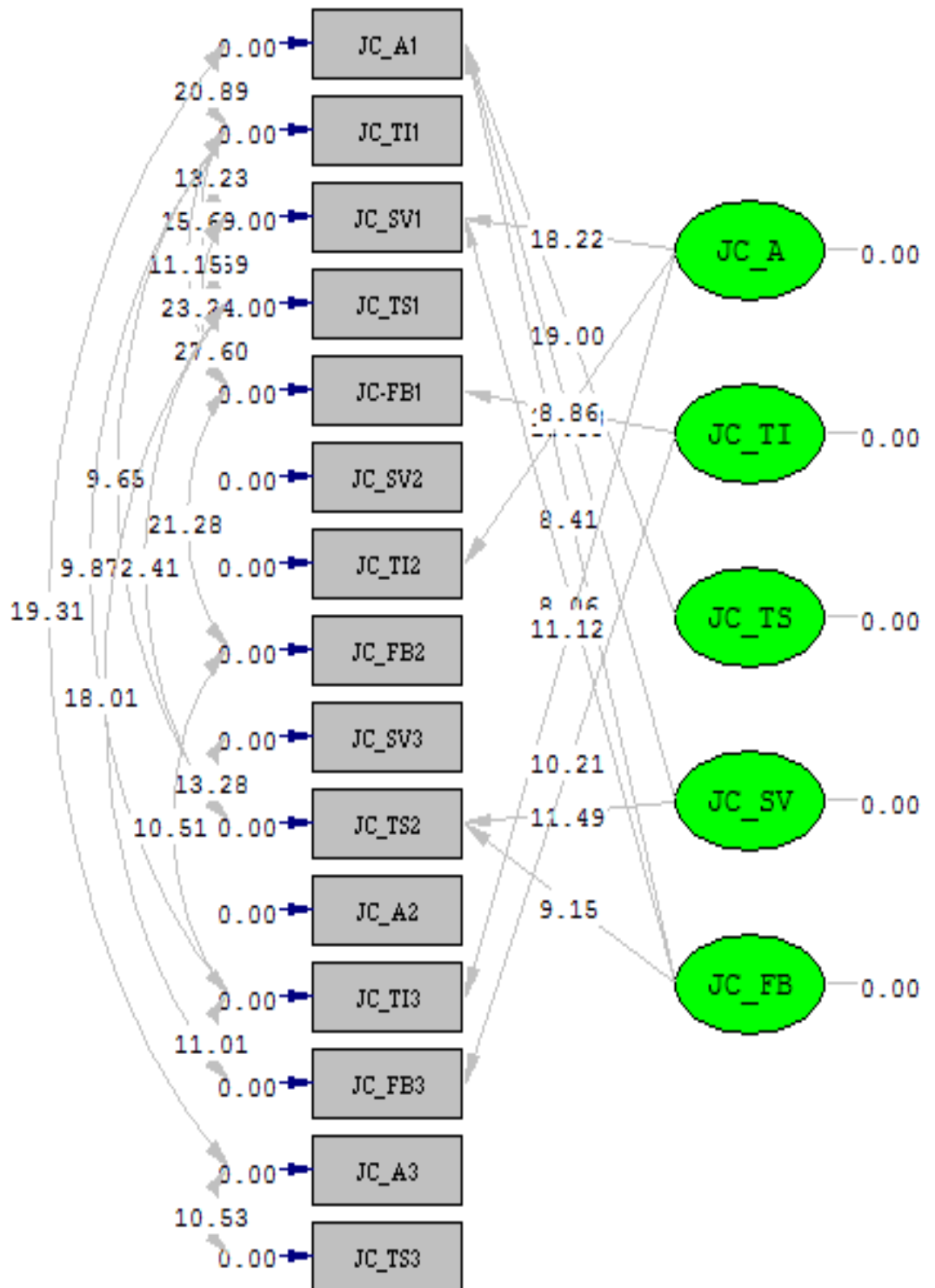
$$H_{a160}: RMSEA>0$$

According to Table 5.63 above it is evident that the close fit null hypothesis should be rejected ( $p<.05$ ; 0.0491). Therefore, according to this test statistic the position that this model displayed close fit in the parameter was not a permissible position. The assumption of mediocre fit in the sample was further corroborated by the RMSEA value in Table 5.63 above ( $RMSEA=0.0868$ ). Further investigation of the modification indices provided a certain degree of clarity. A visual representation of the modification indices is presented in Figure 5.2, followed by the theta-delta modification indices in Table 5.64.

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<sup>72</sup>  $H_{0159}$  and  $H_{a159}$  were not formulated upfront in Chapter 3.

<sup>73</sup>  $H_{0160}$  and  $H_{a160}$  were not formulated upfront in Chapter 3.



Chi-Square=277.75, df=80, P-value=0.00000, RMSEA=0.087

Figure 5.2. Visual Representation of the Job Characteristics Modification Indices

**Table 5.64*****Theta-delta Modification Indices for the Job Characteristics Measurement Model***

	JC_A1	JC_TI1	JC_SV1	JC_TS1	JC-FB1	JC_SV2
JC_A1	--					
JC_TI1	20.885	--				
JC_SV1	6.796	13.229	--			
JC_TS1	0.374	15.693	21.592	--		
JC-FB1	1.323	11.146	23.236	27.602	--	
JC_SV2	0.111	0.246	1.423	0.463	0.605	--
JC_TI2	5.662	1.012	4.389	1.473	3.617	0
JC_FB2	0.190	0.011	0.299	0.410	21.284	1.227
JC_SV3	3.263	2.183	2.053	1.389	1.939	--
JC_TS2	2.628	9.649	1.080	42.414	0.580	6.254
JC_A2	1.100	0.692	3.835	1.533	1.578	0.31
JC_TI3	3.699	9.865	5.261	3.607	4.358	0.339
JC_FB3	0.017	0.422	1.815	18.015	3.263	0.143
JC_A3	19.306	2.342	0.175	0.023	3.228	0.35
JC_TS3	4.644	6.038	2.746	--	4.168	5.972
	<b>JC_TI2</b>	<b>JC_FB2</b>	<b>JC_SV3</b>	<b>JC_TS2</b>	<b>JC_A2</b>	<b>JC_TI3</b>
JC_TI2	--					
JC_FB2	5.083	--				
JC_SV3	0.265	0.004	--			
JC_TS2	0.001	0.901	13.285	--		
JC_A2	0.582	0.830	0.817	4.190	--	
JC_TI3	--	10.513	0.067	3.819	1.000	--
JC_FB3	0.066	--	0.154	0.839	0.105	11.013
JC_A3	0.018	2.115	0.458	1.746	--	6.378
JC_TS3	1.006	1.439	5.689	--	0.436	1.113
	<b>JC_FB3</b>	<b>JC_A3</b>	<b>JC_TS3</b>			
JC_FB3	--					
JC_A3	1.384	--				
JC_TS3	5.507	10.530	--			

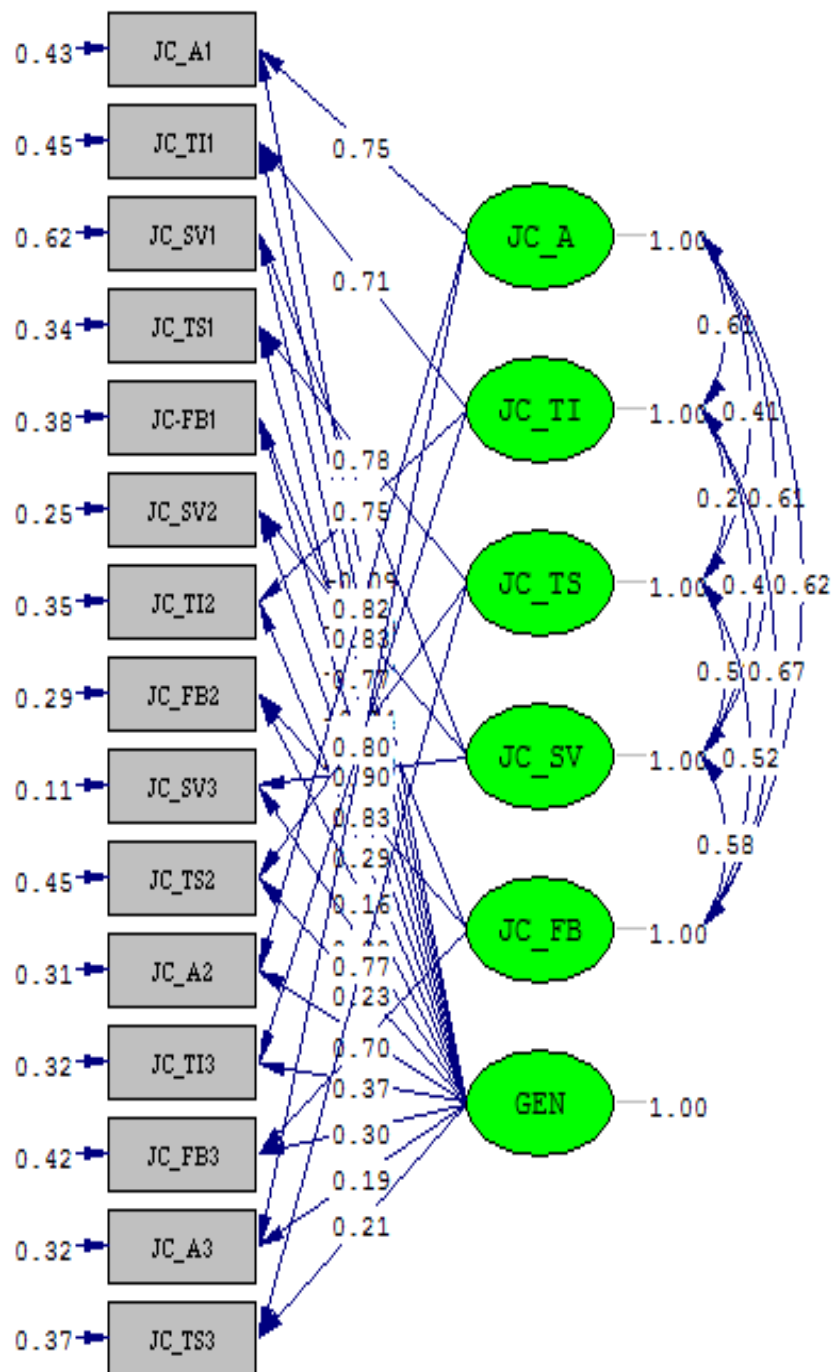
JC\_A=Autonomy, JC\_TI=Task Identity, JC\_SV=Skills Variety, JC\_TS=Task Significance, JC\_FB=Feedback

The theta-delta modification indices suggested 18 covariances (out of the original 105 – 17%), if freed, that would statistically significantly ( $p < .01$ ) improve the fit of the model. Although this percentage did seem somewhat small to argue the introduction of a general factor, it seemed plausible that the item responses could be a function of both a general or primary factor and a more specific secondary factor, especially from a theoretical point of view. According to Reise (2012, p. 667) a bi-factor model, also known as a nested or

general-specific model “specifies that the covariance among a set of item responses can be accounted for by a single general factor that reflects the common variance running among all scale items and group factors that reflect additional common variance among clusters of items, typically, with highly similar content.” DeMars (2013, p. 354) in turn highlights that item responses in a bi-factor model “are a function of a general or primary factor and no more than one specific or secondary factor”.

When the theorising surrounding *job characteristics* was considered this did seem somewhat plausible. An individual may experience the specific characteristics of their job such as *autonomy*, *task identity*, *skill variety*, *feedback* from the job and *task significance* as distinct facets and may experience these differently. These are the nuanced view of an individual’s job. Employees are offered the opportunity to take control and make decisions independently, feel that their job has a certain level of significance within the broader scope of the organisation (or project), obtain feedback directly from their work/job and also be afforded the opportunity to use a variety of their skills within the broader context of their job. Specific items of the scale capture the specific nuanced essence of the various job characteristics, but the items also capture a broader underlying enrichment opportunity afforded to individuals via these characteristics. Hence the presence of a general factor on which all of the *job characteristics* load makes theoretical sense.

A visual representation of the *job characteristics* bi-factor measurement model is presented in Figure 5.3.



Chi-Square=132.65, df=65, P-value=0.00000, RMSEA=0.056

**Figure 5.3. Visual Representation of the Job Characteristics Bi-factor Measurement Model (completely standardised solution)**

Figure 5.3 above illustrates that the bi-factor model was fitted by constraining the correlation between the broad, general *job characteristics* factor and the narrower, specific *job characteristics* factors, to zero. The narrower, more specific *job characteristics* factors

were allowed to correlate. Table 5.65 below presents the goodness of fit statistics for the *job characteristics* bi-factor measurement model.

**Table 5.65**  
***Job Characteristics Bi-factor Measurement Model Goodness of Fit Statistics***

<b>Statistic</b>	<b>Value</b>
Degrees of Freedom	65.000
Minimum Fit Function Chi-Square	151.059 (P= 0.00)
Normal Theory Weighted Least Squares Chi-Square	149.453 (P = 0.000)
<b>Satorra-Bentler Scaled Chi-Square</b>	<b>132.653 (P = 0.000)</b>
Chi-Square Corrected for Non-Normality	147.070 (P = 0.000)
Estimated Non-centrality Parameter (NCP)	67.653
90 Percent Confidence Interval for NCP	(38.549 ; 104.529)
Minimum Fit Function Value	0.461
Population Discrepancy Function Value (F0)	0.206
90 Percent Confidence Interval for F0	(0.118 ; 0.319)
<b>Root Mean Square Error of Approximation (RMSEA)</b>	<b>0.056</b>
90 Percent Confidence Interval for RMSEA	(0.0425 ; 0.0700)
<b>P-Value for Test of Close Fit (RMSEA &lt; 0.05)</b>	<b>0.213</b>
Expected Cross-Validation Index (ECVI)	0.740
90 Percent Confidence Interval for ECVI	(0.651 ; 0.852)
ECVI for Saturated Model	0.732
ECVI for Independence Model	15.153
Chi-Square for Independence Model with 105 Degrees of Freedom	4940.124
Independence AIC	4970.124
Model AIC	242.653
Saturated AIC	240.000
Independence CAIC	5042.065
Model CAIC	506.436
Saturated CAIC	815.527
Normed Fit Index (NFI)	0.973
Non-Normed Fit Index (NNFI)	0.977
Parsimony Normed Fit Index (PNFI)	0.602
Comparative Fit Index (CFI)	0.986
Incremental Fit Index (IFI)	0.986
Relative Fit Index (RFI)	0.957
Critical N (CN)	234.473
Root Mean Square Residual (RMR)	0.088
Standardized RMR	0.044
Goodness of Fit Index (GFI)	0.943
Adjusted Goodness of Fit Index (AGFI)	0.894
Parsimony Goodness of Fit Index (PGFI)	0.511



The Satorra-Bentler chi-square statistic (132.65;  $p=0.000$ ) presented in Table 5.65 above indicated that the null hypothesis of exact fit should be rejected for the bi-factor *job characteristics* measurement model. The p-value of close fit was therefore examined. This value (.213) indicated that the close fit null hypothesis should not be rejected for this model ( $p>.05$ ). This provided supporting evidence that a conclusion of good fit for the *job characteristics* bi-factor measurement model was warranted.

The conclusion of good fit was further corroborated by the remaining fit indices. It was therefore permissible to examine the parameter estimates, measurement error variance,  $R^2$  and phi estimates in order to come to a conclusion surrounding the operationalisation of this latent variable. These are presented below in Tables 5.66, 5.67, 5.68, 5.69, 5.70 and 5.71 respectively.

**Table 5.66*****Job Characteristics Measurement Model Unstandardised Lambda-X Matrix***

	JC_A	JC_TI	JC_TS	JC_SV	JC_FB	GEN
JC_A1	1.013 (0.072) 14.128	--	--	--	--	-0.120 (0.139) <b>-0.864</b>
JC_TI1	--	0.983 (0.076) 13.002	--	--	--	-0.262 (0.121) -2.159
JC_SV1	--	--	--	0.858 (0.086) 9.989	--	-0.425 (0.117) -3.627
JC_TS1	--	--	1.071 (0.073) 14.588	--	--	-0.336 (0.111) -3.017
JC-FB1	--	--	--	--	1.063 (0.071) 14.979	-0.254 (0.125) -2.030
JC_SV2	--	--	--	1.008 (0.065) 15.614	--	0.310 (0.116) 2.667
JC_TI2	--	1.254 (0.078) 16.159	--	--	--	0.481 (0.130) 3.690
JC_FB2	--	--	--	--	1.215 (0.073) 16.579	0.237 (0.143) <b>1.654</b>
JC_SV3	--	--	--	1.219 (0.065)	--	0.382 (0.122)

				18.823		3.117
JC_TS2	--	--	0.917 (0.079)	--	--	0.305 (0.113)
			11.666			2.704
JC_A2	1.058 (0.058)	--	--	--	--	0.196 (0.129)
	18.120					<b>1.515</b>
JC_TI3	--	1.030 (0.079)	--	--	--	0.518 (0.112)
		13.029				4.609
JC_FB3	--	--	--	--	0.996 (0.079)	0.424 (0.130)
					12.566	3.259
JC_A3	1.169 (0.074)	--	--	--	--	0.278 (0.138)
	15.698					2.011
JC_TS3	--	--	1.072 (0.071)	--	--	0.291 (0.124)
			15.167			2.341

JC\_A=Autonomy, JC\_TI=Task Identity, JC\_SV=Skills Variety, JC\_TS=Task Significance,  
JC\_FB=Feedback

All of the factor loadings were statistically significant ( $p < .05$ )<sup>74</sup>, per Table 5.66 above, except for the representation of the general factor by three items. Providing evidence that this argument is somewhat more strongly supported from a theoretical point of view than from an empirical point of view.

The fact that all of the narrow, more specific factors, load statistically significantly commented favourably on the validity with which the constructs of interest were represented by these manifest variables. However, it was nonetheless prudent to examine the completely standardised solution for  $\Lambda^X$ , presented in Table 5.67 below.

It is evident from Table 5.67 that the magnitude of all of the factor loading estimates were more than satisfactory, except for JC\_SV1 and JC\_FB3. Factor loading estimates in this case were considered satisfactory if the completely standardised factor loading estimates exceeded .71 and marginally satisfactory if above .50 (Theron, 2014a). Therefore JC\_SV1 (.549) was merely marginally satisfactory and JC\_FB3 (.703) just missed the satisfactory cut-off criteria.

<sup>74</sup> The statistical significance of the factor loading estimates were tested via two-tailed significance tests based on non-directional  $H_{ai}$  hypotheses that all hypothesised non-zero factor loadings, without specifying the sign of the loading. Therefore, the critical value was |1.96|.

**Table 5.67****Job Characteristics Measurement Model Completely Standardised Lambda-X Matrix**

	JC_A	JC_TI	JC_TS	JC_SV	JC_FB	GEN
JC_A1	0.747	--	--	--	--	-0.088
JC_TI1	--	0.714	--	--	--	-0.190
JC_SV1	--	--	--	<b>0.549</b>	--	-0.272
JC_TS1	--	--	0.775	--	--	-0.243
JC_FB1	--	--	--	--	0.769	-0.184
JC_SV2	--	--	--	0.825	--	0.254
JC_TI2	--	0.753	--	--	--	0.289
JC_FB2	--	--	--	--	0.826	0.161
JC_SV3	--	--	--	0.899	--	0.281
JC_TS2	--	--	0.705	--	--	0.235
JC_A2	0.817	--	--	--	--	0.151
JC_TI3	--	0.736	--	--	--	0.371
JC_FB3	--	--	--	--	<b>0.703</b>	0.299
JC_A3	0.804	--	--	--	--	0.191
JC_TS3	--	--	0.765	--	--	0.208

JC\_A=Autonomy, JC\_TI=Task Identity, JC\_SV=Skills Variety, JC\_TS=Task Significance, JC\_FB=Feedback

It is also evident that a very small proportion of the variance in the items was due to the broad general factor. Table 5.68 displays the unstandardised measurement error variance estimates.

**Table 5.68****Job Characteristics Measurement Model Unstandardised Theta-delta Matrix**

JC_A1	JC_TI1	JC_SV1	JC_TS1	JC_FB1	JC_SV2
0.799	0.861	1.527	0.649	0.718	0.380
(0.090)	(0.118)	(0.145)	(0.115)	(0.101)	(0.071)
8.841	7.293	10.535	5.637	7.106	5.366
JC_TI2	JC_FB2	JC_SV3	JC_TS2	JC_A2	JC_TI3
0.966	0.632	0.209	0.756	0.521	0.626
(0.156)	(0.116)	(0.069)	(0.099)	(0.068)	(0.085)
6.209	5.460	3.010	7.629	7.617	7.338
JC_FB3	JC_A3	JC_TS3			
0.834	0.671	0.728			
(0.086)	(0.097)	(0.098)			
9.742	6.938	7.439			

JC\_A=Autonomy, JC\_TI=Task Identity, JC\_SV=Skills Variety, JC\_TS=Task Significance, JC\_FB=Feedback

It is evident from Table 5.68 above that all indicators were statistically significantly plagued by measurement error ( $z \geq 1.6449$ ). As with the lambda indices, it was again important to also report on the completely standardised solution for completely standardised theta delta ( $\Theta_\delta$ ) matrix. The diagonal of the  $\Theta_\delta$  matrix is shown below in Table 5.69.

**Table 5.69**  
***Job Characteristics Measurement Model Completely Standardised Theta-delta Matrix***<sup>75</sup>

<b>JC_A1</b>	<b>JC_TI1</b>	<b>JC_SV1</b>	<b>JC_TS1</b>	<b>JC-FB1</b>	<b>JC_SV2</b>
0.434	0.454	<b>0.625</b>	0.340	0.376	0.255
<b>JC_TI2</b>	<b>JC_FB2</b>	<b>JC_SV3</b>	<b>JC_TS2</b>	<b>JC_A2</b>	<b>JC_TI3</b>
0.349	0.292	0.113	0.447	0.310	0.320
<b>JC_FB3</b>	<b>JC_A3</b>	<b>JC_TS3</b>			
0.416	0.317	0.371			

JC\_A=Autonomy, JC\_TI=Task Identity, JC\_SV=Skills Variety, JC\_TS=Task Significance,  
JC\_FB=Feedback

It is evident from Table 5.69 above that all of the values were satisfactory except for JC\_SV1 where a larger portion of variance is explained by error (more than 50%) than is desirable. Table 5.70 below presents the latent variable inter-correlations in the phi matrix.

None of the inter-item correlations presented in Table 5.70 were excessively high (all  $\phi_{ij} < .90$ ). This suggested that the exogenous variables within the *job characteristics* measurement model, namely *autonomy*, *task identity*, *task significance*, *skill variety* and *feedback*, were successfully measured as interrelated but qualitatively distinct latent dimensions of *perceived job characteristics*.

<sup>75</sup> It should be noted that the completely standardised  $\theta_{\delta ij}$  estimates reported in Table 5.69 are, due to the presence of the general factor not equal to 1 minus the completely standardised  $\lambda_{jk}^2$  but rather to 1 minus the sum of the squared completely standardised factor loadings of item  $j$  on the narrow *job characteristic* factor it was earmarked to reflect and its squared completely standardised loading on the general *job characteristics* factor.

**Table 5.70**  
**Job Characteristics Measurement Model Phi Matrix<sup>76</sup>**

	JC_A	JC_TI	JC_TS	JC_SV	JC_FB	GEN
JC_A	1.000					
JC_TI	0.610 (0.057) 10.767	1.000				
JC_TS	0.407 (0.072) 5.652	0.226 (0.078) 2.890	1.000			
JC_SV	0.612 (0.048) 12.730	0.443 (0.058) 7.582	0.511 (0.059) 8.659	1.000		
JC_FB	0.615 (0.052) 11.793	0.674 (0.058) 11.697	0.518 (0.060) 8.711	0.576 (0.050) 11.417	1.000	
GEN	--	--	--	--	--	1.000

JC\_A=Autonomy, JC\_TI=Task Identity, JC\_SV=Skills Variety, JC\_TS=Task Significance,  
JC\_FB=Feedback, GEN=General

Table 5.71 below presents the squared multiple correlations for the exogenous variables within the *job characteristics* measurement model.

**Table 5.71**  
**Job Characteristics Measurement Model Squared Multiple Correlations**

<b>JC_A1</b>	<b>JC_TI1</b>	<b>JC_SV1</b>	<b>JC_TS1</b>	<b>JC-FB1</b>	<b>JC_SV2</b>
0.566	0.546	<b>0.375</b>	0.660	0.624	0.745
<b>JC_TI2</b>	<b>JC_FB2</b>	<b>JC_SV3</b>	<b>JC_TS2</b>	<b>JC_A2</b>	<b>JC_TI3</b>
0.651	0.708	0.887	0.553	0.690	0.680
<b>JC_FB3</b>	<b>JC_A3</b>	<b>JC_TS3</b>			
0.584	0.683	0.629			

JC\_A=Autonomy, JC\_TI=Task Identity, JC\_SV=Skills Variety, JC\_TS=Task Significance,  
JC\_FB=Feedback

The  $R^2$  values ranged from .375 to .745 suggesting satisfactory validity for most of the indicators, except for JC\_SV1. JC\_SV1 seemed to be cause for concern in that only a very small portion of variance was explained by the underlying indicator (0.375).

<sup>76</sup> The  $\phi_{ij}$  estimates reported in the phi matrix are the correlations between the latent variables and are therefore the same as the values in the standardised solution.

JC\_SV1 and JC\_FB3 were earmarked as potentially problematic items during the item analysis. Therefore, the possibility of deleting these indicators had to be considered. The researcher was aware that both the deletion and the retention of these items would have potential pros and cons and that either options could easily be contended.

Deletion of these items would seem prudent, due to the potential increase in psychometric quality seen in the item analysis, especially for JC\_SV1. The deletion of this item would improve the internal consistency (Cronbach's alpha increased from .770 to .915). Furthermore, the item additionally suffered from a low item-total correlation and squared multiple correlation, bringing into question whether the item is in fact measuring the same underlying factor as the remaining items. However, evidence of a poorly performing item was not substantiated by the presence of an extreme mean or large standard deviation. Moreover, the factor analysis did not identify JC\_SV1 as problematic in that its loading was more than satisfactory on the single factor. The measurement model fit statistics also painted a conflicting picture of this item.

The situation is somewhat different for JC\_FB3 in that the deletion of this item decreased the Cronbach's alpha and no evidence of a poorly performing item was evident in the factor analysis. It therefore did not seem prudent to delete this item since there did not seem to be enough substantiating evidence.

Additionally, DeVellis (2012) highlights that scale length influences reliability and that longer scales seem to show better reliability. Therefore, due to the fact that these subscales are reflected by merely three items each, the entire scale itself consists of merely 15 items (to operationalise five variables) and the entire survey itself is rather short (79 items in total), and the evidence against retaining these items was not all-together damaging, deletion would not be sensible at this stage. Therefore, these items were retained and no items were deleted for this subscale. This is in contrast to the decision taken by Van Deventer (2015), however, after careful investigation of the psychometric evidence for and against deletion, within her work engagement study, it was clear that her item and dimensionality analysis painted a far more damning picture of the *skill variety* subscale. From the basket of evidence provided above it can be concluded that the bi-factor *job characteristics* measurement model fits reasonably well. Therefore, it seemed reasonable to argue that the operationalisation of the *job characteristics* latent variable via the *job characteristics* scale was successful and additionally that all items should be retained.

The next multidimensional construct to be analysed was the *individual psychological ownership needs* or roots. This will be discussed below in Section 5.6.2.

### 5.6.2 Individual psychological ownership needs (roots)

Before the measurement model for the *individual psychological ownership needs* could be fitted, the critical assumption of normality was again tested. Table 5.72 below displays the sample univariate skewness and kurtosis statistics for each item within the *individual psychological ownership needs* scale before normalisation. Table 5.73 displays the results for the test of multivariate normality.

**Table 5.72**  
**Test of Univariate Normality for the Roots before Normalisation**

Variable	Skewness		Kurtosis		Skewness and Kurtosis	
	Z-Score	P-Value	Z-Score	P-Value	Chi-Square	P-Value
PO_Need_SI_1	-7.099	.000	3.607	.000	63.405	.000
PO_Need_SI_2	-7.832	.000	3.736	.000	75.301	.000
PO_Need_SI_3	-6.536	.000	1.932	0.053	46.455	.000
PO_Need_SI_4	-6.770	.000	2.639	0.008	52.798	.000
PO_Need_SOB_1	-6.979	.000	2.724	0.006	56.121	.000
PO_Need_SOB_2	-8.036	.000	4.548	.000	85.265	.000
PO_Need_SOB_3	-8.002	.000	4.658	.000	85.731	.000
PO_Need_SOB_4	-8.106	.000	4.759	.000	88.354	.000
PO_Need_SE_1	-8.839	.000	5.632	.000	109.855	.000
PO_Need_SE_2	-7.971	.000	4.812	.000	86.700	.000
PO_Need_SE_3	-7.339	.000	3.861	.000	68.759	.000
PO_Need_SE_4	-9.556	.000	6.644	.000	135.462	.000

PO\_Need\_SI= Self Identity, PO\_Need\_SOB= Sense of Belonging, PO\_Need\_SE= Self efficacy/effectance

The chi-square for skewness and kurtosis presented in Table 5.72 indicated that all of the items failed the test of univariate normality ( $p < .05$ ).

**Table 5.73**  
**Test of Multivariate Normality for the Roots before Normalisation**

Value	Skewness		Value	Kurtosis		Skewness and Kurtosis	
	Z-Score	P-Value		Z-Score	P-Value	Chi-Square	P-Value
48.588	38.133	0.000	294.906	20.456	0.000	<b>1872.576</b>	<b>0.000</b>

Furthermore, the null hypothesis that the data follows a multivariate normal distribution also had to be rejected ( $X^2=1872.576$ ;  $p < .05$ ), as per Table 5.73. This therefore indicated



the need to normalise the univariate item distributions<sup>77</sup> in PRELIS. These results are presented below in Table 5.74 and 5.75 respectively.

It is evident from the results that the normalisation was not fully successful. The normalisation in PRELIS did succeed in reducing the extent to which all the individual item distributions deviated from univariate normality. However, unfortunately, all 12 items still failed the test of univariate normality ( $p < .05$ ). Further corroboratory evidence of the failure of these items to meet the critical statistical assumption of normality is evident in Table 5.75 in that, although the procedure did succeed in reducing the deviation of the observed indicator distribution from the theoretical multivariate normal distribution (Chi-square statistic decreased from 1872.576 to 500.570), the null hypothesis that the data follows a multivariate normal distribution still had to be rejected ( $X^2 = 500.570$ ;  $p < .05$ ).

**Table 5.74**  
***Test of Univariate Normality for the Roots after Normalisation***

Variable	Skewness		Kurtosis		Skewness and Kurtosis	
	Z-Score	P-Value	Z-Score	P-Value	Chi-Square	P-Value
PO_Need_SI_1	-2.066	.039	-2.277	.023	9.452	.009
PO_Need_SI_2	-2.332	.020	-1.959	.050	9.274	.010
PO_Need_SI_3	-2.123	.034	-2.469	.014	10.604	.005
PO_Need_SI_4	-2.025	.043	-2.241	.025	9.123	.010
PO_Need_SOB_1	-2.444	.015	-2.860	.004	14.153	.001
PO_Need_SOB_2	-2.769	.006	-2.128	.033	12.198	.002
PO_Need_SOB_3	-2.856	.004	-2.369	.018	13.770	.001
PO_Need_SOB_4	-3.360	.001	-2.628	.009	18.192	.000
PO_Need_SE_1	-3.246	.001	-2.168	.030	15.236	.000
PO_Need_SE_2	-3.380	.001	-2.314	.021	16.778	.000
PO_Need_SE_3	-3.132	.002	-2.146	.032	14.413	.001
PO_Need_SE_4	-5.076	.000	-1.609	.108	28.353	.000

PO\_Need\_SI= Self Identity, PO\_Need\_SOB= Sense of Belonging, PO\_Need\_SE= Self efficacy/effectance

**Table 5.75**  
***Test of Multivariate Normality for the Roots after Normalisation***

Value	Skewness		Kurtosis			Skewness and Kurtosis	
	Z-Score	P-Value	Value	Z-Score	P-Value	Chi-Square	P-Value
18.752	16.765	0.000	229.298	14.816	0.000	<b>500.570</b>	<b>0.000</b>

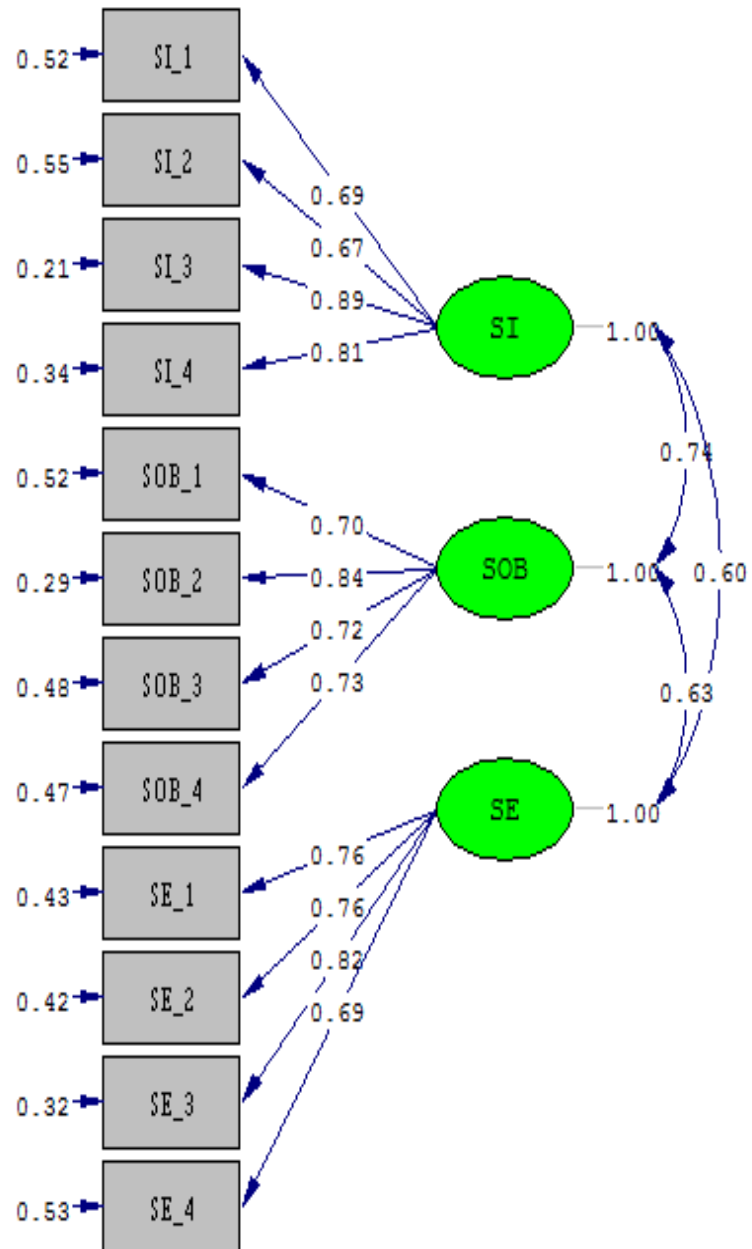
<sup>77</sup> Normalisation was conducted in an attempt to ensure that the data satisfies the assumption of multivariate normality as the quality of the solutions obtained is critically dependent upon this assumption being met. Normalisation, however, unfortunately occurs on the univariate item distributions. Multivariate normality can therefore not be guaranteed even if the univariate normalisation succeeds.

Therefore, since the normalisation was not completely successful, but there was a reduction in the chi-square statistic, an alternative estimation technique, namely robust maximum likelihood was used<sup>78</sup> (Mels, 2003).

Fitting of the measurement model was subsequently conducted. The measurement model fit in this case refers to the quality of the operationalisation of the three *individual psychological ownership needs* namely the *need for a sense of self-identity*, *sense of belonging* and *self-efficacy and effectance* by the 12 items developed to represent them. Figure 5.4 displays a visual representation of the fitted *psychological ownership individual needs* measurement model. Furthermore, the overall fit statistics are presented below in Table 5.76. The goodness of fit statistics provided an opportunity to test the exact fit and the close fit null hypothesis for the measurement model.

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<sup>78</sup> The use of RML necessitates the creation of an asymptotic covariance matrix via PRELIS. This will enable the calculation of appropriate fit indices in LISREL (Mels, 2003)



Chi-Square=121.38, df=51, P-value=0.00000, RMSEA=0.065

**Figure 5.4. Representation of the fitted individual psychological ownership needs measurement model (completely standardised solution)**

The below highlighted indices have been used to assess goodness of fit in the case of the *individual psychological ownership needs* measurement model.

**Table 5.76**  
**Individual Psychological Ownership Needs Measurement Model Goodness of Fit Statistics**

<b>Statistic</b>	<b>Value</b>
Degrees of Freedom	51
Minimum Fit Function Chi-Square	167.510 (P=0.00)
Normal Theory Weighted Least Squares Chi-Square	174.268 (P=0.00)
<b>Satorra-Bentler Scaled Chi-Square</b>	<b>121.385 (P=0.000)</b>
Chi-Square Corrected for Non-Normality	123.295 (P=0.000)
Estimated Non-centrality Parameter (NCP)	70.385
90 Percent Confidence Interval for NCP	(41.953 ; 106.523)
Minimum Fit Function Value	0.511
Population Discrepancy Function Value (F0)	0.215
90 Percent Confidence Interval for F0	(0.128 ; 0.325)
<b>Root Mean Square Error of Approximation (RMSEA)</b>	<b>0.0649</b>
<b>90 Percent Confidence Interval for RMSEA</b>	<b>(0.0501 ; 0.0798)</b>
<b>P-Value for Test of Close Fit (RMSEA &lt; 0.05)</b>	<b>0.0491</b>
<b>Expected Cross-Validation Index (ECVI)</b>	<b>0.535</b>
90 Percent Confidence Interval for ECVI	(0.448 ; 0.645)
ECVI for Saturated Model	0.476
ECVI for Independence Model	13.275
Chi-Square for Independence Model with 66 Degrees of Freedom	4330.127
Independence AIC	4354.127
Model AIC	175.385
Saturated AIC	156.000
Independence CAIC	4411.680
Model CAIC	304.878
Saturated CAIC	530.093
<b>Normed Fit Index (NFI)</b>	<b>0.972</b>
<b>Non-Normed Fit Index (NNFI)</b>	<b>0.979</b>
<b>Parsimony Normed Fit Index (PNFI)</b>	<b>0.751</b>
<b>Comparative Fit Index (CFI)</b>	<b>0.983</b>
<b>Incremental Fit Index (IFI)</b>	<b>0.984</b>
<b>Relative Fit Index (RFI)</b>	<b>0.964</b>
<b>Critical N (CN)</b>	<b>210.122</b>
<b>Root Mean Square Residual (RMR)</b>	<b>0.0667</b>
<b>Standardized RMR</b>	<b>0.0493</b>
<b>Goodness of Fit Index (GFI)</b>	<b>0.919</b>
<b>Adjusted Goodness of Fit Index (AGFI)</b>	<b>0.876</b>
<b>Parsimony Goodness of Fit Index (PGFI)</b>	<b>0.601</b>

Table 5.76 indicates that this model achieved a Satorra-Bentler scaled chi-squared statistic of 121.385 ( $p=.000$ ). The null hypothesis of exact fit was therefore rejected ( $p<.05$ ).

<sup>79</sup>According to Table 5.76 above it is evident that the close fit null hypothesis should be

<sup>79</sup> This outcome is not surprising. A more realistic assumption was that this model could fit well or reasonably well and therefore the hypothesis of close fit was tested.

rejected ( $p < .05$ ; 0.0491). Therefore, according to this test statistic the position that this model displayed close fit in the parameter was not a permissible position. The assumption of merely reasonable fit in the sample was further corroborated by the RMSEA value in Table 5.76 above for the *individual psychological ownership needs* measurement model (RMSEA=0.0649). It is, however, noted that if the exceedance probability would have been rounded up to two decimal figures the null hypothesis of close fit would not have been rejected ( $p = .05$ ).

The remaining fit indices suggested that the *individual psychological ownership needs* scale measurement model fitted reasonably. These findings therefore allowed for the interpretation of the measurement model parameter estimates since the success of the operationalisation of the latent variable *individual psychological ownership needs* cannot be determined without an explicit conclusion pertaining to model fit. Here the significance and the magnitude of the hypothesised paths between each of the manifest and the latent variable they were earmarked to reflect were investigated by looking at the unstandardised and completely standardised lambda-X matrices presented below in Table 5.77 and Table 5.78 respectively.

**Table 5.77**

***Individual Psychological Ownership Needs Measurement Model Unstandardised Lambda-X Matrix***

	SI	SOB	SE
SI_1	0.901 (0.064) 14.010	--	--
SI_2	0.878 (0.068) 12.864	--	--
SI_3	1.234 (0.058) 21.465	--	--
SI_4	1.121 (0.063) 17.728	--	--
SOB_1	--	0.983 (0.070) 13.956	--
SOB_2	--	0.998 (0.051) 19.513	--
SOB_3	--	0.842	--

			(0.057)
			14.889
SOB_4	--	0.840	--
			(0.052)
			16.290
SE_1	--	--	0.759
			(0.049)
			15.473
SE_2	--	--	0.784
			(0.050)
			15.839
SE_3	--	--	0.800
			(0.044)
			18.110
SE_4	--	--	0.556
			(0.044)
			12.785

SI=Self Identity, SOB=Sense of Belonging, SE=Self efficacy/effectance

It is evident from Table 5.77 above that all of the factor loadings are statistically significant ( $p < .05$ ). This suggested that the items therefore load statistically significantly on the latent variables that they were designed to reflect and speaks favourably to their validity. Table 5.78 below highlights the completely standardised lambda-X factor loadings.

**Table 5.78**  
**Individual Psychological Ownership Needs Measurement Model Completely Standardised Lambda-X Matrix**

	SI	SOB	SE
SI_1	<b>0.692</b>	--	--
SI_2	<b>0.672</b>	--	--
SI_3	0.890	--	--
SI_4	0.812	--	--
SOB_1	--	<b>0.695</b>	--
SOB_2	--	0.844	--
SOB_3	--	0.718	--
SOB_4	--	0.730	--
SE_1	--	--	0.756
SE_2	--	--	0.762
SE_3	--	--	0.823
SE_4	--	--	<b>0.688</b>

SI=Self Identity, SOB=Sense of Belonging, SE=Self efficacy/effectance

It is evident from Table 5.78 above that the majority of the items exceeded the critical cut-off factor loading value of .71. However, 4 of the 12 items were merely marginally satisfactory ( $< .71$ ), namely SI\_1 (.692), SI\_2 (.672), SOB\_1 (.695) and SE\_4 (.688).

Nonetheless, they did meet the .50 cut-off and therefore it could be concluded that all of the items provide a reasonable representation of the latent variable they were meant to reflect.

Table 5.79 and 5.80 below presents the unstandardised and standardised theta-delta estimates.

**Table 5.79**

***Individual Psychological Ownership Needs Measurement Model Unstandardised Theta-delta Estimates***

<b>SI_1</b>	<b>SI_2</b>	<b>SI_3</b>	<b>SI_4</b>	<b>SOB_1</b>	<b>SOB_2</b>
0.882	0.934	0.398	0.647	1.033	0.403
(0.109)	(0.116)	(0.077)	(0.102)	(0.134)	(0.068)
8.067	8.078	5.183	6.367	7.690	5.943
<b>SOB_3</b>	<b>SOB_4</b>	<b>SE_1</b>	<b>SE_2</b>	<b>SE_3</b>	<b>SE_4</b>
0.668	0.620	0.431	0.444	0.304	0.344
(0.086)	(0.066)	(0.059)	(0.068)	(0.051)	(0.032)
7.753	9.348	7.342	6.527	5.960	10.840

SI=Self Identity, SOB=Sense of Belonging, SE=Self efficacy/effectance

It is evident from Table 5.79 above that all of the indicators were statistically significantly ( $z > 1.6449$ ) plagued by measurement error.

**Table 5.80**

***Individual Psychological Ownership Needs Measurement Model Completely Standardised Theta-delta Estimates***

<b>SI_1</b>	<b>SI_2</b>	<b>SI_3</b>	<b>SI_4</b>	<b>SOB_1</b>	<b>SOB_2</b>
<b>0.521</b>	<b>0.548</b>	0.207	0.340	<b>0.517</b>	0.288
<b>SOB_3</b>	<b>SOB_4</b>	<b>SE_1</b>	<b>SE_2</b>	<b>SE_3</b>	<b>SE_4</b>
0.485	0.468	0.428	0.419	0.322	<b>0.526</b>

SI=Self Identity, SOB=Sense of Belonging, SE=Self efficacy/effectance

The observed values in Table 5.80 above indicate the proportion of item variance not explained by the underlying latent variable. The majority of the completely standardised error variance values were satisfactory in that less than 50% of the item variance could be ascribed to systematic non-relevant variance and random error variance. The same four items that were previously flagged in Table 5.78 are again indicated here as somewhat problematic in that less than 50% (but more than 25%) of the variance in these items is due to the latent dimension of interest.

Table 5.81 below presents the latent variable inter-correlations in the phi matrix.



**Table 5.81*****Individual Psychological Ownership Needs Measurement Model Phi Matrix***

	SI	SOB	SE
SI	1.000		
SOB	0.744 (0.039) 18.913	1.000	
SE	0.596 (0.056) 10.696	0.634 (0.053) 11.893	1.000

SI=Self Identity, SOB=Sense of Belonging, SE=Self efficacy/effectance

All three individual psychological ownership needs inter-correlations were statistically significant ( $p < .05$ ). It is evident from Table 5.81 above that none of the inter-correlations were excessively high (all  $\phi_{ij} < .90$ ). This suggested that the exogenous variables within the *individual psychological ownership needs* scale measurement model were interrelated but measured as qualitatively distinct latent variables.

Table 5.82 below presents the squared multiple correlations for the exogenous variables.

**Table 5.82*****Individual Psychological Ownership Needs Measurement Model Squared Multiple Correlations for X-Variables***

SI_1	SI_2	SI_3	SI_4	SOB_1	SOB_2
0.479	0.452	0.793	0.660	0.483	0.712
SOB_3	SOB_4	SE_1	SE_2	SE_3	SE_4
0.515	0.532	0.572	0.581	0.678	0.474

SI=Self Identity, SOB=Sense of Belonging, SE=Self efficacy/effectance

The  $R^2$  values in Table 5.82 above ranged from .452 to .793. It can therefore be suggested that these items in the *psychological ownership individual needs* scale displayed satisfactory validity. Higher  $R^2$  values for SI\_1, SI\_2, SOB\_1 and SE\_4 would have been desirable (i.e.  $R^2 > .50$ ).

It can therefore be concluded from the above basket of evidence that the *individual psychological ownership needs* measurement model fits reasonably. Furthermore, it seemed reasonable to argue that the operationalisation of the *individual psychological ownership needs* via the individual psychological ownership needs scale was relatively successful. Further analysis of the third “multidimensional” construct namely the *routes towards psychological ownership* was therefore undertaken post data screening.

### 5.6.3 Psychological ownership routes

The data was screened to again test assumptions of normality prior to investigating model fit. Results of the test for univariate and multivariate normality before normalisation, are presented below in Table 5.83 and Table 5.84 respectively.

**Table 5.83**  
***Test of Univariate Normality for the Routes before Normalisation***

Variable	Skewness		Kurtosis		Skewness and Kurtosis	
	Z-Score	P-Value	Z-Score	P-Value	Chi-Square	P-Value
IK_1	-9.946	0.000	6.794	0.000	145.081	0.000
IK_2	-8.230	0.000	5.589	0.000	98.965	0.000
IK_3	-7.229	0.000	4.007	0.000	68.319	0.000
IK_4	-10.160	0.000	7.701	0.000	162.535	0.000
SINV_1	-10.080	0.000	6.668	0.000	146.070	0.000
SINV_2	-8.589	0.000	5.113	0.000	99.914	0.000
SINV_3	-9.766	0.000	6.248	0.000	134.410	0.000
SINV_4	-8.655	0.000	4.544	0.000	95.565	0.000
C_1	-5.446	0.000	1.690	0.091	32.514	0.000
C_2	-5.669	0.000	0.618	0.537	32.523	0.000
C_3	-5.607	0.000	0.719	0.472	31.956	0.000
C_4	-4.615	0.000	-1.695	0.090	24.173	0.000
C_5	-7.025	0.000	2.968	0.003	58.163	0.000
C_6	-6.311	0.000	1.411	0.158	41.817	0.000

IK=Intimate Knowledge, SINV=Self Investment, C=Control

**Table 5.84**  
***Test of Multivariate Normality for the Routes before Normalisation***

Value	Skewness		Kurtosis			Skewness and Kurtosis	
	Z-Score	P-Value	Value	Z-Score	P-Value	Chi-Square	P-Value
65.049	42.874	0.000	361.007	20.519	0.000	<b>2259.220</b>	<b>0.000</b>

The chi-square for skewness and kurtosis presented in Table 5.83 above indicates that all of the items similarly failed the test of univariate normality ( $p < .05$ ). Furthermore, the null hypothesis that the data follows a multivariate normal distribution also had to be rejected ( $X^2 = 2259.220$ ;  $p < .05$ ). This therefore indicated the need to normalise the items<sup>80</sup> in PRELIS. The results of this normalisation on the univariate and multivariate assumptions are presented below in Table 5.85 and Table 5.86

<sup>80</sup> Normalisation was conducted in order for the data to satisfy the assumption of multivariate normality as the quality of the solutions obtained is critically dependent upon this assumption being met.

**Table 5.85**  
**Test of Univariate Normality for the Routes after Normalisation**

Variable	Skewness		Kurtosis		Skewness and Kurtosis	
	Z-Score	P-Value	Z-Score	P-Value	Chi-Square	P-Value
IK_1	-3.202	0.001	-1.317	0.188	11.984	0.002
IK_2	-3.040	0.002	-1.649	0.099	11.959	0.003
IK_3	-3.540	0.000	-2.202	0.028	17.380	0.000
IK_4	-4.300	0.000	-1.775	0.076	21.641	0.000
SINV_1	-3.954	0.000	-2.051	0.040	19.845	0.000
SINV_2	-2.899	0.004	-2.591	0.010	15.114	0.001
SINV_3	-3.475	0.001	-2.023	0.043	16.170	0.000
SINV_4	-3.873	0.000	-2.813	0.005	22.916	0.000
C_1	-0.714	0.475	-0.362	0.718	0.640	<b>0.726</b>
C_2	-0.991	0.322	-1.238	0.216	2.515	<b>0.284</b>
C_3	-1.083	0.279	-1.269	0.204	2.783	<b>0.249</b>
C_4	-0.992	0.321	-2.207	0.027	5.856	<b>0.054</b>
C_5	-1.677	0.094	-1.615	0.106	5.422	<b>0.066</b>
C_6	-1.539	0.124	-1.943	0.052	6.143	0.046

IK=Intimate Knowledge, SINV=Self Investment, C=Control

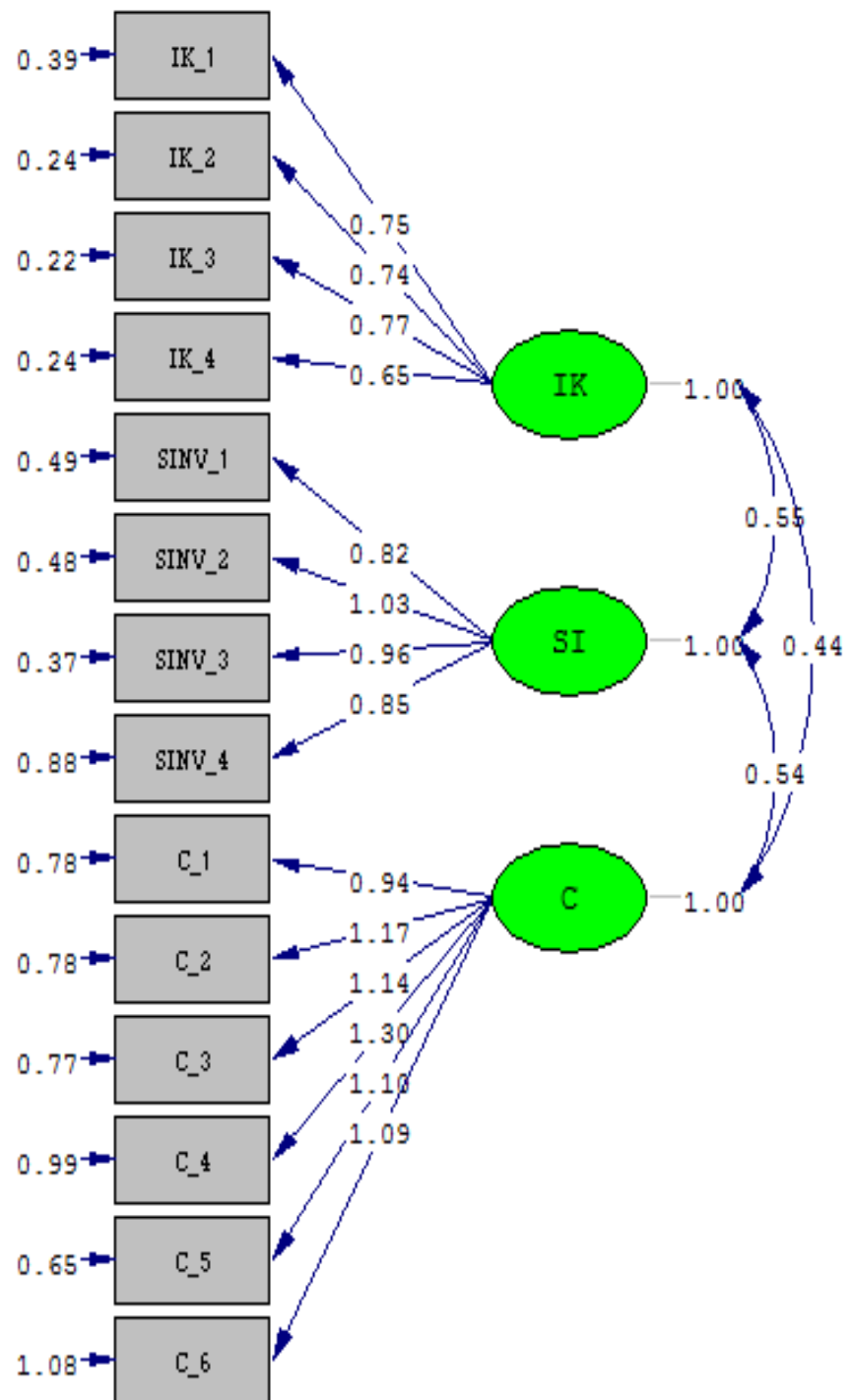
**Table 5.86**  
**Test of Multivariate Normality for the Routes after Normalisation**

Value	Skewness		Value	Kurtosis		Skewness and Kurtosis	
	Z-Score	P-Value		Z-Score	P-Value	Chi-Square	P-Value
23.688	16.271	0.000	265.477	11.228	0.000	<b>390.810</b>	<b>0.000</b>

It is evident from the results presented above in Table 5.85 and Table 5.86 that the normalisation was not fully successful. The normalisation in PRELIS did succeed in reducing the extent to which the univariate item distributions deviate from univariate normality. However, unfortunately nine of the 14 univariate item distributions still failed the test of univariate normality ( $p < .05$ ). Further corroboratory evidence of the failure of these items to meet the critical statistical assumption of normality is evident in Table 5.86 above in that although the procedure did succeed in reducing the deviation of the observed multivariate indicator distribution from the theoretical multivariate normal distribution (chi-square statistic decreased from 2259.220 to 390.810), the null hypothesis that the data follows a multivariate normal distribution still had to be rejected ( $X^2 = 390.810$ ;  $p < .05$ ).

Therefore, similar to the situation found above when investigating the measurement model fit for the *individual psychological ownership needs*, since the normalisation was not completely successful, but there was a reduction in the chi-square statistic, an alternative estimation technique, namely robust maximum likelihood estimation was used. The appropriateness of this technique was highlighted above in Section 5.6.1. A visual

representation of the *psychological ownership routes* measurement model is presented below in Figure 5.5 followed by the goodness of fit statistics in Table 5.87.



Chi-Square=257.64, df=74, P-value=0.00000, RMSEA=0.087

**Figure 5.5. Visual Representation of the Psychological Ownership Routes (Completely Standardised Solution)**

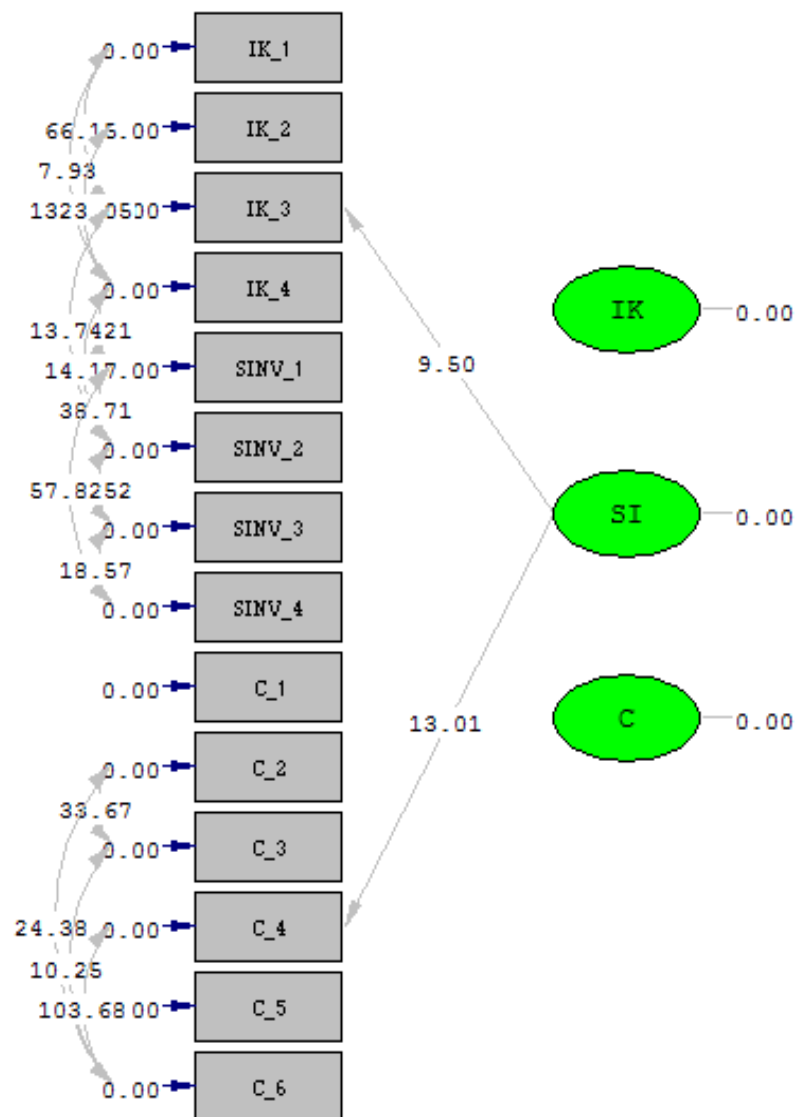
**Table 5.87**  
**Psychological Ownership Routes Measurement Model Goodness of Fit Statistics**

<b>Statistic</b>	<b>Value</b>
Degrees of Freedom = 74	74
Minimum Fit Function Chi-Square = 315.233 (P=0.0)	315.233 (P=0.0)
Normal Theory Weighted Least Squares Chi-Square = 335.871 (P=0.0)	335.871 (P=0.0)
<b>Satorra-Bentler Scaled Chi-Square = 257.640 (P=0.0)</b>	<b>257.640 (P=0.0)</b>
Chi-Square Corrected for Non-Normality = 239.357 (P=0.0)	239.357 (P=0.0)
Estimated Non-centrality Parameter (NCP) = 183.640	183.640
90 Percent Confidence Interval for NCP=(138.520 ; 236.354)	(138.520 ; 236.354)
Minimum Fit Function Value	0.96
Population Discrepancy Function Value (F0)	0.560
90 Percent Confidence Interval for F0	(0.422 ; 0.721)
<b>Root Mean Square Error of Approximation (RMSEA)</b>	<b>0.0870</b>
<b>90 Percent Confidence Interval for RMSEA</b>	<b>(0.0755 ; 0.0987)</b>
<b>P-Value for Test of Close Fit (RMSEA &lt; 0.05)</b>	<b>0.000</b>
Expected Cross-Validation Index (ECVI)	0.975
90 Percent Confidence Interval for ECVI	(0.837 ; 1.135)
ECVI for Saturated Model	0.640
ECVI for Independence Model	17.082
Chi-Square for Independence Model with 91 Degrees of Freedom	5574.836
Independence AIC	5602.836
Model AIC	319.640
Saturated AIC	210.000
Independence CAIC	5669.981
Model CAIC	468.318
Saturated CAIC	713.586
<b>Normed Fit Index (NFI)</b>	<b>0.954</b>
<b>Non-Normed Fit Index (NNFI)</b>	<b>0.959</b>
<b>Parsimony Normed Fit Index (PNFI)</b>	<b>0.776</b>
<b>Comparative Fit Index (CFI)</b>	<b>0.967</b>
<b>Incremental Fit Index (IFI)</b>	<b>0.967</b>
<b>Relative Fit Index (RFI)</b>	<b>0.943</b>
<b>Critical N (CN)</b>	<b>134.934</b>
<b>Root Mean Square Residual (RMR)</b>	<b>0.0864</b>
<b>Standardized RMR</b>	<b>0.0499</b>
<b>Goodness of Fit Index (GFI)</b>	<b>0.872</b>
<b>Adjusted Goodness of Fit Index (AGFI)</b>	<b>0.819</b>
<b>Parsimony Goodness of Fit Index (PGFI)</b>	<b>0.615</b>

Initial inspection of the fit indices for the *psychological ownership routes* measurement model provided conflicting information. Several indices pointed to a poor fitting model, namely the RMSEA (.0870), 90 percent confidence interval RMSEA (0.0755 ; 0.0987), p-value test of close fit (.000) and CN (134.934). While several indicators pointed to a good fitting model namely; NFI (.954), NNFI (.959), CFI (.967), IFI (.967), RFI (.943) and SRMR (.0499). The AIC and ECVI values when compared to the independent models were also lower. However, upon further investigation an indication of the problem was evident in the matrix of modification indices calculated for the theta-delta matrix. Here a large number of

statistically significant modification indices in the off-diagonal of the matrix suggested that the items had something else in common, other than the specific *route to psychological ownership* that they were earmarked to reflect.

The modification indices calculated for the theta-delta matrix more specifically suggested that almost all the items of the *psychological ownership routes* scale had a common source of variance in addition to the specific *route* source of variance (with the exception of C\_1). Figure 5.6 depicts the statistically significant ( $p < .01$ ) modification indices calculated for the fitted *psychological ownership routes* measurement model.



Chi-Square=257.64, df=74, P-value=0.00000, RMSEA=0.087

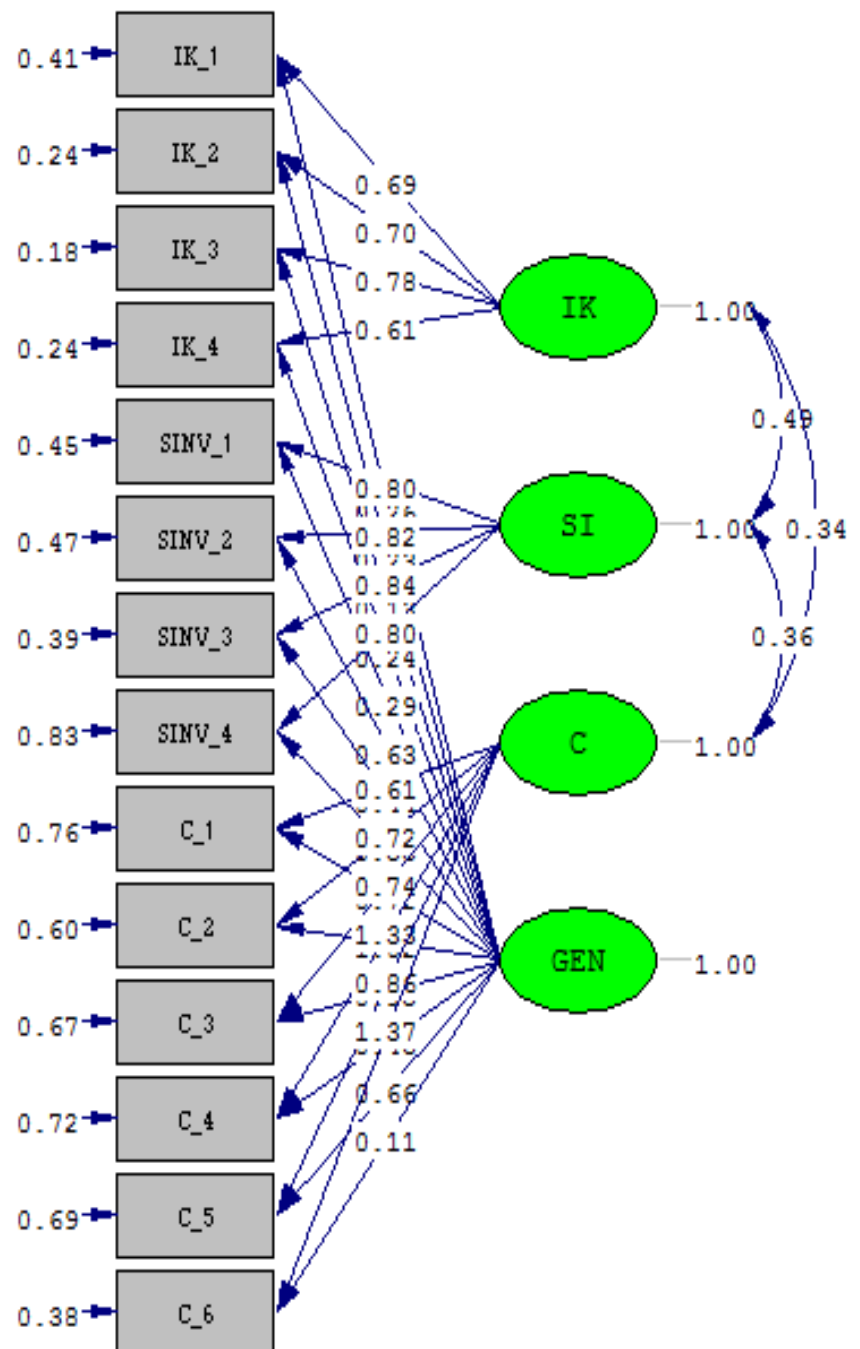
**Figure 5.6. Visual Representation of the Statistically Significant ( $p < .01$ ) Modification Indices Calculated for the Fitted Psychological Ownership Routes Measurement Model**

The large number of statistically significant modification index values depicted in Figure 5.6 above provided a visual representation of the motivation for hypothesising a broad, general route factor in addition to the three narrow, more specific *routes*.

The presence of a broad, general route factor made sense from a theoretical point of view if the theorising surrounding the *routes towards psychological ownership* is considered. Pierce et al. (2001; 2003) argued that *psychological ownership* is the result of being afforded the opportunity to “travel on specific routes” that brings with it specific experiences. Pierce et al. (2001) specifically propose that the *opportunity to have control over a target*, the *opportunity to gain knowledge about the target* and the opportunity to immerse one’s self into the target, through *self-investment*, leads to feelings of *psychological ownership*. Effect indicators written to reflect the extent to which employees have been offered the opportunity to “travel these specific routes” should all also reflect the extent to which employees have been offered the broad opportunity to be intimately psychologically involved in their jobs. Hence the presence of a broad, general factor on which all the *psychological ownership routes* items load makes theoretical sense.

Bi-factor confirmatory factor analysis was subsequently used to evaluate the *psychological ownership routes* measurement model expanded with the inclusion of a general route factor. A visual representation of the *psychological ownership routes* bi-factor measurement model is presented below in Figure 5.7. The goodness of fit results are then presented in Table 5.88 and subsequently discussed.





Chi-Square=130.45, df=60, P-value=0.00000, RMSEA=0.060

**Figure 5.7. Visual Representation of the Psychological Ownership Routes Bi-factor Measurement Model (Completely Standardised Solution)**

Figure 5.7 illustrates that the bi-factor model was fitted by constraining the correlation between the broad, general route factor and the narrower, specific route factors, to zero. The narrower, more specific route factors were allowed to correlate. Table 5.88 below presents the goodness of fit statistics for the *psychological ownership* routes bi-factor measurement model.

**Table 5.88*****Psychological Ownership Routes Bi-factor Measurement Model Goodness of Fit Statistics***

<b>Statistic</b>	<b>Value</b>
Degrees of Freedom	60
Minimum Fit Function Chi-Square	167.654 (P=0.00)
Normal Theory Weighted Least Squares Chi-Square	177.982 (P=0.00)
<b>Satorra-Bentler Scaled Chi-Square</b>	<b>130.449 (P=0.000)</b>
Chi-Square Corrected for Non-Normality	115.298 (P=0.000)
Estimated Non-centrality Parameter (NCP)	70.449
90 Percent Confidence Interval for NCP	(41.281 ; 107.360)
Minimum Fit Function Value	0.511
Population Discrepancy Function Value (F0)	0.215
90 Percent Confidence Interval for F0	(0.126 ; 0.327)
<b>Root Mean Square Error of Approximation (RMSEA)</b>	<b>0.0598</b>
<b>90 Percent Confidence Interval for RMSEA</b>	<b>(0.0458 ; 0.0739)</b>
<b>P-Value for Test of Close Fit (RMSEA &lt; 0.05)</b>	<b>0.119</b>
Expected Cross-Validation Index (ECVI)	0.672
90 Percent Confidence Interval for ECVI	(0.583 ; 0.785)
ECVI for Saturated Model	0.640
ECVI for Independence Model	17.082
Chi-Square for Independence Model with 91 Degrees of Freedom	5574.836
Independence AIC	5602.836
Model AIC	220.449
Saturated AIC	210.000
Independence CAIC	5669.981
Model CAIC	436.271
Saturated CAIC	713.586
<b>Normed Fit Index (NFI)</b>	<b>0.977</b>
<b>Non-Normed Fit Index (NNFI)</b>	<b>0.981</b>
<b>Parsimony Normed Fit Index (PNFI)</b>	<b>0.644</b>
<b>Comparative Fit Index (CFI)</b>	<b>0.987</b>
<b>Incremental Fit Index (IFI)</b>	<b>0.987</b>
<b>Relative Fit Index (RFI)</b>	<b>0.965</b>
<b>Critical N (CN)</b>	<b>223.224</b>
<b>Root Mean Square Residual (RMR)</b>	<b>0.0497</b>
<b>Standardized RMR</b>	<b>0.0350</b>
<b>Goodness of Fit Index (GFI)</b>	<b>0.928</b>
<b>Adjusted Goodness of Fit Index (AGFI)</b>	<b>0.874</b>
<b>Parsimony Goodness of Fit Index (PGFI)</b>	<b>0.530</b>

It is evident from Table 5.88 above that the *psychological ownership* routes bi-factor measurement model obtained a Satorra-Bentler scaled chi-square value of 130.449 ( $p=0.000$ ). This suggested that the null hypothesis of exact fit should be rejected. Again, this was no surprise and therefore the  $p$ -value of the test of close fit should rather be examined. This value (.119) indicated that the close fit null hypothesis should not be rejected for this model ( $p>.05$ ). This provided supporting evidence that a conclusion of

good fit for the *psychological ownership* routes bi-factor measurement model was warranted.

The remaining fit indices additionally showed evidence of good fit. It seemed reasonable to therefore conclude that the *psychological ownership routes* bi-factor measurement model showed good fit and therefore the parameter estimates, measurement error variance,  $R^2$  and phi estimates were investigated in order to come to a conclusion surrounding the success of the operationalisation of this latent variable. These are presented below in Tables 5.89, 5.90, 5.91, 5.92, 5.93, and 5.94, respectively.

**Table 5.89**  
***Psychological Ownership Routes Bi-factor Measurement Model Unstandardised Lambda-X Matrix***

	<b>IK</b>	<b>SI</b>	<b>C</b>	<b>GEN</b>
IK_1	0.694 (0.051) 13.548	--	--	0.258 (0.088) 2.932
IK_2	0.698 (0.045) 15.598	--	--	0.231 (0.079) 2.900
IK_3	0.783 (0.036) 21.838	--	--	0.127 (0.088) <b>1.444</b>
IK_4	0.608 (0.044) 13.684	--	--	0.238 (0.072) 3.314
SINV_1	--	0.799 (0.055) 14.653	--	0.290 (0.095) 3.038
SINV_2	--	0.822 (0.091) 9.001	--	0.629 (0.101) 6.252
SINV_3	--	0.844 (0.070) 12.056	--	0.438 (0.106) 4.143
SINV_4	--	0.804 (0.071) 11.262	--	0.333 (0.104) 3.192
C_1	--	--	0.615 (0.185) 3.326	0.723 (0.166) 4.346
C_2	--	--	0.718 (0.244)	1.017 (0.190)

			2.938	5.360
C_3	--	--	0.740 (0.221)	0.925 (0.189)
			3.345	4.892
C_4	--	--	1.326 (0.137)	0.451 (0.329)
			9.703	1.369
C_5	--	--	0.860 (0.170)	0.657 (0.219)
			5.071	2.998
C_6	--	--	1.369 (0.092)	0.108 (0.318)
			14.834	<b>0.338</b>

IK=Intimate Knowledge, SINV=Self Investment, C=Control

It is evident from Table 5.89 above that all of the factor loadings were statistically significant except for the relationship between the general factor and IK\_3 as well as the relationship between the general factor and C\_6.

**Table 5.90**

***Psychological Ownership Routes Bi-Factor Measurement Model Completely Standardised Lambda-X Matrix***

	IK	SI	C	GEN
IK_1	0.711	--	--	0.264
IK_2	0.790	--	--	0.261
IK_3	0.871	--	--	0.141
IK_4	0.744	--	--	0.292
SINV_1	--	0.739	--	0.268
SINV_2	--	0.662	--	0.506
SINV_3	--	0.741	--	0.385
SINV_4	--	0.637	--	0.264
C_1	--	--	<b>0.477</b>	0.562
C_2	--	--	<b>0.489</b>	0.693
C_3	--	--	0.514	0.643
C_4	--	--	0.810	0.275
C_5	--	--	0.631	0.482
C_6	--	--	0.909	0.071

IK=Intimate Knowledge, SINV=Self Investment, C=Control

It is evident that for the majority of the items the narrower, more specific route latent variables explained more than 50% of the variance in the items, and with the exception of two *control* items, more than 25% of the item variance. This was a favourable position. However, Table 5.90 above indicates that there could potentially have been problems with two of the *control* items (C\_1 and C\_2). However, these items were not indicated as

problematic within the item analysis. Although the narrow, more specific control route only explained *circa* 23% of the variance in the items, the broad general route factor explained more than 25% of the variance in the two items. As shown in Table 5.94 the R<sup>2</sup> values for these two item are therefore still quite acceptable. It is therefore argued that certain items could load higher on the general factor while others could more predominantly reflect a specific narrow route. The findings regarding the two control items are therefore not that concerning.

Table 5.91 below presents the unstandardised theta-delta matrix depicting the residual variances associated with the route items.

**Table 5.91**  
***Psychological Ownership Routes Bi-factor Measurement Model Unstandardised Theta-Delta Matrix***

<b>IK_1</b>	<b>IK_2</b>	<b>IK_3</b>	<b>IK_4</b>	<b>SINV_1</b>	<b>SINV_2</b>
0.406	0.240	0.179	0.241	0.445	0.473
(0.050)	(0.031)	(0.035)	(0.039)	(0.057)	(0.056)
8.101	7.794	5.099	6.197	7.756	8.398
<b>SINV_3</b>	<b>SINV_4</b>	<b>C_1</b>	<b>C_2</b>	<b>C_3</b>	<b>C_4</b>
0.394	0.835	0.757	0.603	0.666	0.719
(0.050)	(0.076)	(0.072)	(0.083)	(0.107)	(0.126)
7.825	11.024	10.447	7.236	6.237	5.703
<b>C_5</b>	<b>C_6</b>				
0.685	0.381				
(0.067)	(0.188)				
10.156	2.029				

IK=Intimate Knowledge, SINV=Self Investment, C=Control

It is evident from Table 5.91 above that all indicators were statistically significantly plagued by measurement error ( $z \geq 1.6449$ ). Table 5.92 below presents the completely standardised theta-delta matrix. Theta-delta estimates were considered adequate if they were less than .50 since this would mean that less than 50% of the item variance could be attributed to measurement error.

**Table 5.92**  
**Psychological Ownership Routes Bi-factor Measurement Model Completely Standardised Theta-Delta Matrix**

IK_1	IK_2	IK_3	IK_4	SINV_1	SINV_2
0.426	0.308	0.222	0.362	0.381	0.306
SINV_3	SINV_4	C_1	C_2	C_3	C_4
0.303	0.524	0.456	0.28	0.322	0.268
C_5	C_6				
0.369	0.168				

IK=Intimate Knowledge, SINV=Self Investment, C=Control

It is evident that all values were therefore satisfactory, except for SINV\_4. SINV\_4. This item was however not identified as a problematic item during the item and factor analysis and only just misses the .50 cut-off criterion and its deletion would reduce Cronbach alpha. Therefore, it seemed reasonable to retain this item.

Table 5.93 below presents the latent variable inter-correlations.

**Table 5.93**  
**Psychological Ownership Routes Bi-factor Measurement Model Unstandardised Phi Matrix**

	IK	SI	C	GEN
IK	1.000			
SI	0.488 (0.069) 7.033	1.000		
C	0.345 (0.086) 4.014	0.359 (0.113) 3.180	1.000	
GEN	--	--	--	1.000

IK=Intimate Knowledge, SI=Self Investment, C=Control, Gen=General Factor

All the correlations between the narrow, more specific, route factors were statistically significant ( $p < .05$ ). It is evident from Table 5.93 that none of these inter-correlations were excessively high which suggested that the narrow, more specific, route latent variables were successfully measured as related, but qualitatively distinct, latent variables.

The  $R^2$  values are depicted in depicted in Table 5.94 below.

**Table 5.94*****Psychological Ownership Routes Bi-factor Measurement Model Squared Multiple Correlations***<sup>81</sup>

<b>IK_1</b>	<b>IK_2</b>	<b>IK_3</b>	<b>IK_4</b>	<b>SINV_1</b>	<b>SINV_2</b>
0.574	0.692	0.778	0.638	0.619	0.694
<b>SINV_3</b>	<b>SINV_4</b>	<b>C_1</b>	<b>C_2</b>	<b>C_3</b>	<b>C_4</b>
0.697	0.476	0.544	0.720	0.678	0.732
<b>C_5</b>	<b>C_6</b>				
0.631	0.832				

IK=Intimate Knowledge, SINV=Self Investment, C=Control

These values ranged from .476 to .832. This suggested somewhat satisfactory validity and that the portion of variance explained by each of the indicator variables was satisfactory except for SINV\_4 which again failed to meet the 50% criterion and indicated that only *circa* 48% of the variance in this indicator is due to *self-investment* and the broad general route factor. Again, this item was not identified as problematic during the item analysis, however it did suffer from both a lower R<sup>2</sup> as well as a less than desirable (but not outright terrible) measurement error variance.

After interpreting and analysing the above basket of evidence it seemed reasonable to conclude that the *psychological ownership routes* bi-factor measurement model fitted the data reasonably, the vital standardised factor loadings were statistically significant and large, the variance terms were small and statistically significant and the R<sup>2</sup> indices were large, for most of the indicators, and discriminant validity was indicated. It was therefore concluded that the operationalisation of the *psychological ownership routes* was successful.

#### **5.6.4 Motivation to pursue psychological ownership routes**

The data was screened to test assumptions of normality prior to investigating model fit. Results of the test for univariate and multivariate normality before normalisation, are presented below in Table 5.95 and Table 5.96 respectively.

<sup>81</sup> The R<sup>2</sup>-values are given by the sum of the completely standardised squared loading of the item on its narrow route factor and its completely standardised squared loading on the broad, general factor.



**Table 5.95****Test of Univariate Normality for Motivation to Pursue the Routes before Normalisation**

Variable	Skewness		Kurtosis		Skewness and Kurtosis	
	Z-Score	P-Value	Z-Score	P-Value	Chi-Square	P-Value
MOT_1	-8.556	0.000	5.811	0.000	106.970	0.000
MOT_2	-7.720	0.000	3.814	0.000	74.145	0.000
MOT_3	-8.662	0.000	5.711	0.000	107.647	0.000
MOT_4	-10.361	0.000	7.410	0.000	162.258	0.000
MOT_5	-4.327	0.000	-2.014	0.044	22.776	0.000
MOT_6	-8.295	0.000	4.786	0.000	91.709	0.000
MOT_7	-10.979	0.000	8.066	0.000	185.595	0.000
MOT_8	-11.342	0.000	7.550	0.000	185.635	0.000
MOT_9	-9.146	0.000	5.764	0.000	116.879	0.000
MOT_10	-7.867	0.000	3.776	0.000	76.141	0.000
MOT_11	-5.508	0.000	0.800	0.423	30.978	0.000
MOT_12	-6.911	0.000	3.182	0.001	57.891	0.000
MOT_13	-8.370	0.000	5.096	0.000	96.020	0.000
MOT_14	-4.601	0.000	-1.389	0.165	23.100	0.000
MOT_15	-7.411	0.000	3.473	0.001	66.988	0.000
MOT_16	-8.633	0.000	5.127	0.000	100.810	0.000
MOT_17	-8.397	0.000	4.432	0.000	90.151	0.000
MOT_18	-8.157	0.000	4.177	0.000	83.980	0.000

Mot=Motivation

**Table 5.96****Test of Multivariate Normality for Motivation to Pursue the Routes before Normalisation**

Value	Skewness		Kurtosis		Skewness and Kurtosis		
	Z-Score	P-Value	Value	Z-Score	P-Value	Chi-Square	P-Value
103.614	50.733	0.000	568.648	23.001	0.000	3102.841	0.000

The chi-square for skewness and kurtosis presented in Table 5.95 above indicates that all of the items similarly failed the test of univariate normality ( $p < .05$ ). Furthermore, the null hypothesis that the data follows a multivariate normal distribution also had to be rejected ( $X^2=3102.841$ ;  $p < .05$ ). This therefore indicated the need to normalise the items<sup>82</sup> in

<sup>82</sup> Normalisation was conducted in order for the data to satisfy the assumption of multivariate normality as the quality of the solutions obtained is critically dependent upon this assumption being met.

PRELIS. The results of this normalisation on the univariate and multivariate assumptions are presented below in Table 5.97 and Table 5.98

**Table 5.97**

***Test of univariate Normality for Motivation to Pursue the Routes after Normalisation***

Variable	Skewness		Kurtosis		Skewness and Kurtosis	
	Z-Score	P-Value	Z-Score	P-Value	Chi-Square	P-Value
MOT_1	-3.530	0.000	-2.193	0.028	17.274	0.000
MOT_2	-2.161	0.031	-2.260	0.024	9.779	0.008
MOT_3	-3.078	0.002	-2.139	0.032	14.046	0.001
MOT_4	-4.411	0.000	-1.776	0.076	22.610	0.000
MOT_5	-1.041	0.298	-2.783	0.005	8.829	0.012
MOT_6	-2.948	0.003	-2.282	0.022	13.901	0.001
MOT_7	-4.486	0.000	-1.708	0.088	23.043	0.000
MOT_8	-5.792	0.000	-0.864	0.388	34.295	0.000
MOT_9	-3.198	0.001	-2.340	0.019	15.705	0.000
MOT_10	-3.545	0.000	-2.407	0.016	18.360	0.000
MOT_11	-1.961	0.050	-2.674	0.007	10.994	0.004
MOT_12	-2.263	0.024	-2.368	0.018	10.732	0.005
MOT_13	-3.502	0.000	-2.061	0.039	16.511	0.000
MOT_14	-1.278	0.201	-2.551	0.011	8.140	0.017
MOT_15	-2.006	0.045	-1.936	0.053	7.772	0.021
MOT_16	-3.929	0.000	-2.047	0.041	19.624	0.000
MOT_17	-4.017	0.000	-2.442	0.015	22.098	0.000
MOT_18	-2.532	0.011	-2.547	0.011	12.900	0.002

Mot=Motivation

**Table 5.98**

***Test of Multivariate Normality for Motivation to Pursue the Routes after Normalisation***

Value	Skewness		Kurtosis		Skewness and Kurtosis	
	Z-Score	P-Value	Value	Z-Score	Chi-Square	P-Value
52.457	25.898	0.000	455.547	16.232	934.203	0.000

It is evident from the results presented above in Table 5.97 and Table 5.98 that the normalisation was not fully successful. The normalisation in PRELIS did succeed in reducing the extent to which the univariate item distributions deviate from univariate normality. However, unfortunately 17 of the 18 univariate item distributions still failed the test of univariate normality ( $p < .05$ ). Further corroboratory evidence of the failure of these items to meet the critical statistical assumption of normality is evident in Table 5.98 above in that although the procedure did succeed in reducing the deviation of the observed

multivariate indicator distribution from the theoretical multivariate normal distribution (chi-square statistic decreased from 3102.841 to 934.203), the null hypothesis that the data follows a multivariate normal distribution still had to be rejected ( $X^2 = 934.203$ ;  $p < .05$ ). Therefore, since the normalisation was not completely successful, but there was a reduction in the chi-square statistic, an alternative estimation technique, namely robust maximum likelihood estimation was used. CFA was conducted on the *motivation to pursue the routes towards psychological ownership* subscale with two factors namely *expectancy* and *valence*. The goodness of fit statistics are presented below in Table 5.99.

It is evident from the statistics in Table 5.99 that this model fits very poorly (RMSEA=.170). Therefore, due to the findings of the dimensionality analysis and the high number of theta-delta modification indices (44.44%) a general factor was added to the measurement model. These results are presented below in Table 5.100<sup>83</sup>.

It is evident from the goodness of fit statistics that this did not substantially improve the fit of the *motivation to pursue the routes* measurement model. In an attempt to improve the fit the researcher fitted a six factor measurement model. This decision was guided by the results of the dimensionality and factor analysis as it seemed prudent to separate each of the *routes* per motivational element namely *expectancy* and *valence*. The fit statistics for the six-factor measurement model are shown in Table 5.101.

It is evident from Table 5. 101 below that this revised model fits reasonably, however the close fit null hypothesis still had to be rejected. Upon deeper investigation of the model's modification indices it became clear that it was still plagued by a high number of statistically significant ( $p < .01$ ) modification indices associated with the theta-delta matrix. It was therefore decided that a general factor should be added to the model. The visual representation of this revised measurement model and goodness of fit results are presented below in Figure 5.8 and Table 5.101 respectively.

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<sup>83</sup> Table 5.100 and Table 5.101 have been inserted on the pages that follow in order to improve readability.

**Table 5.99****Two Factor Motivation to Pursue the Routes towards Psychological Ownership Measurement Model Goodness of Fit Statistics**

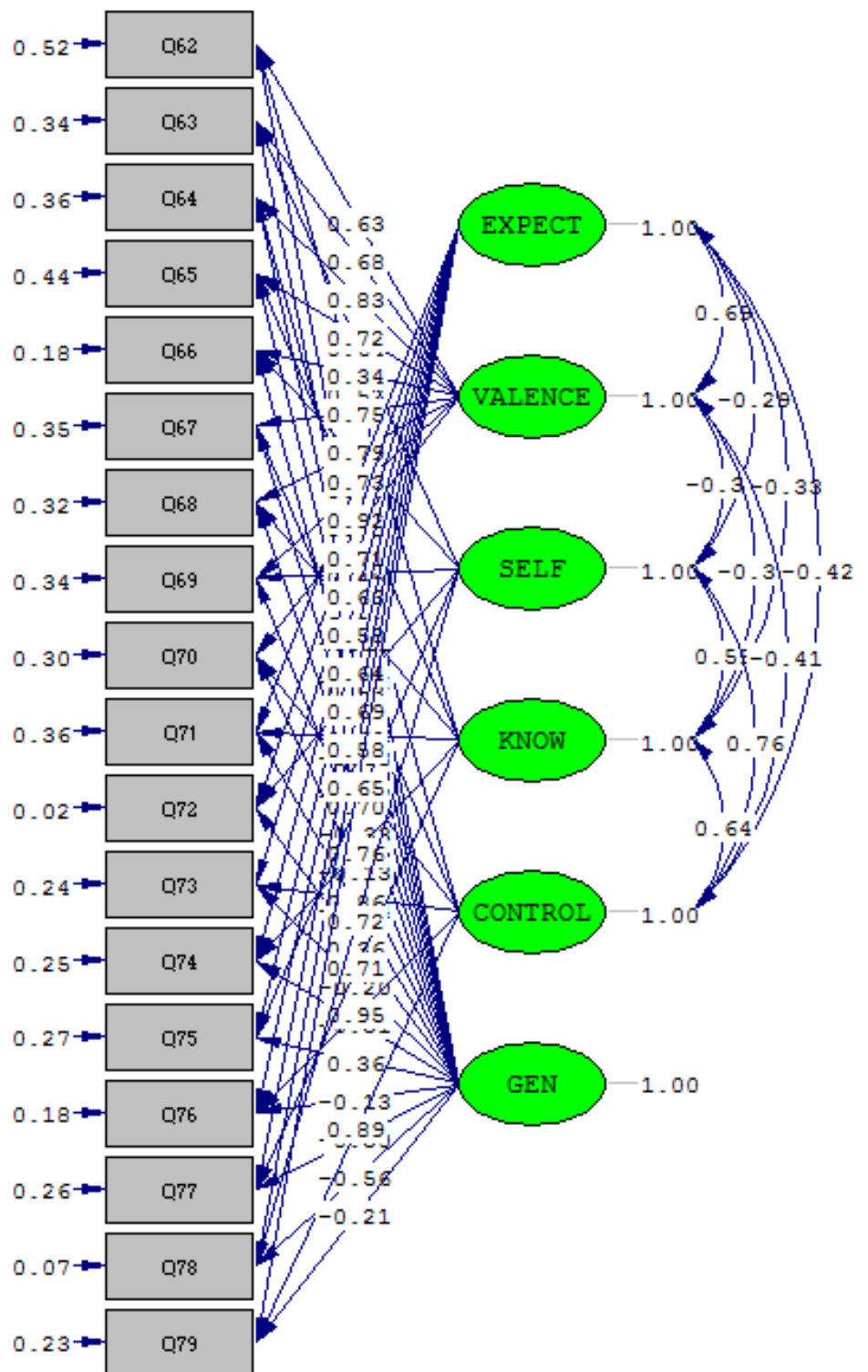
<b>Statistic</b>	<b>Value</b>
Degrees of Freedom	134
Minimum Fit Function Chi-Square	1464.019 (P= 0.0)
Normal Theory Weighted Least Squares Chi-Square	1925.024 (P= 0.0)
<b>Satorra-Bentler Scaled Chi-Square</b>	<b>1398.758 (P= 0.0)</b>
Chi-Square Corrected for Non-Normality	698.301 (P= 0.0)
Estimated Non-centrality Parameter (NCP)	1264.758
90 Percent Confidence Interval for NCP	(1148.376 ; 1388.563)
Minimum Fit Function Value	4.463
Population Discrepancy Function Value (F0)	3.856
90 Percent Confidence Interval for F0	(3.501 ; 4.233)
<b>Root Mean Square Error of Approximation (RMSEA)</b>	<b>0.170</b>
90 Percent Confidence Interval for RMSEA	(0.162 ; 0.178)
<b>P-Value for Test of Close Fit (RMSEA &lt; 0.05)</b>	<b>0.000</b>
Expected Cross-Validation Index (ECVI)	4.490
90 Percent Confidence Interval for ECVI	(4.135 ; 4.868)
ECVI for Saturated Model	1.043
ECVI for Independence Model	30.258
Chi-Square for Independence Model with 153 Degrees of Freedom	9888.674
Independence AIC	9924.674
Model AIC	1472.758
Saturated AIC	342.000
Independence CAIC	10011.003
Model CAIC	1650.212
Saturated CAIC	1162.126
Normed Fit Index (NFI)	0.859
Non-Normed Fit Index (NNFI)	0.852
Parsimony Normed Fit Index (PNFI)	0.752
Comparative Fit Index (CFI)	0.870
Incremental Fit Index (IFI)	0.870
Relative Fit Index (RFI)	0.838
Critical N (CN)	42.036
Root Mean Square Residual (RMR)	0.200
Standardized RMR	0.107
Goodness of Fit Index (GFI)	0.605
Adjusted Goodness of Fit Index (AGFI)	0.496
Parsimony Goodness of Fit Index (PGFI)	0.474

**Table 5.100****Two Bi- factor Motivation to Pursue the Routes towards Psychological Ownership Measurement Model Goodness of Fit Statistics**

<b>Statistics</b>	<b>Value</b>
Degrees of Freedom	116
Minimum Fit Function Chi-Square	888.555 (P= 0.0)
Normal Theory Weighted Least Squares Chi-Square	969.430 (P = 0.0)
<b>Satorra-Bentler Scaled Chi-Square</b>	<b>761.528 (P = 0.0)</b>
Chi-Square Corrected for Non-Normality	523.141 (P = 0.0)
Estimated Non-centrality Parameter (NCP)	645.528
90 Percent Confidence Interval for NCP	(561.976 ; 736.564)
Minimum Fit Function Value	2.709
Population Discrepancy Function Value (F0)	1.968
90 Percent Confidence Interval for F0	(1.713 ; 2.246)
<b>Root Mean Square Error of Approximation (RMSEA)</b>	<b>0.130</b>
90 Percent Confidence Interval for RMSEA	(0.122 ; 0.139)
<b>P-Value for Test of Close Fit (RMSEA &lt; 0.05)</b>	<b>0.000</b>
Expected Cross-Validation Index (ECVI)	2.657
90 Percent Confidence Interval for ECVI	(2.402 ; 2.935)
ECVI for Saturated Model	1.043
ECVI for Independence Model	30.258
Chi-Square for Independence Model with 153 Degrees of Freedom	9888.674
Independence AIC	9924.674
Model AIC	871.528
Saturated AIC	342.000
Independence CAIC	10011.003
Model CAIC	1135.311
Saturated CAIC	1162.126
Normed Fit Index (NFI)	0.923
Non-Normed Fit Index (NNFI)	0.913
Parsimony Normed Fit Index (PNFI)	0.700
Comparative Fit Index (CFI)	0.934
Incremental Fit Index (IFI)	0.934
Relative Fit Index (RFI)	0.898
Critical N (CN)	67.478
Root Mean Square Residual (RMR)	0.172
Standardized RMR	0.0789
Goodness of Fit Index (GFI)	0.753
Adjusted Goodness of Fit Index (AGFI)	0.636
Parsimony Goodness of Fit Index (PGFI)	0.511

**Table 5.101*****Six Factor Motivation to Pursue the Routes Measurement Model Goodness of Fit Statistics***

<b>Statistic</b>	<b>Value</b>
Degrees of Freedom	107.000
Minimum Fit Function Chi-Square	399.798 (P= 0.0)
Normal Theory Weighted Least Squares Chi-Square	377.905 (P= 0.0)
<b>Satorra-Bentler Scaled Chi-Square</b>	<b>298.338 (P= 0.0)</b>
Chi-Square Corrected for Non-Normality	327.312 (P= 0.0)
Estimated Non-centrality Parameter (NCP)	191.338
90 Percent Confidence Interval for NCP	(143.642 ; 246.687)
Minimum Fit Function Value	1.219
Population Discrepancy Function Value (F0)	0.583
90 Percent Confidence Interval for F0	(0.438 ; 0.752)
<b>Root Mean Square Error of Approximation (RMSEA)</b>	<b>0.074</b>
90 Percent Confidence Interval for RMSEA	(0.0640 ; 0.0838)
<b>P-Value for Test of Close Fit (RMSEA &lt; 0.05)</b>	<b>0.000</b>
Expected Cross-Validation Index (ECVI)	1.300
90 Percent Confidence Interval for ECVI	(1.154 ; 1.469)
ECVI for Saturated Model	1.043
ECVI for Independence Model	30.258
Chi-Square for Independence Model with 153 Degrees of Freedom	9888.674
Independence AIC	9924.674
Model AIC	426.338
Saturated AIC	342.000
Independence CAIC	10011.003
Model CAIC	733.286
Saturated CAIC	1162.126
Normed Fit Index (NFI)	0.970
Non-Normed Fit Index (NNFI)	0.972
Parsimony Normed Fit Index (PNFI)	0.678
Comparative Fit Index (CFI)	0.980
Incremental Fit Index (IFI)	0.980
Relative Fit Index (RFI)	0.957
Critical N (CN)	159.258
Root Mean Square Residual (RMR)	0.060
Standardized RMR	0.041
Goodness of Fit Index (GFI)	0.887
Adjusted Goodness of Fit Index (AGFI)	0.819
Parsimony Goodness of Fit Index (PGFI)	0.555



Chi-Square=199.63, df=89, P-value=0.00000, RMSEA=0.062

**Figure 5.8. Visual Representation of the Six Bi-factor Motivation to Pursue the Routes towards Psychological Ownership Measurement Model**



**Table 5.102*****Six Bi-factor Motivation to Pursue the Routes towards Psychological Ownership Measurement Model Goodness of Fit Statistics***

Statistics	Value
Degrees of Freedom	89
Minimum Fit Function Chi-Square	264.814 (P=0.0)
Normal Theory Weighted Least Squares Chi-Square	244.542 (P=0.00)
<b>Satorra-Bentler Scaled Chi-Square</b>	<b>199.628 (P=0.00)</b>
Chi-Square Corrected for Non-Normality	260.935 (P=0.0)
Estimated Non-centrality Parameter (NCP)	110.628
90 Percent Confidence Interval for NCP	(73.465 ; 155.524)
Minimum Fit Function Value	0.807
Population Discrepancy Function Value (F0)	0.337
90 Percent Confidence Interval for F0	(0.224 ; 0.474)
<b>Root Mean Square Error of Approximation (RMSEA)</b>	<b>0.062</b>
90 Percent Confidence Interval for RMSEA	(0.0502 ; 0.0730)
<b>P-Value for Test of Close Fit (RMSEA &lt; 0.05)</b>	<b>0.048</b>
Expected Cross-Validation Index (ECVI)	1.109
90 Percent Confidence Interval for ECVI	(0.995 ; 1.245)
ECVI for Saturated Model	1.043
ECVI for Independence Model	30.258
Chi-Square for Independence Model with 153 Degrees of Freedom	9888.674
Independence AIC	9924.674
Model AIC	363.628
Saturated AIC	342.000
Independence CAIC	10011.003
Model CAIC	756.905
Saturated CAIC	1162.126
Normed Fit Index (NFI)	0.980
Non-Normed Fit Index (NNFI)	0.980
Parsimony Normed Fit Index (PNFI)	0.570
Comparative Fit Index (CFI)	0.989
Incremental Fit Index (IFI)	0.989
Relative Fit Index (RFI)	0.965
Critical N (CN)	203.004
Root Mean Square Residual (RMR)	0.038
Standardized RMR	0.029
Goodness of Fit Index (GFI)	0.923
Adjusted Goodness of Fit Index (AGFI)	0.853
Parsimony Goodness of Fit Index (PGFI)	0.481

The exact fit null hypothesis was rejected in favour of the exact fit alternative hypothesis. The close fit null hypothesis was also rejected, when interpreting the exceedance probability without rounding, but was not rejected when rounding the exceedance probability up to two decimal figures.

The remaining fit statistics provide an indication of reasonable fit, however this fit was marginally better than the fit of the six factor measurement model. This improvement was a promising conclusion. The finding of reasonable fit meant that the parameter estimates could be explored to determine final conclusions pertaining to this scales ability to operationalise the latent variable they were developed to reflect. The parameter estimates are presented below in Tables 5.103 to Table 5.107.

**Table 5.103**

***Motivation to Pursue the Routes towards Psychological Ownership Six, Bi-Factor Unstandardised Lambda-X Matrix***

	EXPECT	VALENCE	SELF	KNOW	CONTROL	GEN
Mot_1	--	0.606 (0.106)	--	0.501 (0.099)	--	-0.035 (0.080)
		5.702		5.082		<b>-0.444</b>
Mot_2	--	0.925 (0.144)	0.867 (0.207)	--	--	0.409 (0.201)
		6.408	4.186			2.041
Mot_3	--	0.888 (0.124)	--	--	0.603 (0.156)	-0.121 (0.111)
		7.188			3.875	<b>-1.091</b>
Mot_4	--	0.598 (0.092)	--	0.395 (0.087)	--	-0.096 (0.076)
		6.483		4.556		<b>-1.260</b>
Mot_5	--	0.579 (0.183)	1.407 (0.279)	--	--	0.747 (0.371)
		3.156	5.038			2.014
Mot_6	--	0.901 (0.153)	--	--	0.870 (0.159)	-0.099 (0.149)
		5.881			5.479	<b>-0.666</b>
Mot_7	--	0.692 (0.108)	--	0.447 (0.095)	--	-0.148 (0.085)
		6.421		4.726		-1.736
Mot_8	--	0.798 (0.132)	0.470 (0.179)	--	--	-0.342 (0.123)
		6.059	2.622			-2.775
Mot_9	--	0.924 (0.154)	--	--	0.854 (0.157)	-0.148 (0.144)

		5.984			5.421	<b>-1.023</b>
Mot_10	0.782 (0.176)	--	--	0.674 (0.135)	--	-0.150 (0.137)
	4.446			4.977		<b>-1.094</b>
Mot_11	1.339 (0.147)	--	0.763 (0.329)	--	--	0.529 (0.249)
	9.121		2.316			2.124
Mot_12	0.922 (0.246)	--	--	--	1.112 (0.200)	-0.254 (0.227)
	3.747				5.571	<b>-1.116</b>
Mot_13	0.640 (0.213)	--	--	0.773 (0.134)	--	-0.316 (0.130)
	2.999			5.776		-2.433
Mot_14	0.948 (0.163)	--	1.132 (0.287)	--	--	0.588 (0.294)
	5.822		3.940			1.997
Mot_15	0.860 (0.257)	--	--	--	1.278 (0.186)	-0.180 (0.262)
	3.341				6.857	<b>-0.686</b>
Mot_16	0.664 (0.195)	--	--	0.684 (0.126)	--	-0.291 (0.123)
	3.414			5.443		-2.358
Mot_17	0.679 (0.269)	--	0.840 (0.273)	--	--	-0.657 (0.209)
	2.521		3.077			-3.139
Mot_18	0.891 (0.262)	--	--	--	1.227 (0.201)	-0.291 (0.250)
	3.396				6.105	<b>-1.167</b>

Mot=Motivation

The addition of the bi-factor did seem to improve the fit of the *motivation to pursue the routes towards psychological ownership* measurement model with eight items loading statistically significantly ( $p < .05$ )<sup>84</sup> on the broad factor. Unfortunately however, ten of the items did not load significantly on the broad general motivation factor. All of the items did load statistically significantly ( $p < .05$ ) on the narrow factors that they were meant to load. It was therefore concluded that the bi-factor argument was tenuous although not altogether without merit (C.C. Theron, personal communication, May 10, 2017). As above, it is however prudent to investigate the completely standardised lambda-X matrix (Table 5.104) before making any decisions.

<sup>84</sup> The statistical significance of the factor loadings were evaluated via a two-tailed test by testing  $H_{0i}$ :  $\lambda_{ij}=0$  against  $H_{ai}$ :  $\lambda_{ij} \neq 0$ .

**Table 5.104*****Motivation to Pursue the Routes towards Psychological Ownership Six, Bi-Factor Completely Standardised Lambda-X Matrix***

	EXPECT	VALENCE	SELF	KNOW	CONTROL	GEN
Mot_1	--	0.631	--	0.522	--	-0.037
Mot_2	--	0.678	0.635	--	--	0.3
Mot_3	--	0.833	--	--	0.566	-0.113
Mot_4	--	0.722	--	<b>0.477</b>	--	-0.116
Mot_5	--	<b>0.344</b>	0.836	--	--	0.444
Mot_6	--	0.752	--	--	0.726	-0.083
Mot_7	--	0.792	--	0.512	--	-0.169
Mot_8	--	0.766	<b>0.451</b>	--	--	-0.328
Mot_9	--	0.786	--	--	0.727	-0.126
Mot_10	0.727	--	--	0.626	--	-0.139
Mot_11	0.921	--	0.525	--	--	0.364
Mot_12	0.711	--	--	--	0.858	-0.196
Mot_13	0.627	--	--	0.758	--	-0.31
Mot_14	0.585	--	0.698	--	--	0.362
Mot_15	0.640	--	--	--	0.952	-0.134
Mot_16	0.687	--	--	0.707	--	-0.301
Mot_17	0.582	--	0.720	--	--	-0.563
Mot_18	0.648	--	--	--	0.893	-0.212

Mot=Motivation

Table 5.104 above indicates that several of the items were less than satisfactory (<.50) while others were good (>.71) at reflecting the variance in the latent variable in question. However, the researcher believes that this situation arose due to the complex nature of each item. This complexity revolves around the fact that the items had to represent both a motivational factor as well as a *route*. The wording of each item therefore had to refer to a specific motivational factor (valence or expectancy) as well as a specific route (investing of the self, gaining intimate knowledge and ability to take control) very clearly. The fact that all the items statistically significantly load on two narrow factors indicated that the items did succeed in doing so but the magnitude of the completely standardised factor loadings on the other hand suggest that not all of the items achieved this objective equally successfully. In the case of some items only one of the factors on which the item loads is explained well as judged by the factor loading criteria applied thus far. The criteria requiring loadings of .71 or at least .50, however, assumed that each item is only meant to reflect a single underlying latent dimension. In the case of complex items the existing criteria become unrealistic. In some instances it is the expectancy factor or valence factor

and in the case of other items more variance is explained in the route factor on which the item loads.

In the final analysis the factor matrix should, however, not be interpreted in terms of the individual factor loadings in isolation but should rather be viewed collectively for each item. The critical question is therefore what proportion of the variance in each item is explained by the four factors that it represented. The sum of the squared completely standardised factor loadings have therefore to be interpreted. The interpretation of results shown in Table 5.104 should therefore take cognisance of the R<sup>2</sup> values shown in Table 5.10. The researcher is of the opinion that when viewed from this perspective the complex situation presented above in terms of factor loadings is tolerable for all the items except Mot\_1. Table 5.107 shows that the four factors each item was designated to reflect explained more than 50% of the variance in all the items except Mot\_1<sup>85</sup>.

It is additionally evident from Table 5.104 above that the items at times [but not consistently] also reflect a general broad motivation factor, but where they do, a very small proportion of the variance in the items are due to the broad general factor.

Table 5.105 shows the unstandardised theta-delta matrix.

**Table 5.105**

***Motivation to Pursue the Routes towards Psychological Ownership Six, Bi-Factor Unstandardised Theta-Delta Matrix***

<b>Mot_1</b>	<b>Mot_2</b>	<b>Mot_3</b>	<b>Mot_4</b>	<b>Mot_5</b>	<b>Mot_6</b>
0.483	0.640	0.406	0.304	0.522	0.496
(0.053)	(0.098)	(0.051)	(0.037)	(0.237)	(0.066)
9.172	6.524	7.912	8.224	2.201	7.531
<b>Mot_7</b>	<b>Mot_8</b>	<b>Mot_9</b>	<b>Mot_10</b>	<b>Mot_11</b>	<b>Mot_12</b>
0.246	0.370	0.420	0.415	0.040	0.398
(0.035)	(0.056)	(0.048)	(0.050)	(0.180)	(0.052)
7.095	6.596	8.769	8.272	<b>0.222</b>	7.590
<b>Mot_13</b>	<b>Mot_14</b>	<b>Mot_15</b>	<b>Mot_16</b>	<b>Mot_17</b>	<b>Mot_18</b>
0.258	0.717	0.331	0.239	0.089	0.432
(0.046)	(0.114)	(0.044)	(0.036)	(0.088)	(0.061)
5.670	6.270	7.445	6.641	<b>1.006</b>	7.100

Mot=Motivation

<sup>85</sup> The R<sup>2</sup>-value for Mot\_1 also only marginally missed the 50% cut-off value.

It is evident from Table 5.105 above that most of the items are statistically significantly plagued with error variance, except for Mot\_11 and Mot\_17. Although this finding would be a pleasant one it is somewhat unrealistic in that this could mean that (in the parameter) Mot\_11 and Mot\_17 were perfect indicators of the latent variables they were developed to reflect. This is, as mentioned, a somewhat unrealistic finding. However, it is the completely standardised theta-delta matrix that is of particular interest. This is presented below in Table 5.106.

**Table 5.106**

**Motivation to *Pursue the Routes towards Psychological Ownership Six, Bi-Factor Completely Standardised Theta-Delta***

<b>Mot_1</b>	<b>Mot_2</b>	<b>Mot_3</b>	<b>Mot_4</b>	<b>Mot_5</b>	<b>Mot_6</b>
<b>0.524</b>	0.344	0.357	0.442	0.184	0.346
<b>Mot_7</b>	<b>Mot_8</b>	<b>Mot_9</b>	<b>Mot_10</b>	<b>Mot_11</b>	<b>Mot_12</b>
0.323	0.341	0.304	0.359	0.019	0.237
<b>Mot_13</b>	<b>Mot_14</b>	<b>Mot_15</b>	<b>Mot_16</b>	<b>Mot_17</b>	<b>Mot_18</b>
0.248	0.273	0.183	0.256	0.065	0.228

Mot=Motivation

The error variance level is reasonable for all items, except for Mot\_1 where it fell just above the .50, as displayed in Table 5.106. This means that more than 50% of the variance in Mot\_1 can be ascribed to systematic and random error and puts into question the success with which this item reflect the latent variables it was meant to reflect. This item was however not identified as a problematic item during the item analysis. It should, however, be conceded that the item analysis was not conducted with this factor structure in mind. Mot\_11 and Mot\_17 stand out as items with very low sample measurement error variance estimates. Lastly, the squared multiple correlation matrix was investigated, as presented below in Table 5.107.

**Table 5.107*****Motivation to Pursue the Routes towards Psychological Ownership Six, Bi-Factor Squared Multiple Correlations***

<b>Mot_1</b>	<b>Mot_2</b>	<b>Mot_3</b>	<b>Mot_4</b>	<b>Mot_5</b>	<b>Mot_6</b>
<b>0.476</b>	0.656	0.643	0.558	0.816	0.654
<b>Mot_7</b>	<b>Mot_8</b>	<b>Mot_9</b>	<b>Mot_10</b>	<b>Mot_11</b>	<b>Mot_12</b>
0.677	0.659	0.696	0.641	0.981	0.763
<b>Mot_13</b>	<b>Mot_14</b>	<b>Mot_15</b>	<b>Mot_16</b>	<b>Mot_17</b>	<b>Mot_18</b>
0.752	0.727	0.817	0.744	0.935	0.772

Mot=Motivation

As indicated above, Mot\_1 was somewhat less related to the motivation factors it was designated to reflect in terms of the imposed model, however it only marginally misses the .50 cut-off for this assumption. It is evident that for all the remaining items a satisfactory percentage of variance of the observed item variance was accounted for by their relationship with the motivation factors they were designated to reflect.

It was therefore concluded that, although there is a certain level of complexity present within the *motivation to pursue the routes* subscale, this measurement model fitted reasonably well. The standardised factor loadings were statistically significant and large, the variance terms were again small and statistically significant and the R<sup>2</sup> indices were large, for most of the indicators. It was therefore concluded that the operationalisation of the *motivation to pursue the routes* was successful.

The item analysis was re-run for the *motivation to pursue the routes towards psychological ownership* scale using the six bi-factor model. A summary of the results is presented below in Table 5.108 and Table 5.109 respectively.

Table 5.108

**Summary Item Analysis Statistics for the Motivation to Pursue the Routes towards Psychological Ownership Six Factor**

<b>Subscale</b>		<b>Cronbach's Alpha</b>		<b>N of Items</b>
Mot_Val_IK		.824		3
<b>Items</b>	<b>Mean</b>	<b>Std. Deviation</b>		<b>N</b>
Mot_1	6.12	.960		329
Mot_4	6.35	.828		329
Mot_7	6.33	.874		329
<b>Subscale</b>		<b>Cronbach's Alpha</b>		<b>N of Items</b>
Mot_Val_SI		.680		3
<b>Items</b>	<b>Mean</b>	<b>Std. Deviation</b>		<b>N</b>
Mot_2	5.56	1.365		329
Mot_5	4.81	1.684		329
Mot_8	6.34	1.042		329
<b>Subscale</b>		<b>Cronbach's Alpha</b>		<b>N of Items</b>
Mot_Val_C		.880		3
<b>Items</b>	<b>Mean</b>	<b>Std. Deviation</b>		<b>N</b>
Mot_9	5.94	1.175		329
Mot_6	5.85	1.198		329
Mot_3	5.98	1.066		329
<b>Subscale</b>		<b>Cronbach's Alpha</b>		<b>N of Items</b>
Mot_Exp_IK		.883		3
<b>Items</b>	<b>Mean</b>	<b>Std. Deviation</b>		<b>N</b>
Mot_13	6.07	1.020		329
Mot_16	6.17	.967		329
Mot_10	6.04	1.076		329
<b>Subscale</b>		<b>Cronbach's Alpha</b>		<b>N of Items</b>
Mot_Exp_SI		.768		3
<b>Items</b>	<b>Mean</b>	<b>Std. Deviation</b>		<b>N</b>
Mot_11	5.33	1.453		329
Mot_14	4.96	1.622		329
Mot_17	6.02	1.167		329
<b>Subscale</b>		<b>Cronbach's Alpha</b>		<b>N of Items</b>
Mot_Exp_C		.928		3
<b>Items</b>	<b>Mean</b>	<b>Std. Deviation</b>		<b>N</b>
Mot_15	5.53	1.343		329
Mot_18	5.66	1.375		329
Mot_12	5.60	1.296		329

Mot=Motivation

It is evident that all but two of the *motivation to pursue the routes towards psychological ownership* subscales achieved a Cronbach's alpha above the critical cut-off point (.80). Mot\_Val\_SI (.680) and Mot\_Exp\_SI (.768)<sup>86</sup> failed to meet this criterion therefore providing evidence of questionable internal consistency within this subscale. There do not however

<sup>86</sup> This again brings into question Mot\_17, since it was previously identified as a potentially problematic item during the CFA. It, however, needs to be remembered that the previous item analysis assumed a different underlying factor structure.



seem to be any extreme means or low standard deviations to support the notion of problematic items, suggested by the low Cronbach alpha. However, Mot\_5's mean, although not extreme, is slightly lower when compared to the remaining items for Mot\_Val\_SI. However, from Table 5.109 below it is evident that deletion of this item would decrease the internal consistency of this scale (Cronbach's alpha decreases from .680 to .588). Given the small number of items designated to each subscale the somewhat lower coefficients of internal consistency are not altogether surprising.

Further supporting evidence for the potential of poor items is provided by the summary Table 5.109<sup>87</sup> below.

**Table 5.109**  
**Summary Statistics for the Motivation to Pursue the Routes Six Factor – if Items Deleted**

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_1	12.68	2.395	.655	.437	.789
Mot_4	12.45	2.748	.666	.460	.773
Mot_7	12.47	2.494	.727	.531	.710
Mot_2	11.16	4.670	.685	.470	.321
Mot_5	11.91	4.177	.518	.378	<b>.588</b>
Mot_8	10.38	7.510	<b>.346</b>	.191	<b>.749</b>
Mot_9	11.83	4.329	.789	.623	.811
Mot_6	11.92	4.295	.772	.599	.828
Mot_3	11.79	4.896	.749	.562	.850
Mot_13	12.21	3.500	.804	.659	.805
Mot_16	12.11	3.736	.787	.638	.823
Mot_10	12.24	3.506	.731	.535	.873
Mot_11	10.98	5.414	.737	.606	.525
Mot_14	11.35	4.832	.708	.597	.562
Mot_17	10.29	8.365	<b>.412</b>	.172	<b>.866</b>
Mot_15	11.26	6.380	.870	.757	.881
Mot_18	11.12	6.308	.853	.732	.895
Mot_12	11.19	6.773	.835	.698	.909

Mot=Motivation

It is evident that an improvement in internal consistency occurred only when Mot\_8 and Mot\_17 were to be deleted. For all of the remaining indicators deletion would result in a poorer internal consistency. Since each subscale was only reflected by three indicators and the evidence for deletion of certain items was not overwhelming, it was decided that these items would be retained.

<sup>87</sup> Table 5.105 is a summary of the item statistics collated from the separate outputs obtained from the six item analyses performed on the three items included in each subscale.

## 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 models with a large number of structural and measurement model parameters that need to be estimated<sup>88</sup>. Therefore, to operationalise the latent variables in a manner that reduces the complexity of the model, two item parcels were created for each latent variable. 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. The orthogonalising, or residual centering procedure proposed by Little et al. (2006) was used to calculate the effect indicators for the latent product terms and the latent squared terms in the model.

## 5.8 FITTING THE PSYCHOLOGICAL OWNERSHIP MEASUREMENT MODEL

### 5.8.1 Data screening prior to fitting the measurement model and structural model

Multivariate statistics, and particularly SEM, hinge on certain critical statistical assumptions. One such assumption is that the indicator variables, used to operationalise the latent variables, follow a multivariate normal distribution. More specifically, the default method of estimation, namely maximum likelihood, when fitting the measurement model to continuous data, assumes that the distribution of the indicator variables follows a multivariate normal distribution. The inappropriate analysis of continuous non-normal

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<sup>88</sup> It was originally considered to use the job characteristic dimension scores and the root need dimension scores to represent the *perceived job characteristics* and the *salient psychological ownership need strength* latent variables. This would have resulted in a relatively large number of indicators for the phantom latent variables. This resulted in the calculation of two item parcels for these two latent variables with the parcelling being done in an odd-even format across the subscales as opposed to an approach that honoured the underlying factor structure. 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).

variables can result in incorrect standard errors and chi-square estimates, according to DuToit and Du Toit (as cited in Theron, 2014a). This critical statistical assumption, in terms of the default estimation technique used when fitting measurement models, of multivariate normal distribution, must therefore be assessed prior to fitting the measurement or structural models. It was therefore imperative to assess the null hypothesis that the item parcels, used to operationalise the latent variables, follow a multivariate normal distribution.

The test for univariate normality evaluates each indicator individually with regards to the standardised test statistics of skewness and kurtosis, and whether these are significantly different from zero. Departures from normality are indicated by significant skewness and/or kurtosis sample estimates. However, it is crucial to examine multivariate values of skewness and kurtosis and not exclusively evaluate univariate normality. If the null hypothesis of multivariate normality is rejected, then the composite indicator variables need to be normalised in an attempt to improve the symmetry and kurtosis of the indicator variable distribution. Alternatively, other methods of estimation such as weighted least squares, diagonal weighted least squares and robust maximum likelihood (RML) could be used should the null hypothesis of multivariate normality be rejected. Mels (2003) supports the use of RML if the assumption of normality does not hold. The results of the test of univariate and multivariate normality of the *psychological ownership* measurement model are presented below in Table 5.110 and Table 5.111 respectively.

The chi-square for skewness and kurtosis, presented in Table 5.106 above, indicated that all of the composite indicator variables failed the test of univariate normality ( $p < .05$ ). Furthermore, the null hypothesis that the data follows a multivariate normal distribution also had to be rejected ( $X^2 = 14486.535$ ;  $p < .05$ ). This therefore indicated the need to normalise the indicator variables<sup>89</sup> in PRELIS.

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<sup>89</sup> Normalisation was conducted in order for the data to satisfy the assumption of multivariate normality as the quality of the solutions obtained is critically dependent upon this assumption being met.

**Table 5.110*****Test of Univariate Normality for the Psychological Ownership Measurement Model before Normalisation***

Variable	Skewness		Kurtosis		Skewness and Kurtosis	
	Z-Score	P-Value	Z-Score	P-Value	Chi-Square	P-Value
JC_1	-7.075	0.000	3.498	0.000	62.289	0.000
JC_2	-7.229	0.000	4.278	0.000	70.570	0.000
IK_1	-7.741	0.000	4.911	0.000	84.046	0.000
IK_2	-7.727	0.000	5.763	0.000	92.925	0.000
SI_1	-9.898	0.000	6.647	0.000	142.149	0.000
SI_2	-8.686	0.000	5.237	0.000	102.868	0.000
C_1	-6.295	0.000	1.991	0.047	43.593	0.000
C_2	-5.768	0.000	0.706	0.480	33.773	0.000
PO_1	-9.186	0.000	5.172	0.000	111.140	0.000
PO_2	-8.416	0.000	4.896	0.000	94.799	0.000
PON_1	-6.459	0.000	4.131	0.000	58.787	0.000
PON_2	-6.376	0.000	3.817	0.000	55.219	0.000
MOT_1	-5.905	0.000	3.371	0.001	46.231	0.000
MOT_2	-6.381	0.000	3.566	0.000	53.431	0.000
RES_1	8.180	0.000	9.582	0.000	158.717	0.000
RES_2	1.601	0.109	6.934	0.000	50.642	0.000
RES_3	8.951	0.000	9.564	0.000	171.598	0.000
RES_4	4.326	0.000	7.159	0.000	69.975	0.000
RES_5	11.514	0.000	9.623	0.000	225.155	0.000
RES_6	11.914	0.000	9.708	0.000	236.189	0.000
RES_7	10.640	0.000	8.438	0.000	184.411	0.000
RES_8	10.595	0.000	8.500	0.000	184.505	0.000
RES_9	10.117	0.000	7.266	0.000	155.137	0.000
RES_10	11.901	0.000	8.648	0.000	216.415	0.000
RES_11	11.349	0.000	8.366	0.000	198.805	0.000
RES_12	13.336	0.000	9.745	0.000	272.826	0.000
RES_13	13.295	0.000	9.880	0.000	274.376	0.000
RES_14	13.375	0.000	9.847	0.000	275.842	0.000

JC=Job Characteristics, IK=Intimate Knowledge, SI=Self Investment, C=Control, PO=Psychological Ownership, PON=Psychological Ownership Individual Needs, Mot=Motivation, Res=Residuals

**Table 5.111*****Test of Multivariate Normality for the Psychological Ownership Measurement Model before Normalisation***

Value	Skewness		Value	Kurtosis		Skewness and Kurtosis	
	Z-Score	P-Value		Z-Score	P-Value	Chi-Square	P-Value
478.169	116.552	0.000	1415.975	30.035	0.000	<b>14486.535</b>	<b>0.000</b>

The results of this normalisation are presented below in Table 5.112 and Table 5.113 respectively.

**Table 5.112****Test of Univariate Normality for the Psychological Ownership Measurement Model after Normalisation**

Variable	Skewness		Kurtosis		Skewness and Kurtosis	
	Z-Score	P-Value	Z-Score	P-Value	Chi-Square	P-Value
JC_1	-0.072	0.943	-0.030	0.976	0.006	<b>0.977</b>
JC_2	-0.172	0.863	-0.226	0.821	0.081	<b>0.960</b>
IK_1	-2.487	0.013	-2.608	0.009	12.988	0.002
IK_2	-2.843	0.004	-2.688	0.007	15.310	0.000
SI_1	-2.676	0.007	-2.752	0.006	14.734	0.001
SI_2	-2.077	0.038	-2.427	0.015	10.204	0.006
C_1	-0.303	0.762	-0.356	0.722	0.219	<b>0.896</b>
C_2	-0.380	0.704	-0.562	0.574	0.460	<b>0.794</b>
PO_1	-2.918	0.004	-3.380	0.001	19.940	0.000
PO_2	-2.430	0.015	-3.209	0.001	16.205	0.000
PON_1	-0.608	0.543	-0.962	0.336	1.296	<b>0.523</b>
PON_2	-0.823	0.411	-1.316	0.188	2.407	<b>0.300</b>
MOT_1	-0.434	0.664	-0.821	0.412	0.862	<b>0.650</b>
MOT_2	-0.454	0.650	-0.767	0.443	0.794	<b>0.672</b>
RES_1	0.000	1.000	0.082	0.935	0.007	<b>0.997</b>
RES_2	0.000	1.000	0.082	0.935	0.007	<b>0.997</b>
RES_3	0.000	1.000	0.082	0.935	0.007	<b>0.997</b>
RES_4	0.000	1.000	0.082	0.935	0.007	<b>0.997</b>
RES_5	-0.005	0.996	0.075	0.940	0.006	<b>0.997</b>
RES_6	-0.003	0.997	0.077	0.938	0.006	<b>0.997</b>
RES_7	-0.006	0.995	0.073	0.942	0.005	<b>0.997</b>
RES_8	-0.003	0.997	0.077	0.938	0.006	<b>0.997</b>
RES_9	0.000	1.000	0.081	0.936	0.007	<b>0.997</b>
RES_10	0.001	0.999	0.079	0.937	0.006	<b>0.997</b>
RES_11	0.001	0.999	0.080	0.936	0.006	<b>0.997</b>
RES_12	-0.056	0.955	0.017	0.987	0.003	<b>0.998</b>
RES_13	0.069	0.945	-0.173	0.863	0.035	<b>0.983</b>
RES_14	-0.084	0.933	-0.007	0.995	0.007	<b>0.996</b>

JC=Job Characteristics, IK=Intimate Knowledge, SI=Self Investment, C=Control, PO=Psychological Ownership, PON=Psychological Ownership Individual Needs, Mot=Motivation, Res=Residuals

**Table 5.113****Test of Multivariate Normality for the Psychological Ownership Measurement Model after Normalisation**

Value	Skewness		Kurtosis			Skewness and Kurtosis	
	Z-Score	P-Value	Value	Z-Score	P-Value	Chi-Square	P-Value
242.575	65.592	0.000	1079.123	21.686	0.000	<b>4772.569</b>	<b>0.000</b>

It is evident from the results presented above in Table 5.112 and Table 5.113 that the normalisation was not fully successful. The normalisation in PRELIS did succeed in increasing the p-values for all 28 composite indicator variables. However, unfortunately 6 of the 28 still failed the test of univariate normality ( $p < .05$ ). Further corroboratory evidence of the failure of these items to meet the critical statistical assumption of normality is evident in Table 5.109 above, in that although the procedure did succeed in reducing the deviation of the observed indicator distribution from the theoretical multivariate normal distribution

(chi-square statistic decreased from 14486.535 to 4772.569), the null hypothesis that the data follows a multivariate normal distribution still had to be rejected ( $X^2 = 4772.569$ ;  $p < .05$ ).

Therefore, since the normalisation was not completely successful, but there was a reduction in the chi-square statistic, an alternative estimation technique, namely robust maximum likelihood estimation<sup>90</sup> was used to analyse the normalised data set. The appropriateness of this technique has been outlined above.

### **5.8.2 Evaluating the fit of the psychological ownership measurement model**

An investigation into the substantive relationships of interest cannot occur unless the psychometric quality of the measures used to operationalise the latent variables have been verified. It is therefore important to first determine the psychometric quality of the measures, prior to investigating the fit of the structural model or the substantive relationships of interest. Evaluating the fit of the *psychological ownership* measurement model involves the evaluation of the hypothesised relationships between the latent variables in the *psychological ownership* structural model and the composite indicators created to represent them. The objective is to determine the reliability and validity with which the measures designed to represent the latent variables do just that. When fitting the measurement model, verdicts pertaining to the goodness of fit are more credible if derived from a combination of a variety of fit indices (Tanaka, 1993; Theron 2014a).

Although a wide range of goodness-of-fit statistics are available to evaluate model fit, no one single measure is unequivocally superior when compared to the others. This is due to the fact that intervening factors such as sample size, estimation procedure and model complexity influence the way in which certain indices operate and furthermore fit is measured differently by the various fit indices (Diamantopoulos & Siguaw, 2009). Consensus about what constitutes "good fit statistics" (Tanaka, 1993) also seems to be missing. Therefore, in order to reach a valid conclusion regarding the fit of a model it is imperative to consider a basket of evidence surrounding measurement model fit (Theron, 2014a). However, this does not imply that all fit indices should be reported on, nor should the choice of fit indices be purely motivated by popularity of use. Several relevant

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<sup>90</sup> The use of RML necessitates the creation of an asymptotic covariance matrix via PRELIS. This will enable the calculation of appropriate fit indices in LISREL (Mels, 2003)

indicators were subsequently considered when evaluating the measurement model fit of the *psychological ownership* measurement model, but not all.

Fit was assessed using absolute fit indices and incremental as well as parsimony fit indices simultaneously. In addition to these goodness of fit indices, the distribution of the standardised variance and covariance residuals and the magnitude of the model modification indices calculated for  $\Lambda^X$  and  $\Theta_\delta$  were also assessed to determine model fit. The overall fit statistics used to assess measurement model fit, highlighted<sup>91</sup> in Table 5.110 below, should according to Diamantopoulos and Siguaw, (2009), Hooper, Coughlan and Mullen, (2008) and Hu and Bentler (1999), along with an evaluation of the standardised residuals and percentage of large modification indices, be more than sufficient to aid in reaching a well informed conclusion surrounding model fit.

Upon initial investigation or analysis of the *psychological ownership* measurement model with the two interaction effects, the squared terms and the correlated measurement error terms the model showed close fit, as is evident from Table 5.114 below. However, the fitted measurement model unfortunately suffered from inadmissible parameter estimates, evident in Table 5.115 and Table 5.116 below.

The slope of the regression of a standardised composite indicator on the (single) standardised latent variable that it had been earmarked to reflect cannot exceed unity. In a completely standardised simple regression model the slope coefficient is the bivariate correlation between the indicator and the latent variable. Despite the fact that the close fit null hypothesis had not been rejected the model therefore still had to be rejected because of the six inadmissible parameter estimates. Various approaches were attempted to resolve the problem with the inadmissible factor loadings. Firstly, the problematic factor loadings were constrained to .90. This constrained the unstandardised lambda's to .90, but left the completely standardised values unaffected and still problematic. Secondly, RES1, one of the problematic indicators, was deleted as an indicator. Although this solved the problem with the factor loadings, in as far as all of the remaining loadings now had permissible values, it subsequently created a problem with an inadmissible phi estimate. Therefore, the methodologically prudent thing to do, given that the problems centred on

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<sup>91</sup> The measures used have been highlighted by bolding the specific values under investigation. The discussion surrounding the benefit of the use of each measure will be presented hand-in-hand with the data interpretation. Additionally, the justification for ignoring certain other indices have also been provided.

the indicators of the polynomial latent variables, was to remove the squared latent variables and the interaction effect<sup>92</sup> and subsequently the residualised indicators, from the model.

**Table 5.114**  
***Psychological Ownership Measurement Model Goodness of Fit Statistics***

<b>Statistic</b>	<b>Value</b>
Degrees of Freedom	279
Minimum Fit Function Chi-Square	507.535 (p= 0.00)
Normal Theory Weighted Least Squares Chi-Square	476.218 (p= 0.00)
<b>Satorra-Bentler Scaled Chi-Square</b>	<b>427.155 (p= 0.000)</b>
Chi-Square Corrected for Non-Normality	3684.218 (p=0.0)
Estimated Non-centrality Parameter (NCP)	148.155
90 Percent Confidence Interval for NCP	(96.302 ; 207.965)
Minimum Fit Function Value	1.547
Population Discrepancy Function Value (F0)	0.452
90 Percent Confidence Interval for F0	(0.294 ; 0.634)
<b>Root Mean Square Error of Approximation (RMSEA)</b>	<b>0.0402</b>
<b>90 Percent Confidence Interval for RMSEA</b>	<b>(0.0324 ; 0.0477)</b>
<b>P-Value for Test of Close Fit (RMSEA &lt; 0.05)</b>	<b>0.986</b>
<b>Expected Cross-Validation Index (ECVI)</b>	<b>2.077</b>
90 Percent Confidence Interval for ECVI	(1.919 ; 2.259)
<b>ECVI for Saturated Model</b>	<b>2.476</b>
<b>ECVI for Independence Model</b>	<b>39.594</b>
Chi-Square for Independence Model with 378 Degrees of Freedom	12930.806
<b>Independence AIC</b>	<b>12986.806</b>
<b>Model AIC</b>	<b>681.155</b>
<b>Saturated AIC</b>	<b>812</b>
<b>Independence CAIC</b>	<b>13121.095</b>
<b>Model CAIC</b>	<b>1290.255</b>
<b>Saturated CAIC</b>	<b>2759.199</b>
<b>Normed Fit Index (NFI)</b>	<b>0.967</b>
<b>Non-Normed Fit Index (NNFI)</b>	<b>0.984</b>
<b>Parsimony Normed Fit Index (PNFI)</b>	<b>0.714</b>
<b>Comparative Fit Index (CFI)</b>	<b>0.988</b>
<b>Incremental Fit Index (IFI)</b>	<b>0.988</b>
<b>Relative Fit Index (RFI)</b>	<b>0.955</b>
<b>Critical N (CN)</b>	<b>259.677</b>
<b>Root Mean Square Residual (RMR)</b>	<b>0.0405</b>
<b>Standardized RMR</b>	<b>0.035</b>
<b>Goodness of Fit Index (GFI)</b>	<b>0.906</b>

<sup>92</sup> The latent *psychological safety*\**motivation to pursue the routes towards psychological ownership* interaction effect was, however, retained.



Adjusted Goodness of Fit Index (AGFI)	0.863
Parsimony Goodness of Fit Index (PGFI)	0.623

**Table 5.115*****Psychological Ownership Measurement Model Completely Standardised Lambda-X Matrix***

	JC	PO	MOT	SQJC	SQPON	IK	C	SI	PS_MOT	JC_PON	PON
JC_1	0.935	--	--	--	--	--	--	--	--	--	--
JC_2	0.919	--	--	--	--	--	--	--	--	--	--
IK_1	--	--	--	--	--	0.914	--	--	--	--	--
IK_2	--	--	--	--	--	0.937	--	--	--	--	--
SI_1	--	--	--	--	--	--	--	0.922	--	--	--
SI_2	--	--	--	--	--	--	--	0.850	--	--	--
C_1	--	--	--	--	--	--	0.956	--	--	--	--
C_2	--	--	--	--	--	--	0.829	--	--	--	--
PO_1	--	0.949	--	--	--	--	--	--	--	--	--
PO_2	--	0.949	--	--	--	--	--	--	--	--	--
PON_1	--	--	--	--	--	--	--	--	--	--	0.963
PON_2	--	--	--	--	--	--	--	--	--	--	0.899
MOT_1	--	--	0.967	--	--	--	--	--	--	--	--
MOT_2	--	--	0.978	--	--	--	--	--	--	--	--
RES_1	--	--	--	--	--	--	--	--	--	<b>1.091</b>	--
RES_2	--	--	--	--	--	--	--	--	--	0.747	--
RES_3	--	--	--	--	--	--	--	--	--	0.959	--
RES_4	--	--	--	--	--	--	--	--	--	0.646	--
RES_5	--	--	--	--	--	--	--	--	0.907	--	--
RES_6	--	--	--	--	--	--	--	--	0.88	--	--
RES_7	--	--	--	--	--	--	--	--	0.938	--	--
RES_8	--	--	--	--	--	--	--	--	0.900	--	--
RES_9	--	--	--	0.889	--	--	--	--	--	--	--
RES_10	--	--	--	0.854	--	--	--	--	--	--	--
RES_11	--	--	--	<b>1.018</b>	--	--	--	--	--	--	--
RES_12	--	--	--	--	0.805	--	--	--	--	--	--
RES_13	--	--	--	--	0.794	--	--	--	--	--	--
RES_14	--	--	--	--	<b>1.012</b>	--	--	--	--	--	--

JC=Job Characteristics, IK=Intimate Knowledge, SI=Self Investment, C=Control, PO=Psychological Ownership, PON=Psychological Ownership Individual Needs, Mot=Motivation, SQJC=Squared Job Characteristics, SQPON= Squared Psychological Ownership Individual Needs, PS\_MOT=Interaction between Psychological Safety and Motivation, JC\_PON=Interaction between Job Characteristics and Squared Psychological Ownership Individual Needs, Res=Residuals

Table 5.116

**Psychological Ownership Measurement Model Squared Multiple Correlations for X-Variables**

Variable	Value
JC_1	0.875
JC_2	0.845
IK_1	0.835
IK_2	0.877
SI_1	0.850
SI_2	0.723
C_1	0.914
C_2	0.687
PO_1	0.900
PO_2	0.900
PON_1	0.928
PON_2	0.808
MOT_1	0.935
MOT_2	0.957
RES_1	<b>1.191</b>
RES_2	0.558
RES_3	0.921
RES_4	0.418
RES_5	0.823
RES_6	0.775
RES_7	0.879
RES_8	0.811
RES_9	0.791
RES_10	0.729
RES_11	<b>1.037</b>
RES_12	0.648
RES_13	0.631
RES_14	<b>1.025</b>

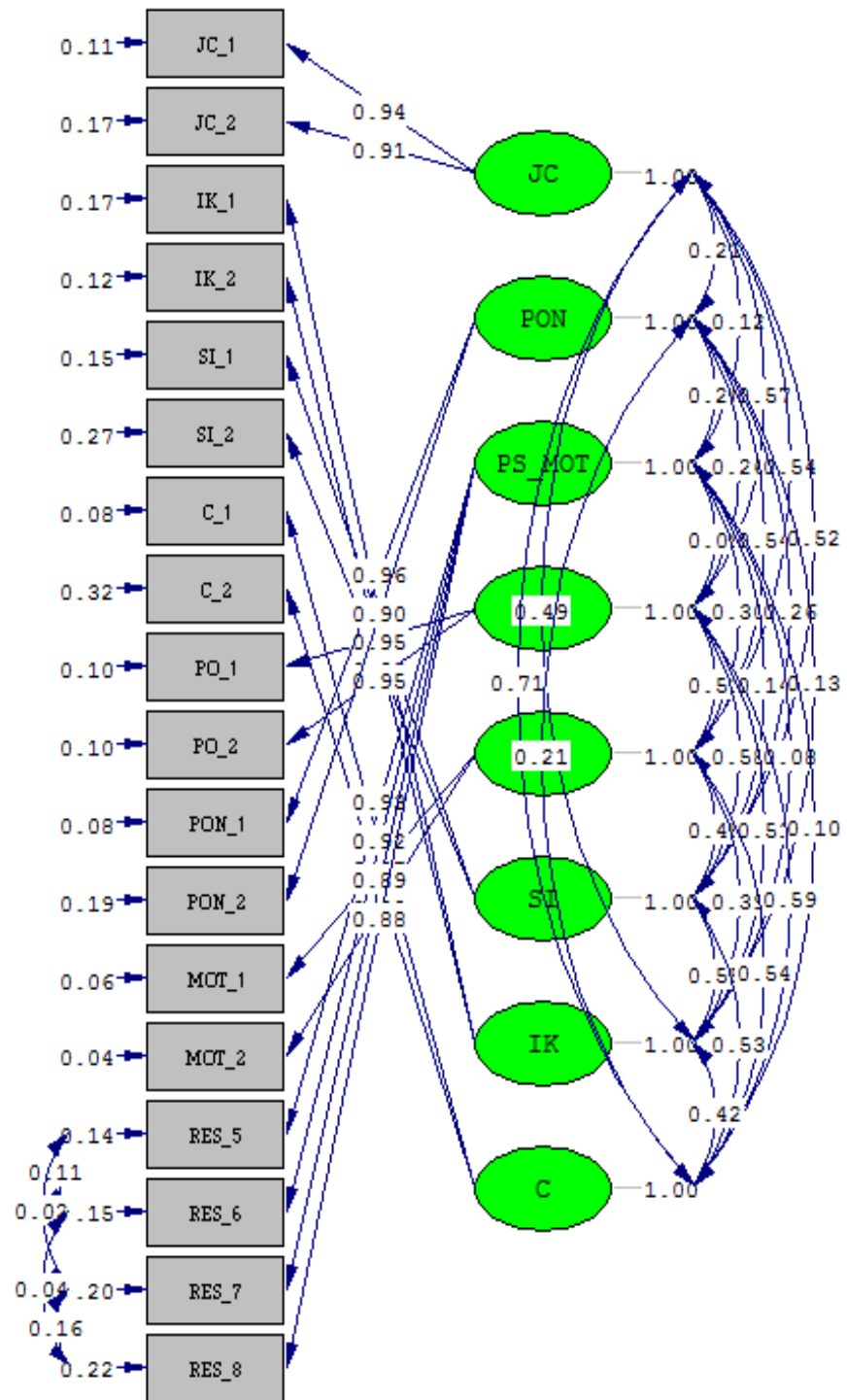
JC=Job Characteristics, IK=Intimate Knowledge, SI=Self Investment, C=Control, PO=Psychological Ownership, PON=Psychological Ownership Individual Needs, Mot=Motivation, Res=Residuals

This reduced *psychological ownership* model, however, prevented the testing of a number of the original hypotheses. More specifically, the polynomial regression hypotheses could not be tested as originally intended, but they now had to be tested through observed score polynomial regression analysis. This in turn implied that a separate narrow-focused structural model had to be created that hypothesised the *motivation to pursue the routes to psychological ownership* to be a function of the *salience of the individual psychological ownership needs* (still treated as a multidimensional composite latent variable), *perceived job characteristics* (also still treated as a multidimensional composite latent variable), the *squared psychological needs*, the *interaction between needs and job characteristics* and the *squared job characteristics*. This is as opposed to the original proposed method of including the polynomial effects in the structural model, and conducting latent variable polynomial regression. Therefore, an additional overarching substantive research

hypothesis (Hypothesis 19) had to be added to the study. Hypothesis 19 claims that the narrow-focused structural model provides an accurate account of the psychological mechanisms that underpin the levels of *motivation to pursue the routes towards psychological ownership*. The narrow-focused structural model attributes the level of *motivation to pursue the routes towards psychological ownership* to the congruence (or lack of it) between the *salience of psychological ownership needs* and the *ability of the job characteristics to satisfy these needs*. The manner in which the *motivation to pursue the routes towards psychological ownership* changes as the magnitude and nature of the congruence (and incongruence) changes is still hypothesised to change as described under hypotheses 7 and 8. This is examined in Section 5.11 via observed score polynomial regression analysis.

The reduced *psychological ownership* measurement and structural models were subsequently evaluated and the results are presented below in Section 5.8.3.

A visual representation of the reduced *psychological ownership* measurement model (Model A) is presented in Figure 5.9 below. This is followed by Table 5.117, in Section 5.8.3, which outlines the goodness of fit indices.



Chi-Square=115.69, df=103, P-value=0.18510, RMSEA=0.019

**Figure 5.9. Visual Representation of the Reduced Psychological Ownership Measurement Model (Completely Standardised Solution)**

### 5.8.3 Reduced psychological ownership measurement model fit indices

The overall fit statistics presented below in Table 5.117 provide a chance to test the exact fit and close fit hypotheses.

**Table 5.117**  
***Reduced Psychological Ownership Measurement Model Goodness of Fit Statistics***

<b>Statistic</b>	<b>Value</b>
Degrees of Freedom	103
Minimum Fit Function Chi-Square	125.356 (p=0.0664)
Normal Theory Weighted Least Squares Chi-Square	121.483 (p=0.103)
<b>Satorra-Bentler Scaled Chi-Square</b>	115.688 (p=0.185)
Chi-Square Corrected for Non-Normality	192.325 (p=0.000)
Estimated Non-centrality Parameter (NCP)	12.688
90 Percent Confidence Interval for NCP	(0.0; 43.254)
Minimum Fit Function Value	0.382
Population Discrepancy Function Value (F0)	0.0387
90 Percent Confidence Interval for F0	(0.0; 0.132)
<b>Root Mean Square Error of Approximation (RMSEA)</b>	<b>0.0194</b>
90 Percent Confidence Interval for RMSEA	(0.0; 0.0358)
<b>P-Value for Test of Close Fit (RMSEA &lt; 0.05)</b>	<b>1.00</b>
Expected Cross-Validation Index (ECVI)	0.767
90 Percent Confidence Interval for ECVI	(0.729; 0.861)
ECVI for Saturated Model	1.043
ECVI for Independence Model	25.251
Chi-Square for Independence Model with 153 Degrees of Freedom	8246.166
Independence AIC	8282.166
Model AIC	251.688
Saturated AIC	342
Independence CAIC	8368.495
Model CAIC	577.82
Saturated CAIC	1162.126
Normed Fit Index (NFI)	0.986
Non-Normed Fit Index (NNFI)	0.998
Parsimony Normed Fit Index (PNFI)	0.664
Comparative Fit Index (CFI)	0.998
Incremental Fit Index (IFI)	0.998
Relative Fit Index (RFI)	0.979
Critical N (CN)	395.954
Root Mean Square Residual (RMR)	0.0155
Standardized RMR	0.0155
Goodness of Fit Index (GFI)	0.960
Adjusted Goodness of Fit Index (AGFI)	0.934
Parsimony Goodness of Fit Index (PGFI)	0.579

Chi-square is a popular absolute fit index which “assesses the magnitude of discrepancy between the sample and fitted covariance matrices” (Hu & Bentler, 1999, p. 2). Therefore, an insignificant result for  $X^2$  would provide an indication of good fit. This fit index can therefore be considered a badness of fit indices (Kline, 2005). Diamantopoulos and Siguaw (2009) caution against the use of the Minimum Fit Function Chi-Square as this chi-square statistic is very sensitive to departures from multivariate normality, sample size and model complexity. In terms of the value of 78.668 for Minimum Fit Function Chi-Square for the *psychological ownership* measurement model with 103 degrees of freedom, this is not significant ( $p > .05$ ). However, a better indication, given the complexity of the model, and the violation of the multivariate normality assumption, is the Satorra-Bentler Scaled Chi-Square statistic of perfect fit. The null hypothesis that the model fits the population data perfectly is tested by the  $X^2$  test statistic:

$$H_{020a}: \text{RMSEA} = 0$$

$$H_{a20a}: \text{RMSEA} > 0$$

Table 5.117 indicates that this model achieved a Satorra-Bentler Scaled Chi-squared statistic of 115.688 ( $p = .185$ ). The null hypothesis of exact fit ( $H_{020a}$ ) was therefore not rejected ( $p < .05$ ). This was a somewhat surprising finding as the assumption that a model could fit exactly in the population is somewhat unrealistic. A more realistic assumption is that this model could fit well or reasonably well and therefore the hypothesis of close fit would normally rather be tested, namely:

$$H_{020b}: \text{RMSEA} = 0$$

$$H_{a20b}: \text{RMSEA} > 0$$

Given the decision not to reject the exact fit null hypothesis, it followed that the more lenient close fit null hypothesis would also not be rejected. According to Table 5.117 above it is evident that the close fit null hypothesis was not rejected ( $p > .05$ ). The conditional probability of obtaining the sample RMSEA estimate (.0194) under the assumption that the close fit null hypothesis is true in the parameter was sufficiently large (1.00) not to reject the close fit null hypothesis ( $H_{020b}$ ).

The Root Mean Squared Error of Approximation (RMSEA) which is generally regarded as one of the more informative fit indices, considers the degrees of freedom within the model. It focuses on the discrepancy between the observed co-variance matrix and the estimated co-variance matrix implied by the measurement model per degree of freedom

(Diamantopoulos & Siguaw, 2009; Hooper et al. 2008). It therefore accounts for model complexity. In terms of RMSEA values certain rules of thumb are available for the interpretation of model fit in the sample. Values of .05, or less, are a sign of good fit, reasonable fit can be suggested for values above .05 and under .08, mediocre fit is indicated by a value of .08 and poor fit in the sample is indicated for RMSEA values of .10 and greater (Diamantopoulos & Siguaw, 2009).

The value of the sample estimate for RMSEA in Table 5.113 above, for the reduced *psychological ownership* measurement model (RMSEA = .0194), shows that the model fit in the sample is good. If assessed in conjunction with the 90 percent confidence interval for RMSEA (0.0; 0.0358) (as recommended by Byrne, 2001) it is further suggested that this model shows good fit in the parameter in that the interval is small, which is indicative of a higher level of precision of model fit in the population and in that the upper bound of the confidence interval falls below .05. The SRMR (0.0155) reported in Table 5.117 above additionally indicates good fit (SRMR<.05).

The final two absolute measures of model fit suggested as prudent measures of model fit include the goodness-of-fit index (GFI) and adjusted goodness-of-fit index (AGFI). The GFI acts as an indication of how closely the model can reproduce the observed covariance matrix (Diamantopoulos & Siguaw, 2009; Tabachnick & Fidell, 2014). The AGFI additionally takes degrees of freedom into account. Values for both indices should range between 0 and 1 and any value greater than .90 reflects good fit (Diamantopoulos & Siguaw, 2009; Tabachnick & Fidell, 2014). Table 5.117 above presents values of 0.960 and 0.934 for GFI and AGFI respectively, further suggesting good fit.

The incremental or relative fit indices, namely normed-fit Index (NFI) and comparative fit index (CFI) indicate that when compared to a baseline independent model, suggested a well-fitting model. NFI assesses fit by comparing the chi-square value of the model to the chi-square value of the null hypothesis model<sup>93</sup>. According to Bentler and Bonnet (1980) values greater than .90 are indicative of good fit. However, Hu and Bentler (1999) more recently suggested that a better cut-off would be values equal to or greater than .95. An NFI of 0.986 was reported for the reduced *psychological ownership* measurement model which suggests that this model fits well. A major drawback of this index however is its sensitivity to sample size. However, it is believed that the sample of 329 should be

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<sup>93</sup> In this model all of the measured variables will be uncorrelated and this is therefore a worst case scenario (Hooper et al. 2008).

sufficient. The non-normed fit index is suggested as a fit statistic that could be used to counteract the sensitivities of the NFI (but it is not without its own sensitivities, especially in terms of model complexity). The NNFI of 0.998 supports the assumption of good fit presented by the NFI (and other statistics presented thus far). A revised form of the NFI which is less affected by sample size is the comparative fit index (CFI). Values closer to one are an indication of good fit (Diamantopoulos & Siguaaw, 2009; Hooper, Coughlan, & Mullen, 2008). Therefore, according to Table 5.117 above it is suggested that this model fitted very well (0.997).

Lastly, a collection of parsimony fit indices was considered before making the final conclusions surrounding model fit, namely parsimony goodness-of-fit index (PGFI) and the parsimonious normed fit index (PNFI). Both indices take degrees of freedom into account when assessing fit. These indices must be viewed with caution however when assessing complex models and Hooper et al. (2008) explain that PGFI and PNFI values that are lower than the reported fit statistics should not be cause for concern. They suggest that values within the .50 region could indicate good fit. From Table 5.117 above it is therefore evident that this model fitted well (PGFI = .579 and PNFI = .664).

Taking all of the above fit indices into account is seemed reasonable to suggest that the reduced *psychological ownership* measurement model showed good fit. However, before a final conclusion is drawn with regards to the model fit, the standardised residuals and modification indices were considered. These analyses are presented below in Sections 5.8.4 and 5.8.5 respectively.

#### **5.8.4 Reduced psychological ownership measurement model standardised residuals**

Standardised residuals point to variance and/or covariance terms in the observed sample covariance matrix that were poorly estimated from the model parameter estimates. Numerous large standardised residuals would therefore comment negatively on the ability of the model and its parameter estimates to reproduce the observed covariance matrix. Therefore, the shape and distribution, as well as the number of large and small standardised residuals,<sup>94</sup> were considered.

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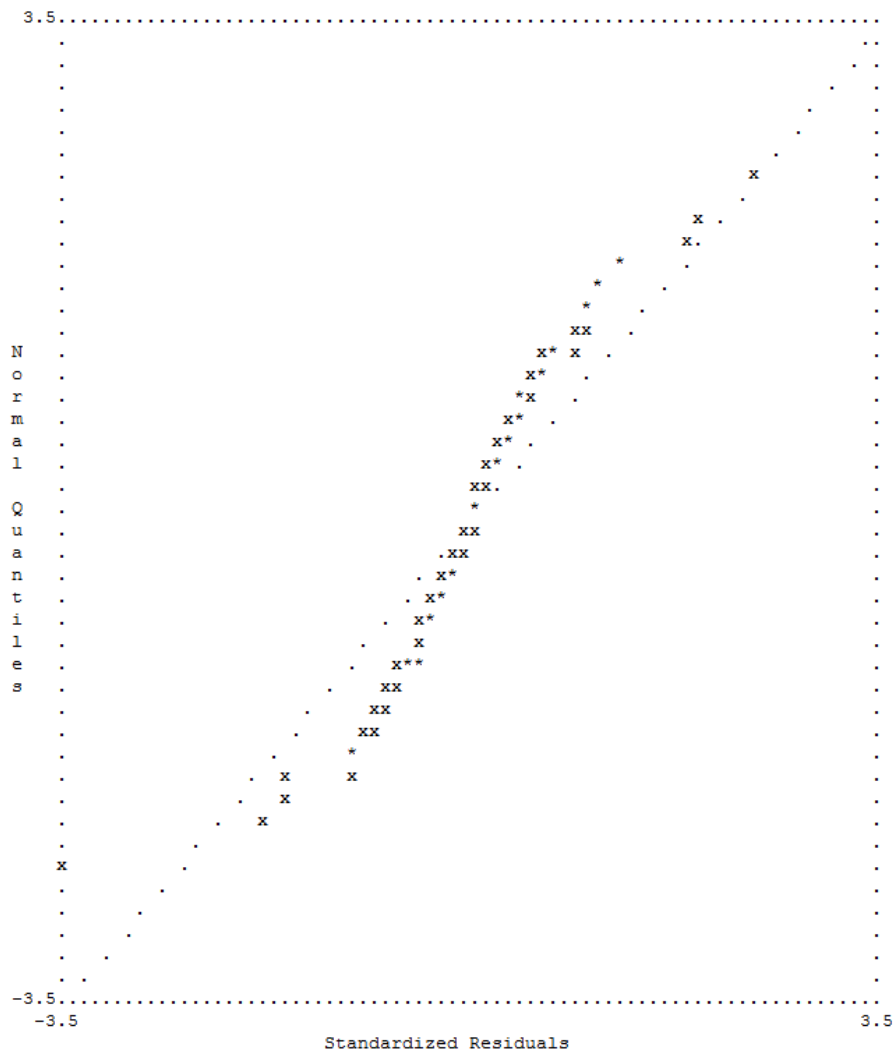
<sup>94</sup> It must be noted here that the standardised residuals have been reported on due to the fact that they do not display a dependence on the unit of measurement (unlike fitted residuals which are influence heavy by the units of measurement used in the questionnaire).





in the measurement model would not be necessary. However, the presence of only one large negative residual and no large positive residuals provided further support for good fit.

The Q-plot presented below in Figure 5.11 provides further corroboratory evidence of a well-fitting model.



**Figure 5.11. Q- Plot of the Reduced *Psychological Ownership* Measurement Model**

The Q-plot above, in Figure 5.11, provided further supporting evidence that, the model fitted very well in that the data points were concentrated predominantly around the 45 degree reference line. It additionally corroborates the findings presented in Table 5.118 in that the data points swivelled away from the 45 degree line specifically at the tails (and more so at the lower region) indicating the one large negative residual. It is important to also consider the modification indices for the reduced *psychological ownership* measurement model before making a final decision with regards to model fit.

### 5.8.5 Reduced psychological ownership measurement model modification indices

Modification indices provide estimates of model parameters of paths that are freed which are currently set to zero. These modifications subsequently allow for the statistical significance of these unspecified relationships within the model to be assessed. The modification indices indicate the decrease in the model's  $X^2$  if a previously fixed parameter is freed and the model re-estimated. Modification indices larger than 6.64 represent statistically significant ( $p < .01$ ) decreases in the  $X^2$  fit statistic. The intention of this investigation into the modification indices was not to determine any specific parameters to be freed or appropriate model modifications but rather to act as an indication of the integrity of the model fit. It seems logical to suggest that if the proposed modifications are limited that this alludes to a well-fitting model. The modification indices for the lambda-X matrix are presented below in Table 5.119. It is evident from the matrix that only in the case of 4 (3.2%) of the current 126 fixed factor loading parameters would setting them free statistically significantly ( $p < .05$ ) improve the fit of the reduced *psychological ownership* measurement model. This small percentage of large modification indices for  $\Lambda^X$  was further evidence of a well-fitting model.

**Table 5.119**  
**Modification Indices Calculated for the Lambda-X Matrix**

	JC	PON	PS_MOT	PO	MOT	SI	IK	C
JC_1	--	0.849	0.004	0.323	0.144	0.136	<b>8.064</b>	4.115
JC_2	--	0.830	0.004	0.324	0.132	0.128	<b>7.924</b>	1.639
IK_1	1.791	0.005	1.060	0.066	0.041	1.261	--	0.428
IK_2	1.987	0.005	1.069	0.078	0.045	1.586	--	0.474
SI_1	0.354	0.018	0.265	0.009	3.448	--	0.419	1.979
SI_2	0.311	0.018	0.261	0.007	3.509	--	0.586	1.967
C_1	1.354	0.101	0.699	1.764	1.098	2.924	0.111	--
C_2	0.800	0.103	0.723	1.980	1.260	2.839	0.101	--
PO_1	0.269	0.171	0.284	--	0.185	1.136	0.933	0.251
PO_2	0.225	0.162	0.285	--	0.161	1.115	0.918	0.212
PON_1	2.139	--	1.299	3.304	0.323	0.634	0.214	0.705
PON_2	2.114	--	1.314	3.342	0.367	0.625	0.214	0.714
MOT_1	0.312	0.037	4.265	1.181	--	0.164	<b>7.676</b>	0.037
MOT_2	0.385	0.039	4.439	1.344	--	0.186	<b>8.060</b>	0.044
RES_5	0.876	0.989	--	2.039	0.581	1.291	1.046	1.902
RES_6	0.978	0.855	--	1.958	0.649	1.085	0.713	1.550
RES_7	1.350	0.233	--	0.592	0.761	1.135	0.659	2.022
RES_8	1.490	0.144	--	0.521	0.801	0.899	0.368	1.597

JC=Job Characteristics, IK=Intimate Knowledge, SI=Self Investment, C=Control, PO=Psychological Ownership, PON=Psychological Ownership Individual Needs, Mot=Motivation, PS\_MOT=Interaction between Psychological Safety and Motivation Res=Residuals

Table 5.120 below outlines the modification indices for the theta-delta matrix.

**Table 5.120**

***Modification Indices Calculated for the Theta-Delta Matrix***

	JC_1	JC_2	IK_1	IK_2	SI_1	SI_2
JC_1	--					
JC_2	--	--				
IK_1	1.237	<b>7.150</b>	--			
IK_2	0.274	0.810	--	--		
SI_1	0.001	1.278	0.204	0.754	--	
SI_2	0.279	3.159	0.185	0.002	--	--
C_1	1.353	3.058	5.405	3.730	0.161	1.425
C_2	0.274	1.435	2.503	1.181	2.628	0.059
PO_1	0.835	0.201	1.825	4.331	0.646	0.140
PO_2	0.678	0.127	1.157	3.307	0.366	0.356
PON_1	0.002	0.609	0.246	0.619	3.238	4.238
PON_2	0.605	0.001	0.076	0.353	1.661	2.315
MOT_1	1.866	5.649	2.442	0.085	0.378	0.017
MOT_2	0.815	3.504	2.658	0.037	0.099	0.808
RES_5	0.237	0.101	4.108	4.703	0.954	1.095
RES_6	0.115	0.110	<b>8.634</b>	<b>8.421</b>	0.635	0.741
RES_7	0.158	0.085	1.739	1.837	0.545	0.307
RES_8	0.320	0.071	4.486	3.833	0.118	0.015
	<b>C_1</b>	<b>C_2</b>	<b>PO_1</b>	<b>PO_2</b>	<b>PON_1</b>	<b>PON_2</b>
C_1	--					
C_2	--	--				
PO_1	0.169	1.510	--			
PO_2	0.197	0.023	--	--		
PON_1	0.680	0.328	0.269	1.714	--	
PON_2	0.127	0.002	0.065	1.229	--	--
MOT_1	0.223	0.598	0.070	0.294	2.348	1.525
MOT_2	0.048	0.012	0.012	0.147	2.816	1.983
RES_5	1.596	0.695	0.402	0.061	1.986	1.039
RES_6	0.885	0.459	0.391	0.039	1.311	0.674
RES_7	2.574	1.588	0.047	0.001	3.514	3.691
RES_8	2.200	1.960	0.160	0.065	3.294	3.872
	<b>MOT_1</b>	<b>MOT_2</b>	<b>RES_5</b>	<b>RES_6</b>	<b>RES_7</b>	<b>RES_8</b>
MOT_1	--					
MOT_2	--	--				
RES_5	4.176	3.032	--			
RES_6	<b>7.352</b>	6.072	--	--		
RES_7	2.082	1.972	--	--	--	
RES_8	3.014	3.147	--	--	--	--

JC=Job Characteristics, IK=Intimate Knowledge, SI=Self Investment, C=Control, PO=Psychological Ownership, PON=Psychological Ownership Individual Needs, Mot=Motivation, Res=Residuals

It is evident from Table 5.120 above that similarly only 4 of the 149 covariance terms in the theta-delta matrix currently fixed to zero, if set free, would significantly ( $p < .01$ ) improve the fit of the model. Therefore, only 2.7% of the values, if set free, would lead to a statistically significant ( $p < .01$ ) decrease in the  $X^2$  statistic. The low percentages obtained here again speaks to a measurement model that fits very well.

The above evidence pertaining to the level of fit obtained for the measurement model allowed for further investigation of the measurement model parameter estimates and squared multiple correlations.

### **5.8.6 Reduced psychological ownership measurement model parameter estimates and squared multiple correlations**

In order to determine if the manifest variables reliably and validly represented the latent variables they are supposed to measure, it was firstly important to ascertain the significance and the magnitude of the hypothesised paths between each of the manifest and the latent variable they were earmarked to reflect. This was done by investigating the unstandardised and completely standardised lambda-X matrices. Diamantopoulos and Siguaw (2009) and Theron (2014a) suggest that although the unstandardised matrix should be viewed and interrogated to evaluate the statistical significance of the factor loading estimates, it is more prudent to report on the completely standardised matrix for lambda-X when evaluating the magnitude of the factor loadings. This is because the unstandardised matrix is more complicated to interpret, due to its reliance on the original unit of measurement, and the fact that different scales may have been used to measure indicators of different constructs.

The unstandardised matrix still provides some valuable information pertaining specifically to three aspects namely 1) the unstandardised parameter estimate, 2) the standard error term, and 3) the z-value, which is the value of the parameter divided by its standard error. This provides an indication of the significance of the relationship.

As a rule of thumb a smaller value, in terms of the precision with which the parameter value has been estimated (standard error term), is an indication of a good estimation (Van Deventer, 2015). The value of particular importance here is however the z-value, which indicates whether factor loadings/path coefficients are statistically significant (i.e. whether the indicator variables/parcels load statistically significantly on the latent variables that

they were designed to reflect). The unstandardised lambda-X matrix is presented below in Table 5.121.

**Table 5.121**

***Reduced Psychological Ownership Measurement Model Unstandardised Lambda-X Matrix***

	JC	PON	PS_MOT	PO	MOT	SI
JC_1	0.889 (0.041) 21.475	--	--	--	--	--
JC_2	0.812 (0.038) 21.158	--	--	--	--	--
IK_1	--	--	--	--	--	--
IK_2	--	--	--	--	--	--
SI_1	--	--	--	--	--	0.926 (0.042) 22.151
SI_2	--	--	--	--	--	0.940 (0.052) 18.230
C_1	--	--	--	--	--	--
C_2	--	--	--	--	--	--
PO_1	--	--	--	1.235 (0.048) 25.804	--	--
PO_2	--	--	--	1.180 (0.044) 26.562	--	--
PON_1	--	0.818 (0.038) 21.764	--	--	--	--
PON_2	--	0.734 (0.036) 20.421	--	--	--	--
MOT_1	--	--	--	--	0.774 (0.031) 25.321	--
MOT_2	--	--	--	--	0.788 (0.032) 24.902	--
RES_5	--	--	0.808 (0.063) 12.817	--	--	--
RES_6	--	--	0.840	--	--	--

			(0.068)			
			12.361			
RES_7	--	--	0.839	--	--	--
			(0.072)			
			11.633			
RES_8	--	--	0.859	--	--	--
			(0.075)			
			11.492			
	<b>IK</b>	<b>C</b>				
JC_1	--	--				
JC_2	--	--				
IK_1	0.757	--				
	(0.034)					
	22.110					
IK_2	0.700	--				
	(0.030)					
	23.230					
SI_1	--	--				
SI_2	--	--				
C_1	--	1.135				
		(0.051)				
		22.134				
C_2	--	1.112				
		(0.062)				
		17.793				
PO_1	--	--				
PO_2	--	--				
PON_1	--	--				
PON_2	--	--				
MOT_1	--	--				
MOT_2	--	--				
RES_5	--	--				
RES_6	--	--				
RES_7	--	--				
RES_8	--	--				

JC=Job Characteristics, PON=Psychological Ownership Individuals Needs, PS\_Mot=Psychological Safety\*Mot Interaction ,PO=Psychological Ownership, Mot=Motivation, SI=Self Investment, IK=Intimate Knowledge, C=Control

According to C.C. Theron (personal communication, January 8, 2017) paths are significant if the test statistics (z-values) associated with the factor loadings are greater than |1.6449| due to the fact that the alternative hypotheses proposed in Chapter 3 are formulated as directional hypotheses. From the above Table 5.121 it is evident that all of the factor loadings were statistically significant ( $p < .05$ ). This commented favourably on the validity with which the constructs of interest, the latent variables, were represented by the manifest

variables, in this case the item parcels that were earmarked to reflect them. This matrix is very useful in determining whether the factor loadings/path coefficients are significant but as mentioned a “problem with relying on unstandardised loadings and associated t-values is that it may be difficult to compare the validity of different indicators measuring a particular construct” (Diamantopoulos & Siguaaw, 2009, p. 89). It was therefore important to also report on the completely standardised solution for  $\Lambda^X$ , which is presented below in Table 5.122.

The completely standardise  $\lambda_{ij}$  estimates, in the matrix in Table 5.122, should be interpreted as the slope of the regression of the standardised indicator variables on the standardised latent variables. The completely standardised factor loadings therefore indicate the average change, expressed in standard deviation units, in the indicator variable associated with one standard deviation change in the latent variable. In the case of simple linear regression, the completely standardised factor loadings are correlation coefficients. The ideal is to have the estimated factor loadings in the completely standardised lambda-X correlations as close to one as possible. A correlation greater than .50 was considered marginally satisfactory; however, the aim was to get the correlation as high as possible. Factor loading estimates in this case were considered satisfactory if the completely standardised factor loading estimates exceeded .71 (Theron, 2014a).

It is evident from Table 5.122 above that the magnitude of all of the factor loading estimates were more than satisfactory.

In terms of the reliability and validity of the indicators it was considered important to investigate their squared multiple correlations ( $R^2$ ). These squared correlations, displayed in Table 5.123 below, provide an indication of the proportion of variance in an indicator that the underlying latent variable it was earmarked to reflect, explains. It is a measure of the percentage of variance in a dependent variable that is accounted for by its relationship with the independent variable. Given that the  $R^2$  will always be equal to, or smaller than  $r_{ttx}$ ,  $R^2$  therefore constitutes a conservative, lower-bound estimate of the reliability of the indicator measures. Higher values are an indication of stronger validity and reliability and Hair et al (2010) suggest that loading estimates of at least .50 and ideally exceeding .71 should be found as evidence of good reliability and validity<sup>95</sup>. Low  $R^2$  is a sign that the

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<sup>95</sup> Given that each item parcel only represents a single latent variable, the square of the completely standardised factor loadings equals the  $R^2$  for each indicator variable.



outcome is relatively unrelated to the predictors and as alluded to above values closer to one indicate that the indicator variables and their underlying latent variables are highly related.

**Table 5.122**

***Reduced Psychological Ownership Measurement Model Completely Standardised Lambda-X Matrix***

	JC	PON	PS_MOT	PO	MOT	SI	IK	C
JC_1	0.943	--	--	--	--	--	--	--
JC_2	0.912	--	--	--	--	--	--	--
IK_1	--	--	--	--	--	--	0.912	--
IK_2	--	--	--	--	--	--	0.938	--
SI_1	--	--	--	--	--	0.920	--	--
SI_2	--	--	--	--	--	0.852	--	--
C_1	--	--	--	--	--	--	--	0.958
C_2	--	--	--	--	--	--	--	0.827
PO_1	--	--	--	0.948	--	--	--	--
PO_2	--	--	--	0.949	--	--	--	--
PON_1	--	0.959	--	--	--	--	--	--
PON_2	--	0.903	--	--	--	--	--	--
MOT_1	--	--	--	--	0.968	--	--	--
MOT_2	--	--	--	--	0.978	--	--	--
RES_5	--	--	0.927	--	--	--	--	--
RES_6	--	--	0.920	--	--	--	--	--
RES_7	--	--	0.894	--	--	--	--	--
RES_8	--	--	0.884	--	--	--	--	--

JC=Job Characteristics, PON=Psychological Ownership Individuals Needs, PS\_Mot=Psychological Safety\**Mot Interaction*, PO=Psychological Ownership, Mot=Motivation, SI=Self Investment, IK=Intimate Knowledge, C=Control

**Table 5.123****Reduced Psychological Ownership Measurement Model Squared Multiple Correlations for X-Variables**

JC_1	JC_2	IK_1	IK_2	SI_1	SI_2
0.888	0.832	0.832	0.880	0.847	0.725
C_1	C_2	PO_1	PO_2	PON_1	PON_2
0.918	0.684	0.899	0.901	0.920	0.815
MOT_1	MOT_2	RES_5	RES_6	RES_7	RES_8
0.936	0.956	0.860	0.847	0.800	0.782

JC=Job Characteristics, IK=Intimate Knowledge, SI=Self Investment, C=Control, PON=Psychological Ownership Individuals Needs, PO=Psychological Ownership, Mot=Motivation, Res=Residuals

As is evident from Table 5.123 above, the R<sup>2</sup>-values ranged from .684 to .956. Therefore, it can be suggested that the measurement model displays satisfactory validity in that a satisfactory proportion of variance is explained by each indicator variable and consequently, by implication also satisfactory reliability.

The unstandardised theta-delta matrix, in Table 5.124 below, presents the variance in measurement error terms of the indicators of the latent variables in the measurement model (all treated as exogenous latent variables). Interpretation of the magnitude of the error variances in the completely standardised theta-delta matrix is again preferred, however, the interpretation of the error variance estimates in the unstandardised theta-delta matrix below provides an indication of the statistical significance of the  $\theta_{\delta ij}$  estimates.

**Table 5.124****Reduced Psychological Ownership Measurement Model Unstandardised Theta-Delta Matrix**

	C_1	C_2	PO_1	PO_2	PON_1	PON_2
C_1	0.115 (0.055) 2.089					
C_2	--	0.571 (0.060) 9.463				
PO_1	--	--	0.171 (0.050) 3.447			
PO_2	--	--	--	0.153 (0.042) 3.607		

PON_1	--	--	--	--	0.058 (0.030) 1.952	
PON_2	--	--	--	--	--	0.123 (0.024) 5.009
MOT_1	--	--	--	--	--	--
MOT_2	--	--	--	--	--	--
RES_5	--	--	--	--	--	--
RES_6	--	--	--	--	--	--
RES_7	--	--	--	--	--	--
RES_8	--	--	--	--	--	--
	<b>MOT_1</b>	<b>MOT_2</b>	<b>RES_5</b>	<b>RES_6</b>	<b>RES_7</b>	<b>RES_8</b>
MOT_1	0.041 (0.012) 3.290					
MOT_2	--	0.029 (0.012) 2.300				
RES_5	--	--	0.106 (0.095) <b>1.113</b>			
RES_6	--	--	0.085 (0.098) <b>0.871</b>	0.127 (0.107) <b>1.192</b>		
RES_7	--	--	0.020 (0.025) <b>0.822</b>	--	0.176 (0.111) <b>1.588</b>	
RES_8	--	--	--	0.032 (0.025) <b>1.258</b>	0.147 (0.108) <b>1.361</b>	0.206 (0.112) <b>1.841</b>

C=Control, PON=Psychological Ownership Individuals Needs, PO=Psychological Ownership, Mot=Motivation, Res=Residuals

It is evident from Table 5.124 above that all indicators were statistically significantly plagued by measurement error as is evident in the fact that all indicators, report z-values greater than 1.6449 ( $z \geq 1.6449$ ) except for RES\_5 (1.113), RES\_6 (1.192) and RES\_7 (1.588). This finding was disconcerting in that it suggested that it would be permissible to regard these indicator variables, in general (or in the parameter), as perfectly reliable and valid measures of the *psychological safety\*motivation to pursue the routes towards psychological ownership* latent variable. Although such a finding could, on the one hand have been welcomed, it, on the other hand, evoked suspicion simply because it was too good a finding to be trusted. All the covariances between the measurement error terms of

indicators of the latent interaction effect were statistically insignificant ( $p > .05$ ). Moreover, as with the lambda indices, it was again important to also report on the completely standardised solution for  $\Theta_{\delta}$ .

The diagonal of the completely standardised theta-delta ( $\Theta_{\delta}$ ), matrix shown below in Table 5.125, reflects the proportion of the variance in X due to measurement error. The indicator variable completely standardised theta-delta estimates were considered satisfactory when  $\Theta_{\delta_{jj}} \leq$  were less than .50 and adequate when they were less than .25. The off-diagonal covariance estimates reflect the covariance between the measurement error terms associated with the indicators of the latent *psychological safety\*motivation to pursue the routes towards psychological ownership* interaction effect. They were, however, not interpreted since all four estimates were found to be statistically insignificant ( $p > .05$ ).

**Table 5.125**

***Reduced Psychological Ownership Measurement Model Completely Standardised Theta-Delta Matrix***

	JC_1	JC_2	IK_1	IK_2	SI_1	SI_2
JC_1	0.112					
JC_2	--	0.168				
IK_1	--	--	0.168			
IK_2	--	--	--	0.120		
SI_1	--	--	--	--	0.153	
SI_2	--	--	--	--	--	0.275
C_1	--	--	--	--	--	--
C_2	--	--	--	--	--	--
PO_1	--	--	--	--	--	--
PO_2	--	--	--	--	--	--
PON_1	--	--	--	--	--	--
PON_2	--	--	--	--	--	--
MOT_1	--	--	--	--	--	--
MOT_2	--	--	--	--	--	--
RES_5	--	--	--	--	--	--
RES_6	--	--	--	--	--	--
RES_7	--	--	--	--	--	--
RES_8	--	--	--	--	--	--
	<b>C_1</b>	<b>C_2</b>	<b>PO_1</b>	<b>PO_2</b>	<b>PON_1</b>	<b>PON_2</b>
C_1	0.082					
C_2	--	0.316				
PO_1	--	--	0.101			
PO_2	--	--	--	0.099		
PON_1	--	--	--	--	0.080	

PON_2	--	--	--	--	--	0.185
MOT_1	--	--	--	--	--	--
MOT_2	--	--	--	--	--	--
RES_5	--	--	--	--	--	--
RES_6	--	--	--	--	--	--
RES_7	--	--	--	--	--	--
RES_8	--	--	--	--	--	--
	<b>MOT_1</b>	<b>MOT_2</b>	<b>RES_5</b>	<b>RES_6</b>	<b>RES_7</b>	<b>RES_8</b>
MOT_1	0.064					
MOT_2	--	0.044				
RES_5	--	--	0.140			
RES_6	--	--	0.107	0.153		
RES_7	--	--	0.025	--	0.200	
RES_8	--	--	--	0.036	0.162	0.218

JC=Job Characteristics, IK=Intimate Knowledge, SI=Self Investment, C=Control,  
 PON=Psychological Ownership Individuals Needs, PO=Psychological Ownership,  
 Mot=Motivation, Res=Residuals

The observed values in Table 5.125 above indicate the proportion of item parcel variance not explained by the underlying latent variable. All values were satisfactory and less than 32% of the variance could be ascribed to systematic non-relevant variance and random error variance for each indicator variable.

A final aspect that is relevant in determining conclusions surrounding the reduced *psychological ownership* measurement model fit is the discriminant validity of the indicator measures. The phi matrix below in Table 5.126 presents the latent variable inter-correlations. It is evident that none of these inter-correlations were excessively high (all  $\phi_{ij} < .90$ ). Given the magnitude of the latent variable inter-correlations it was not deemed necessary to examine the discriminant validity of the operationalisation of the latent variables comprising the structural model more stringently (Diamantopoulos & Siguaw, 2009). It was therefore concluded that the manner in which the latent variables comprising the *psychological ownership* structural model were operationalised succeeded in discriminating between the latent variables as related but qualitatively distinct variables.

**Table 5.126**  
**Unstandardised Phi Matrix<sup>96</sup>**

	JC	PON	PS_MOT	PO	MOT	SI	IK	C
JC	1.000							
PON	0.212 (0.060) 3.516	1.000						
PS_MOT	0.117 (0.079) 1.471	0.258 (0.063) 4.109	1.000					
PO	0.568 (0.052) 11.000	0.261 (0.055) 4.741	0.094 (0.077) 1.218	1.000				
MOT	0.536 (0.055) 9.839	0.544 (0.046) 11.691	0.296 (0.092) 3.206	0.509 (0.048) 10.505	1.000			
SI	0.519 (0.059) 8.820	0.264 (0.059) 4.480	0.143 (0.079) 1.822	0.578 (0.050) 11.595	0.451 (0.053) 8.473	1.000		
IK	0.490 (0.059) 8.375	0.126 (0.061) 2.070	0.082 (0.072) 1.136	0.508 (0.050) 10.194	0.386 (0.059) 6.491	0.546 (0.049) 11.255	1.000	
C	0.706 (0.035) 20.053	0.209 (0.055) 3.801	0.103 (0.080) 1.300	0.591 (0.046) 12.813	0.537 (0.047) 11.414	0.531 (0.051) 10.366	0.425 (0.059) 7.236	1.000

JC=Job Characteristics, PON=Psychological Ownership Individuals Needs, PS\_Mot=Psychological Safety\*Mot Interaction, PO=Psychological Ownership, Mot=Motivation, SI=Self Investment, IK=Intimate Knowledge, C=Control

### 5.8.7 Overall conclusions regarding the fit of the reduced psychological ownership measurement model

Van Deventer (2015) outlines general criteria in terms of arriving at a verdict on the success with which the latent variables comprising a structural model have been operationalised. She suggests that successful operationalisation can be assumed if the following criteria have been met:

- 1) the measurement model fits the data reasonably well,
- 2) the completely standardised factor loadings  $\lambda_{ij}^x$  are large ( $\lambda_{ij} \geq .71$ ) and statistically significant ( $p < .05$ ),

<sup>96</sup> Although this illustrates the so-called unstandardised phi matrix the  $\phi_{ij}$  estimates displayed are nonetheless standardised estimates and can therefore be interpreted as correlation coefficients rather than covariances.

- 3) the variance terms ( $\theta_{\delta_{jj}}$ ) in the completely standardised solution are small and statistically significant ( $p < .05$ ) for all indicators,
- 4) the  $R^2$  indices are large for all indicators; and
- 5) discriminant validity had been demonstrated.

When considering the above-mentioned criteria in terms of the reduced *psychological ownership* measurement model specifically, the following can be concluded. Good model fit indices were reported in the goodness-of-fit statistics. The completely standardised factor loadings in terms of the lambda-X parameter estimates were relatively high. Furthermore, the measurement error terms were all small and mostly statistically significant. Finally, discriminant validity had been demonstrated. It was therefore concluded that the operationalisation of the latent variables comprising the *psychological ownership* structural model was successful. It was therefore permissible to interpret the fit of the *psychological ownership* structural model.

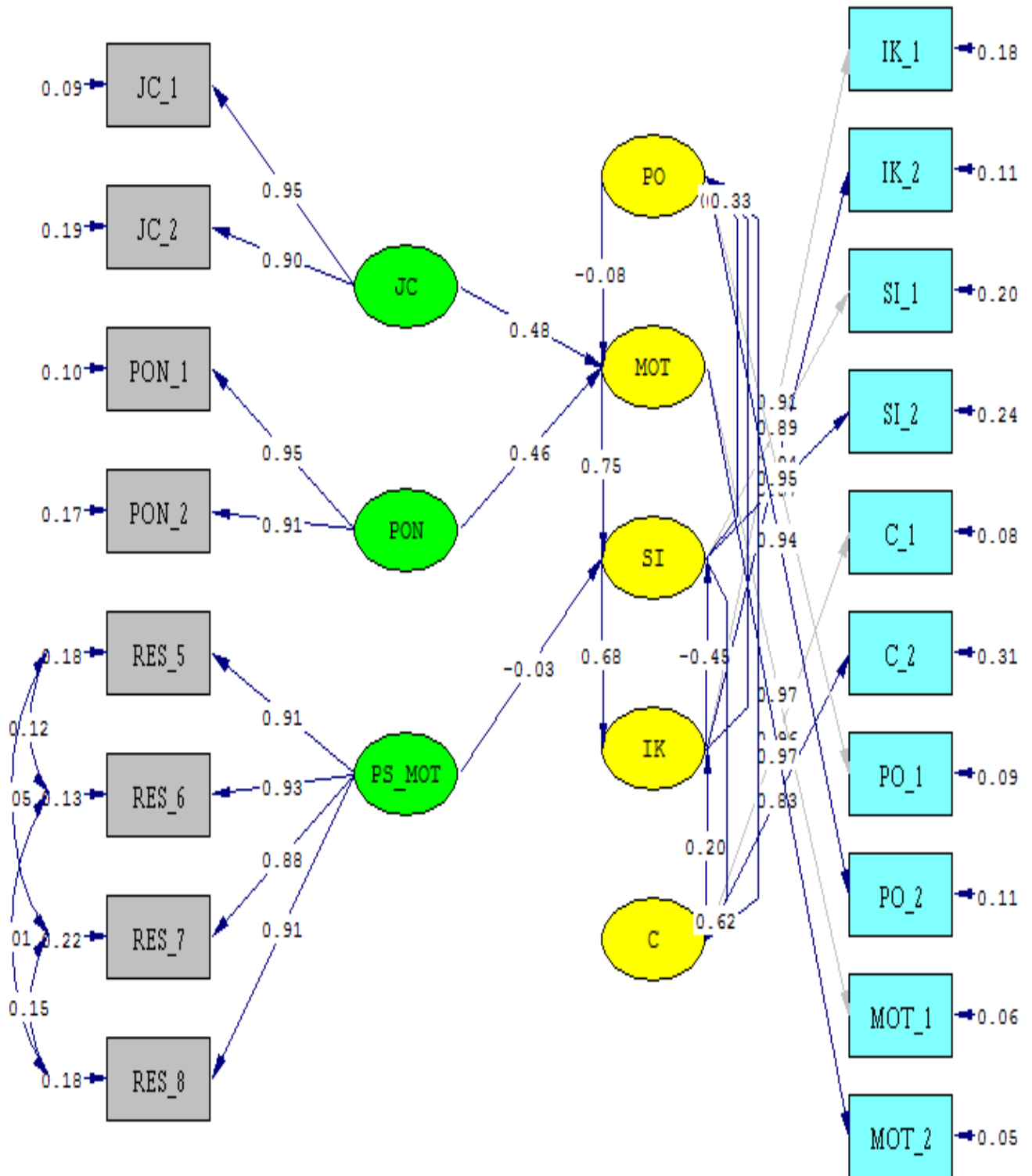
## 5.9 EVALUATING THE FIT OF THE PSYCHOLOGICAL OWNERSHIP STRUCTURAL MODEL

When assessing the structural model, the focus is on the substantive relationships of interest (Diamantopoulos & Siguaw, 2009). Here the focus is on the various relationships hypothesised in the model, between the exogenous and endogenous latent variables, as well as between the endogenous latent variables. The objective of this part of the research study is to determine if the hypothesised relationships are in fact supported by the data.

The inadmissible values obtained in the original measurement model necessitated the deletion of latent *salience of psychological ownership needs \* job characteristics* interaction effect, the latent squared *salience of psychological ownership needs* effect and the latent squared *job characteristics* effect. This in turn necessitated the deleting of the following three paths from the model:  $\gamma_{23}$   $\gamma_{24}$   $\gamma_{25}$ . Therefore, the reduced *psychological ownership* structural model, deemed Model A, and depicted in Figure 5.12, was evaluated using LISREL 8.80.

### 5.9.1 Evaluating the goodness of fit of the reduced psychological ownership structural model (Model A)

Figure 5.12 portrays a visual representation of the reduced *psychological ownership* structural model (Model A). This is followed by Table 5.127 which outlines the fit statistics.



Chi-Square=248.22, df=116, P-value=0.00000, RMSEA=0.059

**Figure 5.12. Visual Representation of the Reduced Psychological Ownership Structural Model (Model A) (Completely Standardised Solution)**



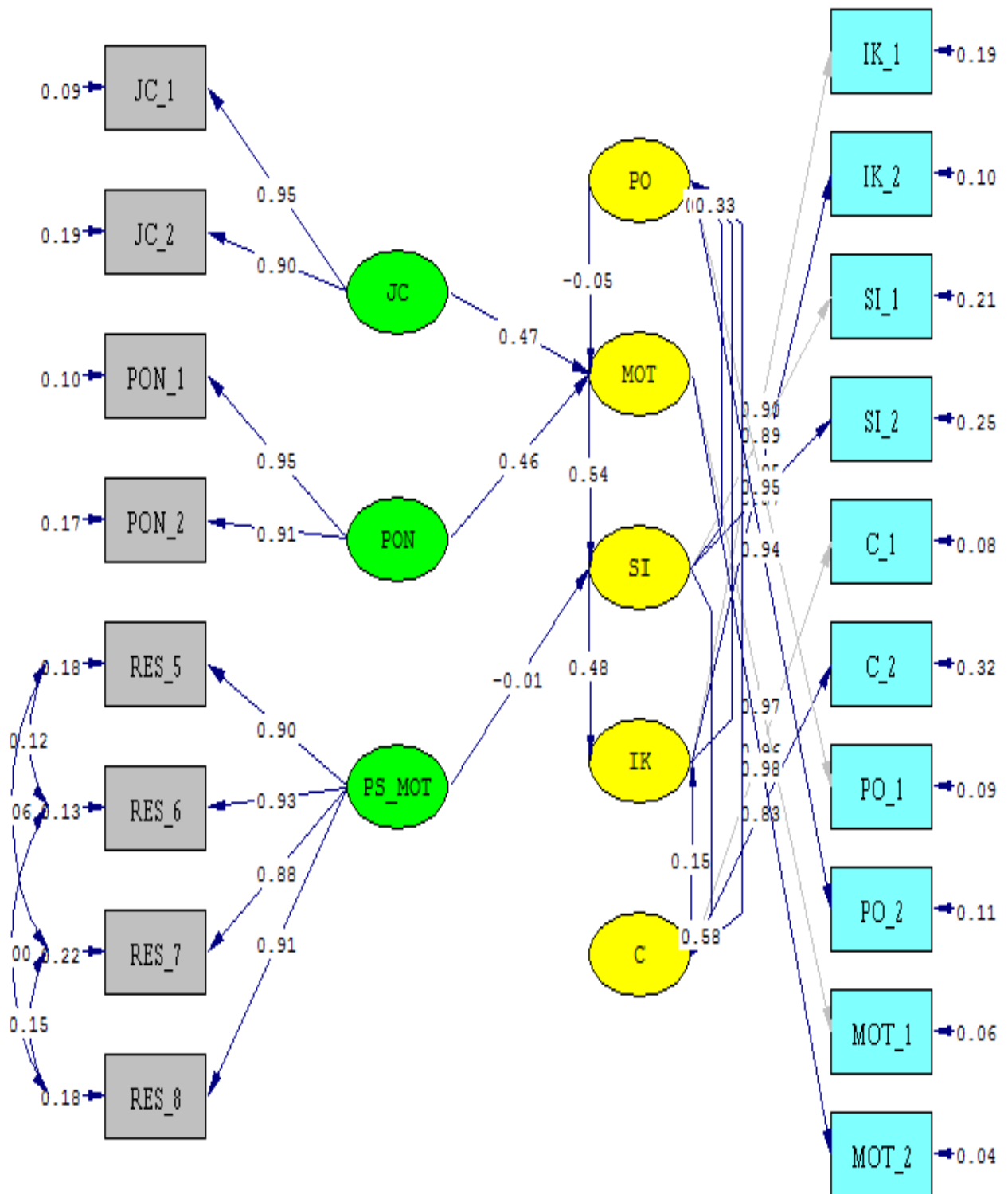
The conclusion on structural model fit, for Model A, was similarly based on a basket of evidence and not merely one single indicator (as seen above in the interpretation of the measurement model fit). Therefore, several fit indices, highlighted in Table 5.127 below, were considered in determining the fit of the reduced *psychological ownership* structural model (Model A).

The exact fit null hypothesis ( $H_{01a}$ : RMSEA = 0) was rejected ( $p < .05$ ). The close fit null hypothesis was not rejected ( $p > .05$ ). The remainder of the fit statistics in Table 5.127 above indicated reasonable to good fit. The completely standardised structural error variance estimate for  $\eta_3$ , however, returned an inadmissible value ( $\psi_{33} = 1.219$ ). The model was therefore not further interpreted.

The model was subsequently modified by removing the path from *intimate knowledge* ( $\eta_4$ ) on *self-investment* ( $\eta_3$ ). The hypothesised influence of *intimate knowledge* on *self-investment* was found to be statistically significant ( $p < .05$ ) but the sign of the regression slope disagreed with the nature of the relationship hypothesised under the directional alternative hypothesis. The modified *psychological ownership* structural model with  $\beta_{34}$  deleted (Model B) was subsequently refitted. The model converged in 37 iterations. The fitted modified *psychological ownership* structural model (completely standardised solution) is shown in Figure 5.13. Inspection of the completely standardised solution indicated no inadmissible parameter estimates. The fit statistics are shown in Table 5.127.

**Table 5.127****Reduced Psychological Ownership Structural Model (Model A) Goodness of Fit Statistics**

<b>Statistic</b>	<b>Value</b>
Degrees of Freedom	116
Minimum Fit Function Chi-Square	325.490 (P = 0.0)
Normal Theory Weighted Least Squares Chi-Square	267.441 (P = 0.00)
<b>Satorra-Bentler Scaled Chi-Square</b>	<b>248.225 (P = 0.00)</b>
Chi-Square Corrected for Non-Normality	414.027 (P = 0.0)
Estimated Non-centrality Parameter (NCP)	132.225
90 Percent Confidence Interval for NCP	(90.678 ; 181.523)
Minimum Fit Function Value	0.992
Population Discrepancy Function Value (F0)	0.403
90 Percent Confidence Interval for F0	(0.276 ; 0.553)
<b>Root Mean Square Error of Approximation (RMSEA)</b>	<b>0.059</b>
90 Percent Confidence Interval for RMSEA	(0.0488 ; 0.0691)
<b>P-Value for Test of Close Fit (RMSEA &lt; 0.05)</b>	<b>0.072</b>
Expected Cross-Validation Index (ECVI)	1.092
90 Percent Confidence Interval for ECVI	(0.965 ; 1.242)
ECVI for Saturated Model	1.043
ECVI for Independence Model	25.251
Chi-Square for Independence Model with 153 Degrees of Freedom	8246.166
Independence AIC	8282.166
Model AIC	358.225
Saturated AIC	342.000
Independence CAIC	8368.495
Model CAIC	622.008
Saturated CAIC	1162.126
Normed Fit Index (NFI)	0.970
Non-Normed Fit Index (NNFI)	0.978
Parsimony Normed Fit Index (PNFI)	0.735
Comparative Fit Index (CFI)	0.984
Incremental Fit Index (IFI)	0.984
Relative Fit Index (RFI)	0.960
Critical N (CN)	204.947
Root Mean Square Residual (RMR)	0.114
Standardized RMR	0.107
Goodness of Fit Index (GFI)	0.917
Adjusted Goodness of Fit Index (AGFI)	0.878
Parsimony Goodness of Fit Index (PGFI)	0.622



Chi-Square=252.72, df=117, P-value=0.00000, RMSEA=0.059

**Figure 5.13. Visual Representation of the Modified Psychological Ownership Structural Model (Model B) (Completely Standardised Solution)**

**Table 5.128****Modified Psychological Ownership Structural Model (Model B) Goodness of Fit Statistics**

<b>Statistic</b>	<b>Value</b>
Degrees of Freedom	117
Minimum Fit Function Chi-Square	333.984 (p=0.0)
Normal Theory Weighted Least Squares Chi-Square	272.103 (p=0.00)
<b>Satorra-Bentler Scaled Chi-Square</b>	<b>252.716 (p=0.00)</b>
Chi-Square Corrected for Non-Normality	464.818 (p=0.0)
Estimated Non-centrality Parameter (NCP)	135.716
90 Percent Confidence Interval for NCP	(93.694 ; 185.486)
Minimum Fit Function Value	1.018
Population Discrepancy Function Value (F0)	0.414
90 Percent Confidence Interval for F0	(0.286 ; 0.566)
<b>Root Mean Square Error of Approximation (RMSEA)</b>	<b>0.0595</b>
90 Percent Confidence Interval for RMSEA	(0.0494 ; 0.0695)
<b>P-Value for Test of Close Fit (RMSEA &lt; 0.05)</b>	<b>0.0602</b>
<b>Expected Cross-Validation Index (ECVI)</b>	<b>1.100</b>
<b>90 Percent Confidence Interval for ECVI</b>	<b>(0.972 ; 1.251)</b>
ECVI for Saturated Model	1.043
ECVI for Independence Model	25.251
Chi-Square for Independence Model with 153 Degrees of Freedom	8246.166
Independence AIC	8282.166
Model AIC	360.716
Saturated AIC	342.000
Independence CAIC	8368.495
Model CAIC	619.703
Saturated CAIC	1162.126
Normed Fit Index (NFI)	0.969
Non-Normed Fit Index (NNFI)	0.978
Parsimony Normed Fit Index (PNFI)	0.741
Comparative Fit Index (CFI)	0.983
Incremental Fit Index (IFI)	0.983
Relative Fit Index (RFI)	0.960
<b>Critical N (CN)</b>	<b>202.819</b>
Root Mean Square Residual (RMR)	0.120
Standardized RMR	0.115
Goodness of Fit Index (GFI)	0.916
Adjusted Goodness of Fit Index (AGFI)	0.877
Parsimony Goodness of Fit Index (PGFI)	0.626

In order to test the exact fit null hypothesis ( $H_{01a}$ : RMSEA = 0;  $H_{a1a}$ : RMSEA > 0) the Satorra-Bentler Scaled Chi-Square was examined. It is evident from Table 5.128 above that the modified *psychological ownership* structural model obtained a Satorra-Bentler Scaled Chi-Square value of 252.716 ( $p=0.0$ ). This finding of significance attests to the fact that the null hypothesis of exact fit should be rejected.

A more reasonable assumption is that the modified psychological ownership model could provide a valid plausible explanation, and therefore close fit would be more realistic. In order to determine close fit, the RMSEA and p-value test of close fit were examined. The modified *psychological ownership* structural model obtained a RMSEA value of .0595, indicating reasonable to good fit. 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 ( $p>.05$ ) not to reject the close fit null hypothesis. When viewed in conjunction with the 90 percent confidence interval for RMSEA (.0494; .0695) further evidence of good to reasonable fit was obtained, in that in a well-fitting model the lower limit should be close to 0 (at least below .05) while the upper limit should be less than .08. It is apparent that these conditions have been met and therefore the fit of this model was good to reasonable. This bolstered confidence in this modified *psychological ownership* structural model and it seemed reasonable to suggest that it may provide a reasonable reproduction, and therefore explanation, of the observed covariance matrix. But further exploration was necessary.

The ECVI value showed that the difference between the sample covariance matrix derived from fitting the modified *psychological ownership* structural model on the current sample, and the expected covariance, should the fitted model be cross validated to another sample, was favourable (IECVI: 25.251 to ECVI: 1.100). It is evident that the ECVI for the fitted model is much lower than that of the independent model. It was however slightly higher than that reported for the saturated model (1.043), providing evidence for a model potentially lacking paths (Diamantopoulos & Siguaw, 2009).

The NFI (.969), NNFI (.978), CFI (.983) IFI (.983) and RFI (.960) fit indices, presented in Table 5.128 above, in agreement with the preceding indices, rather convincingly suggested a favourable fit of the *psychological ownership* structural model. All values exceed the more stringent cut-off value of .95 that has been suggested for these indices (Hu and Bentler, 1999).

The CN (202.819) moreover also provided corroboratory evidence for this finding of good fit in that the reported value was above the 200 threshold, albeit only marginally, and therefore sufficient representation of data by the fitted model was suggested. Further evidence of a merely reasonably well fitting model was evident in the final fit indices namely the SRMR, GFI and AGFI. The model obtained a satisfactory GFI (.916) but an unsatisfactory AGFI (.877). It should be acknowledged however that these values fell just below the cut-off (>.90) and therefore the model should not be assumed to be a poor-fitting model. The SRMR (.115) did however provide further support for a problematic-fitting model, as it fell above the .05 threshold.

Considering the above it can thus far be suggested that the modified *psychological ownership* structural model, presented in Figure 5.13, shows reasonable model fit. However, before a final conclusion can be drawn pertaining to the fit of this model the standardised residuals and modification indices were evaluated and interpreted (Jöreskog & Sörbom, 1996).

### 5.9.2 Modified psychological ownership structural model (Model B) standardised residuals

The distribution of the standardised residuals is visually depicted below in Figure 5.14, followed by a summary of both the large positive and large negative residuals presented in Table 5.129.

---

```
- 3|98
- 2|43210
- 1|5554210
- 0|99988888777665544432221111000000000000000000000000000000000000
0|11122334444555555566666667777788888999
1|0111112222333344457778
2|144
3|03447
4|0456899
5|13789
6|011
7|0358
```

---

### **Figure 5.14. Stem-And-Leaf Plot for the Modified Psychological Ownership Structural Model (Model B)**

A stem-and-leaf plot, that depicts a good fitting model, would display residuals distributed closely around 0. It is evident from Figure 5.14 above that the distribution of the standardised residuals for the modified *psychological ownership* structural model were somewhat positively skewed. Therefore, it can be suggested that in general the observed

covariance matrix is being underestimated by the model parameters. Additional support for this finding was found in Table 5.129 below where only 2 of the 26 significant standardised residuals were negative.

**Table 5.129**

**Summary Statistics for the Modified Psychological Ownership Structural Model (Model B) Standardised Residuals**

<b>Largest Negative Standardised Residuals</b>	
Residual for MOT_1 and SI_1	-3.809
Residual for MOT_2 and SI_1	-3.922
<b>Largest Positive Standardised Residuals</b>	
Residual for MOT_1 and C_1	4.914
Residual for MOT_1 and C_2	3.440
Residual for MOT_1 and PO_1	4.895
Residual for MOT_1 and PO_2	5.750
Residual for MOT_2 and C_1	4.803
Residual for MOT_2 and C_2	3.443
Residual for MOT_2 and PO_1	4.450
Residual for MOT_2 and PO_2	5.055
Residual for JC_1 and IK_1	4.610
Residual for JC_1 and IK_2	4.393
Residual for JC_1 and SI_1	3.706
Residual for JC_1 and SI_2	3.312
Residual for JC_1 and C_1	7.765
Residual for JC_1 and C_2	6.970
Residual for JC_1 and PO_1	5.710
Residual for JC_1 and PO_2	6.098
Residual for JC_2 and IK_1	5.870
Residual for JC_2 and IK_2	5.310
Residual for JC_2 and SI_1	4.041
Residual for JC_2 and SI_2	2.991
Residual for JC_2 and C_1	7.513
Residual for JC_2 and C_2	7.311
Residual for JC_2 and PO_1	5.981
Residual for JC_2 and PO_2	6.146

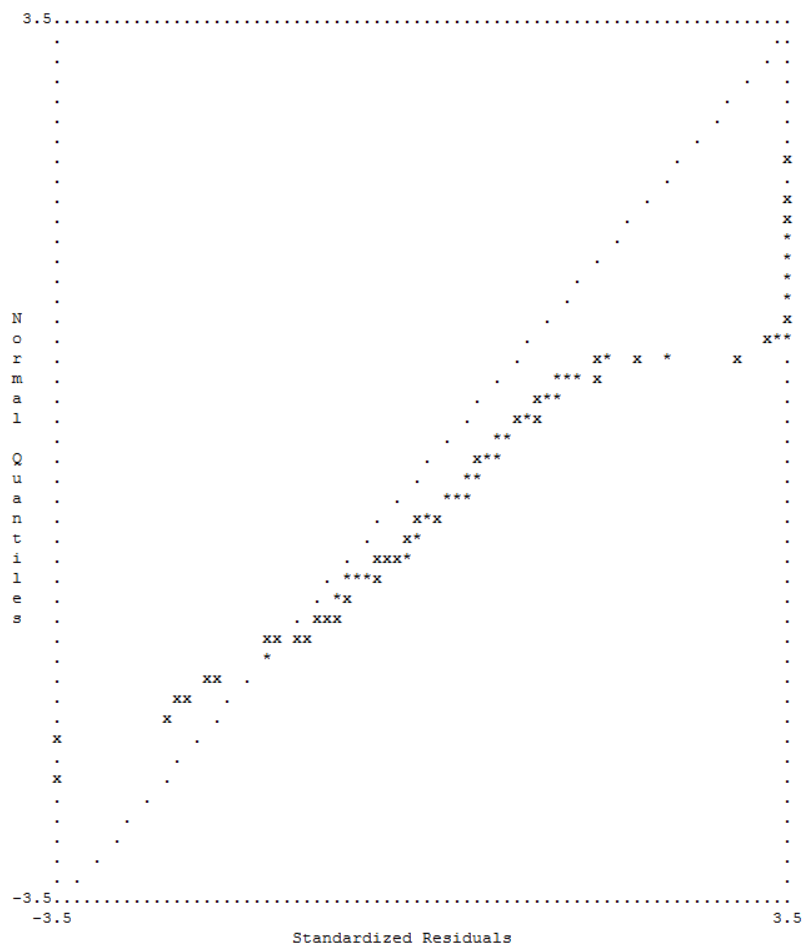
JC=Job Characteristics, PO=Psychological Ownership, Mot=Motivation, SI=Self Investment, IK=Intimate Knowledge, C=Control

It was additionally concluded that 26 residuals were large ( $>|2.58|$ ), with two being large negative and 24 being reported as large positive residuals. It can therefore be concluded that 15.2%<sup>97</sup> of the unique variance-covariance terms were poorly estimated. This

<sup>97</sup>  $26/[(18 \times 19)/2] = 26/171 = .1520467$

corroborates the findings concluded from the fit statistics in Table 5.128 and standardised residuals depicted in Figure 5.14 above. The inference derived from the standardised residual distribution that the model tended to underestimate the observed covariance matrix dovetailed with the finding that both ECVI and the Akaike information criterion (AIC) were more favourable for the saturated model than for the fitted model. The consistent Akaike information criterion (CAIC) did not support this trend. It seemed that the addition of new paths might be necessary to improve model fit.

The Q-plot, displayed below in Figure 5.15, provided further corroboratory evidence of the findings of underestimation in that the data points swivelled away from the 45-degree line predominantly in the upper region.



**Figure 5.15. Q-Plot of the Modified Psychological Ownership Structural Model (Model B) Standardised Residuals**

This provided further evidence for a model that displayed only reasonable fit, as good fit would have been indicated by data points gathered tightly around the 45-degree reference line.



Since it seemed reasonable, based on the foregoing basket of evidence, to suggest that the fit of the modified *psychological ownership* structural model was reasonable, it was decided that it would be permissible to examine and interpret the statistical significance of the unstandardised parameter estimates, the magnitude of the completely standardised parameter estimates as well as the proportion of variance explained in each of the endogenous latent variables.

### **5.9.3 Modified psychological ownership structural model parameter estimates and squared multiple correlations**

When assessing the modified *psychological ownership* structural model in terms of the parameter estimates three specific matrices were of interest, namely, Gamma, Beta and Psi. Gamma describes the estimated slopes of the regression relationships that were hypothesised between the exogenous and endogenous latent variables and Beta describes the estimated slopes of the directional regression relationships hypothesised between the endogenous variables. Both  $\gamma_{ij}$  and  $\beta_{ij}$  were interpreted as partial regression coefficients unless only a single  $\xi_i$  or  $\eta_i$  was hypothesised to affect  $\eta_j$ . This therefore meant that  $\gamma_{ij}$  and  $\beta_{ij}$  described the average change in  $\eta_j$  associated with one unit change in  $\eta_i$  when holding constant (or controlling for) all other latent variables that were structurally linked to  $\eta_j$ . Psi describes the estimated variances of the structural error terms associated with each endogenous latent variable in the modified *psychological ownership* structural model.

Diamantopoulos and Siguaw (2009) highlight four aspects of importance when investigating the above-mentioned parameters. Firstly, the sign of the estimated path coefficients should correspond to the relevant path-specific substantive hypotheses, theorised in Chapter 2, and the statistical alternative hypotheses proposed in Chapter 3. If, for example a positive relationship had been hypothesised between *psychological ownership* and *motivation*, the sign of the parameter estimate for this path should be positive (and *vice versa*). All structural error variance estimates have to be positive. Secondly, it should be determined whether the parameter estimates were statistically significant ( $p < .05$ ). Thirdly, the magnitude of the parameter estimates should be interpreted and, lastly, the squared multiple correlations should be analysed to determine the variance in each endogenous variable that was accounted for by the latent variables linked to it in the structural model.

Both the standardised and unstandardised matrices for gamma, beta and psi will be discussed below, presented in Tables 5.130, 5.131, 5.132, 5.133, 5.134 and 5.135 respectively.

In the unstandardised matrices three figures are reported, the unstandardised parameter estimates (the first value), the standard error terms (the middle value) and the z-values (the bottom value). Due to the directional alternative hypotheses, a parameter estimate was considered statistically significant ( $p < .05$ ) if the absolute z-value obtained was greater than or equal to  $|1.6449|$ .

**Table 5.130**  
**Modified Psychological Ownership Structural Model (Model B) Unstandardised Gamma Matrix**

	JC	PON	PS_MOT
PO	--	--	--
MOT	0.466* (0.057) 8.126	0.457* (0.053) 8.581	--
SI	--	--	-0.009 (0.063) -0.135
IK	--	--	--
C	--	--	--

\* ( $p < .05$ )

JC=Job Characteristics, PON=Psychological Ownership Individuals Needs, PS\_Mot=Psychological Safety\*Mot Interaction, PO=Psychological Ownership, Mot=Motivation, SI=Self Investment, IK=Intimate Knowledge, C=Control

The unstandardised gamma matrix above, describes the slopes of the regression of the endogenous latent variables ( $\eta$ ) on the exogenous latent variables ( $\xi$ ). Table 5.130 provides an assessment of the strength and the statistical significance of the relationship between *job characteristics* (JC) and the *motivation to pursue the routes towards psychological ownership* (MOT), of the relationship between *individual psychological ownership individual needs* (PON) and *motivation to pursue the routes towards psychological ownership* (MOT) and of the moderating effect of *psychological safety* (PS) on the effect of the *motivation to pursue the routes towards psychological ownership* (MOT) on *investing the self* (SI).

The sign of two of the three  $\gamma_{ij}$  estimates, indicating the nature of the relationships, both agreed with the hypothesised positive relationships. Additionally, two of the three path

coefficient estimates were statistically significant ( $p < .05$ ).  $H_{02}: \gamma_{21} = 0$  and  $H_{03}: \gamma_{22} = 0$  were therefore rejected<sup>98</sup>. Path-specific substantive hypotheses 2 and 3 were therefore corroborated. Support was therefore obtained for the hypothesised effect of *job characteristics* (JC) on the *motivation to pursue the routes towards psychological ownership* and for the hypothesised effect *individual psychological ownership needs* (PON) on the *motivation to pursue the routes towards psychological ownership* (MOT).  $H_{010}: \gamma_{36} = 0$  could, however, not be rejected. Path-specific substantive hypothesis 10 was therefore not corroborated. Support was therefore not obtained for the hypothesised moderating effect of *psychological safety* on the effect of the *motivation to pursue the routes towards psychological ownership* on *investing the self*. The unstandardised beta matrix, describing the slope of the relationship between the various endogenous variables in the modified *psychological ownership* structural model (Model B), is presented below in Table 5.131.

**Table 5.131**  
**Modified Psychological Ownership Structural Model Unstandardised Beta Matrix (Model B)**

	PO	MOT	SI	IK	C
PO	--	--	0.331 (0.079)	0.185 (0.059)	0.331 (0.071)
MOT	<b>-0.045</b> (0.060)	--	--	--	--
SI	--	0.544 (0.069)	--	--	--
IK	--	--	0.477 (0.077)	--	0.155 (0.073)
C	--	--	0.578 (0.056)	--	--
			10.308		

PO=Psychological Ownership, Mot=Motivation, SI=Self Investment, IK=Intimate Knowledge, C=Control

According to Table 5.131 above, all of the hypothesised relationships between the endogenous variables within the model are statistically significant ( $p < .05$ ) except for the

<sup>98</sup> Given the fact that the  $\gamma_{ij}$  (and the  $\beta_{ij}$ ) represent partial regression coefficients the  $H_{02}$  and  $H_{03}$  tested here are not strictly speaking equal to the hypotheses formulated in Chapter 3.  $H_{02}$  here, when written in full states  $H_{02}: \gamma_{21} = 0 | \xi_2 \neq 0; \xi_3 \neq 0; \xi_4 \neq 0; \xi_5 \neq 0$ .

relationship between *psychological ownership* and *motivation to pursue the routes towards psychological ownership*.  $H_{09}$ :  $\beta_{32}=0$ ,  $H_{013}$ :  $\beta_{13}=0$ ,  $H_{016}$ :  $\beta_{43}=0$ ,  $H_{011}$ :  $\beta_{53}=0$ ,  $H_{015}$ :  $\beta_{14}=0$ ,  $H_{014}$ :  $\beta_{15}=0$  and  $H_{012}$ :  $\beta_{45}=0$  were therefore all rejected in favour of  $H_{aj}$ :  $j=9, 11, 12, 13, 14, 15, 16$ . Path-specific substantive hypotheses 9, 11, 12, 13, 14, 15 and 16 were therefore corroborated.  $H_{018}$ :  $\beta_{21}=0$  could not be rejected. Path-specific substantive hypotheses 18 was therefore not corroborated.

The standardised matrices were investigated as they provided additional “insights into the relative impact of each independent variable on each endogenous variable” (Diamantopoulos & Siguaaw, 2009, p. 93). Similar to the standardised matrices investigated in the measurement model these standardised matrices for gamma, beta and psi provide information that is unaffected by differences in the units of measurement in the questionnaire. The completely standardised gamma and beta matrices describe the average change in the endogenous latent variable  $\eta_j$  expressed in standard deviation units associated with one standard deviation change in the exogenous latent variable  $\xi_j$  or endogenous latent variable  $\eta_i$ . Moreover, both the unstandardised and the completely standardised path coefficients should be interpreted as partial regression coefficients. The  $\gamma_{ij}$  estimate therefore describes the average change in  $\eta_i$  associated with one unit change in  $\xi_j$  when holding all other effects that have been hypothesised to affect  $\eta_i$  constant. Likewise the  $\beta_{ij}$  estimate describes the average change in  $\eta_i$  associated with one unit change in  $\eta_j$  when holding all other effects that have been hypothesised to affect  $\eta_i$  constant. Table 5.132 below depicts the completely standardised gamma matrix.

**Table 5.132**

***Modified Psychological Ownership Structural Model Completely Standardised Gamma Matrix (Model B)***

	JC	PON	PS_MOT
PO	--	--	--
MOT	0.466	0.457	--
SI	--	--	-0.009
IK	--	--	--
C	--	--	--

JC=Job Characteristics, PON=Psychological Ownership  
Individuals Needs, PS\_Mot=Psychological Safety\*Mot Interaction  
PO=Psychological Ownership, Mot=Motivation, SI=Self  
Investment, IK=Intimate Knowledge, C=Control

According to Table 5.128, above the influence of *job characteristics* on *motivation to pursue the routes towards psychological ownership* (.466) and the influence of an

*individual's salient psychological ownership root need on motivation to pursue the routes towards psychological ownership (.457)* were both moderately strong. On average, the *motivation to pursue the routes to psychological ownership* increased approximately half a standard deviation for every standard deviation increase in *job characteristics* when holding all other effects in the model that are structurally mapped on *motivation* constant. Likewise on average the *motivation to pursue the routes to psychological ownership* increased approximately half a standard deviation for every standard deviation increase in *salience of the needs for psychological ownership* when holding all other effects in the model that are structurally mapped on *motivation* constant.

Table 5.133 depicts the completely standardised gamma matrix.

**Table 5.133**

***Modified Psychological Ownership Structural Model Completely Standardised Beta Matrix (Model B)***

	PO	MOT	SI	IK	C
PO	--	--	0.331	0.185	0.331
MOT	-0.045	--	--	--	--
SI	--	0.544	--	--	--
IK	--	--	0.477	--	0.155
C	--	--	0.578	--	--

PO=Psychological Ownership, Mot=Motivation, SI=Self Investment, IK=Intimate Knowledge, C=Control

Table 5.133 above indicates that the relationship between *self-investment* and *control* was the most pronounced (.578), followed by the positive effect of *motivation to pursue the routes to psychological ownership* on *self-investment* (.544) and the positive effect of *self-investment* on *intimate knowledge* (.477). The paths between *control* and *psychological ownership* (.331), *intimate knowledge* and *psychological ownership* (.185), and between *control* and *intimate knowledge* (.155), were somewhat less pronounced. It was heartening to the researcher to see that one of the most pronounced relationship is that of *motivation* on *self-investment* as this was an additional path included in the model after much theorising and questioning of current literature pertaining to *psychological ownership*.

Table 5.134 below depicts the unstandardised psi matrix which outlines the variance in the structural error terms. Similar to the previous unstandardised gamma and beta matrices, the top value represents the unstandardised psi coefficients. The second value is the standard error and the last value represents the test statistic z. A moderate to small,

but statistically significant ( $p < .05$ ) psi variance is to be expected since the model cannot be regarded as perfect.

**Table 5.134**

***Modified Psychological Ownership Structural Model Unstandardised Psi Matrix (Model B)***

PO	MOT	SI	IK	C
0.516	0.515	0.728	0.667	0.673
(0.053)	(0.057)	(0.080)	(0.065)	(0.084)
9.787	9.032	9.144	10.258	8.040

PO=Psychological Ownership, Mot=Motivation, SI=Self Investment, IK=Intimate Knowledge, C=Control

It is evident from Table 5.134 above that the null hypothesis that the variance in the  $j^{\text{th}}$  structural error term is zero could be rejected ( $z > 1.6449$ ) for all of the endogenous latent variables. This implies that the estimated structural error variance was statistically significant ( $p < .05$ ), which was to be expected since it is unlikely that the model would provide a perfect explanation for variance in the endogenous latent variables<sup>99</sup>.

Table 5.135 depicts the completely standardised psi matrix

**Table 5.135**

***Modified Psychological Ownership Structural Model Completely Standardised Psi Matrix (Model B)***

PO	MOT	SI	IK	C
0.516	0.515	0.728	0.667	0.673

PO=Psychological Ownership, Mot=Motivation, SI=Self Investment, IK=Intimate Knowledge, C=Control

Table 5.135 depicting the completely standardised psi matrix provides a somewhat disappointing view in terms of the magnitude of the error variance coefficients for the modified *psychological ownership* structural model (Model B). It was expected that these variances would be significant but reasonably modest in magnitude. However, this is not the case and the magnitude is somewhat disappointing. This evidence suggests that the model did a reasonably poor job of explaining variance in each of the endogenous latent

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<sup>99</sup> Models within psychological research are not meant to be perfect representation of reality. They are ever changing, ever evolving representation or explanations that provide us with a window into the uniqueness that underlies each individual within society. They act as mere glimpses into the complex world of human nature and therefore are expected to provide a somewhat close or reasonable representation but not perfect explanation of reality.

variables<sup>100</sup>. It must however be highlighted here that the psi estimate for the focal variable of interest (*psychological ownership*) was relatively satisfactory (.516) as was the  $\psi_{22}$  estimate for *motivation to pursue the routes to psychological ownership*. Additionally, it must be highlighted that the *self-investment* latent variable posed several questions for the researcher and it did not altogether come as a surprise that this variable requires much more exploration to reduce its psi variance.

Approaching the same question from the opposite angle, the proportion of variance evident within each endogenous variable that the weighted composite of effects linked to it in the model explained will now be examined in order to identify areas in the model that require further elaboration. These values are presented below in Table 5.136.

**Table 5.136**

***Squared Multiple Correlations for the Endogenous Variables of the Modified Psychological Ownership Structural Model (Model B)***

PO	MOT	SI	IK	C
0.484	0.485	0.272	0.333	0.327

PO=Psychological Ownership, Mot=Motivation, SI=Self Investment, IK=Intimate Knowledge, C=Control

It is evident from the squared multiple correlations above in Table 5.136 that 48% of the variance for *psychological ownership* was explained by the proposed *psychological ownership* structural model. It can therefore be concluded that the proposed structural model was therefore reasonably successful in explaining variance in *psychological ownership*. This was similarly true for its attempts to explain variance in the *motivation to pursue the routes to psychological ownership* in that the proposed *psychological ownership* model explains 48% of the variance in the *motivation to pursue the routes to psychological ownership*. However, the same could unfortunately not be deduced for the three *routes to psychological ownership* namely *self-investment* (.272), *taking control of the job* (.327) and *gaining intimate knowledge* (.333). The need for further research to elaborate the current structural model can therefore be inferred from these values.

<sup>100</sup> At the same time, however, the reasonably large error variance estimates attest to the complex nature of the psychological mechanism that operates to regulate the levels of *psychological ownership* and that the current model still suffers from substantial deficiencies. The purpose of research is to uncover complex interrelationships and antecedents of intricate behaviours of, in this case, working man. It is therefore acknowledged here that although these findings are somewhat disappointing it highlights the need for ongoing research in this area to uncover the "omitted" variables and to build them into an improved version of the psychological mechanism regulating levels of *psychological ownership*.

The modification indices will now be investigated with a twofold objective, firstly to corroborate model fit and secondly to determine paths or relationships that could be added to this seemingly underestimated model to provide a more valid explanation of the antecedents of levels of *psychological ownership* experienced by working man. The latter aspect was regarded as data-driven suggestions for future research and was consequently discussed in Chapter 6.

#### 5.9.4 Modified psychological ownership structural model modification indices

According to Van Deventer (2015) currently fixed parameters, that if set free, would statistically significantly ( $p < .01$ ) improve the model fit are indicated by critical chi-square values above 6.6449. The modification indices for gamma and beta are depicted below in Tables 5.137 and Table 5.138.

**Table 5.137**

***Modified Psychological Ownership Structural Model Modification Indices for Beta (Model B)***

	PO	MOT	SI	IK	C
PO	--	<b>14.115</b>	--	--	--
MOT	--	--	<b>70.924</b>	1.102	0.401
SI	<b>278.955</b>	--	--	<b>9.078</b>	<b>24.928</b>
IK	--	3.146	--	--	--
C	--	<b>47.376</b>	--	--	--

PO=Psychological Ownership, Mot=Motivation, SI=Self Investment, IK=Intimate Knowledge, C=Control

From Table 5.137 above it is evident that six of the nine parameters, suggested as additional paths or relationships in Model B, if set free, would statistically significantly ( $p < .01$ ) improve model fit. This percentage (67%) seems to provide further corroboratory evidence for reasonable fit, underestimation and the subsequent need for further paths to be added to the model to improve its explanatory power. However, a pertinent question to ask is whether these suggested modifications make substantive theoretical sense. Before considering possible modifications between the endogenous variables within the model the gamma modifications were also examined, as presented in Table 5.138 below.



**Table 5.138****Modified Psychological Ownership Structural Model Modification Indices for Gamma (Model B)**

	JC	PON	PS_MOT
PO	4.309	3.702	0.023
MOT	--	--	<b>8.210</b>
SI	<b>55.120</b>	0.306	--
IK	<b>7.169</b>	0.553	0.004
C	<b>81.227</b>	1.727	0.260

JC=Job Characteristics, PON=Psychological Ownership Individuals Needs, PS\_Mot=Psychological Safety\**Mot* Interaction, PO=Psychological Ownership, Mot=Motivation, SI=Self Investment, IK=Intimate Knowledge, C=Control

From Table 5.138 above it is evident that 4 of the 12 parameters (33%) suggested as additional paths or relationships in Model B, if set free, would statistically significantly ( $p < .01$ ) improve model fit. These potential modifications will be discussed further in Chapter 6.

## 5.10 POWER ASSESSMENT

An often overlooked, but critical, aspect in model evaluation is the statistical power associated with testing a structural model (Diamantopoulos & Siguaaw, 2009). In the case of SEM statistical power relates to the probability of rejecting an invalid model. According to Tabachnick and Fidell (2014, p. 43), power “represents the probability that effects that actually exist have a chance of producing statistical significance in...the...eventual data analysis”. In SEM the null hypothesis represents the position that the model fits exactly or fits closely in the parameter. The ideal in SEM is therefore not to reject the null hypothesis.

When the null hypothesis is not rejected, due to a nonsignificant test statistic ( $\chi^2$  or RMSEA), it will be interpreted that the model is valid. The conclusion will therefore be that it is permissible to regard the model as a plausible description of the psychological mechanism that brought about the observed covariance matrix. The conclusion will not be that the model *is* the psychological mechanism that brought about the observed covariance matrix. The conclusion may, however, be incorrect if the statistical power of the test for exact and/or close fit is low (i.e. if the probability of rejecting the null hypothesis of exact fit [or close fit], given that the null hypothesis is false, is small). The danger of associating statistical nonsignificance with the null hypothesis being true has been accentuated widely, but power assessment is still not practised widely in SEM research studies assessing model fit. Wang et al. (2013) concur and highlight the danger of uncritically

interpreting statistical nonsignificance of chi-square and RMSEA test statistics in SEM as necessarily indicating that the fitted model is valid.

Power assessments are important due to the influence of sample size on model testing. Kline (2004) and Wang et al. (2013) offer the following cautionary note: “If you increase the sample enough, any result will be statistically significant. This is scary,” (Kline, 2004, p. 16). Wang et al. (2013, p.736) concur and express that “the reverse logic applies: If you decrease the sample size enough, then any result will be statistically nonsignificant – thus supporting the theory that no effect exists. This is even scarier because a researcher could claim the posited theory of no effect by simply doing a small sample study”. By not including power information or supporting evidence any results, specifically nonsignificant results, will be questionable and inconclusive and should be treated as such during interpretation.

Diamantopoulos and Siguaaw (2009) caution that the mechanism by which a model is tested can increase the probability of experiencing a Type I or Type II error. As such, testing a model using chi-square, as is the case above, could emphasise or exacerbate a Type I error, whereby a correct model is rejected. A Type II error occurs when an incorrect model is not rejected. The statistical power indicates the likeliness of rejecting a false null hypothesis (invalid model).

For the purposes of this research study power was taken into account prospectively when determining the appropriate or required sample size (Tabachnick & Fidell, 2014). The prudent thing to do when assessing a structural model is to additionally investigate power retrospectively. There are various mechanisms that can be employed to conduct an assessment of power. A variety of software is additionally available to aid in estimating the power available given the sample size and statistical technique used.

For the purposes of this study, power was assessed using the Preacher and Coffman software developed in R and freely available online at <http://www.quantpsy.org/rmsear/rmsear.htm> (Prinsloo, 2013). In order to conduct the analysis a significance level of .05 was specified, a sample size (N) of 329, the degrees of freedom were set to 117, the value of RMSEA was set to .05 under  $H_0$  and the value of RMSEA under  $H_a$  was set to .08. According to the results, obtained via the Preacher and Coffman software, the probability of rejecting the close fit null hypothesis if the model showed mediocre fit in the parameter (RMSEA=.08) was therefore quite high (.9996016). This provided confidence in the close fit verdict on the model and the statistical sensitivity

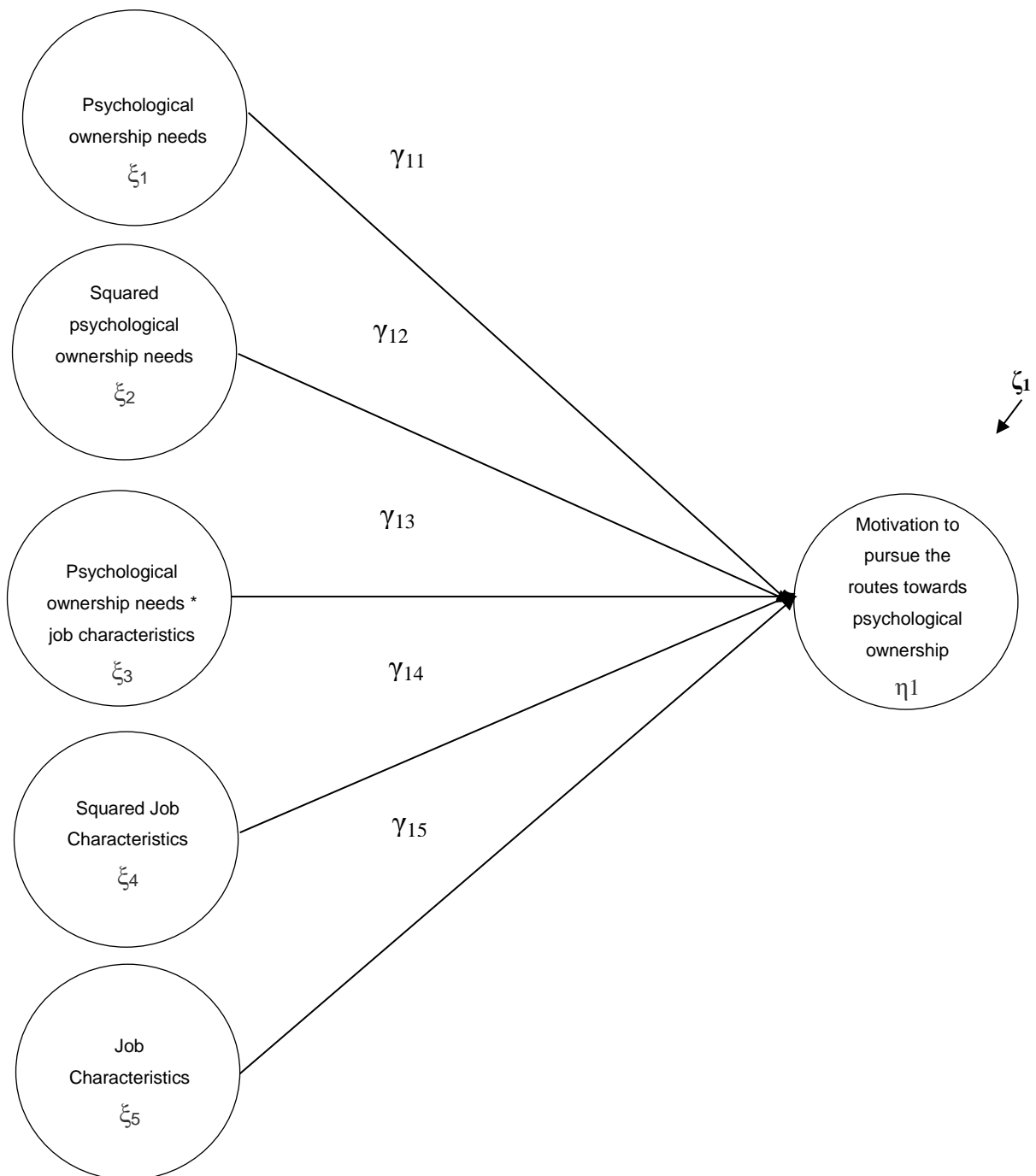
of the close fit hypothesis test. It is therefore unlikely that the close fit null hypothesis in the current study had not been not rejected because of low statistical power. It is more likely that the close fit null hypothesis in the current study had not been rejected because the model fits closely in the parameter. Therefore it is suggested that the verdict on the fit of the model can be trusted as a credible verdict and that allowed for the confident interpretation of the model parameter estimates.

### **5.11 OBSERVED SCORE POLYNOMIAL REGRESSION ANALYSIS WITH RESPONSE SURFACE ANALYSIS**

The primary focus of this research study was the development and empirical testing of a *psychological ownership* structural model. In response to the research initiating question a comprehensive *psychological ownership* structural model was developed in Chapter 2. In order to empirically test the proposed *psychological ownership* structural model, SEM was employed. Although the measurement model containing the three latent higher-order polynomial regression terms converged and fitted the data well, the completely standardised  $\Lambda^X$  matrix nonetheless contained four inadmissible factor loading estimates associated with the latent squared *job characteristics*, the latent squared *salient psychological ownership needs* and the latent *job characteristics x salient psychological ownership needs* interaction effect that exceeded unity.

These inadmissible factor loadings necessitated the deletion of the three latent higher-order polynomial regression terms from the model and consequently also the paths through which these latent polynomial effects were hypothesised to non-linearly affect the *motivation to pursue the routes to psychological ownership*. This is unfortunate as it erodes the value and meaning derived from this analysis.

These modifications therefore forced the use of observed score polynomial regression on a narrow-focused structural model as opposed the latent variable polynomial regression within the comprehensive *psychological ownership* structural model, to understand the manner in which the degree of congruence, or lack of it, between the ability of the *job characteristics* to meet the *individual psychological ownership needs*, and the *salience of the individual psychological ownership need* nonlinearly affect the *motivation to pursue the routes towards psychological ownership*. The narrow-focussed *motivation to pursue the routes towards psychological ownership* structural model is depicted in Figure 5.16.



**Figure 5.16. Narrow Focused Motivation to Pursue the Routes towards Psychological Ownership Structural Model**

The below sections outline the results of this analysis, after determining the viability of this investigation.

### 5.11.1 Describing the incidence of congruence and incongruence

Before commencing the polynomial regression analysis it was important to first determine whether different degrees of congruence and incongruence are sufficiently represented to allow a credible estimate of the response surface over the whole regression space (Theron, 2014b). In other words, determining whether there were sufficient correspondences and discrepancies between the two predictors to warrant an investigation into how these correspondences and discrepancies affect the outcome variable (Shanock et al. 2010).

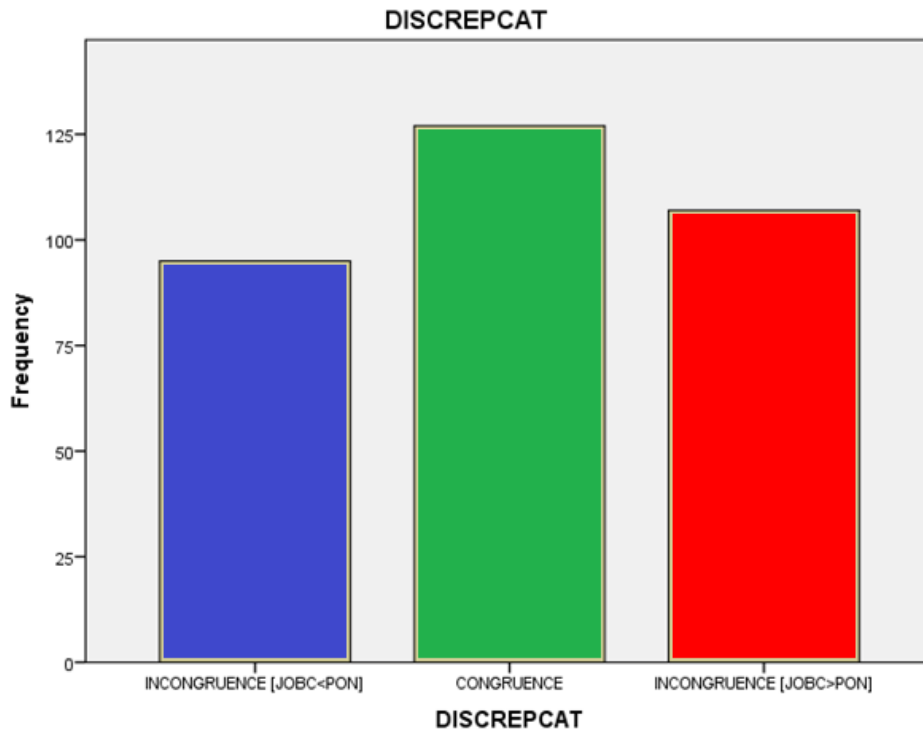
To determine whether the procedure would result in a credible response surface the measures of the two predictor variables [*salience of the individual psychological ownership need* and *job characteristics* (i.e. *perceived ability of the job to satisfy the root needs*)] were standardised (i.e. transformed to z-scores) and the difference between them calculated. According to Shanock et al. (2010) any participant with a standardised score on one predictor variable that is more than half a standard deviation above or below the standardised score on the other predictor variable is considered to have discrepant values. These differences were categorised into three groups, as seen in Table 5.139 below.

**Table 5.139**  
***Incidence of Congruence and Incongruence***

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Incongruence JOBC<PON	95	28.9	28.9	28.9
	Congruence	127	38.6	38.6	67.5
	Incongruence JOBC>PON	107	32.5	32.5	100.0
	Total	329	100.0	100.0	

JOBC=Job Characteristics, PON=Psychological Ownership Individual Needs

From Table 5.139 above it is evident that just under two thirds (61%) of the sample (N=329) experienced the *salience of their psychological ownership root needs* differently from the *perceived ability of their jobs to satisfy these psychological ownership root needs*, in one direction or another. Just over a third experienced congruence between the *salience of their psychological ownership root needs* and the *perceived ability of their jobs to satisfy these psychological ownership root needs*. Further evidence with regards to the levels of congruence and incongruence can be portrayed graphically using a bar chart as depicted in Figure 5.17.



**Figure 5.17. Bar Chart Representing Incidence of Congruence and Incongruence**

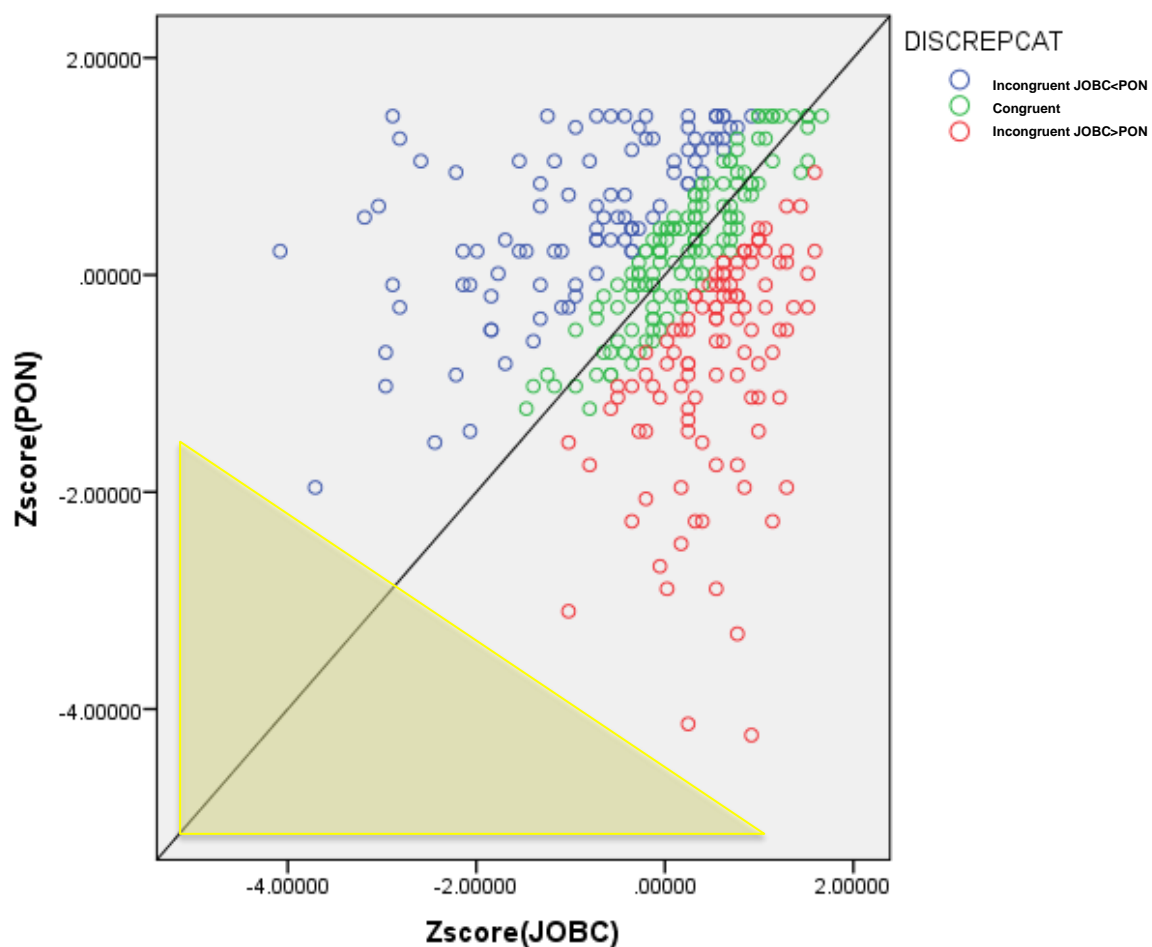
Figure 5.17 above portrays a reasonably equal representation of congruence and the two forms of incongruence. It would therefore seem, from Figure 5.17, that there were sufficient incidences of congruence and both types of incongruence to warrant further investigation.

The problem with the manner in which Table 5.139 and Figure 5.17 examines the question whether the different degrees of congruence and incongruence are sufficiently represented to allow a credible estimate of the response surface over the whole regression space is that it (a) fails to distinguish between + + and - - congruence and (b) it fails to take the magnitude of the two forms of congruence (+ + and - -) and the two forms of incongruence (+ - and - +) into account. These problems are mitigated by not calculating the difference in the standardised predictors and by not trichotomising the difference. Rather, the standardised salience of *psychological ownership root needs* were plotted against the *perceived ability of jobs to satisfy these psychological ownership root needs* to create a two-dimensional scatter plot. Each observation in the scatterplot was colour-code based on his/her classification in the previous trichotomy. The scatterplot is depicted in Figure 5.18.

The finding of sufficient incidences of congruence and both types of incongruence was however not substantiated by the scatterplot which allowed for a more nuanced view of

the incidence of congruence and incongruence, as well as the exact position of these observations across the response surface. The scatterplot does show sufficient cases of congruence and incongruence. However, Figure 5.18 below indicates that there seemed to be a lack of both congruence and incongruence in the bottom left-hand corner of the graph (indicated by the yellow highlighted triangle).

Ideally, one would have wanted to see a few more observations in the triangular area demarcated in yellow. The lack of observations in this area inevitably meant treating the response surface that emerged in this region as somewhat more tentative. Saying this, the scatterplot did show sufficient cases of congruence and incongruence to allow credible results. Based on this data it was concluded that exploring, how the satisfaction of salient *individual psychological ownership needs* by the *characteristics of the job* relates to the *motivation to pursue the routes towards psychological ownership*, made practical sense.



**Figure 5.18. Scatterplot Representing Incidents of Congruence and Incongruence**

### 5.11.2 Fitting the polynomial regression model

Fitting the polynomial regression model involved first preventatively dealing with the problem of multicollinearity, then calculating the squared and product terms in the equation, specifying the model and finally inspecting the significance of  $R^2$ .

#### 5.11.2.1 Preventatively dealing with the problem of multicollinearity

The problem of high multicollinearity occurs when one of the independent variables has nearly a perfect linear relationship to one or more of the other X-variables – robbing each other of significance due to the shared explanatory power (Kahane, 2001). The problem here lies with the “inability of our data to clearly distinguish the separate yet subtle effects of two independent variables,” (Kahane, 2001, p. 114). Because the three higher-order polynomial regression terms were calculated from the *job characteristics* measure (X) and the *salience of psychological ownership needs* measure (Y) the danger of multicollinearity presented itself as a very real one. Dealing with multicollinearity therefore alleviated the problem of overly high correlations between the five predictors in the polynomial regression model.

There are several options for dealing with this issue namely, midpoint-centering, mean-centering or residual-centering (Little, Card, Bovaird, Preacher, & Crandal, 2007). In this case, mean-centering was used because the scale scores were calculated from the *job characteristics* and *psychological ownership needs* instruments and the midpoints of these scales were unclear. See Table 5.140 below for the mean values used.

**Table 5.140**  
**Descriptive Statistics**

	N	Minimum	Maximum	Mean	Std. Deviation
JOBC	329	28.00	105.00	82.6900	13.40053
PON	329	29.00	84.00	69.8875	9.64283
Valid N (listwise)	329				

JOBC=Job Characteristics, PON=Psychological Ownership Individual Needs



### 5.11.2.2 Calculating the squared and product terms

Calculating the squared and product terms (the ingredients necessary for second-order polynomial regression and insertion in the Cunningham Excel Macro) involved manually creating the quadratic and product terms in SPSS that form the latter part of the polynomial regression equation, shown as equation 2 below.

$$E[Z|X,Y] = b_0 + b_1X + b_2Y + b_3Y^2 + b_4XY + b_5Y^2 \dots \dots \dots \text{Equation 2}$$

Where:

- *Z* is the predicted *motivation to pursue the routes to psychological ownership* outcome value for the polynomial model
- *X* and *Y* are the predictor variables *job characteristics* and the *salience of the psychological ownership needs* respectively
- $X^2$  and  $Y^2$  are the quadratic terms for the predictors *X* and *Y*, respectively
- *XY* is the interaction term of the two predictors

*Motivation to pursue the routes to psychological ownership* was subsequently regressed on the weighted linear combination of *job characteristics* (*X*), the *salience of the psychological ownership needs* (*Y*),  $X^2$ ,  $Y^2$  and *XY*. The results of the polynomial regression is shown in Table 5.141.

**Table 5.141**  
**Polynomial regression analysis**

Model	Unstandardised Coefficients		Standardised Coefficients		Sig.
	b	Std. Error	Beta	t	
1 (Constant)	303.876	4.327		70.234	.000
*JOBCCEN_b1 (X)	2.820	.328	.487	8.609	.000
*PONCEN_b2 (Y)	3.701	.410	.460	9.018	.000
*JOBCCENSQ_b3 ( $X^2$ )	.024	.012	.107	1.918	.056
*INTER_b4 (XY)	-.060	.026	-.098	-2.261	.024
*PONCENSQ_b5 ( $Y^2$ )	.063	.022	.145	2.877	.004

a. Dependent Variable: MOTIV

\*Predictor variables in the polynomial regression model namely, as listed from the top, *X*, *Y*, quadratic *X* ( $X^2$ ), product/interaction (*XY*) and quadratic *Y* ( $Y^2$ )<sup>101</sup>.

It is evident from Table 5.141 above that most of the b-coefficients were significant ( $p < .05$ ). Four of the five effects statistically significantly ( $p < .05$ ) explained unique variance in

<sup>101</sup> These ingredients form part of the second-order polynomial regression model

*motivation to pursue the routes to psychological ownership* (Z). The only exception was X<sup>2</sup>. It was therefore assumed that the a-values will also be significant<sup>102</sup>. Values from Table 5.141 above, as well as Table 5.142 below, were used to create the response surface pattern, using the Cunningham Excel Macro (Shanock et al. 2010).

### 5.11.3 Interpreting the fit by specifying the model and inspecting significance

The overarching substantive research hypothesis (Hypothesis 19) that the *salient needs-job characteristics motivation to pursue the routes to psychological ownership* structural model (depicted in Figure 5.16) provided an accurate explanation of the psychological processes that underpin the level of *motivation to pursue the routes towards psychological ownership* was tested by testing the null hypothesis:

$$H_{O19}: P=0^{103}$$

$$H_{a19}: P>0$$

Hypothesis 19 was tested by inspecting the significance of the multiple correlation. It is evident from Table 5.142 and Table 5.143 below that the R value (.644) is statistically significant ( $p<.05$ ). Therefore the null hypothesis  $H_{O19}: P=0$  had to be rejected. This implies that the fitted observed score second-order polynomial regression model statistically significantly ( $p<.05$ ) explained variance in levels of *motivation to pursue the routes towards psychological ownership*. The proportion of variance in *motivation to pursue the routes* explained by the weighted linear composites of the five effects within the narrow focused structural model is represented by R<sup>2</sup>. The R<sup>2</sup> value (.415) shown in Table 5.142 below indicated that the narrow focused structural model explained 41.5% of variance in the *motivation to pursue the routes*.

**Table 5.142**  
**Regression Output: Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.644 <sup>a</sup>	.415	.405	59.81799

a. Predictors: (Constant), PONCENSQ\_b5, JOBCCENSQ\_b3, INTER\_b4, PONCEN\_b2, JOBCCEN\_b1

<sup>102</sup> This is done with a certain degree of trepidation as the rationalisation behind this process/reasoning/conclusion requires investigation. Further information is required surrounding the motivation for such assumptions and the complexity of the relationship between the b-coefficients and a-values. Questions surrounding further use of the b-coefficients are cautiously raised however as this is a new area and some reflection may be needed here to determine the usefulness of interpreting the b-coefficients.

<sup>103</sup> P represents the Greek capital letter R (rho)

**Table 5.143**  
**Regression Output: Anova<sup>a</sup>**

	Model	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	818308.140	5	163661.628	45.739	.000 <sup>b</sup>
	Residual	1155755.847	323	3578.191		
	Total	1974063.988	328			

a. Dependent Variable: MOTIV

b. Predictors: (Constant), PONCENSQ\_b5, JOBCCENSQ\_b3, INTER\_b4, PONCEN\_b2, JOBCCEN\_b1

At first sight this finding did not seem satisfactory, however it must be noted here that this interaction has been extracted from a greater, more complex, model and thus 41.5% can be deemed as quite a satisfactory percentage in terms of the explanation of variance by this narrow focused model. It might even have been somewhat over-ambitious to have expected that congruence between *root need salience* and the *ability of the job to satisfy these needs* as represented by this model could explain a large percentage of variance in *motivation to pursue the routes towards psychological ownership*.

#### 5.11.4 Creating and interpreting the response surface test values and graph

In order to determine the influence of congruence and incongruence in the two predictor or exogenous variables (*salience of the individual psychological ownership needs* and the ability of the *job characteristics* to satisfy *salient individual psychological ownership needs*) on the outcome or endogenous variable (*motivation to pursue the routes towards psychological ownership*) the response surface was created and examined.

Rather than using the  $b_i$  coefficients directly in the analysis, a Cunningham Excel Macro was used to convert them by calculating four response surface test values ( $a_1, a_2, a_3, a_4$ ).

Once created, there are four characteristics of the response surface that are of particular importance and that are described by these four response surface test values namely:

- The slope (either positive or negative) of the response surface as one moves along the line of congruence from extreme - -<sup>104</sup> congruence to extreme + + congruence described by  $a_1 [b_1 + b_2]$ ,
- The curvature (either concave or convex) of the response surface as one moves along the line of congruence from extreme - - congruence to extreme + + congruence as described by  $a_2 [b_3 + b_4 + b_5]$ ,

<sup>104</sup> The first sign refers to the standardised (0, 1) X and the second sign to the standardised (0, 1) Y

- The slope (positive or negative) of the response surface as one moves along the line of incongruence from extreme - + incongruence to extreme + - incongruence as described by  $a_3 [b_1 - b_2]$ ; and
- The curvature (either concave or convex) of the response surface as one moves along the line of incongruence from extreme - + incongruence to extreme + - incongruence as described by  $a_4 [b_3 - b_4 + b_5]$ .

These characteristics allowed for the examination of the manner in which the outcome variable (Z) responded as the exogenous variables moved along both the line of congruence and incongruence. This therefore allowed for a description of the manner in which *motivation to pursue the routes towards psychological ownership* responded as the *salient individual psychological ownership needs* and the ability of the *job characteristics* to satisfy the individual *psychological ownership* root needs moved along the line of incongruence as well as the line of congruence. This will now be discussed below using Table 5.144, which displays the above mentioned response surface values coupled with an evaluation of their statistical significance.

**Table 5.144**  
**Statistical Significance of the Calculated Response Surface Test Values**

Effect	Coefficient	Standard Error	Test Stat (t)	p-value	
<b>a<sub>1</sub>: Slope along x = y (as related to Z)</b>	6.52	0.46	14.198	0.000	<b>Sig!</b>
<b>a<sub>2</sub>: Curvature on x = y (as related to Z)</b>	0.03	0.04	0.764	0.445	
<b>a<sub>3</sub>: Slope along x = -y (as related to Z)</b>	-0.88	0.58	-1.510	0.132	
<b>a<sub>4</sub>: Curvature on x = -y (as related to Z)</b>	0.15	0.04	3.648	0.000	<b>Sig!</b>

Where X represents the *ability of the job characteristics to meet the individual psychological ownership needs*, Y represents the *salience of the individual psychological ownership needs* and Z represents the *motivation to pursue the routes towards psychological ownership*.

When looking at the effect of the nature and the direction of congruence and incongruence between the *salience of individual psychological ownership root needs* and the *ability of job characteristics to meet these needs* on the *motivation to pursue the routes towards psychological ownership* the statistically significant positive  $a_1$  ( $p < .05$ ) (gradient or slope) indicated that in general there is a positive trend or change in Z as we move along the line of congruence ( $X=Y$ ) from - - to + +. Therefore, *motivation to pursue the routes towards psychological ownership* increases along the line of congruence as congruence moves from low salient *psychological ownership needs* and low *ability of the job characteristics to satisfy these salient psychological ownership needs* towards high salient *psychological ownership needs* and high *ability of the job characteristics to satisfy these salient*

*psychological ownership needs*. Therefore,  $H_{07a}$ :  $a_1=0$  was rejected due to the fact that the conditional probability associated with the sample  $a_1$  estimate under  $H_{07a}$  was sufficiently small.

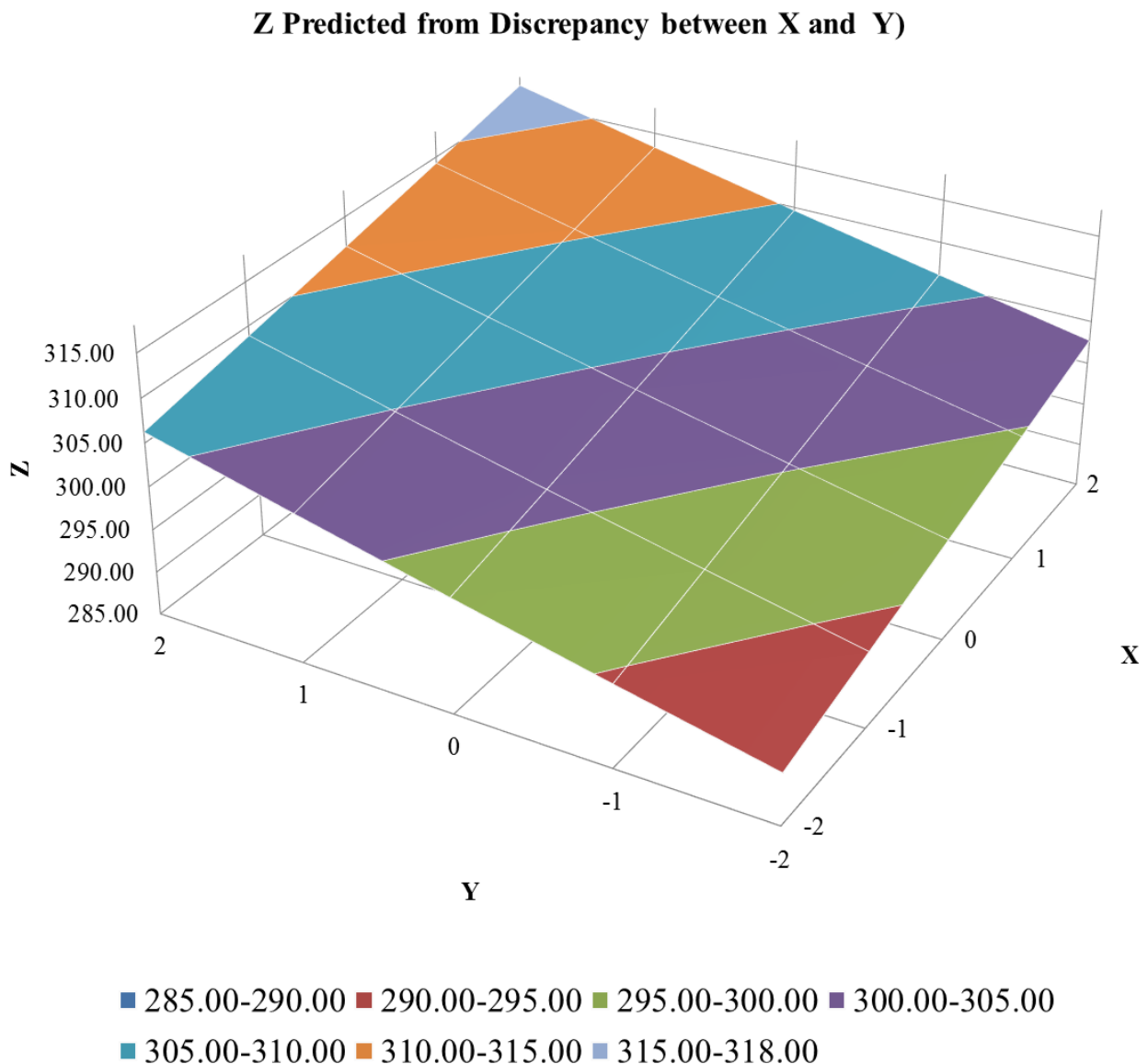
Furthermore, it can additionally be concluded that there is a linear relationship between the outcome variable  $Z$  and the position of observations on the line of congruence, since the sample  $a_1$  (slope) estimates were significant, as well as positive, and the sample  $a_2$  (curvature) estimates were statistically insignificant ( $p>.05$ ). Consequently, hypothesis  $H_{07b}$ :  $a_2=0$  was not rejected indicating a lack of support for the hypothesised convex relationship between the predictor interaction and outcome variable. Should the results have indicated a statistically significant  $a_2$  the response surface along this line would have been curvilinear. However, the statistically insignificant  $a_2$  ( $p>.05$ ) indicated that this change of the response surface along the line of congruence was linear. It can therefore be concluded that the *motivation to pursue the routes towards psychological ownership* (outcome/ $Y$ ) increases linearly as the *salient individual psychological ownership root needs* and the *ability of the job characteristics to satisfy salient root need values* increases along the line of congruence (- - to + +).

The positive and statistically significant  $a_4$  (couple with the statistically insignificant  $a_3$ ) and subsequent rejection of  $H_{08b}$ :  $a_4=0$  but failure to reject  $H_{08a}$ :  $a_3=0$ ) implied that the outcome variable  $Z$  changed convexly as the predictor variables moved along the line of incongruence from - + to + -. Therefore, the *motivation to pursue the routes towards psychological ownership* increased non-linearly as the discrepancy between the *salience of the individual psychological ownership root needs* and the *ability of the job characteristics to meet these salient root needs* increased along the line of incongruence outward from 0 0. In other words, as the discrepancy between the two predictors moved further away from the centre of the graph along the line of incongruence the outcome variable changes convexly.

Taken in conjunction with the statistically insignificant  $a_3$  estimate the positive and statistically significant  $a_4$  estimate implied that the lips of the convex surface at the two extremes of the line of incongruence do not differ significantly in terms of height. The conclusions on both  $H_{08a}$  and  $H_{08b}$  were not in line with the proposed substantive hypotheses on the manner in which *motivation to pursue the route to psychological ownership* responds to incongruence in *job characteristics* and the salience of the *psychological ownership needs*. In terms of the two substantive hypotheses in question

$H_{08a}$  should have been rejected and  $H_{08b}$  should not have been rejected. Despite the fact that the results were contrary to that which had been expected in terms of the substantive hypothesis  $H_{08b}$ :  $\alpha_4=0$  could still be rejected because  $H_{a8b}$  was formulated as a non-directional alternative hypothesis.

Figure 5.19 below provides a visual representation of this interpretation.



**Figure 5.19. Response Surface Graph**

Where X represents the individuals salient *psychological ownership* root needs, Y represents the ability of the *job characteristics* to satisfy salient root needs and Z represents the *motivation to pursue the routes towards psychological ownership*.

The above statistical interpretations are to some degree reflected in the response surface graph depicted in Figure 5.19 above. It is clearly evident that along the line of congruence, *motivation to pursue the routes towards psychological ownership* (Z) increased from low

*salient individual psychological ownership root needs* (X) and low ability of the *job characteristics* to satisfy salient root needs (Y) to high *salient individual psychological ownership root needs* (X) and high ability of the *job characteristics* to satisfy salient root needs (Y) (i.e. increased from - - to + + congruence). This linear trend is also apparent when visually inspecting the change in the response surface moving from the right front (- -) corner to the left back (+ +) corner of the congruence-incongruence response space.

The convex nature of the relationship along the line of incongruence is upon initial inspection, difficult to detect. However, the significant but small  $a_4$  value provides evidence that indicates a modest convex response surface along the line of incongruence. If, however, the colour codes are taken into account it does become apparent that with movement along the line of incongruence from the lower left (- +) corner to the back right (+ -) corner the response surface changes from blue to purple to green and back to purple but not quite back into blue (suggesting a negative, albeit not statistically significant, slope).

## 5.12 SUMMARY

This chapter outlined the results of the statistical analysis conducted to determine if the proposed *psychological ownership* structural model provided a plausible and permissible (i.e. valid) description of the psychological mechanism that regulates differences in the level of *psychological ownership* of employees that could be generalised to the sampling population. Circumstance necessitated the deletion of observed variables from the model, which unavoidably necessitated concomitant modifications to the original *psychological ownership* structural model. This in turn lead to the creation of an additional, not originally anticipated, narrow-focused structural model.

Chapter 6 will discuss the findings of the study in more detail and elaborate on aspects such as the limitations of this study and recommendations in terms of future research opportunities and workplace implications of these results.



## CHAPTER 6

### CONCLUSIONS, RECOMMENDATIONS, IMPLICATIONS AND SUGGESTIONS FOR FUTURE RESEARCH

#### 6.1 INTRODUCTION

The level of *psychological ownership* that employees experience towards their jobs is not the outcome of a random event. Rather it is complexly determined by an extensive and richly interconnected nomological network of latent variables characterising the employee and his/her work environment. The current study had as its objective to identify at least some of the influential latent variables and the manner in which they structurally combine to affect *psychological ownership*. The motivation behind understanding the psychological mechanism that underpins levels of *psychological ownership* within working man pertains to its practical use within the context of workplace improvement. By gaining a valid understanding pertaining to the determinants of the construct of *psychological ownership*, and the manner in which they structurally combine in the nomological network, HR can begin to implement relevant interventions to enhance the level of *psychological ownership* experienced by employees. These interventions will, however, only be as effective as our own level of understanding of the psychological mechanism that influences the feelings of ownership that employees experience for their job specifically.

In the preceding chapters an attempt was made to answer the research initiating question outlined in Chapter 1 namely; why variance in *psychological ownership* exists across employees, jobs and organisations. The theorising, conducted in Chapter 2, led to the construction of a proposed explanatory *psychological ownership* structural model as a tentative answer to the above posed question for job-based *psychological ownership* specifically. This explanatory structural model was then empirically tested in Chapter 5, using statistical as well as ethical best practises outlined in Chapters 3 and 4 respectively. The preceding work was undertaken in order to meet the research study objectives in terms of developing and empirically testing an explanatory *psychological ownership* structural model that provides a valid description of the psychological mechanism that regulates the level of job-based *psychological ownership* that employees experience.

This final chapter of the research study will provide a discussion surrounding the subsequent evaluation of the measurement and structural models as well as the response surface analysis and subsequent implications of this research from an applied and theoretical sense.



## 6.2 RESULTS

This section outlines a discussion pertaining to the statistical results presented in Chapter 5. An overall evaluation of both the measurement and structural models are presented alongside the required modification rationale. This culminates in the presentation of a newly modified *psychological ownership* structural model and a brief discussion pertaining to some insights gained from the data.

### 6.2.1 Evaluation of the psychological ownership measurement model

The process of evaluating the measurement model was undertaken to determine the validity and reliability of the measures used to operationalise the latent variables. The aim was to determine whether the measures used to represent the latent variables of interest could be trusted. This was a critical first step in the evaluation of the model as a whole since untrustworthy indicators would diminish our faith in the investigation of the substantive relationships of interest within the proposed *psychological ownership* structural model.

Post data screening, via item and dimensionality analysis, the original *psychological ownership* model was evaluated. This model ran successfully and a finding of close fit was found. However, the model was unfortunately plagued with inadmissible parameter estimates. These values related specifically to the indicators of the polynomial latent variables. Therefore, as discussed, after much troubleshooting and problem-solving, attempting various statistical procedures to navigate this issue, these observed variables and the associated latent variables were unfortunately deleted from the model. This led to the development of a reduced *psychological ownership* model.

This change had unavoidable implications for the analysis of the impact of the interaction between the salient *individual psychological ownership root needs* and the ability of the *job characteristics* to satisfy these needs, and this influence on *motivation to pursue the routes towards psychological ownership* (the polynomial regression with response surface analysis). These will be discussed in more detail in Section 6.2.3.

After rejecting the null hypothesis in favour of the alternative close fit hypothesis and examining several statistical outputs it was determined that the reduced *psychological ownership* measurement model fitted very well. Various goodness of fit indices were used to establish this. These findings were additionally further substantiated by the

measurement model standardised residuals, modification indices and squared multiple correlations.

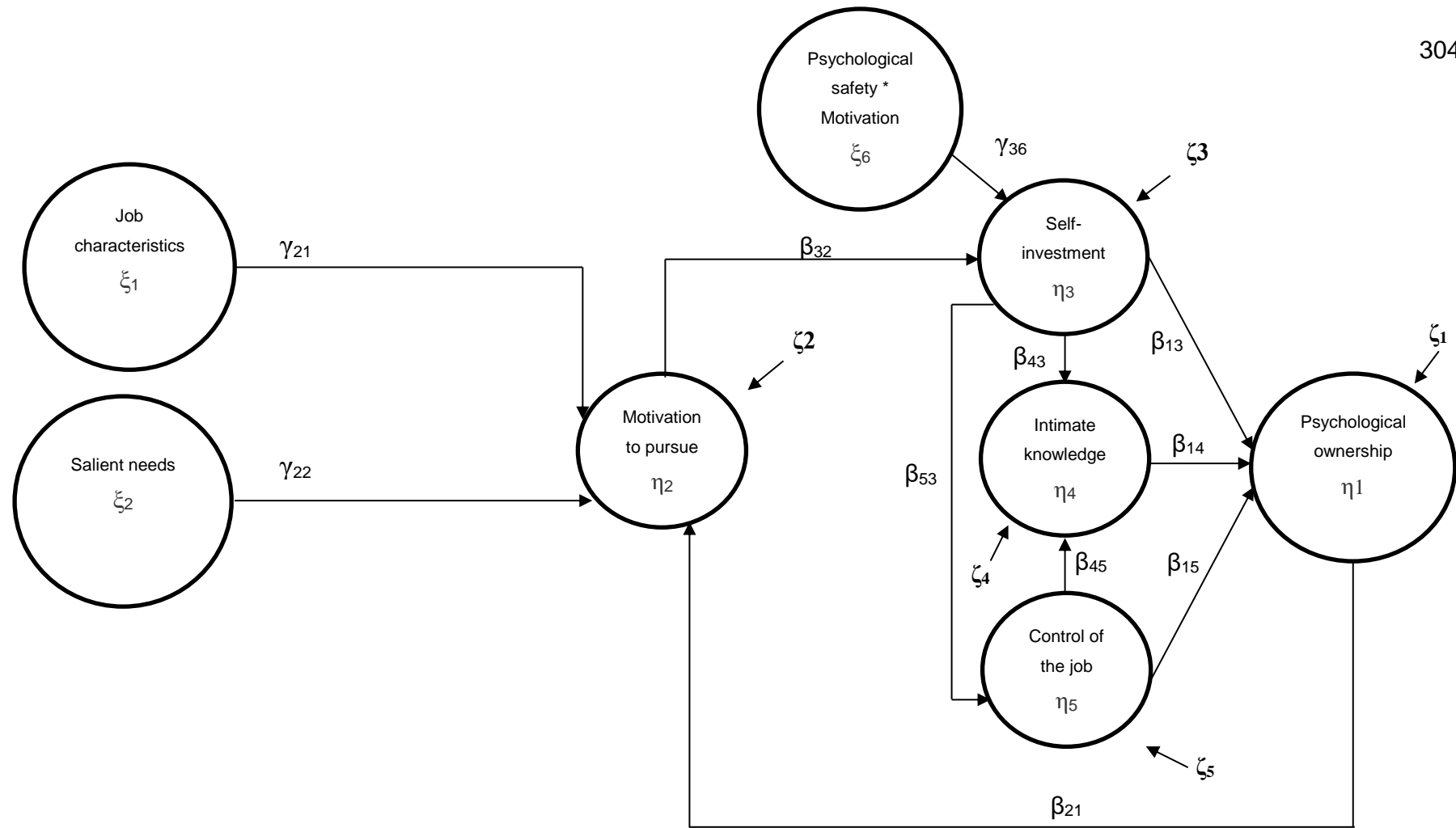
Several questions were asked in determining the final conclusion surrounding the success with which the latent variables comprising the reduced *psychological ownership* structural model had been operationalised, namely, did the measurement model fit the data reasonably well, were the standardised factor loadings large and statistically significant, were the measurement error variance terms in the completely standardised solution small and significant and were the  $R^2$  indices large? The answer to all of the above posed questions was yes, pointing to the conclusion that the reduced *psychological ownership* structural model had been successfully operationalised. It was therefore possible to interpret the fit of the *psychological ownership* structural model.

### 6.2.2 Evaluation of the psychological ownership structural model

In order to determine if the relationships, identified through theorising in Chapter two, were supported by the data, the reduced structural model was evaluated. The adaptation of the measurement model necessitated the deletion of  $\gamma_{23}$   $\gamma_{24}$   $\gamma_{25}$  and therefore the formation of a reduced *psychological ownership* structural model.

The reduced *psychological ownership* model obtained reasonable fit but was similarly plagued with an inadmissible parameter estimate in that the completely standardised structural error variance estimate for  $\eta_3$  returned an inadmissible value ( $\psi_{33}=1.219$ ). Further interpretation was halted and the path between intimate knowledge ( $\eta_4$ ) and self-investment ( $\eta_3$ ) was deleted. This subsequent modified *psychological ownership* structural model, as presented below in Figure 6.1, was fitted. Conclusions surrounding the fit of the structural model were again based on a basket of evidence.

The goodness of fit statistics were considered as well as the statistical significance and magnitude of the structural model parameter estimates, squared multiple correlations for the endogenous latent variables and the modification indices for  $\Gamma$  and  $\mathbf{B}$ .



**Figure 6.1. The Final Modified Psychological Ownership Structural Model**

As is evident from Figure 6.1 above this modified *psychological ownership* structural model consisted of 11 paths instead of the initially hypothesised 16 paths. The modified *psychological ownership* structural model showed reasonable to good fit according to the goodness of fit statistics (RMSEA: .0595, p-value of close fit: 0.0602). The finding of reasonable fit was corroborated by the Q-plot and stem-and-leaf in that the data points swivelled away from the 45 degree line, specifically at the upper and lower regions and the stem-and-leaf indicated a model that was positively skewed. This therefore implied the potential of an underestimated covariance matrix. The conclusion of reasonable fit was further corroborated by the standardised residuals in that 26 were large (24 of which were large positive, pointing to the need to add more paths). Furthermore, 67% of the additional paths, suggested between the endogenous variables within the modified *psychological ownership* structural model, if set free, would improve model fit. This is a rather high percentage, again supporting the assumption of a merely reasonably fitting model.

Upon examining the parameter estimates (beta and gamma matrices), to determine whether the data supported the relationships hypothesised in Chapter 2, it was evident that all of the paths were statistically significant ( $p < .05$ ) except for the feedback path between *psychological ownership* and the *motivation to pursue the routes* and the path between the interaction of *psychological safety* and *motivation* and *self-investment*. This meant that  $H_{01b}$  could be rejected in favour of  $H_{a1b}$ , and similarly of the original hypothesised relationships  $H_{02}$ ,  $H_{03}$ ,  $H_{09}$ ,  $H_{011}$ ,  $H_{012}$ ,  $H_{013}$ ,  $H_{014}$ ,  $H_{015}$ , and  $H_{016}$ , could be rejected in favour of  $H_{a2}$ ,  $H_{a3}$ ,  $H_{a9}$ ,  $H_{a11}$ ,  $H_{a12}$ ,  $H_{a13}$ ,  $H_{a14}$ ,  $H_{a15}$ , and  $H_{a16}$ . However,  $H_{010}$  and  $H_{018}$  could not be rejected.

From these findings it can therefore be suggested that evidence was found to support relationships between *job characteristics* and *motivation to pursue the routes*, *individual psychological ownership needs* and *motivation to pursue the routes*, *motivation to pursue the routes* and *self-investment*, *self-investment* and *control*, and between *control* and *intimate knowledge* as well as between the three *routes* towards *psychological ownership*, namely *taking control*, *gaining intimate knowledge* and *self-investment*, and *psychological ownership*. However, evidence to support the relationship between *psychological safety* \* *motivation to pursue the routes* towards *psychological ownership* and *self-investment*, as well as *psychological ownership* and *motivation to pursue the routes* was not found.

It was somewhat disappointing that support for the path between *psychological safety* \* *motivation to pursue the routes* and *self-investment* was not found. A seemingly well thought-out theoretical argument for the positive influence of this interaction on an

individual's level of self-investment was argued in Chapter two. It was argued that investment of the self requires an element of vulnerability or exposing of the self within the job and according to Kahn this investment, which was likened to personal employee engagement within this research study, would be positively influenced by a certain level of *psychological safety*. It was argued that an employee that experiences a level of *psychological safety* would be more willing to invest him or herself in the job role and therefore would be willing to enact his/her *motivation to pursue the routes towards psychological ownership* if *psychological safety* was experienced. It was therefore argued that a high *motivation to pursue the routes towards psychological ownership* should result in the *investment of the self* in the job provided doing so is experienced as *psychologically safe*. Therefore it was argued that *perceived psychological safety* would moderate the effect of *motivation to pursue the routes*, on the extent to which the employee *invests the self* in the job.

This argument was however not supported by the data. Upon further consideration, deep reflection and investigating the motivational model presented in Chapter 2 it became apparent that perhaps it could be suggested that the relationship between the *motivation to pursue the routes* and *psychological safety* might be more of a direct relationship as opposed to a moderator, as initially suggested. This will be discussed further in Section 6.4.1.

The hypothesised path between *psychological ownership* and *motivation to pursue the routes towards psychological ownership* was additionally not supported by the data. In Chapter 2 it was argued that an employee, after experiencing levels of *psychological ownership* towards a job will feel further motivated to invest more of the self, take further control and gain even more knowledge about the target. This hypothesis was not supported by the data and after some careful consideration the researcher concurs and believes that the experience of *motivation to pursue the routes* post experiencing feelings of ownership may differ depending on the root need that was "activated initially". Moreover, the researcher believes that perhaps the experience of feelings of ownership could in turn have the opposite effect on the *motivation to pursue the routes towards psychological ownership* temporarily and that perhaps a state of maintenance is reached whereby the employee nurtures the current state and feels less inclined (motivated) to *invest the self* or *gain intimate knowledge* and *take control* until another need is activated and the *motivation to pursue the routes* is again followed. It is conceded though that this line of reasoning points to a negative relationship between *psychological ownership* and

*motivation to pursue the routes* which was also not borne out by the  $\beta_{21}$  estimate. The complexity of the multidimensional constructs within this proposed structural model, specifically the *roots* or *individual psychological ownership needs* and the *motivation to pursue the routes* calls for further investigation into these variables.

It was evident that the model was reasonably successful in its attempt to explain variance in levels of *psychological ownership*, the prime variable under study, in that 48% of the variance in feelings of ownership was explained by the modified *psychological ownership* structural model. However, 52% was still explained by latent effects that were not recognised by the model. This highlights the need for further research to elaborate the current model and provide more satisfying answers.

Before concluding this evaluation of the *psychological ownership* structural model there are two important points that should be stressed in order to aid in future research studies.

Firstly, the hypothesised paths within the *psychological ownership* structural model should be treated as partial regression coefficients. By combining several hypothesised paths in a single complex model it is implied that the influence of one exogenous, or endogenous variable, on another variable within the model occurs when the variance in the remaining latent variables linked to it are controlled for. The insignificant  $\beta_{21}$  estimate therefore should not be interpreted to mean that *psychological ownership* does not statistically significantly explain variance in *motivation to pursue the routes to psychological ownership*. It means that *psychological ownership* does not statistically significantly explain unique variance in *motivation to pursue the routes to psychological ownership* that is not explained by the *perceived ability of the job to satisfy the root needs* and by the *salience of the root needs*. In order for future research studies to be comparable this must be kept in mind. Secondly, it must be noted that the model only obtained reasonable fit, therefore the subsequent discussion pertaining to the implications within the workplace has been made with some circumspection.

### **6.2.3 Evaluation of the response surface analyses**

The initial modification (reduction) of the proposed *psychological ownership* structural model (the deletion of the observed and latent variables pertaining to the polynomial regression analysis) necessitated the development of a narrow-focused structural model in order to investigate the complex interaction between two endogenous variables and this interaction's subsequent effect on a single exogenous latent variable namely the

*motivation to pursue the routes towards psychological ownership*. The subsequent response surface was created 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 these salient needs*.

In order to determine this response, and to evaluate the hypotheses developed pertaining to this response, the response surface test values were analysed to determine the slope and curvature of the response surface in the three dimensional congruence/incongruence space.

Upon inspection of the response surface test values a significant and positive  $a_1$  and insignificant  $a_2$  was found.  $H_{07a}$ :  $a_1 = 0$  was therefore rejected in favour of the alternative hypothesis  $H_{a7a}$ :  $a_1 > 0$  due to the fact that the observed sample  $a_1$  value unlikely would have been obtained under  $H_{07}$ . Support was therefore obtained for the hypothesis that *motivation to pursue the routes towards psychological ownership* increases as one moves along the line of congruence from - - to + +. Hypothesis  $H_{07b}$ :  $a_2 = 0$  was not rejected indicating a lack of support for the hypothesised convex relationship between the predictor interaction and outcome variable. It can therefore be concluded that if an *individual's psychological ownership root needs* are satisfied by *characteristics of the job*, *motivation to pursue the routes towards psychological ownership* will increase linearly.

When examining the response surface test values further it was evident that  $H_{08b}$   $a_4 = 0$  should be rejected. The positive and statistically significant  $a_4$  (coupled with the statistically insignificant  $a_3$ , and subsequent non rejection of  $H_{08a}$ :  $a_3 = 0$ ) implies that the outcome variable changes convexly as the predictor variables move along the line of incongruence. The height of the convex response surface however does not significantly differ under the two extreme forms of incongruence.  $H_{08b}$   $a_4 = 0$  was rejected.

From the above it can therefore be concluded that *motivation to pursue the routes towards psychological ownership* will increase linearly as congruence moves from - - to + +. Not unsurprisingly, the optimal conditions for employees to experience increased *motivation to pursue the routes* (and possibly by extension increased levels of *psychological ownership*) is therefore when the *psychological ownership root needs* are highly salient and the *job characteristics* allow the satisfaction of the root needs. The convex response surface along the line of incongruence indicates that there is a dip towards the middle of the line of incongruence, however, the level of *motivation to pursue the routes* at the edges of the convex cup, under the two extreme forms of incongruence, do not differ significantly



( $p > .05$ ). It is therefore not permissible to claim that a scenario where the job offers the opportunity to satisfy the root needs but where employees do not experience the root needs as salient is somewhat more conducive to motivating the employee to pursue the routes to psychological ownership than the opposite scenario even though the sample response surface and the sample response surface test value estimates would suggest this ( $a_3 = -0.88$ ).

### 6.3 LIMITATIONS TO THE STUDY

Several limitations were highlighted throughout the research study, however they will briefly be outlined and discussed here. The limitations began from the commencement of theorising in Chapter two. The fact that the *psychological ownership root needs*, as well as the *job characteristics* were conceptualised as multidimensional constructs but nonetheless employed as single latent variables in the proposed *psychological ownership* model posed certain limitations on the analysis and interpretation of these complex variables. Here, the combined effect of the *psychological ownership needs* and the *job characteristics* were taken into account and the actual complexity of the influence of the individual latent dimensions that make up these multidimensional latent variables was somewhat lost. Therefore, it cannot be said with any degree of certainty which *roots* or *job characteristics* influenced the *motivation to pursue the route to psychological ownership* and how this influence comes to fruition. Therefore, it is the researcher's opinion that a certain degree of meaning was lost by combining these variables into multidimensional variables.

An additional limitation that unfortunately fell outside of the control of the researcher, but that plagues many academic research studies, was the sample size. Although the sample size seemed to meet the minimum criteria outlined in Chapter three<sup>105</sup>, namely a sample size of between 300 and 350, it only narrowly complied (329). Furthermore, insufficient sample size necessitated the use of an alternative parcelling/indicator procedure that was less than desirable. It is hoped that future studies will be able to obtain larger samples so as to ensure more stable and precise parameter estimates.

An additional limitation, in terms of the sampling, was the use of a convenience sample in the form of an email to the researchers' contacts on LinkedIn. This convenience sample

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<sup>105</sup> And with the deletion of several paths within the model the sample size is possibly more than adequate.



potentially lacked the diversity required to properly represent the South African workforce. Therefore, generalisations to the South African workplace population as a whole should be made suggestively and with some circumspection.

Several limitations pertain to the modifications made to the *psychological ownership* model and the creation of an additional narrow focused model. By assessing the narrow focused structural model separately, as opposed to within the *psychological ownership* model as a whole, a certain degree of meaning is lost and the complexity of the interrelationships within the model as a whole are not fully interpretable. An additional modification was the deletion of the interrelationship between intimate knowledge and self-investment due to inadmissible parameter estimates.

A final limitation relates to the polynomial regression analysis and response surface analyses, specifically the lack of full coverage of the response surface. This lack of coverage necessitates caution when drawing conclusions since areas of the graph would be “drawn on extensive extrapolation of trends that was observed in more populated areas of the floor of the response surface space” (Van Deventer, 2015, p. 271).

#### **6.4 RECOMMENDATIONS FOR FUTURE RESEARCH**

“It is in fact a great virtue of a good model that it does suggest further questions, taking us beyond the phenomenon from which we began, and tempts us to formulate hypotheses which turn out to be experimentally fertile...Certainly it is this suggestiveness, and systematic deployment, that makes a good model something more than a simple metaphor<sup>106</sup>” (Black, 1962, p. 239).

A danger when investigating complex phenomenon, with multiple potential influences, is to accept the first and most obvious interpretation of any established relation. However, it is also similarly as dangerous to embark upon a fishing expedition without the foundation of sound theory in an attempt to make a model fit well. It was evident when interpreting the structural model that not only were additional paths recommended by the data, but some paths were suggested for deletion (they were found to be insignificant).

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<sup>106</sup> It is acknowledged that Black (1962) uses the term model in a different sense than the current study does when referring to a structural model. For Black (1962) a model refers to an “as if”, analogue representation that is permissible because of sufficient isomorphism between the model and that which is being modelled. In the current study the term model is, however, used to refer to a representation of the psychological mechanism that regulates the level of *psychological ownership* that employees experience. Black’s (1962) comments on the fertility of a model to generate further hypotheses also applies to the current study.

This therefore allowed for the opportunity to provide theoretical evidence to substantiate relevant suggestions for future research efforts. The researcher is of the opinion that empirically testing a proposed model should not culminate in the testing and re-testing of several different models in order to obtain a model that fits best. It seems prudent to rather expose suggested modifications, whether they be data driven in terms of the modification indices or due to the finding of insignificance or theory driven in light of the current findings, to new data.

It is with this in mind that the following suggestions for future research have been developed from both a data driven and theoretical point of view.

#### **6.4.1 Suggested additional paths - data driven perspective**

The complexity of social phenomena and the challenging task of a researcher to decipher meaning from the interplay of several latent variables within a model is confirmed by the suggestion of additional paths within the *psychological ownership* model. More specifically, an additional six paths were suggested between the endogenous variables within the modified *psychological ownership* structural model by the modification indices calculated for **B**, namely paths in which<sup>107</sup>:

- Psychological ownership affects self investment (278.955),
- Self investment affects motivation to pursue the routes towards psychological ownership (70.924),
- Motivation to pursue the routes affects control (47.376),
- Control affects self investment (24.928),
- Motivation to pursue the routes affects psychological ownership (14.115); and
- Intimate knowledge affects self investment (9.078).

Furthermore, an additional four paths were identified between the exogenous and endogenous variables by the modification indices calculated for **Γ** within the model, namely paths in which<sup>108</sup>:

- Job characteristics affects control (81.227),
- Job characteristics affects self investment (55.120),

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<sup>107</sup> The values in brackets refer to the modification indices calculated for **B**.

<sup>108</sup> The values in brackets refer to the modification indices calculated for **Γ**.

- Psychological safety x motivation interaction affects motivation to pursue the routes towards psychological ownership (8.210); and
- Job characteristics affects intimate knowledge (7.169).

When using modification indices to guide the addition of paths for future research, it was important that each suggested path be considered one by one, starting from the largest modification index value across  $\Gamma$  and  $\mathbf{B}$  (Hooper et al. 2008). Furthermore, three aspects were additionally considered to determine whether or not to allow the data to dictate model changes that should in turn be tested using different data. Firstly, whether the proposed structural path made substantive theoretical sense. If so, whether the sign of the expected change dovetailed with the theoretical argument offered in support of the path. If so, was the magnitude of the standardised expected change sufficiently large to justify the addition of the path. If the proposed path with the highest modification index value failed any one of these three criteria the proposed path with the next highest modification index value was evaluated.

The first path considered was therefore the suggested path from *psychological ownership* to *self-investment*. This path upon initial investigation seemed to make substantive theoretical sense. As argued in Chapter two, an individual who experiences feelings of ownership towards a target will care for that target. This act of caring would involve a level of *self-investment*. For example, when an individual buys photographic equipment he or she will tend to, and care for, this equipment by making sure it is cleaned regularly, placed in protective gear and not ill-treated. He or she will make use of the protective strap when taking photographs in order to maintain this possession in pristine condition. All of these acts involve a certain level of *self-investment* by the owner of the photographic equipment.

It therefore seems reasonable, if we apply the same thinking or rationale to a workplace situation, to suggest that if an employee experiences feelings of ownership towards a job that the employee will tend and care for the job and therefore invest of him or herself to take this care. Therefore, it is argued that this suggested path does make theoretical sense. However, the sign does not dovetail this hypothesised argument. The researcher would have hypothesised this link to be positive in nature, however the findings were that this relationship would be negative. It is acknowledged here that perhaps once an individual has experienced a certain level of *psychological ownership* that he or she may

well decrease the investment of the self<sup>109</sup>. However, the researcher is of the opinion that the former argument makes better sense and this suggests that this path does not meet the second criterion. It is therefore proposed that this path not be explored further until additional theoretical evidence is provided to substantiate this negative relationship between *psychological ownership* and *self investment* (and if it is again proposed via significant modification index values in subsequent studies).

The remaining suggested paths, except for one other<sup>110</sup>, did not make theoretical sense to the researcher, within the context of psychological ownership theory. However, it is acknowledged that outside of the context of psychological ownership theory certain links hypothesised as indirect could potentially be direct. However, it is important to bear in mind that this proposed explanatory model provides a glimpse of a tentative answer and as mentioned within social phenomenon this glimpse is far more complex than can be captured within a single model.

The suggested (feedback) path between *self-investment* and *motivation to pursue the routes towards psychological ownership* did not make sufficient substantive theoretical sense to suggest the freeing of this path. In terms of the original theorising the *motivation to engage in the investment of the self*, as a *route towards psychological ownership*, should occur first, after the assessment that the job via its characteristics would allow the satisfaction of the *individual psychological ownership root needs* if the act of psychologically “purchasing the job” would be embarked on, before an individual will actually *pursue the routes*, which then should lead to feelings of ownership. The *motivation to pursue the routes* have been shown in the current study to be affected by the *job characteristics* (i.e., the *ability of the job to satisfy the root needs*) and the *salience of the root needs*. The statistically significant modification index associated with path from *self-investment* to *motivation to pursue the routes towards psychological ownership* implies that *self-investment* would explain unique variance in *motivation to pursue the routes* that

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<sup>109</sup> This argument points to the relevance of longitudinal models in industrial psychology research. Since the hypotheses describes mechanisms operating over time, the risk of failing to capture the full complexity of these mechanisms, when using a cross sectional design, is evident.

<sup>110</sup> This path is the suggested path between psychological safety and motivation – this will be covered under this section as the rational and thinking was prompted by the data, although not formally via a statistically significant modification index value (*psychological safety* as such was not included as a latent variable in the model). It is, however, acknowledged that it could have been discussed under the theoretical perspective too.

is not explained by the two effects currently linked to it. It is therefore not denying the initial theorising.

The complexity of interactions, specifically those pertaining to the relationships between the *roots*, the *routes* and the *motivation to pursue the routes* is however acknowledged. The bi-factor nature of the measurement model pertaining to the *routes* further complicates interpretation as there does seem to be a broad, general underlying factor that influences all the items in the three route subscales.

Feedback loops could additionally be present within the interaction. It is the researcher's opinion, however, that feedback from the *routes* to *motivation to pursue the routes* would need to occur through the experience of feelings of ownership first. A direct link from *self-investment* to the *motivation to pursue the routes* would mean that the individual has not experienced the desired outcome of feelings of ownership towards the target, in this case the job. The act of self-investment (more generally the act of psychologically "purchasing the job") has not as yet paid any dividends. It does not seem to make theoretical sense for an individual to be more *motivated to pursue the routes* towards *psychological ownership* if he or she has not yet experienced the desired result of *psychological ownership* of the target. Unless if perhaps the individual's needs were further activated or perhaps the individual experiences very high valence for the outcome of feelings of ownership. It seems reasonable to argue that the feedback loop would be between *psychological ownership* and *motivation to pursue the routes* and not directly from either of the routes but additionally research attention is needed to this interaction. At the same time, however, it needs to be acknowledged that the current study did not support the hypothesised feedback loop from *psychological ownership* to *motivation to pursue the routes*.

Similarly, the suggested paths between *job characteristics* and the *routes* namely *control*, *self-investment* and *intimate knowledge*<sup>111</sup> do not make sufficient substantive theoretical sense to the researcher. This is due to the argument presented in Chapter two pertaining to the mechanisms through which *psychological ownership* develops. Pierce and Jussila, (2011) state that the *routes* act as paths to the emergence of feelings of ownership and feelings of ownership will only be initiated via the satisfaction of the *individuals root needs*.

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<sup>111</sup> The researcher acknowledges that this modification is the smallest in terms of magnitude and should not be considered in this order. However, it seemed to make logical sense to discuss the three routes simultaneously since the suggested paths did not make substantive theoretical sense. If the paths were to make substantive theoretical sense this would have been the tenth path that would have been considered.

As argued, J. Pierce (personal communication, May 12, 2016) believes “that absent of one or more aroused motives (roots) *psychological ownership* is unlikely to develop, as we do not, for example, come to a sense of ownership for everything that we experience control over”. Therefore, as argued in Chapter two, it is suggested that “*psychological ownership* emerges at the confluence of several factors...In the presence of a target possessing a certain set of attributes...when one or more of the motives that underpin *psychological ownership* (e.g., effectance, home, self-identity) is in an aroused state” (J. Pierce, personal communication, May 12, 2016), an individual, according to the researcher, will feel a sense of *motivation to pursue the routes towards psychological ownership* and travel “down one or more of the routes” (J. Pierce, personal communication, May 12, 2016). Therefore, direct paths from the target (*job characteristics*, in this case) to the *routes*, does not make substantive theoretical sense to the researcher as this would in a sense mean bypassing the psychological mechanism (activation and satisfaction of the salient *psychological ownership needs*) underpinning the experience of feelings of ownership.

It is however acknowledged here that outside of the context of *psychological ownership* a direct link from *job characteristics* to the essence of the *routes* could make sense in that the characteristics of the job will allow for, or prohibit, a certain level of *route* to be reached. For example, the level of autonomy granted within a job will influence the level of control and individual can take. However, it is argued here that this process, within the context of *psychological ownership*, is conducted through a level of *motivation to pursue these routes* via the manner in which the *needs-job characteristics* interaction is assessed by the individual and then influenced by the *motivation* of the employee to follow the routes, post accessing the autonomy granted within the job. The researcher acknowledges that this is a rather complex relationship with several multidimensional variables which in future could be separated to provide a more nuanced view of these particular interactions. It is therefore suggested that in future research projects these multidimensional variables should be dealt with separately<sup>112</sup>.

In terms of the suggested path or relationship between *motivation to pursue the routes* and *control*, this could make theoretical sense. It has been argued that in the context of this proposed explanatory model that this relationship occurs via an element of *self-*

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<sup>112</sup> The researcher however acknowledges that this will have major sample size implications and that within the South African context may be difficult to study.



*investment*. It was argued in Chapter two that a certain degree of investment of the self needs to occur in order for an individual to take control of their job and gain intimate knowledge about the job. For example, taking the time to ask questions about the specific aspects of the job would be an act of exerting energy and intellect pertaining to the job. It is therefore suggested that a certain amount of *self-investment* is involved in taking *control*. Therefore, a direct link to *control* via *motivation to pursue the routes* as an *alternative* to the originally proposed link between *motivation to pursue the routes* and *control* via *self-investment* seemed unlikely. This is, however not what is suggested by the modification index in question. What is suggested (along with the suggested path from control to self-investment) is an *additional* path through which motivation to pursue the routes translates into the act of actually psychologically “purchasing the job”. Therefore, although it does not make substantive theoretical sense to add a direct path between the variable of *motivation to pursue the routes* and any other *routes*, besides *self-investment* (which then in turn acts as a mediator to the two remaining routes of *intimate knowledge* and taking *control of the job*) in place of the current pathway, it is not without theoretical merit to compliment the mechanism with an additional pathway where *motivation to pursue the routes* also operates through *control* to affect *psychological ownership* and root need satisfaction. The foregoing argument does not, however, sufficiently convincingly reason why *control* specifically should be an additional portal through which *motivation to affect the routes* translates into the act of actually psychologically “purchasing the job”.

The same argument applies when considering the suggested path between *control* and *self-investment*. It was argued that a certain degree of *self-investment* is necessary in order to *take control* therefore the act of taking control of one’s job requires a certain investment of the self first. Therefore, a direct path between *control* and *self-investment* does not make theoretical sense to the researcher. It could however be argued that after investing of the self within the job and gaining control that an individual may be motivated to invest in the self further. This is really what the modification index in question suggests. But again it feels more satisfactory to interpret this as a feedback loop returning to the *motivation to pursue the routes*, and specifically the *motivation to pursue the route of control*, since the outcome of *psychological ownership* has not yet been experienced.

Future studies could look at separating the elements of each route motivational factor within a more complex model to gain further insights into these interactions. This suggested path additionally failed the second criterion in that the sign does not dovetail the theoretical argument (a negative expected  $\beta$  was associated with this path). On the

other hand though, it could be argued that an individual who experiences a certain level of *control* would minimise the *self-investment* however, again this would then occur without the individual experiencing the outcome of *psychological ownership*.

The same thinking applies to a direct link between *motivation to pursue the routes* and *psychological ownership*. It was argued in Chapter two that, according psychological ownership theory, an individual must first anticipate the satisfaction of salient *psychological ownership needs* (root needs), then embark on psychologically “purchasing the job” by travelling the *routes towards psychological ownership by investing of the self* to take *control* and gain *intimate knowledge* of the job before experiencing *psychological ownership* as a state of root need satisfaction. Therefore, feelings of ownership are only experienced through these *routes* or paths. Pierce and Jussila, (2011, p. 78) explain this process as the “antecedents...influencing the emergence of psychological ownership working through one or more of the routes”. Therefore a direct link between the *motivation to pursue the routes*<sup>113</sup> towards *psychological ownership* and *psychological ownership* does not make theoretical sense to the researcher.

A suggested modification which baffled<sup>114</sup> the researcher somewhat is the path between *intimate knowledge* and *self-investment*. A theoretical argument was provided for this path in Chapter two, pertaining to the investment that a gardener makes into a garden and upon receiving feedback (knowledge), in the form of flourishing/wilting flowers, then invests further effort and time into maintaining the garden, due to a newly formed deeper understanding of the garden’s needs. When applied within a working context it seems reasonable to suggest that upon investing of one’s self into the job and gaining intimate knowledge about aspects of the job one would in return further invest the self. However, when this path was tested (in the original Model A), the completely standardised structural error variance estimate for  $\eta_3$  returned an inadmissible value ( $\psi_{33}=1.219$ ) and the path between *intimate knowledge* ( $\eta_4$ ) and *self-investment* ( $\eta_3$ ) was subsequently removed from the model. Although the relationship was statistically significant the sign of the regression slope was in contrast to the nature of the relationship hypothesised under the

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<sup>113</sup> It must be emphasised here that this form of motivation refers to the motivation to engage in behaviour pertaining to self-investment and taking time and energy to gain control and intimate knowledge. This is not purely motivation to act. It is motivation to act in a specific way (following the routes) that will lead to the emergence of feelings of ownership via the paths.

<sup>114</sup> The researcher was surprised to see this suggested modification since the path had to be deleted due to inadmissible parameter estimates. It is comforting that it was re-suggested but then the question remains as to why the inadmissible values were found.



directional alternative hypothesis. This suggested path therefore failed the second criterion in that the sign did not dovetail with the theoretical argument.

A final suggested modification is the path between the *psychological safety x motivation interaction* and *motivation to pursue the routes towards psychological ownership*. The suggested path was not considered meaningful given the fact that the *psychological safety x motivation interaction* effect means that the effect of *motivation to pursue the routes* on another latent variable is moderated by the level of *psychological safety*. Motivation can, however, not be modelled to affect itself so as allow *psychological safety* to moderate that relationship. Nonetheless, as alluded to in Section 6.2.2, the finding that the initially hypothesised path between the *psychological safety motivation interaction* and *self-investment* was insignificant was very thought provoking. This lead the researcher to consider alternative options.

The researcher feels that perhaps a direct path between *psychological safety* and *motivation to pursue the routes towards psychological ownership* makes better substantive theoretical sense, as opposed to the originally hypothesised *psychological safety x motivation interaction* effect on *self-investment* path. It seems reasonable to argue that the influence of *psychological safety* might be more apparent when considered as a main effect on the *motivation to pursue the routes*, as opposed to a factor which influences an individual level of self-investment post feeling *motivated to pursue the routes*.

The initial interaction argument assumed that the *psychological safety* appraisal was stimulated only once the *motivation to pursue the routes* had been formed, without actually influencing the *motivation to pursue the routes*. It, however, would seem more reasonable to suggest that an employee who feels *psychologically safe* (or has evaluated a situation or context as *psychologically safe* within his or her work environment/job) will experience maximal strength expectancies. In contrast, an employee who wishes to attach themselves to a job (by providing ideas or exerting energy to make the job "theirs"), but fears they may be ridiculed for doing so, might not be as *motivated to pursue the routes towards psychological ownership*. It could be considered as a latent variable influencing the valence of the salient outcomes within the equation for motivation. Appraising the act of psychologically "purchasing the job" as psychologically unsafe implies that negatively valenced outcomes are anticipated with non-zero probabilities, if the *routes* to psychological ownership would be pursued. It is therefore hypothesised that *psychological safety* would influence the action-outcome associations that employees experience, which would then negatively (or positively) influence the level of *motivation* experienced to

pursue the *routes*. *Psychological safety* could therefore possibly influence, or form part of, the evaluation process (how an individual evaluates the outcome of *pursuing the routes to psychological ownership*) that influences the motivational process.

It is however acknowledged here that this *psychological safety* effect could differ from individual to individual as a function of individual characteristics that moderate the effect of *psychological safety* on *motivation to pursue the routes to psychological ownership*. Should an employee experience very high valence for feelings of ownership towards their job then they may not deem *psychological safety* as an important factor (less risk-averse individuals take risks to own things that they really want, for example). It is therefore suggested here that this interaction deserves future research attention.

In terms of the deletion of insignificant paths, an important question to ask is whether the theoretical argument for the inclusion of these paths still holds true. Two path coefficients were identified as statistically insignificant namely the path coefficient associated with the path between the *psychological safety x motivation to pursue the routes* interaction and *self-investment* ( $\gamma_{33}$ ) as well as the path coefficient associated with the path between *psychological ownership* and *motivation to pursue the routes* ( $\beta_{21}$ ).

As discussed, it is suggested that the former path should be aborted and rather replaced with a direct relation between *psychological safety* and *motivation to pursue the routes towards psychological ownership*. In terms of the latter path, the relationship between *psychological ownership* and *motivation to pursue the routes* it is argued here that the theoretical argument, presented in Chapter two, still applies. However, a further caveat may need to be considered. What level of *psychological ownership* will cause the *motivation to pursue the routes towards psychological ownership* to decrease as opposed to increase? It has been argued that once an individual experiences feelings of ownership they will be further motivated to tend and care for the target, increasing levels of *psychological ownership*. However, at the same time, it seems reasonable to argue that perhaps should an individual experience very high levels of feelings of ownership or experience these feelings for an extended period of time, that an individual's *psychological ownership* needs may evolve and that this feedback loop may actually have an inverse effect. This line of reasoning moreover raises the question whether the feedback should not impact on the *salience of the psychological ownership roots* and thus only indirectly on the *motivation to pursue the routes to psychological ownership*. It should in addition be noted that this is not a path that LISREL could have suggested via the modification indices.

However, this argument has not been solidified within the researchers mind and requires further elaboration and investigation.

Moreover, since the modified *psychological ownership* structural model did not allow for the testing of the polynomial regression with response surface analysis it is additionally suggested that further research could include these aspects within the structural model as a whole, rather than looking at them separately in a narrow focused model. Further polynomial regression could also be conducted to determine the effect of the congruence between the profile of *root needs* and the ability of the job to satisfy these separate root needs on *motivation to pursue the routes to psychological ownership*. This kind of evaluation would however require the extension of the polynomial regression model<sup>115</sup> (Edwards, 1993) and the drawing and interpreting of three response surfaces.

#### 6.4.2 Additional paths – theoretical perspectives

It is evident that the complexity of the interactions within the nomological network of latent variables provides broadened scope for future research endeavours in an attempt to capture the nuanced relationships within a single model. Theoretical proposals, pertaining to proposed future paths, relating to either the individual employee, the target (or job) and the organisation as a whole were additionally elicited when the current paths, with new insights gleaned from the statistical analysis and interpretation, were considered.

As seen from the discussion in Chapter two, *psychological ownership* is understandably perceived as a latent variable that is by its very nature a personal experience (between an owner and a target). According to Hillenbrand and Money (2015) explanations of how *psychological ownership* develops at an individual level are inherently more variable and depend on an individual's sense-making and self-concept and an individual personal interpretation of 'this is me'. Therefore, future research attempts could focus on the nature of the individual. Emphasis here could shift to focus on an individual level model where layers of the self, as highlighted by Hillenbrand and Money, are then interpreted in combination with the employee's job or the entire organisation. Here the emphasis is on the individual's self-identity (personality, race, gender, cultural aspect) and how he or she

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<sup>115</sup>  $E[Y|X_{11}, X_{21}] = b_0 + b_1 X_{11} + b_2 X_{21} + b_3 X_{11}^2 + b_4 X_{11} X_{21} + b_5 X_{21}^2 + b_6 X_{12} + b_7 X_{22} + b_8 X_{11}^2 + b_9 X_{12} X_{22} + b_{10} X_{22}^2 + b_{11} X_{13} + b_{12} X_{23} + b_{13} X_{13}^2 + b_{14} X_{13} X_{23} + b_{15} X_{23}^2$

sees, understands and knows the self, and how this level of knowing will influence any attachment to a target, whether it be a job or organisation. This would shift the target of emphasis to a more intrapersonal, individual, focus.

Another individual level area of interest is the interrelationship between employee wellbeing and the experience of feelings of ownership. This conjures up several questions within the researcher's mind in terms of whether an employee experiencing psychological distress would attach to a target object or not? Would an individual currently experiencing burnout have the ability to attach him or herself to a job and experience feelings of ownership? Would a psychologically well employee experience feelings of ownership more frequently than an employee that was experiencing wellbeing shortcomings?

Another important consideration at an individual level is whether feelings of ownership are good or bad for employees. Research could look at aspects such as the resultant "strain" on individuals with the increased burden of responsibility of attaching oneself to the target or job and the subsequent exploitation of this by organisations.

Human behaviour does however not occur in isolation, void of any situational factors (Mischel, 1973). Several authors, for example, Porter, Lawler and Hackman (1975), Clayton (1981) and Brousseau (1983) have suggested that an individual's reaction to his or her job may be influenced not only by the properties of the job and the individual's needs, but also by the nature of the work context or the organisational "milieu" surrounding the job. Kahn (1990) additionally points out the importance of psychological experiences within organisations and the influence of elements of the work context. The focus of this research study was on the psychological mechanism at work underpinning levels of *psychological ownership* and *job characteristics*, a contextual factor. However, since job-based *psychological ownership* occurs within the organisation context, further contextual factors should additionally be considered when tackling the nomological network underpinning these feelings of ownership. It is suggested that future research should focus on the additional contextual or environmental factors influencing levels of *psychological ownership* within individuals at work. This could include, but is not limited to, aspects such as the role of leadership (different leadership styles), organisational culture and climate, tenure and the like.

Future research endeavours could focus on determining the manner in which *psychological ownership* directly and/or indirectly affects important outcome aspects pertaining to individuals at work including its influence on employee performance, state

engagement, psychological empowerment, job satisfaction, job commitment and how these feedback onto *psychological ownership*. Furthermore, and specifically within the diverse South African organisational landscape, the aspect of Ubuntu, as well as societal perspectives pertaining to ownership, could be evaluated within the context of *psychological ownership*. It is suggested here that an investigation of collective *psychological ownership* at a team level would be valuable within the South African organisational context. According to Pierce and Jussila (2011) a social-identity motive underpins the presence of collective *psychological ownership*. Within the South African context it could be argued that a lack of social-identity or a burdened social identity could negatively influence the experience or development of feelings of ownership within the diverse organisational context in South Africa. This could in turn have negative implications for interventions, if applied within a context where they are destined to fail. Further research is needed to shed some light on this matter.

As mentioned, this research study investigated the influence of the *psychological ownership root needs*, and their subsequent satisfaction, collectively. This was noted as a potential weakness of this current research study. Future research could therefore investigate the role of each of the three *psychological ownership root needs*, namely the *need for belonging*, the *need for self-identity* and the *need for efficacy and effectance*, individually, in order to determine their influence on *motivation to pursue the routes to psychological ownership* and eventually the levels of *psychological ownership*.

Another area which could potentially require further clarification, specifically pertaining to the root needs, is the definition of the root need of efficacy and effectance and a clarification of the use of these two terms. It could be argued that one (efficacy) could potentially be considered as an outcome of the other (effectance). According to J. Pierce (personal communication, May 10, 2016) the motivation to effect outcomes, to make things happen, to experience oneself as competent; is pleasure producing. It leads to experiencing personal efficacy. As such, efficacy is a resulting condition, stemming from one's ability to interact effectively with one's environment. But this requires further thought and research to solidify the meaning of these terms within the theory of psychological ownership.

In terms of deepening the body of knowledge surrounding *psychological ownership* future research endeavours could focus on the specific underlying psychological mechanisms that lead to the development and experience of the two different types of *psychological ownership* namely preventative and promotion oriented. According to Alok, (2014) and

Dawkins et al. (2017) these two types of *psychological ownership* are too independent to be considered within a single multidimensional construct. It therefore seems prudent to look at these two types of *psychological ownership* separately within future research studies.

Moreover, future research could additionally focus on the darkside of feelings of ownership. This is an area that has received very little attention within the literature (Dawkins et al. 2017), and it would be prudent to have knowledge pertaining to the point at which feelings of ownership turn bad.

From a personal experience point of view the researcher would like to posit time as an additional factor that requires future investigation in terms of its influence on the levels of *psychological ownership* employee's experience. It seems reasonable to suggest that as an employee invests time (this could be seen as an element of self-invest or moderated by self-investment and could potentially be considered as an additional route towards feelings of ownership) into their job they will begin to experience feelings of ownership.

Although the researcher acknowledges that there is still much research to be done pertaining to the topic of *psychological ownership* within the work context, it is hoped that this research will expand the research base on *psychological ownership* and provide further empirical support for the value of *psychological ownership* within organisations as well as its assessment and development in the workplace.

## **6.5 PRACTICAL IMPLICATIONS**

The objective of this research study was to develop and empirically test a proposed *psychological ownership* structural model. However, it is important to bear the arguments presented in Chapter one in mind with regards to the working world and the influence it has on working man when considering the results. In order to provide employees a context or environment that allows working man to present his or her true self and flourish, it is important that the findings from research studies, undertaken to better understand the complexities of a working environment as well as individual employees, are translated into practical solutions. A better understanding of working man, and the psychological mechanisms at play at an individual, group and organisational level will lead to improved, more successful, interventions that are aimed at improving performance as well as the working environment for employees. Therefore, the usefulness of research could be contested should it not provide practical solutions for organisations.



The structural model does not in and of itself provide information pertaining specifically to the types of interventions that should be introduced within organisational contexts. However, the results, when applied to the body of research available surrounding organisational effectiveness, do provide some food for thought and possible intervention examples. It is with this in mind that the preceding section discusses several practical implications uncovered via the results of this research study.

The data suggests that in order to influence levels of *job-based psychological ownership* organisations could attempt to influence the characteristics of an employee's job. More specifically, organisations could attempt to increase levels of *autonomy*, *task variety*, and *skill variety*, as well as provide employees with more insight pertaining to the level of *task significance* and *feedback*. Organisations can additionally attempt to align individual *psychological ownership needs* with specific *job characteristics* by determining the level of *individual psychological ownership needs* experienced by a potential employee before selection and aligning these with the characteristics of the specific job applied for. Organisations can also focus on facilitating the process of self-investment, taking control and gaining intimate knowledge of a job. Although it was not covered within the statistical analysis it is suggested that an employee's line manager would have a certain degree of influence here.

Literature highlights the importance of the job in one's relationship with an organisation. Attempts by organisations to influence job characteristics would imply job design or redesigning of jobs<sup>116</sup>. According to Strümpfer, (2006) and Tims and Bakker (2010) jobs that are well designed have positive effects and can lead to improved employee wellness, and may even bring about thriving, when employees experience growth in the face of challenges. It therefore seems reasonable to suggest that jobs should be designed in a way that allows for increased levels of *autonomy* and *task significance*. Organisations can additionally design jobs that allow for increased levels of performance feedback, while making use of several skills in completing a task or job from beginning to end. Jobs should therefore be designed so that they are more complex, challenging and stimulating. This can be done by examining the *job characteristics* and tailoring these in such a way that they ignite the needs and motivate employees to invest of themselves in the job as well

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<sup>116</sup> The researcher is of the opinion that an employee's involvement in job redesign would have further motivational force than a job design exercise fully undertaken by the organisation alone (top-down). However, it must be acknowledged that since it is individual needs that are satisfied by these job characteristics and that job cannot feasibly be designed for each and every employee individually, that a best case design would need to be considered.

as take *control* and gain *intimate knowledge* of the job. It must however be noted that further empirical research is required to determine the specific *job characteristics* that should be developed or designed into a job to have the most pronounced influence on levels of *psychological ownership* (and avoid the dark side of *psychological ownership*). Proper understanding pertaining to the individual *job characteristics* and their interactions with the *individual psychological ownership needs* is therefore a vital first step before jobs are redesigned.

A question organisations should ask themselves, however, is how much of this design should occur pre-hiring an employee (job design) for the job or post hiring (job redesign) an individual. It is suggested that answers to this question would have further implications for the level of *psychological ownership* experienced by an employee.

Furthermore, role theory (Biddle, 1979) states that the same job would be performed differently by two individuals, since they enact their roles in different ways. Pierce and Jussila (2011) additionally state that a job becomes a big part of one's own identity. It is therefore suggested that job redesign should take an individual slant and therefore involve more than merely a top-down scientific approach (Taylor, 1911). It is suggested that organisations and HR in particular could facilitate job crafting by employees, where they can be afforded the opportunity to "change elements of their jobs and relationships with others to change the meaning of their work and the social environment at work" (Wingerden, Bakker, & Derks, 2017, p. 165). Employees could then mould or craft their job by shifting the emphasis of the job to suit their own unique personality, preferences and most importantly strengths.

By affording employees the opportunity to craft their own jobs employees are encouraged to self-invest in not only the job itself (with a desired organisational outcome), but also creating the job, further contributing to the experience of feelings of ownership for the job. Three strategies are often employed by individuals to craft their own jobs. They change their relationship with co-workers in terms of how much time they spend interacting, they change their job perspective or they adapt the tasks in terms of type and frequency (Wrzesniewski & Dutton, 2001). Therefore, employees should be afforded the opportunity to invest of themselves within their job by having the ability to take control and gain intimate knowledge and using this knowledge and control to adapt their job and relations within it to suit their sense of self in order to experience increased levels of *psychological ownership*.



Managers additionally need to allow employees the flexibility to craft their own jobs. It seems reasonable to argue here that managers within organisations should allow their employees a certain degree of freedom within their jobs to implement these three strategies. Furthermore, managers should carry out programs within job roles that can lead to experienced control, intimate knowing and investment of the self into the job to harness the abovementioned benefits. Managers have the opportunity to create working environments where their employees can easily gain *intimate knowledge* about their job, take *control* over that job and *invest* parts of themselves into that job. Therefore, managers should be trained and empowered with information pertaining to the general benefits of *psychological ownership* within the world of work, and more specifically the benefits that increased levels of promotion-oriented *psychological ownership* can elicit.

Taking the individual, person-centred, aspects into consideration, coupled with the linear interaction of *motivation to pursue the routes towards psychological ownership* when *job characteristics* and *individuals needs* are aligned, it seems reasonable to consider the implications for selection. Specifically in terms of the salience of *psychological ownership root needs* and how these can be assessed as part of the recruitment and selection process within organisations. Given the substantial benefits of the experience of *psychological ownership* to both employees and the organisation it begs to reason that organisations could look at their selection process and as part of their battery of selection assessments and methods, they could additionally assess the salience of an individual's *psychological root need/needs*. Increased levels of salience, coupled with a correctly designed job could elicit higher levels of *psychological ownership* which as outlined in Chapter two could lead to increased organisational commitment, extra-role or citizenship behaviour, reduced turnover, improved employee performance and in turn improved organisational performance.

## 6.6 CONCLUDING THOUGHT

*Psychological ownership* is an important construct in industrial psychology. It holds important implications for harvesting optimal performance from working man. At the same time, however, it holds implications for granting working man his moral right to become who he fundamentally is. Johan Steinbeck (1939, p. 50), in *The Grapes of Wrath*, beautifully expresses something of the latter thought.

Funny thing how it is. If a man owns a little property, that property is him, it's part of him, and it's like him. If he owns property only so he can walk on it and

handle it and be sad when it isn't doing well, and feel fine when the rain falls on it, that property is him, and some way he's bigger because he owns it. Even if he isn't successful he's big with his property. That is so.'

But let a man get property he doesn't see, or can't take time to get his fingers in, or can't be there to walk on it - why, then the property is the man. He can't do what he wants, he can't think what he wants. The property is the man, stronger than he is. And he is small, not big. Only his possessions are big - and he's the servant of his property. That is so, too.

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**APPENDIX 1**



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**DEVELOPMENT AND EMPIRICAL EVALUATION OF AN EXPLANATORY  
PSYCHOLOGICAL OWNERSHIP STRUCTURAL MODEL**

**Angela Lee**

**SUPERVISOR: PROFESSOR C.C. THERON  
CO-SUPERVISOR: MR T MARIRI  
MARCH 2016**



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## STELLENBOSCH UNIVERSITY

### CONSENT TO PARTICIPATE IN RESEARCH – DELPHI TECHNIQUE

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#### DEVELOPMENT AND EMPIRICAL TESTING OF A PSYCHOLOGICAL OWNERSHIP STRUCTURAL MODEL - DELPHI TECHNIQUE

You are invited to participate in a research study conducted by Angela Lee, a Master of Commerce student, from the Department of Industrial Psychology at the faculty of Economic and Management Sciences, Stellenbosch University. The results of this research study will contribute towards the completion of the research component of the thesis and consequently the completion of her studies.

#### **Brief introduction to the purpose of this mini study within the larger context of the development and testing of a *psychological ownership* structural model:**

In order to operationalise certain variables within the proposed psychological ownership structural model certain new items have been proposed. Before these items can be included within the psychological ownership scale, and subsequent testing of the structural model can begin, they require vetting and quality assessment to determine their applicability for inclusion. You were selected as a possible participant in this study due to your knowledge and expertise in the field of industrial psychology in general and/or with regards to *psychological ownership* specifically. 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 in levels of psychological ownership exist among different employees working in different organisational contexts, the objective of this research study is to develop an explanatory *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 decide to participate in this research study, we would ask you to complete a Subject matter Expert (SME) Item analysis questionnaire. The questionnaire will be presented in an electronic Word document, to enable reviewers to provide feedback and suggestions. If you do not want to answer specific questions or evaluate certain items you may leave them blank, without the risk of any negative consequence. 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 SME Item Analysis questionnaire and answer the questions as honestly as possible. Your responses and feedback will be manually processed by the researcher herself.

## **3. POTENTIAL RISKS AND DISCOMFORTS**

There are no foreseeable harmful risks for you as a participant. However, the completion of the questionnaire will entail some of your time and energy.

## **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 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.

## **5. PAYMENT FOR PARTICIPATION**

There is no offer of payment for participation in this study.

## 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.

Upon completion of the thesis, information supplied to the public (the thesis is available online via the Stellenbosch Library E-thesis portal) will only be supplied on an aggregate basis. 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. 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:

- Angela Lee on [angelalee1405@gmail.com](mailto:angelalee1405@gmail.com) or 082 607 1120
- Professor Callie Theron, at the department of Industrial Psychology, 021 8083009 or [ccth@sun.ac.za](mailto:ccth@sun.ac.za)
- Mr Mariri, at the department of Industrial Psychology, 021 808 3008 or [tmariri@sun.ac.za](mailto:tmariri@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](mailto:mfouche@sun.ac.za); 021 808 4622] at the Division for Research Development.

**INFORMED CONSENT**

After due consideration please tick the statement that applies to you.

I have read and understand the information that was provided to me surrounding my potential participation in the Psychological ownership research study. I would like to participate and therefore voluntarily consent to further participation.

I have read and understand the information that was provided to me surrounding my potential participation in the psychological ownership research study. I would not like to participate.

I, \_\_\_\_\_, provide my voluntary informed consent to participate in the Delphi Technique study as part of Angela Lee's development and empirical testing of a *psychological ownership* structural model, at \_\_\_\_\_ on, this \_\_\_\_ day of \_\_\_\_\_ 2016.

Signed: \_\_\_\_\_

Thank you for taking the time to work through the proposed items for inclusion in five subscales of the composite Job –based Psychological Ownership Scale that will be used to operationalise the latent variables in an explanatory psychological ownership structural model. This will be of great value to our study.

The composite Job –based Psychological Ownership Scale consists of ten subscales. Four of these are existing scales. These existing scales will be used to measure the *job characteristics*, *psychological safety*, the two psychological ownership routes (*gaining control* and *self-investment*) latent variables within the proposed psychological ownership structural model.

Appropriate existing measures could, however, not be found in the literature for the five latent variables in the model, namely *motivation to pursue the routes to psychological ownership*, the psychological ownership route *gaining intimate knowledge* and the three psychological ownership needs, the *need for self-identity*, the *need for a sense of belonging* and the *need for self-efficacy and effectance*. The items that were written for these five subscales are displayed below.

What is expected of you:

1. For each statement, please indicate, by marking with an X, whether you regard the item to be highly inappropriate (HI), slightly inappropriate (SI), slightly appropriate (SA) or highly appropriate (HA) in measuring the behaviours described in the dimension.
2. Please consider the following questions when working through the item and address these in the comments column:
  - Does the item assess the behaviour described in the definition of the dimension it relates to, or is it better suited to another dimension?
  - Is the item clear and unambiguous?
  - Is the language of the item clear enough for employees with Grade 12 level English to understand?
  - Does each item assess only one construct?
  - Does each item assess a unique aspect/facet of the construct which is not measured by any other listed for a specific dimension? If there is duplication, which is the stronger item?
3. Feel free to suggest any additional items you feel should be included with a brief motivation.

**SME ITEM ANALYSIS SHEET**

<b>Dimension 1: Motivation to engage in the routes to psychological ownership</b>					
Motivation here refers to the psychological mechanisms at play that move an employee from the experience of individual psychological ownership needs, (need for self-identity, need for self-efficacy, and a sense of belonging) to the act of following the route(s) of psychological ownership (taking control, gaining intimate knowledge and investing the self within the job role). In order for an employee to be moved to engage in route following behaviour, that could facilitate the development of psychological ownership, an employee must value the reward/outcome (feelings of ownership) and expect that any effort (engaging in the route behaviours) will lead to this reward.					
<b>Items</b>	<b>HI</b>	<b>SI</b>	<b>SA</b>	<b>HA</b>	<b>Comments</b>
1. I value the feeling of being attached to my job.					
2. I experience the desire to give of myself in my job role.					
3. I value that I can see myself in the work that I do.					
4. It motivates me that my job speaks to who I am as a person.					
5. It is important for me to feel as though my job is mine, and that the job is me.					
6. I want to learn more about my job.					
7. I value knowing my job role well.					

**Dimension 2: Gaining intimate knowledge**

Active participation with/in the job leads an employee to feel an attachment to the job. This active participation involves learning more about the intricacies of the job (by becoming familiar with its needs) thereby providing more information to an employee. This in turn facilitates the building of a connection between the employee and the job. This living relationship evolves and changes over time. The more information possessed about the job, the more intimate the connection between the employee and the job becomes. This knowing the job intimately leads to the job feeling as though it is an extension of the self. Therefore, the investment of time and energy (through self-investment) into the job, to gather information, leads an employee to experience the job as an 'extension of me' and subsequently feelings of ownership towards the job develop.

Items	HI	SI	SA	HA	Comments
1. I actively make an effort to be informed about aspects of my job.					
2. I ask questions if I don't know something about my job.					
3. I seek understanding and clarity about my job.					
4. I like to know every little detail about my job.					
5. I do not take time to find out about my job.					

Please note that dimensions three to five refer to an employees need for three identified psychological constructs. This therefore means we are not measuring the individuals actual level on these psychological constructs of self-efficacy, self-identity and having a home, per say. Rather the purpose is to determine an individual's desire/need/motive level. This has therefore influenced the nature of the questions for these three dimensions.

### **Dimension 3: Need for self-identity**

Individuals, in an attempt to understand themselves, express themselves to others and maintain a sense of continuity of self-identity, have a need to attach themselves, and create a relationship, with an object or several objects, such as a job. Employees have a need to interact with their job in order to explore, experience and construct meaning through self-expression within the job role. The job, therefore acts as an extension of one's self, communicating to the world 'this is mine, this is me'. Employees have a need to achieve continuity of the self within the job role. Employees find comfort in their relationship with their job should it indeed form part of who they are.

<b>Items</b>	<b>HI</b>	<b>SI</b>	<b>SA</b>	<b>HA</b>	<b>Comments</b>
1. I have a desire for my job to be an extension of me.					
2. I need to understand who I am within my job role.					
3. I need my job to be an expression of who I am.					
4. I desire to explore my own identity within my job role					
5. I desire to explore aspects of my job to discover if they communicate 'me' to my colleagues.					

<b>Dimension 4: Need for a sense of belonging / having a home</b>					
Individuals need to feel 'within' and 'a part of' a place. 'Home' provides an element of safety as well as a mechanism for self-expression, through self-invest. From a psychological perspective, objects that are considered 'home' are those objects that an individual has invested themselves into emotionally and physically. Within the organisational context this refers to the need to find one's 'place' and invest one's energy into a job that allows for personalisation and development of the self as well as a safe place for self-expression.					
Items	HI	SI	SA	HA	Comments
1. I have a desire to personalise my work space.					
2. I have a desire to feel 'at home' in my job role.					
3. I want my job to allow for self-expression.					
4. I need to be able to invest 'me' in my job role.					

<b>Dimension 5: Need for self-efficacy and effectance</b>					
An individual's need to be in control of their job and the ability to make changes within the job. It also refers to an individual's need to effectively interact with their environment and a need to make changes within that environment. The job is seen as an element that the employee can control. Employees need to be the cause of outcomes within their job. Person-job interactions lead to the exercising of control and subsequent changes to the environment, causing pleasure producing feelings.					
Items	HI	SI	SA	HA	Comments
1. I have a desire to take control of different aspects of my job.					
2. I want to be able to make changes within my job.					
3. I have a desire to have the ability to control job outcomes.					
4. I have a desire to be resourceful and solve problems within my job role.					
5. I have a desire to know the part that I have played in a job outcome.					



## APPENDIX 2



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### STELLENBOSCH UNIVERSITY

#### CONSENT TO PARTICIPATE IN RESEARCH

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#### DEVELOPMENT AND EMPIRICAL TESTING OF A PSYCHOLOGICAL OWNERSHIP STRUCTURAL MODEL

You are invited to participate in a research study conducted by Angela Lee, a Master of Commerce student, from the Department of Industrial Psychology at the Faculty of Economic and Management Sciences, Stellenbosch University. The results of this research study will contribute towards the completion of the research component of the thesis and consequently the completion of her studies. You were selected as a possible participant in this study because the study requires an investigation into employees under full-time employment, within different industries, within the borders of South Africa. Your participation would be greatly appreciated, but is on a voluntary basis.

##### 1. PURPOSE OF THE STUDY

In response to the research initiating question, why does variance in levels of *psychological ownership* exist among different employees working in different organisational contexts, the objective of this research study is to develop an explanatory *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 decide to participate in this research study, we would ask you to complete a questionnaire. The questionnaire will be presented in an online format (that is mobile device friendly). Access to either a smart device or personal computer and the internet

will be required. The questionnaire should take about 30 minutes to complete. Should you not wish to continue (if you do not want to answer specific questions) you may exit the questionnaire by closing the browser. 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. You can save and stop at any point in time and return to complete the remaining questions later. 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 some of your time and energy.

### **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 one mobile tablet. Other than this you as a participant may not directly benefit from 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.

### **5. PAYMENT FOR PARTICIPATION**

There is no offer of payment for participation in this study. This extends to both the organisation and you as the participant.

### **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 anonymous.

Should you wish to partake in the opportunity to win a smart device you may complete a second survey after you have complete the Composite Job-based psychological Ownership Questionnaire. This will not be linked to your survey answers and will merely require you to provide your cellphone number.

Furthermore, the data received will only be accessible by Angela Lee, Professor Theron and Mr Mariri of the Industrial Psychology Department at Stellenbosch University. 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, will only be supplied on an aggregate basis. 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.

## **7. PARTICIPATION AND WITHDRAWAL**

It is your choice whether you wish to participate in this study. It would be of great value if you chose to, but participation is purely voluntary. If you volunteer to be in this study, you may withdraw at any time without negative consequences, to yourself, of any kind.

## **8. IDENTIFICATION OF INVESTIGATORS**

If you have any questions or concerns about the research, please feel free to contact:

- Angela Lee on [angelalee1405@gmail.com](mailto:angelalee1405@gmail.com) or 082 607 1120
- Professor Callie Theron, at the department of Industrial Psychology, 021 8083009 or [ccth@sun.ac.za](mailto:ccth@sun.ac.za)

- Mr Mariri, at the department of Industrial Psychology, 3008 or [tmariri@sun.ac.za](mailto:tmariri@sun.ac.za)  
021 808 3008

## **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](mailto:mfouche@sun.ac.za); 021 808 4622] at the Division for Research Development, Stellenbosch University.

**INFORMED CONSENT**

After proper consideration please select the statement that applies to you.



I have read and understand the information that was provided to me surrounding my participation in the psychological ownership research study. I would like to participate and therefore voluntarily consent to further participation.



I have read and understand the information that was provided to me surrounding my potential participation in the psychological ownership research study. I would not like to participate.

**APPENDIX 3**

UNIVERSITEIT • STELLENBOSCH • UNIVERSITY  
jou kennisvenoot • your knowledge partner

**LETTER OF PERMISSION FOR RESEARCH STUDY**

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**DEVELOPMENT AND EMPIRICAL TESTING OF A PSYCHOLOGICAL OWNERSHIP  
STRUCTURAL MODEL**

To whom it may concern,

**Letter requesting permission for a research study to be conducting within your  
organisation**

Research into the complex psychological constructs that underpin the behaviour of working man is necessary in order to understand the complex network of latent variables that underpin employee behaviour. This will inevitably inform interventions geared towards the effective and efficient use of society's most precious resource – human capital. One such complex construct within the network of latent variables underpinning behaviour of working man is *psychological ownership*. Research shows several positive side effects of the development and nurturing of levels of *psychological ownership* within the work place. These include but are not limited to increased satisfaction, performance, tenure, commitment and decreased levels of absenteeism.

In order to successfully develop and manage the levels of *psychological ownership* experienced by employees within organisations, to aid in individual flourishing and ensure optimal organisational performance, a valid understanding of the manner in which the construct of *psychological ownership* is embedded in this complex nomological network of latent variables is however critical. Only to the extent that the identity of the determinants that directly and indirectly affect the level of *psychological ownership* that employees experience and the manner in which they structurally combine in the nomological network is validly understood would it allow HR management to rationally and purposefully affect the well-being and work behaviour of employees and to develop appropriate interventions to harness this psychological construct within the workplace.

Research surrounding the concept of *psychological ownership* therefore needs to address some unanswered questions which refer to the processes by which *psychological ownership* develops within an individual and a target becomes an inherent part of an individual's identity. This, in turn, could improve organisational performance as well as employee wellbeing.

We hereby request permission to conduct our research within your organisation. The Psychological Ownership Questionnaire will be administered for the purpose of the study, via the Stellenbosch University web-based e-Survey service [SURveys]. The following link will be distributed to the staff compliment made available:

[www.psychologicalownershipsurvey.co.za](http://www.psychologicalownershipsurvey.co.za)

In order to protect the personal information of the employees of any participating organisation, and comply with the Protection of Personal Information Act No 4, 2013, the link will be distributed by an internal staff member. The details of which should be filled in below.

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 their participation in this research study. No payment will be made to participants for taking part in this study. An offer of eligibility for participation in a lucky draw will be provided to all participants to potentially increase the response rate. Each participant's cellphone number will be required for participation in this lucky draw. However, they will have the option to enter it or opt out (entry into the lucky draw is voluntary and will only be requested once the questionnaire has been completed. So should a participant not wish to enter they do not have to supply their details. Cellphone numbers entered will not be linked to questionnaires completed. A second survey requesting merely a cellphone number will be offered upon completion of the questionnaire. The researcher will randomly select one number and only call the winner. Permission will be asked for the researcher to make contact to obtain further delivery details. The other numbers will not be used in any way, shape or form and will be deleted once the draw has been completed.

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 a coding procedure, restricting access to data and aggregating results. Furthermore, should the results of this

research study be used for publication in academic or peer reviewed journals confidentiality will be maintained. Participant's names will not be published.

If you have any questions or concerns about the research, please feel free to contact Angela Lee ([angelalee1405@gmail.com](mailto:angelalee1405@gmail.com) / 082 607 1120) or Professor Callie Theron of the Department of Industrial Psychology of Stellenbosch University ([ccth@sun.ac.za](mailto:ccth@sun.ac.za) / 0218083009).

We trust that you will kindly grant us the institutional permission to conduct the *psychological ownership* study in your organisation. Thanking you in anticipation.

Yours sincerely

Angela Lee

Professor C Theron

Mr Mariri



**PERMISSION FOR A RESEARCH STUDY TO BE CONDUCTED WITHIN OUR  
ORGANISATION**

The signature below hereby confirms that permission has been granted, by an authorised signatory, for the research study: Development and empirical testing of a psychological ownership structural model, to be conducted within our organisation. It is acknowledged that this study is being conducted for academic purposes by Angela Lee, Professor Theron<sup>117</sup> and Mr Mariri<sup>118</sup>, from Stellenbosch University. It is additionally acknowledged that any results provided will be supplied in an aggregate format and the data will be collected anonymously.

Company name to remain anonymous:  Yes  No

Signed: \_\_\_\_\_ Print name & surname: \_\_\_\_\_

Position: \_\_\_\_\_

Date: \_\_\_\_\_

Witnessed: \_\_\_\_\_ Print name & surname: \_\_\_\_\_

Date: \_\_\_\_\_

Individual responsible for distributing the email link to participants:

Print name & surname: \_\_\_\_\_

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

\_\_\_\_\_

<sup>117</sup> Supervisor for this research study

<sup>118</sup> Co-supervisor for this research study

## APPENDIX 4 <sup>119</sup>


 UNIVERSITEIT  
STELLENBOSCH  
UNIVERSITY

### STELLENBOSCH UNIVERSITY CONSENT TO PARTICIPATE IN RESEARCH DEVELOPMENT AND EMPIRICAL TESTING OF A PSYCHOLOGICAL OWNERSHIP STRUCTURAL MODEL

You are invited to participate in a research study conducted by Angela Lee, a Master of Commerce student, from the Department of Industrial Psychology at the Faculty of Economic and Management Sciences, Stellenbosch University. The results of this research study will contribute towards the completion of the research component of the thesis and consequently the completion of her studies. You were selected as a possible participant in this study because the study requires an investigation into employees under full-time employment, within different industries, within the borders of South Africa. Your participation would be greatly appreciated, but is on a voluntary basis.

#### PURPOSE OF THE STUDY

In response to the research initiating question, why does variance in levels of *psychological ownership* exist among different employees working in different organisational contexts, the objective of this research study is to develop an explanatory *psychological ownership* structural model, as well as to empirically test the validity of the model. It is hoped that this model will provide a valid description of the psychological mechanism that regulates the level of *psychological ownership* that employees experience.

#### PROCEDURES

If you decide to participate in this research study, we would ask you to complete a questionnaire. The questionnaire should take about 15 minutes to complete. Should you not wish to continue (if you do not want to answer specific questions) you may exit the questionnaire by closing the browser. 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. You can save and stop at any point in time and return to complete the remaining questions later. Your responses will be captured electronically and automatically stored for processing.

#### POTENTIAL RISKS AND DISCOMFORTS

There are no foreseeable harmful risks for you as a participant. However, the completion of the questionnaire will entail some of your time and

#### 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 one Samsung Galaxy Tablet. Other than this, you as a participant may not directly benefit from 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.

#### PAYMENT FOR PARTICIPATION

There is no offer of payment for participation in this study. This extends to both the organisation and you as the participant.

#### 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 utilizes 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 anonymous. Should you wish to partake in the opportunity to win a smart device you may complete a second survey after you have completed the Composite Job-based psychological Ownership Questionnaire. This will not be linked to your survey answers and will merely require you to provide your cellphone number. Furthermore, the data received will only be accessible by Angela Lee, Professor Theron and Mr Mariri 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.

- 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, will only be supplied on an aggregate basis. 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.

#### PARTICIPATION AND WITHDRAWAL

It is your choice whether you wish to participate in this study. It would be of great value if you chose to, but participation is purely voluntary. If you volunteer to be in this study, you may withdraw at any time without negative consequences, to yourself, of any kind.

#### IDENTIFICATION OF INVESTIGATORS

If you have any questions or concerns about the research, please feel free to contact:

- Angela Lee on [angelalee1405@gmail.com](mailto:angelalee1405@gmail.com) or 082 607 1120
- Professor Callie Theron, at the department of Industrial Psychology, 021 808 3009 or [ccth@sun.ac.za](mailto:ccth@sun.ac.za)
- Mr Mariri, at the department of Industrial Psychology, 021 808 3008 or [tmariiri@sun.ac.za](mailto:tmariiri@sun.ac.za)

#### 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](mailto:mfouche@sun.ac.za); 021 808 4622] at the Division for Research Development, Stellenbosch University.

- I have read and understand the information that was provided to me surrounding my participation in the psychological ownership research study. I would like to participate and therefore voluntarily consent to further participation.
- I have read and understand the information that was provided to me surrounding 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. The below questions or statements cover information pertaining to demographic information. This information will be used for statistical purposes only.

- \*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 race from the drop down list.**
- Black
  - Coloured
  - Indian
  - White
  - Other

- \*Please indicate your gender from the drop down list.**
- Female
  - Male
  - Other

- \*Please indicate your field of work/industry from the drop down list.**
- Agriculture
  - Communications - Marketing/Advertising/PR
  - Construction
  - Education
  - Engineering
  - Finance
  - Government
  - Health and fitness
  - I work across industries
  - Mining and manufacturing
  - Retail
  - Telecommunications
  - Tourism
  - Transport
  - Sales
  - 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 you 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

**\*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?**

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?**

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 a 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?**

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.



**\*To what extent does *doing the job itself* provide you with information about your work performance? That is, does the actual work itself provide clues about how well you are doing - aside from any 'feedback' co-workers or supervisors may provide?**

Very little; the job itself is set up so that I could work forever without finding out how well I am doing.

Moderately; sometimes doing the job provides 'feedback' to me; sometimes it does not.

Very much; the job is set up so that I get almost constant 'feedback' as I work about how well I am doing.











**\*Listed below are a number of job outcomes. How good or bad, -3 being very bad and +3 being very good, are the following outcomes?**

	-3	-2	-1	0	1	2	3
Being intimately familiar with your job.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Experiencing your job as an extension of your self.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Having control over your job.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Having a depth of knowledge that relates to your job.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Your job defining who you are.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Having the ability to decide what tasks to do.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Having a broad understanding of your job.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Seeing your effort come to fruition in your job.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Having the ability to decide how things are done in your job.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**\*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?**

	1	2	3	4	5	6	7
Being intimately familiar with your job.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Experiencing your job as an extension of your self.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Having control over your job.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Having a depth of knowledge that relates to your job.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Your job defining who you are.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Having the ability to decide what tasks to do.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Having a broad understanding of your job.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Seeing your effort come to fruition in your job.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Having the ability to decide how things are done in your job	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**\*Do you wish to participate in the lucky draw to stand a chance to win a Samsung Galaxy Tablet?**

- Yes
- No

Thank you for your time.