THE DEVELOPMENT AND EMPIRICAL TESTING OF A REVISED PERFORMANCE INDEX

by

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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 2019

DECLARATION

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ABSTRACT

Human resource interventions have in the past concentrated their effort on measuring and improving the performance of the individual employee in the workplace, with relatively little attention given to the understanding, monitoring and improvement of the performance of organisational work units. It is argued that the gap in the understanding of the performance in the work unit is considered a major flaw in the discipline of industrial psychology. Organisations, in effect, are a conglomeration of work units that are guided by a single shared vision and mission.

The level of performance that any organisational work unit achieves is, similarly to the performance of the individual employee, the result of the operation of a complex identifiable nomological network of latent variables characterising the unit and the wider organisational context in which it operates. Interventions conducted by human resource practitioners aimed at enhancing the performance of the work unit will only succeed if it is clear what constitutes work unit-performance, if the determinants of the work unit performance are established, if a valid understanding exists of the manner in which these determinants directly and indirectly regulate the level of work unit performance and if a valid, reliable and unbiased instrument has been developed to measure work unit performance.

The primary objective of this research study was to revise the Performance Index (PI) of Spangenberg and Theron (2004). Firstly, all latent organisational unit competency potential variables were removed from the PI. Secondly additional latent organisational unit competencies and latent organisational unit outcome variables were suggested for inclusion in the work unit performance construct. This revision of the PI's conceptualisation of organisational unit performance necessitated the development and validation of a new version of the Performance Index [Work Unit Performance Questionnaire (WUPQ)]. The WUPQ comprises of two subscales, namely the Work Unit Competency Questionnaire (WUCQ) and the Work Unit Outcome Questionnaire (WUOQ).

This resulted in seven latent behavioural competencies variables being measured by the Work Unit Competency Questionnaire, namely *innovation, effort,* *counterproductive workplace behaviour, organisational citizenship behaviour, employee green behaviour,* and *core people processes*. Furthermore, there were six latent outcome variables being measured by the Work Unit Outcome Questionnaire, namely *production and efficiency, work unit climate, employee satisfaction, market standing, high performance culture* and *future growth*. The Work Unit Performance Questionnaire therefore measures work unit performance in terms of thirteen work unit performance dimensions.

The WUCQ measurement model and the WUOQ measurement model both showed close fit. Two factor loadings in the WUCQ measurement model had to be constrained to obtain close fit. The initial work unit performance LISREL model did not converge. However, the problem was resolved by adding a path from *high performance culture* to *satisfaction* to the structural model. The close fit hypothesis was rejected ($p<.05$) but a reasonable model fit was found in the sample. Support was found for 15 of the original 21 path-specific substantive hypotheses and for an additional hypothesis. Practical implications are discussed and suggestions for future research are made.

OPSOMMING

Menslike hulpbronintervensies het in die verlede hul pogings gefokus op die meting en verbetering van die prestasie van individuele werknemers in organisasies, maar het relatief min aandag geskenk aan die verstaan, monitering en verbetering van die prestasie van organisatoriese werkeenhede. Daar word aangevoer dat die gaping in die verstaan van die prestasie van die werkeenheid ’n belangrike tekortkoming is in bedryfsielkunde as dissipline. Organisasies is, in effek, ‘n konglomoraat van werkeenhede gelei deur ‘n enkele gemeenskaplike visie en missie

Die vlak van prestasie wat enige organisatoriese werkeenheid bereik is, soortgelyk aan die prestasie van die individuele werknemer, die resultaat van die werking van ‘n komplekse identifiseerbare nomologiese network van latent veranderlikes wat die werkeenheid kenmerk en wat die die wyer organisatoriese omgewing waarin die eenheid opereer kenmerk. Intervensies gerig op die verbetering van die prestasie van ‘n organisatoriese werkseenheid, wat deur menslike hulpbronpraktisyns onderneem word, sal slegs slaag indien dit duidelik is wat die wesensaard van werkeenheidprestasie is, indien die determinante van werkeenheidprestasie geïdentifiseer is, indien daar ‘n geldige verstaan is van die wyse waarop hierdie determinante, direk en indirek die vlak van werkeenheidprestasie reguleer en indien ’n geldige en betroubare instrument ontwikkel is om werkeenheidprestasie te meet.

Die primêre oogmerk van hierdie studie was om die Performance Index (PI) van Spangenberg en Theron (2004) te hersien. Eerstens is alle latent organisatoriese werkeenheid-bevoegdheidspotensiaal latente veranderlikes uit die PI verwyder. Ten tweede is addisionele latente organisatoriese werkeenheidbevoegdhede en latente organisatoriese werkeenheiduitkomste voorgestel vir insluiting in die werkeenheidprestasiekonstruk. Hierdie hersiening van die PI se konseptualisering van organisatoriese werkeenheidprestasie het die ontwikkeling en validering van ‘n nuwe weergawe van die Performance Index [Work Unit Performance Questionnaire (WUPQ)] genoodsaak[1]. Die WUPQ bestaan uit twee subskale, naamlik die Work Unit

[1] Daar is besluit om nie die Engelse name van die instrument en sy subskale na Afrikaans te vertaal nie.

Competency Questionnaire (WUCQ) en die Work Unit Outcome Questionnaire (WUOQ).

Dit het daartoe gelei dat die Work Unit Competency Questionnaire, sewe latent werkeenheidbevoegdhede meet, naamlik *innovasie, poging, teenproduktiewe werksgedrag, organisatoriese burgergedrag, werknemer groengedrag, kern-mensprosesse en taakprestasie*. Voorts meet die Work Unit Outcome Questionnaire, ses latent werkeenheiduitkomste, naamlik *produksie en doelmatigheid, wekeenheidklimaat, werknemer-tevredenheid, markreputasie, prestasiekultuur en toekomstige groei.* Die Work Unit Performance Questionnaire meet gevolglik werkeenheidprestasie in terme van dertien werkeenheidprestasie-dimensies.

The WUCQ metingsmodel en die WUOQ metingsmodel het beide benaderde passing getoon. Twee faktorladings moes in die WUCQ metingsmodel ingeperk word om benaderde passing te kry. Die aanvanklike werkeenheidprestasie-strukturele model het nie gekonvergeer nie. Die problem is egter opgelos deur ‘n baan vanaf *prestasiekultuur* na *tevredenheid* in die strukturele model by te voeg. Die benaderde passing nulhipotese is verwerp ($p<.05$) maar redelike pasgehalte is vir die model in die steekproef gevind. Steun is vir 15 van die oorspronklike 21 baanspesifieke substantiewe hipoteses gevind en vir die addisionele hipotese. Praktiese implikasies word bespreek en voorstelle vir verdere navorsing word gemaak.

ACKNOWLEDGEMENTS

To complete a thesis of this magnitude requires the support of many people and it is important to sufficiently acknowledge the various different contributions.

Firstly, I would like to thank my academic mentor, Professor Callie Theron. Prof, your endless guidance and knowledge has been pivotal to the completion of this thesis. You have encouraged me to think critically and shaped my academic career.

I would further like to express my gratitude to my parents, Janice and Mark. This thesis required countless hours of dedication to complete and their support has given me the strength to ensure that it is done at the highest quality.

I would like to thank my partner, Tamryn. You have remained my foundation throughout the process of writing this thesis and your endless love has been something that I truly cherish.

Lastly, I would I like to thank all my friends and family that have had an influence or played any part in the writing of this thesis.

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CHAPTER 1

INTRODUCTION, RESEARCH OBJECTIVES AND STRUCTURE OF THE RESEARCH PROPOSAL

1.1 INTRODUCTION

Organisations are a created for a definitive purpose and goal. This man-made phenomenon has the task to provide society with products and services that sufficiently satisfy the needs of its people. In pursuit of this objective, an organisation has the duty to society of using the earth's finite and scarce resources in an efficient and effective manner.

This duty is defined in the economic principle that demands from organisations to achieve maximum economic utility from minimum input. Using the least amount of input, or factors of production, organisations have to create a product or service with the greatest amount of worth to society. The measure that serves as a barometer of the extent to which organisations in a capitalistic economic system successfully adhere to the economic principle, is profit. Profit, colloquially referred to as the bottom line, is defined as the difference between the capital input in the creation of a product or service and the monetary compensation offered in return by the customer, which in effect is society (Rädel & Reynders, 2004; Theron, 1999).

Thus, profit is a necessary but not a sufficient indicator of the extent to which organisations are succeeding in their attempt to serve mankind. At the same time profit can be considered a reward for the unavoidable risk incurred by entrepreneurs in the creation of ventures. However, a condition that must be met for profit to serve as a barometer of the rationality with which organisations serve society is that the business environment, in which the organisation operates, should be a free economic system that comprises of sophisticated, knowledgeable and rational consumers applying their reason in consumption decisions. The application of this ensures that the deserving organisations are adequately rewarded for their service to society (Rädel & Reynders, 2004; Theron, 1999).

The fight for an organisation to remain profitable has intensified considerably in the 21st century. The promise of new ventures that enter the market and current competitors that continually refine products, processes and services pose as a threat to an organisation's competitive advantage. Therefore, organisations must both incrementally improve their products and services and introduce innovations to remain relevant.

However, to propose that organisations successfully serve society in the creation of products and services through the use of finite resources as long as they generate profit is both short-sighted and ignorant. In the long-term interest of society, profit needs to be generated under specific *provisos*. Therefore, contrasting the previously mentioned traditional bottom line, the triple bottom line, commonly known as the Three-P model, has been conceptualised to fully illustrate the moral and ethical responsibilities that organisations have towards society. The three considerations in the model are profit, people and the planet (Elkington, 1998; Slaper & Hall, 2011).

The moral responsibility of profit through the efficient use of resources has been sufficiently expressed above and therefore will not be discussed further. The second notion of organisational responsibility is the duty of organisations to the people within a society. This ethical consideration extends to both their employees and to the greater society. Organisations, as employers, have the obligation to promote employee wellbeing and consider man to be more than a mere factor of production or a means to an end. Further, individuals in the wider society must be served by organisations through the attempt of addressing societal concerns such as unemployment and a low number of skilled workers (Elkington, 1998; Slaper & Hall, 2011).

Lastly, organisations have a moral duty to the planet. Through the consumption of finite and scarce resources in the production process, the responsibility exists for organisations to use these limited resources frugally for products that indisputably serve the non-trivial needs of society and do not exploit or abuse the earth unnecessarily through their production process. The idea that the planet must be protected and conserved for future generations must remain prominent in an organisation's operations (Elkington, 1998; Slaper & Hall, 2011).

This proposed notion of a triple bottom line has been promoted through various initiatives and laws. The most prominent of which is the Report on Governance in

South Africa (King III). The King III was created with the broad intention of enhancing the positive economic effects that an organisation has in the community and reducing the negative effects. The report has become so widely accepted that it is a requirement for listed organisations on the Johannesburg Stock Exchange to comply with the principles identified in the report (King Committee on Governance, 2009). Further, many organisations have endorsed the greater responsibility imposed on them by the triple bottom line and have provided an annual sustainability report.

In order to operate successfully and to achieve the triple bottom line, organisations consist of an array of mutually coordinated activities that need to be performed through a system of inter-related organisational functions. The efficient and competent running of these reciprocal organisational functions is a prerequisite in the attainment of the primary organisational objectives.

The human resource function (HR) represents one of these functions. The contribution made by this function, through an integrated array of efficient human resource interventions and labour practices, to the organisational aspirations, expressed in the triple bottom line, is of great importance. This importance derives from the fact that the labour present in organisations is considered the pivotal factor of production. This notion is based on the fact that the optimal utilisation of all the resources in the production process is dependent on the performance of the work force (Theron, 1999).

Individual employees are employed in specific jobs that are, in turn, created to achieve particular outcomes. To achieve these outcomes, specific tasks need to be performed adequately. Individual employee performance is consequently conceptualised in terms of a structural inter-related set of latent behavioural competencies, structurally mapped onto a structurally inter-related set of latent outcome variables (Myburgh, 2013).

The level of performance, conceptualised in this manner, that individual employees achieve, is not the outcome of a random event. Rather it is determined by a complex nomological network of latent variables characterising the employee and his/her working environment. In order to optimise the performance of individual employees in the workplace, the human resource function consequently must attempt to ensure that the characteristics of the employee and the characteristics of the organisational context that affect performance are at their optimal levels. This ideal is pursued through firstly identifying these aforementioned variables and the manner in which they structurally combine to affect performance. Secondly through implementing an integrated system of flow and stock interventions that attempt to affect the level of the determining person qualities and environmental qualities so as to enhance performance to ultimately serve the triple bottom line (Milkovich, Boudreau & Milkovich, 2008). This shows the important role of the human resource function in the achievement of the organisational aspirations via its impact on the performance of individual employees.

In the past, these interventions have concentrated their effort towards measuring and improving the performance of the individual employee in the workplace, with little attention given to the understanding, monitoring and improvement of the performance of the work unit (Christensen, 2006; Gelade & Ivery, 2003).

1.2 THE IMPORTANCE OF THE WORK UNIT

The work unit is conceptualised as a temporary or permanent organisational entity that operates in a private, state-owned or not-for-profit organisation. The size of these work units varies from a small team consisting of a leader and three subordinates to a department within a company that is comprised of a large number of individuals (Spangenberg & Theron, 2004).

Like the jobs of individual employees, organisational work units are created to achieve specific outcomes. To achieve these outcomes, work units need to perform specific tasks. Work unit performance can consequently also be conceptualised in terms of a structurally inter-related set of latent behavioural competencies, structurally mapped onto a structurally inter-related set of latent outcome variables. However, the latent behavioural competencies “displayed” by the work unit and the latent outcome variables “achieved” by the work unit should now be interpreted as the aggregate of the behaviour and achievements of its members. The organisational work unit does not exist independently of the actions of its members.

Although work units compromise of individuals, the level of performance that is achieved by an organisational work unit nonetheless is not simply determined by the sum of the individual performance levels achieved by the unit members. Although satisfactory individual performance is a precondition for sufficient work unit performance, a number of individually talented members present in a work unit does not guarantee superior performance from the group as a whole. A synergy exists. There are many relevant examples of units or teams in the areas of business or sport, compiled of individuals that are regarded as having standard abilities, that nonetheless achieve extraordinary results. The performance of the unit is greater than the sum of the performance of its parts.

The level of performance a work unit achieves also cannot be considered the outcome of a series of random events. Rather, as was argued with regards to individual employee performance, the level of performance any organisational work unit achieves is similarly the result of the operation of a complex identifiable nomological network of latent variables characterising the unit and the wider organisational context in which it operates. Interventions conducted by human resource practitioners aimed at enhancing the performance of the work unit will only succeed if it is clear what constitutes work unit-performance, if the determinants of the work unit performance are established, if the manner in which the determinant structurally combine to affect performance is validly understood and if a valid, reliable and unbiased instrument has been developed to measure work unit performance.

The gap in the understanding of the performance in the work unit is considered a major flaw in the discipline of industrial psychology. Organisations, in effect, are a conglomeration of work units that are guided by a single vision and mission (Spangenberg & Theron, 2004). To efficiently and effectively achieve the goal of the organisation, all work units need to perform at a satisfactory level. No individual or group of individuals working alone can successfully produce the required operations for an organisation to operate successfully.

Spangenberg and Theron (2004) have pioneered research on the conceptualisation of work unit performance based on the work done by Nicholson and Brenner (1994) and Cockerill, Schroder and Hunt (1993). The Nicholson and Brenner (1994) conceptualisation of work unit performance comprised of four unit performance dimensions, namely wealth, markets adaptability and climate. The Cockerill *et al*. (1993) conceptualisation of work unit performance also comprised of four unit performance dimensions, namely output, climate, adaptability and resource input. Spangenberg and Theron (2004) were of the opinion that neither the Nicholson and Brenner (1994) nor the Cockerill *et al*. (1993) conceptualisation explicated the full connotative meaning of the unit performance construct. They defined work unit performance in terms of eight performance dimensions. In addition to this conceptualisation, the Performance Index (PI) was proposed as a generic measure of organisational unit performance (Henning, Spangenberg & Theron, 2004). Based on this, a partial competency model was developed by Henning *et al*. (2004) that was claimed to reflect the internal structure of the organisational work unit performance construct. However, the current study would want to suggest that the Henning *et al*. (2004) model does not provide a sufficient representation of the organisational work unit performance construct.

The PI structural model was meant to reflect the generic latent behavioural competencies and generic latent outcome variables in terms of which the performance of any organisational work unit could be evaluated. However, this ideal was not achieved. At the same time the need for a comprehensive organisational unit competency model that describes the manner in which latent organisational unit competency potential variables and latent situational variables are structurally related to the latent organisational unit competencies and finally, illustrates how the latent organisational unit competencies are structurally related to the latent organisational unit outcomes still exists (Theron & Spangenberg, 2016). The current PI performance model seems to incorrectly incorporate a limited number of latent variables from the domain of latent organisational unit competency potential variables, and to correctly incorporate latent variables from the domain of latent behavioural competencies and the domain of latent outcome variables but fails to fully represent the latter two domains. Neither does the current PI performance model formally distinguish between the competency and outcome domains. This shortcoming can be attributed to the fact that Spangenberg and Theron (2004) never looked at organisational work unit performance through the lens of competency modelling.

A revision of the PI's conceptualisation of organisational unit performance is therefore required. More specifically, all latent organisational work unit competency potential variables have to be removed from the organisational unit performance model[2] and the failure of the current model to acknowledge all relevant latent organisational unit competencies and latent organisational unit outcome variables needs to be corrected. A revision of the PI's conceptualisation of organisational unit performance would invariably necessitate the development and validation of a new version of the Performance Index (the Work Unit Performance Questionnaire (WUPQ)) comprising of two subscales, namely the Work Unit Competency Questionnaire (WUCQ) and the Work Unit Outcome Questionnaire (WUOQ).

1.3 RESEARCH INITIATING QUESTION

The research initiating question is therefore the three-pronged question of (a) what the connotative meaning of the organisational work unit performance construct is, (b) what the denotative meaning of the organisational work unit performance construct is and (c) whether the WUPQ provides a reliable and construct valid measure of the latent behavioural work unit competencies and latent work unit outcomes?

The research-initiating question is deliberately stated as an open-ended question. By having an open-ended question that sets the research in motion, the likelihood increases that the literature study will be used to creatively, in a problem-solving manner, build-up the connotative meaning of the work unit performance construct. Instead of committing to a specific constitutive definition of work unit performance upfront the latent work unit performance dimensions now have to earn their inclusion in the work unit performance construct through the process of theorising. Moreover, the connotative meaning is explicated by theorising specific structural relations between the latent organisational unit competencies, between the latent organisational unit outcome variables and between the latent organisational unit competencies and the latent organisational unit outcome variables.

[2] The latent organisational work unit competency potential variables that were removed from the PI's conceptualisation of organisational unit performance will be held on ice for consideration for inclusion into the organisational work unit competency model.

1.4 RESEARCH OBJECTIVES

The current research focuses on the conceptualisation and operationalisation of the organisational work unit performance construct. The research objective consists of the following seven parts namely to:

- Explicate the connotative meaning of the organisational unit performance construct (this translates to a partial competency model which structurally maps the latent behavioural unit competencies on the latent unit outcomes);
- Explicate the denotations of the organisational unit performance construct (specifically of the latent behavioural unit competencies and the latent unit outcomes);
- Develop a unit performance competency questionnaire [the Work Unit Competency Questionnaire (WUCQ)];
- Empirically test the reliability and construct validity of the WUCQ by fitting the WUCQ measurement model;
- Develop a unit performance outcome questionnaire [the Work Unit Outcome Questionnaire (WUOQ)];
- Empirically test the reliability and construct validity of the WUOQ by fitting the WUOQ measurement model; and
- Empirically test the construct validity of the WUCQ and the WUOQ by fitting the structural model that maps the latent behavioural unit competencies on the latent unit outcomes.

1.5 OUTLINE OF THE STRUCTURE OF THE RESEARCH PROPOSAL

The thesis consists of six chapters and represents an attempt to convincingly motivate the research objective, to develop an in-depth and holistic conceptualisation of the organisational unit performance construct, to argue the objectivity of the methodology that will be used to evaluate the psychometric credentials of the WUPQ, to explicate the results and the practical and future research implications of the expected results. The thesis needs to develop, describe and motivate a study that will provide the greatest opportunity to obtain a valid answer to the research-initiating questions.

Chapter 2 provides an analysis of previous literature on work unit performance in the form of a literature study. The analysis will consider relevant models, theories and viewpoints pertaining to work unit performance. Initially, the conceptualisation of the organisational work unit performance construct proposed by Spangenberg and Theron (2004) in terms of eight dimensions will be examined.

Moreover, the Performance Index, a standardised measure of organisational work unit performance, is placed under scrutiny. Further in Chapter 2, a model of particular importance to the study of work unit performance: an organisational work unit performance model developed by Henning *et al*. (2004) is evaluated. The evaluation consists of initially categorising the existing dimensions and, once achieved, new dimensions are suggested. Cause and effect relationships between these dimensions are inferred and this culminates into a proposed organisational work unit performance structural model.

Chapter 3 describes the methodology used in the development of a Work Unit Performance Questionnaire (WUPQ) suitable for measuring the unit performance construct as conceptualised in Chapter 2 in work units in organisations, and finally, the process of validating the instrument by fitting the measurement models and structural model to the data collected on the instrument.

Research in the social sciences will inevitably have ethical considerations. Chapter 4 provides an evaluation of the ethical risks associated with this thesis. Chapter 5 illustrates the results of the various analyses that were conducted. Finally, Chapter 6 provides a brief summary of the study and the results, lists the main limitations of the study, implications for the field of Industrial Psychology and the recommendations for future research.

CHAPTER 2
LITERATURE REVIEW

2.1 INTRODUCTION

The long-term objective of the research described in this thesis is to develop a comprehensive competency model of the work unit. The objective of the current research study reported in this thesis is to develop an organisational work unit performance model that depicts the structural linkages existing between the competencies and outcomes constituting organisational work unit performance. It has been realised that the past attempts (specifically the attempts by Henning *et al.*, 2004 and Spangenberg & Theron, 2004) to create such a model that fully explicates work unit performance fell short in that it did not fully acknowledge that performance should be conceptualised in terms of both behavioural and outcome latent variables. Moreover, their attempts failed to provide a sufficiently comprehensive coverage of the behavioural and outcome latent variables that constitute organisational unit performance. In addition, they seem to have included competency potential latent variables that determine, rather than characterise, unit performance in their model. Henning *et al*. (2004) and Spangenberg and Theron (2004) therefore failed to sufficiently carefully distinguish between the three domains constituting a competency model in the sense that the current study interprets the term.

An attempt will be made in the current study to rectify these shortcomings by initially grouping the dimensions currently considered by the PI competency model into the correct domain as either an outcome, a competency or a competency potential latent variable. Further, in light of the current studies aim to contribute to the creation of a fully-fledged organisational work unit competency model that explicitly acknowledges the three content domains, new competencies and outcomes will be suggested for the underrepresented domains.

The concepts of a structural model and competency model are central to the achievement of the long-term objective as described about. A competency model as interpreted in the current study is essentially a structural model comprising of three categories of constructs. Constructs and their meaning are therefore discussed first.

Once this is understood, three categories of constructs that are central to competency modelling are briefly explained and defined, namely competency potential, competencies and outcomes. Further, the constitutive definitions of these form the basis of the subsequent critical analysis of the Spangenberg and Theron (2004) conceptualisation of organisational unit performance. This provided the foundation of the analysis on the appropriateness of the organisational unit performance dimensions currently included in the Performance Index and the suggested new latent variables that ought to be included in the competency and outcome domains.

Grounded in the definition of competency potential, competencies and outcomes, the current study's interpretation of a competency model and competency modelling is then explicated.

2.2 CONSTRUCTS

Constructs are pivotal to the study of social sciences for numerous reasons. Firstly, in their purest form and most basic function, constructs form the basis of man's[3] attempts to provide meaning and make sense of the daily occurrences that occur in his or her World 1 (Babbie & Mouton, 2001) through his fluid intelligence or abstract thinking ability. Without constructs, everything that occurs in the world would be experienced as a bewildering, meaningless, chaotic cacophony of sensations and man would be unable to operate in or with the world he lives in. Constructs are abstractions of one or more common (or shared) themes shared by a collection of observable phenomena or experiences in World 1 (Kerlinger & Lee, 2001; Mouton & Marais, 1985).

Consequentially, as man creates constructs as thought objects to intellectually bring order to his experience of World 1, they do not physically exist (Kerlinger & Lee, 2001). Constructs exist as abstract thought objects in Babbie and Mouton's (2001) World 2. However, that in nature, which the construct is created to represent, is very real and present. This notion of representation is easy to conceive in more simple representations such as water or wind. However, when constructs are considered on more of an abstract level, the level of complexity and difficulty of understanding greatly

[3] The term man and the phrase working man is used in the current study as a gender neutral term to refer to any member of the species *homo sapiens* or to all the members of this species collectively.

increases. This aforementioned complexity is especially prominent in the social sciences when topics such as adaptability or innovation are considered. Nonetheless the observable denotations of constructs created by man's fluid intelligence in World 2 (Babbie & Mouton, 2001) exist in World 1 even for these more abstract constructs.

The researcher in the social sciences has the objective of explaining phenomena that occur in human functioning in World 1 in terms of the structural relations that exist between constructs in World 2 (Babbie & Mouton, 2001). The manner in which this is achieved is through employing these constructs in the process of theorising to develop hypotheses on the nature of the structural relationships that exist between these constructs that determine the phenomenon as a whole. Thus, the process of structural modelling (Diamantopoulos & Siguaw, 2000) is key in the attempt to discover and express these complex relationships.

In the process of forming a nomological net of relationships between constructs that forms the phenomenon as a whole, the two dimensions of meaning of constructs must be understood and applied correctly. These two dimensions of meaning are the connotative and the denotative dimension of meaning (Mouton & Marais, 1985).

Firstly, the connotative meaning of a construct refers to that in which a person has in mind when using a construct. It is the intellectual idea that constitutes the construct that is represented by words that refer to the construct (Mouton & Marais, 1985). To fully explicate the connotative meaning of a construct it is necessary to look at the various definitions of the construct via a literature study and to review the manner in which people use the construct in language in relation to other constructs. The connotative meaning of a construct is captured in (or explicated by) a constitutive definition. The constitutive definition should clarify the internal structure of the construct and the manner in which the construct is embedded in a larger nomological network of constructs (Kerlinger & Lee, 2001). It is important to emphasise that constructs do not have an absolute meaning. There is no universal dictionary that provides the definitive constitutive definition of constructs. Constructs are constructed by the abstract thinking capacity of man and are attributed a specific connotative meaning that can differ across individuals. The manner in which constructs are constitutively defined constrain/restrict the manner in which the construct is used in language.

The creation of a comprehensive organisational work unit performance model[4] in essence, therefore, entails explicating the connotative meaning of the performance construct by describing the internal structure of the organisational work unit performance construct. The creation of a comprehensive organisational work unit competency model in turn further explicates the connotative meaning of the performance construct by describing the manner in which the organisational work unit performance construct is embedded in a large nomological network of latent variables characterising the unit and the broader organisational context.

Secondly, the denotative meaning of a construct is an important consideration in the creation of a comprehensive organisational work unit performance model. The denotative meaning refers to the observable events or behaviours that represent a construct as it is constitutively defined and the conditions or situations that affect the level of the construct (Kerlinger & Lee, 2001). The denotations of a construct are those observable behaviours, events or situations in which the construct observably expresses itself or it represents the situations or conditions that affect the level of the construct.

The denotations of a construct are used in a practice that is commonly referred to as operationalisation. This process creates operational definitions indicating the operations or activities necessary to obtain an empirical grasp on the construct as constitutively defined. An empirical grasp can be obtained on a construct either through experimental manipulation or through measurement. Experimental operational definitions specify how an empirical grasp can be obtained on a construct by experimentally manipulating situations or conditions that affect the level of the construct. Measured operational definitions specify how an empirical grasp can be obtained on a construct by eliciting, through stimuli, observable behaviour in which the level of the construct expresses itself (Theron, 1999). Naturally, as the

[4] The term *organisational work unit performance model* will be reserved to refer to the partial competency model that explicates only the competencies and outcomes that constitute organisational unit performance. The term *organisational work unit competency model* will be reserved to refer to the model that describes the psychological mechanism that regulates the level of performance that organisational work units achieve.

multidimensional work unit performance construct needs to be measured to provide empirical evidence on units' standing on the construct, operationalisation is a vital process by which a construct is measured indirectly through the appropriate denotations of the construct. It therefore follows that the explication of an adequate denotative meaning of the organisational work unit competencies and performance constructs is a necessary condition to allow the operationalisation of the construct and to obtain the necessary success in gaining empirical evidence on organisational work units' standing on the performance construct (Kerlinger & Lee, 2001).

2.3 COMPETENCIES, COMPETENCY POTENTIAL AND OUTCOMES

It is imperative, as indicated in the aforementioned reasoning, to gain an understanding of the core constructs used in the construction of a competency model as they play a pivotal role in this research proposal. Using the aforementioned line of reasoning to gain an understanding of the connotative meaning of a construct, it is necessary to consult the literature on competency modelling and to gain a comprehensive understanding of the manner in which the core constructs are used in language. With the aid of the previous research and conceptualisation of the construct, one can create a well-researched comprehensive definition that can be used throughout the current study.

Interestingly, when referring to the literature on competencies, it seems that two conceptually different viewpoint exists on what constitutes competencies. These differing viewpoints seem to correlate with the geographical origin of the definition. The conceptualisation of competencies more specifically seems to depend on whether they originate from the United States of America (USA) or whether they stem from the United Kingdom (UK) (Cheng, Dainty & Moore, 2003).

It is hoped that by acknowledging both, it will be possible to use the contributions of both viewpoints without ignoring a facet that may be exclusive to either source. Further, the differing views proposed by the literature can assist in understanding the domains of the competency model.

Firstly, the researchers from the USA tend to consider competencies to be attributes that are causally related to success (Boyatzis, 1982; Campion, Fink, Ruggeberh, Carr, Phillips & Odman, 2011; Klemp, 1980). Researchers from the UK in contrast refer to the same construct as competency potential latent variables. An example of such a definition that alludes completely to the attributes of a person is that of Klemp (1980, p. 21) in which he views a job competency as an 'underlying characteristic of a person which results in effective or superior performance on a job'. In the current study, it is not characteristics of individuals that are of interest but rather the characteristics of individuals as a collective which are working together as a unit towards shared organisational unit objectives.

Contrary to the definitions of competencies suggested by the USA, the UK definition and understanding of a competency considers the construct to be the abstract theme shared by a bundle of related behaviours that are casually related to success (Bartram, 2006; Bartram, Robertson & Callinan, 2002; SHL, 2011). This view is illustrated in the definition that is used by Saville and Holdsworth (SHL), in which Bartram (2006, p. 2), refers to competencies as a 'set of behaviours that are instrumental in the delivery of desired results or outcomes'.

Using the insight gained from both viewpoints, the definition of competencies, that forms the basis for the study, is that of Spangenberg and Theron (2016) which stipulates:

> competencies are sets of related behaviour, arising from underlying aspects of the individual which are determinants of success … as they are focused on what people do, competency based approaches have the potential to offer a clear and integrated set of dimensions against which performance can be measured.

For the purpose of this study, a variation of the aforementioned definition of competencies is employed. This varied definition is used so as to acknowledge that competencies refer to the abstract theme shared by a bundle of related behaviours displayed by an organisational unit and thus are constructs, that the level of competence achieved on competencies is determined by organisational unit characteristics (competency potential) and that the level of competence achieved on the competencies determine the extent to which the outcomes are achieved for which the unit exists. The current study therefore defines competencies as follows:

> Competencies are the abstract themes in distinct bundles of related observable organisational work unit behaviour, driven by a nomological network of organisational work unit characteristics, situational characteristics and unit*situation characteristics latent interaction effects, which, when exhibited, would constitute high organisational work unit performance and would probably, depending on situational constraints/opportunities lead to organisational work unit success defined in terms of outcomes for which the unit exists.

It is important to note that, according to the current study, the construct of competencies does not embrace both characteristics and behaviour. It refers to one or the other and neither interpretation is inherently wrong or deficient. Both interpretations add value. A model that attempts to describe and explain work unit performance that excludes either of the two interpretations would be deficient. A choice therefore had to be made for one interpretation under the name competencies and the other interpretation had to be re-christened with a new term. Allowing the construct of competencies to refer to both behaviours and outcomes, in turn, would squander the explanatory opportunity that the distinction offers.

The current study follows the UK tradition to refer to the characteristics that allow the agent (in this case the organisational work unit but in other cases the individual employee) to display a specific level of competence on the competencies as competency potential latent variables (Bartram, 2006). Competency potential latent variables in the current study therefore refer to relatively malleable and less easily malleable characteristics of the work unit that affect the level of competence that the unit displays on the competencies comprising organisational work unit performance.

Organisational work units exist to achieve specific outcomes. The level of competence that organisational work units achieve on the competencies determine the degree of success that they achieve on these outcome latent variables. The latent outcome variables therefore represent the results that the organisational work unit is held accountable for. Organisational work unit performance is constituted by the extent to which the outcomes the organisational work unit is held accountable for is achieved in conjunction with the level of competence that the unit displays on the competencies that are instrumental in the attainments of the outcomes.

2.4 COMPETENCY MODEL

Industrial psychology is the study of working man, both as individual employee and as a collective, that attempts to explain and potentially change his behaviour. However, the behaviour of man is complexly determined and therefore never fully predictable; it is widely accepted in the field (e.g. Cilliers, 1998) that the pursuit of a perfect, complete explanation of working man's behaviour is an ideal that is to be considered unobtainable.

That is not to consider the study of human nature and working man to be fruitless. As a science, we have succeeded and continue to succeed in gaining approximations of the nomological net of latent variables that underpin behaviour that are to be considered satisfactory for the objective of influencing the behaviour of working man. Man can, however, only improve his ability to derive interventions that will successfully affect the performance of working man to the extent that he can extend his understanding of the vast and complex nomological net that regulates the level of performance that individual employees and organisational work units achieve. More penetrating insight into the various constructs which form the psychological mechanism that regulates the level of performance has to be sought as well as the nature of the structural relationships that exist between the various constructs so as to understand the working of the psychological mechanism in its entirety. Of importance is the fact that the understanding of the psychological mechanism lies spread across all the components (i.e. constructs) and structural relations comprising the mechanism (Cilliers, 1998). Omission of components and/or structural relations therefore invariably mean a loss in meaning or understanding and a concomitant loss in control.

The study of the social sciences has created and adopted many procedures and methods that allow the researcher the greatest opportunity to gain an understanding of human behaviour. Structural equation modelling (Gefen, Straub & Boudreau, 2000; Hox & Bechger. 1998) is one of these aforementioned procedures that is widely employed and has been proven to provide a large amount of insight. The value of structural equation modelling lies firstly in the fact that it promotes the construction of psychological mechanisms in explanatory research. Its value secondly lies in the fact that it permits the empirical evaluation of complex hypotheses on the nature of the psychological mechanism as integrated entities. Structural equation modelling therefore explicitly acknowledges that the understanding of the psychological mechanism lies spread across all the components (i.e. constructs) and structural relations comprising the mechanism (Cilliers, 1998). In addition, it allows complex hypothesised relationships between latent variables to be studied rather than the corresponding relationships between fallible measures of the latent variables (Diamantopoulos & Siguaw, 2009). Acknowledging this success and these advantages, it will be used extensively in this research.

Essentially, a structural model is used to explain a phenomenon that is observed in reality (i.e., in Babbie and Mouton's (2001) World 1). It is appreciated that activities and events, especially in the social sciences and industrial psychology, are not random but are as a result of a large number of inter-related cause and effect relationships. These relationships, many of which are unknown to man, are essential to the understanding of the phenomenon of interest (Babbie & Mouton, 2001; Diamantopoulos & Siguaw, 2009). A structural model is therefore essentially a stance on what the nomological net underpinning performance looks like, or stated differently, an illustration of a psychological mechanism that is capable of regulating the levels of the latent variables constituting the performance construct[5].

A structural model consists of a large number of constructs (or latent variables) that represents each factor in the previously mentioned cause and effect relationships that comprise the psychological mechanism that regulates the phenomenon of interest. These constructs can be categorised into exogenous variables, namely variables that purely act as causes in the structural model, and endogenous variables that act both as cause and dependent variables in the structural model (Diamantopoulos & Siguaw, 2009). A major advantage of structural equation modelling as a statistical technique, is that it allows the empirical testing of hypotheses that postulate structural (i.e., causal) relationships between endogenous latent variables (Diamantopoulos & Siguaw, 2009).

[5] It is acknowledged, given Popper's (1972) falsification principle, that a definite claim on the nature of the nomological net underpinning performance is not possible. At best it can be claimed that a specific stance on what the nomological net looks like is valid (i.e. permissible) because it survived an opportunity to be falsified.

Competency modelling, as interpreted in the current study, is a form of structural modelling that describes what is meant to successfully complete a job and that explains what determines the degree of success that is achieved (Myburgh, 2013). In addition to explicating the internal structure of the performance construct, the model suggests the necessary person qualities and environmental conditions that are required to adequately complete a job. These previously explicated components of a competency model can be categorised into four differing structurally inter-related domains namely; situational latent variables, competency potential latent variables, competency latent variables and outcome latent variables.

For the purpose of the research proposal, the conceptualisation by SHL (2011, p. 6) of a competency model will be utilised as basis of the current study's conceptualisation of a competency model:

> A model of performance at work that defines the relationship between competency potential, competency requirements and competencies themselves. 'Competencies' are defined as behaviours that support the attainment of organisational objectives. 'Competency potential' is seen to derive from individual dispositions and attainments and 'competency requirements' refer both to facilitators of and barriers to effective performance in the workplace.

The SHL 2011 and Bartram (2005 & 2006) conceptualisation of a competency model essentially thought of the various domains as comprising of lists of characteristics, behaviours and outcomes. The emphasis that the current study places on the structural relations existing between various elements within a specific domain as well as between domains did not form part of the original SHL thinking on competency models. Therefore, using the above definition as basis, but integrating it with the concept of structural equation modelling (Diamantopoulos & Siguaw, 2009; Du Toit & Du Toit, 2001), a competency model is a set of structurally related competency potential latent variables that affect a set of structurally related competency latent variables, which in turn, affect a set of structurally related outcome latent variables. Further, the effect of the competency potential variables on the competency latent variable and the competency latent variable on the outcome latent variable is moderated by situational characteristics. Situational characteristics are finally also allowed to exert main effects on the competency potential latent variables and latent outcome variables.

Competency modelling refers to the act of developing and empirically testing the validity of the model by testing the fit of the model and the statistical significance of the hypothesised structural linkages.

Whilst the latent variables in the competency model can be categorised into four differing domains, it is the fact that these latent variables within and across the domains are structurally related in a richly interconnected manner in which they impact on each other in cause and effect relationships that prevents the location of the understanding of performance in any specific latent variable or structural linkage. The totality of a model is of critical importance to fully understand a phenomenon as each latent variable and each structural linkage is a necessary but not sufficient component to describe the working of the psychological mechanism that plays a unique role in the dynamic of the mechanism. Thus, the entirety, structural interrelatedness and comprehensiveness of the competency model is what gives the model its value.

A basic representation of this relationship is presented below in Figure 2.1.

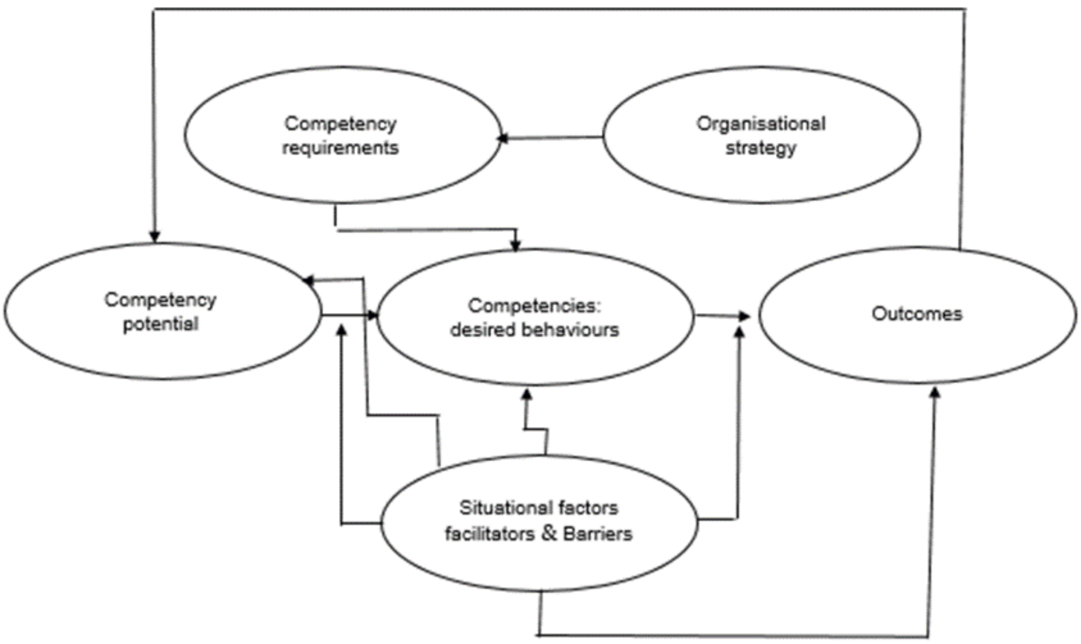

***Figure 2.1.* Basic representation of competency modelling**

2.5 PERFORMANCE

To understand the concept of performance it is necessary to gain an understanding of its connotative meaning. Like in the case of the previous constructs that were discussed, the literature pertaining to performance must be referred to. This will encourage a comprehensive understanding and reinforce the conceptualisation.

Myburgh and Theron (2014) argue that definitions of job performance generally do not define performance as a construct that includes both a behavioural domain and an outcome domain. Definitions of job performance tend to focus exclusively on either the behavioural or the outcome domain. An example of such a definition that does not include both the behavioural and the outcome domain but focuses on the behavioural is that of Campbell and Wiernik (2015, p. 2) whom state that “performance is defined as things people actually do, actions they take, that contribute to the organisations goals”.

Myburgh and Theron (2014) further suggested that the definitions of performance do, however, often hint at the other neglected domain. In the analysis of the literature, the work of Viswesvaran and Ones (2000) is an example of this and is considered to be pivotal in the research of job performance. They suggest job performance to be “scalable actions, behaviours and outcomes that employees engage in or bring about that are linked with and contribute to the organisational goals” (Viswesvaran & Ones, 2000, p. 216). This definition is important for the current study as it suggests that performance must be related and linked to organisational goals. Further, the definition suggests that these are scalable, meaning that they can be measured and therefore, a competency model can be empirically tested.

Individual employees and organisational work units serve these organisational goals through the achievement of specific outcome variables. Individual jobs and organisational work units are created to achieve specific results. It therefore seems problematic when reflecting on the success with which individual employees perform their jobs or the success with witch organisational work units’ function to only focus on the level of competence that they achieve on the competencies (i.e. the scalable actions) that are instrumental in the achievement of the results or outcomes but not on the outcome themselves.

Consequently, Myburgh and Theron (2014, p. 30) define (individual employee) job performance more extensively to include both the outcomes that are to be achieved and the competencies that are instrumental in their achievement:

> Performance is the nomological network of structural relations existing between an interrelated set of latent behavioural performance dimensions (abstract representations of bundles of related observable behaviour) and an interrelated set of latent outcome variables valued by the organisation, and that contribute to organizational goals.

In terms of Myburgh and Theron's (2014) conceptualisation of (individual employee) performance the construct should be thought of as a partial competency model. The Myburgh and Theron (2014) definition forms the basis of this study's conceptualisation of work unit performance. Therefore, organisational work unit performance is conceptualised as a nomological network of structurally interrelated set of organisational unit competencies that has a cause-and-effect relationship with a nomological set of organisational unit outcomes.

2.6 THE PERFORMANCE INDEX

The aspiration to create a work unit competency model has a long history of cumulative research. The Performance Index was developed by Spangenberg and Theron (2004) as a generic questionnaire to measure organisational work unit performance. The PI was created using the previous research of Nicholson and Brenner's (1994) perceived organisational performance that is based on the systems model and the Unit Performance Questionnaire developed by Cockerill, Schroder and Hunt (1993).

The index was aimed at creating a measure that is applicable to various different work units within a single organisation and across different organisations and industries (Spangenberg & Theron, 2004). The PI questionnaire attempted to incorporate all the performance dimensions that the unit leader is held accountable for or on which performance management interventions should aim to impact. This is, however, exactly where the PI failed due to its inability to approach the question on organisational unit performance from a competency modelling perspective.

The eight performance dimensions that the PI suggested should constitute the performance construct (Spangenberg & Theron, 2004) and a brief constitutive definition of each dimension is provided in Table 2.1.

Table 2.1.

The performance dimensions of the Performance Index

Dimension	Summary
Production and efficiency	Quantitative outputs such as meeting goals, quantity, quality and cost-effectiveness, and task performance.
Core people processes	Organisational effectiveness criteria such as goals and work plans, communication, organisational interaction, conflict management, productive clashing of ideas, integrity and uniqueness of the individual or group, learning through feedback and rewarding performance.
Work unit climate	Psychological environment of the unit, and gives an overall assessment of the integration, commitment and cohesion of the unit. It includes working atmosphere, teamwork, work group cohesion, agreement on core values and consensus regarding the vision, achievement-related attitudes and behaviours and commitment to the unit.
Employee satisfaction	Satisfaction with the task and work context, empowerment, and career progress, as well as with outcomes of leadership
Adaptability	Flexibility of the unit's management and administrative systems, core processes and structures, capability to develop new products or services and versatility of staff and technology. Overall, it reflects the capacity of the unit to appropriately and expeditiously change.
Capacity	Internal strength of the unit, financial resources, profits and investment, physical assets and materials supply and quality and diversity of staff.
Market share/standing	Market share, competitiveness and market-directed diversity of products or services, customer satisfaction and reputation for adding value to the organisation
Future growth	Index of projected future performance and includes profits and market share, capital investment, staff levels and expansion of the unit.

(Spangenberg & Theron, 2004, p. 23)

Given the nature of the research objective, the work on the PI is pivotal in the current research study. The aforementioned dimensions identified by Spangenberg and Theron (2004) will form the basis of the creation of an organisational work unit competency model. The shortcomings in the PI were attributed to the failure of the developers of the PI to view organisational unit performance and its determinants through competency modelling lens. To correct the shortcomings in the PI, the current PI dimensions were consequently categorised into the four domains comprising a competency model and once completed, the question was considered whether any additional organisational work unit competencies and organisational work unit outcomes needed to be suggested.

Recognising that the connotative meaning of a construct lies in the internal structure attributed to the construct Spangenberg and Theron (2004) suggested that future research on the PI should propose and empirically test a structural model that explicated the manner in which the work unit performance dimensions, directly and indirectly, affect each other as a means to improve the understanding of the work unit performance construct. The suggestion was accepted by Henning (2002) and formed the basis of her master's research project[6]. The study conducted by Henning (2002) aimed to establish the nature of the causal linkages between the eight unit dimensions identified in the PI. The manner in which the dimensions were hypothesised to be directly or indirectly dependent on each other is shown in Figure 2.2.

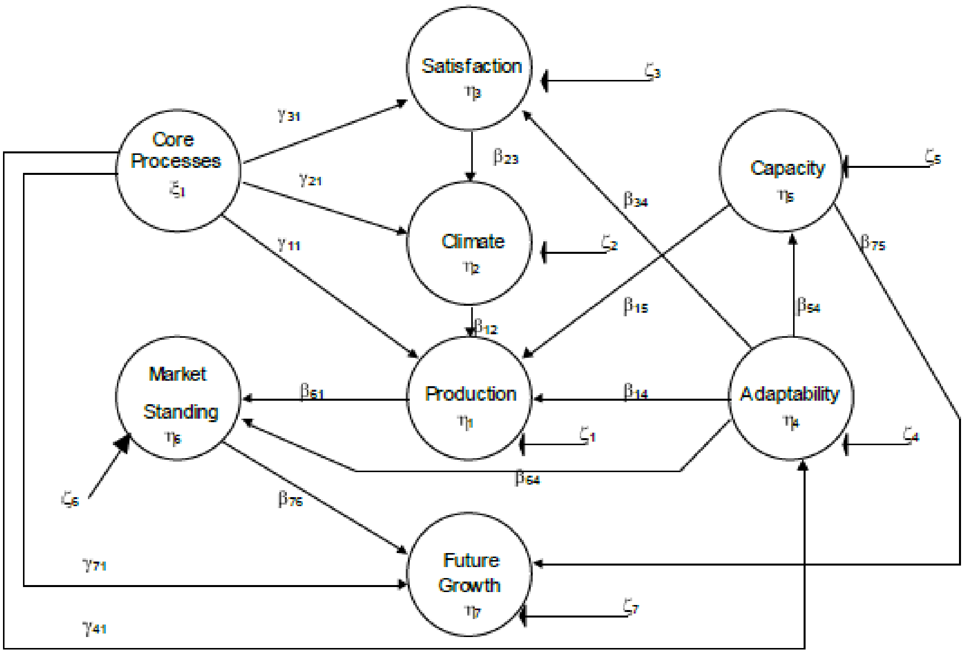

Figure 2.2. **The Work Unit Performance structural model**
(Henning *et al.,* 2004, p. 37)

[6] Although the publication of the development and validation of the PI only occurred in 2004 the work on the development and validation of the PI occurred before 2002.

Although it was the intention of Spangenberg and Theron (2004), Henning *et al*. (2004) and Theron, Spangenberg and Henning (2004) to create an organisational work unit performance model that fully acknowledges all the relevant performance dimension on which the performance of a work unit should be evaluated, they never fully achieved this objective due to the authors ignoring the insight brought by a competency modelling approach. Moreover, their long-term intention, just as the long-term objective of the current study, was to develop a comprehensive organisational work unit competency model that structurally maps the unit competency potential latent variables on the unit competencies and outcomes.

It became very clear in the Henning *et al*. (2004) model that, although the competency potential variables were considered, they were prematurely considered. The Henning *et al*. (2004) model was meant to comprehensively capture the internal structure of the organisational work unit performance construct. It was not intended as a comprehensive organisational work unit competency model. Although only a few variables were included in the model that fall into this category, their inclusion in the organisational work unit performance model was nonetheless wrong. At the same time, the Henning *et al*. (2004) model severely neglected its coverage of the organisational work unit competency domain. Therefore, the current PI model (Henning *et al*., 2004) is not a comprehensive competency model, but only selectively covers the competency potential latent variables that determine organisational work unit performance and also fails to include relevant latent variables from the competency and outcome domains. At the same time the current PI model (Henning *et al*., 2004) fails as an organisational work unit performance model because of its inappropriate inclusion of competency potential latent variables and its omission of relevant work unit competencies and outcomes. The Henning *et al.* (2004) model includes latent behavioural competency dimensions. However, a limited number of the PI dimensions fall in this domain and it failed to consider the large number of latent competency variables that are instrumental in the achievement of the outcomes that an organisational work unit is held accountable for. Unfortunately, this was the domain with the greatest number of latent variables omitted and therefore required a great amount of attention in the proposed new organisational work unit performance model.

Outcome latent variables are the result of the two aforementioned domains. They represent that which the organisational unit has been created to achieve. Organisational unit competencies, as defined above, are important to the extent that they are instrumental in achieving the outcomes for which the unit exists. Further, upon inspection of the Henning *et al.* (2004) organisational work unit performance model, it was apparent that the model had a few latent variables in this domain. Although it was remarkably better represented than the latent behavioural competency domain, the outcome domain still has to be considered incomplete and therefore further work was required to ensure that this domain is accurately represented. The underrepresentation of the competency and outcome domains is a great flaw in the Henning (2002) study as, previously alluded to, a competency model gains its value through its ability to capture the entirety of the psychological mechanism that regulates differences in organisational unit performance. The internal structure of the performance construct forms part of the competency model. Omissions from the organisational work unit performance model therefore unavoidably negatively impact on the ability of the competency model to fully capture the functioning of the psychological mechanism that regulates differences in organisational work unit performance levels.

The purpose of this study, is not to discredit the previous work that has been done on the phenomenon of work unit performance but to utilise and build on the findings of Henning (2002), Spangenberg and Theron (2004) and Henning *et al*. (2004) by casting it in the mould of a three-domain competency model. Each of the 8 performance dimensions identified by the PI, illustrated in Table 2.1, were therefore classified as either a competency potential latent variable, a competency or an outcome latent variable. Once this was completed, the current study attempted to identify deficiencies in the competency and outcomes domains.

2.6.1 Competency Potential Latent Variables

For the purpose of the research, the conceptualisation by Bartram (2006) of competency potential latent variables was utilised. He defines competency potential as “the individual attributes necessary for someone to produce the desired behaviours” (Bartram, 2006, p. 3). As this research is conducted on the work unit, the reference to 'individual' is further extended to 'the individual and the organisational work unit'. However, the core of the definition remains.

2.6.1.1 Capacity

The current study regarded two of the eight PI performance dimensions as competency potential variables. The first performance dimension in the PI that was regarded as a competency potential variable is: *capacity*. *Capacity*, was conceptualised by Spangenberg and Theron (2004, p. 23), as 'the internal strength of the unit'. This internal strength is further dissected into two distinct aspects: the materialistic and the quality of the staff. The materialistic aspects include the financial resources, profits and investment, physical assets and materials supply. It is logical to suggest that the materialistic facets provide the organisational unit an opportunity for success. Although it is possible that an organisational unit may succeed with a low presence of these material resources, the likelihood is greatly decreased. This notion is particularly relevant in the presence of physical assets and material supply.

The second category of *capacity* as suggested by Spangenberg and Theron (2004) refers to the individuals comprising the unit. The quality of staff, the first consideration, is arguably one of the most important characteristics of a work unit. Individuals with superior abilities and more importantly, individuals that have a propensity for teamwork can undoubtedly perform satisfactorily in a work unit. Further, a team consisting of individuals with superior quality can overcome an unfavourable shortage of the aforementioned material resources. In addition, a team consisting of a diverse range of members is classified as part of the *capacity* competency potential latent variable. This diversity includes, but is not limited to, cultural, ethnic, academic background and individual preferences. This notion of a diverse team is particularly relevant in the South African context that has a diverse population. The PI latent dimension of *capacity* can therefore also be described as the wealth of the resources that the organisational work unit has at its disposal (Cockerill *et al*., 1993; Nicholson & Brenner, 1994). It is clearly a characteristic of an organisational work unit that can vary in magnitude and that influences the level of competence that the unit achieves on the competencies that constitute work unit performance. It is clearly not an organisational work unit competency or an outcome.

2.6.1.2 Adaptability

The second PI performance dimension under consideration for classification in the category of competency potential latent variable was: *adaptability*. *Adaptability* is defined by Spangenberg and Theron (2004, p. 30) as:

> Flexibility of the unit's management and administrative systems, core processes and structures, capability to develop new products or services and versatility of staff and technology. Overall, it reflects the capacity of the unit to appropriately and expeditiously change.

The *adaptability* of a team, according to Spangenberg and Theron (2004), can be further dissected into two subfactors. The first categorisation describes aspects pertaining to the formal organisational environment that the unit operates within. The second categorisation illustrates the specific contributions of the individuals in the team.

The environment that the unit operates is explicated by Spangenberg and Theron (2004) as the flexibility of the unit's management and administrative system. The importance of the work unit's management cannot be overstated; the work unit is greatly enhanced by favourable conditions in which a supportive management is considered a pivotal factor and a catalyst for the other environmental conditions. The willingness and ability of the work unit's management to acknowledge that change is an inevitable variable that must be taken cognisance of and that the work unit, in order to be successful, needs to have conditions that are created by management which acknowledge this. This includes administrative systems such as performance appraisals that acknowledge the differing goals of teams due to changing conditions and structures that allow the team to appropriately respond to sudden changes quickly.

The second facet of *adaptability* refers to the capability of staff to develop new products or services through versatility and technology. It is further stated that overall, it reflects the capacity of the unit to appropriately and expeditiously change (Spangenberg & Theron, 2004). *Adaptability* is also clearly a characteristic of an organisational work unit that can vary in magnitude and that influences the level of competence that the unit achieves on the competencies that constitute work unit performance. It is not an organisational work unit competency or an outcome.

2.6.1.3 Behavioural Competency Dimensions

The behavioural competency dimensions are understood in accordance with the definition provided by SHL (2000) and Bartram (2005 & 2006) as the abstract theme in related sets of behaviours that are instrumental in the delivery of the results or outcomes for which the unit exists.

2.6.1.4 Core people processes

The *core people processes* performance dimension of the PI was suggested to be a behavioural competency variable. *Core people processes* as defined by Spangenberg and Theron (2004, p. 23) refers to:

> Reflect organisational effectiveness criteria such as goals and work plans, communication, organisational interaction, conflict management, productive clashing of ideas, integrity and uniqueness of the individual or group, learning through feedback and rewarding performance.

Core people processes refers to the extent to which clear goals and work plans for the organisational unit are continuously derived and adapted through a process of open communication, vibrant interaction and productive clashing of ideas between unit members in the interest of improving unit performance, and in which contributions of individual unit members are valued and rewarded (Henning, 2002). In accordance with the above definition, it is appropriate to classify core people processes as a behavioural dimension. The above definition can be further subdivided into two aspects, behaviours pertaining exclusively to interactions within the work unit and behaviours that include interactions between the work unit and individuals and/or groups external to the unit.

Conflict is a natural occurrence in human interaction and the potential for conflict is heightened in the work unit. This conflict can range from a personal level in the clashing of personalities or values, which is particularly prominent in the early stages of group formation, to an intellectual disagreement. Conflict is not to be avoided or discouraged. What is important in the presence of conflict is the manner in which it is handled. The correct manner in which conflict is handled is through constructive conflict management, that attempts to use the occurrence of conflict to build the team as a unit and to derive synergy from the conflict. In this trend, it is appropriate to give special cognisance to the intellectual conflict of a team. The correct manner to handle intellectual conflict is through the productive clashing of ideas; creative conflict (Becker & Huselid, 1998). This constructive behaviour includes not discrediting a member's idea but using differing ideas to create a converging, and usually better, newly constructed idea (Henning, 2002).

Further, communication must be considered. Communication is pivotal in team behaviour to create a common understanding between individuals and can further encourage the constructive handling of diverging interests or ideas.

In this sub-categorisation of the *core people processes*, the creation of goals and work plans for the unit is a behaviour of which the importance cannot be understated. The team must create goals that are aligned with the organisational goals in the outcome domain and create a satisfactory and productive plan to achieve these (Henning *et al.*, 2004; Spangenberg & Theron, 2004).

Regarding the second facet of the *core people processes* performance dimension, the unit's interaction with the larger organisation in which it is embedded is of importance. The interaction can be in the form of discussions and meetings that ensure the work unit is working in accordance with the goals that the larger organisation requires. This will encourage feedback that the unit must constructively use in the improvement of processes or ideas to meet the requirements of the larger organisation (Henning *et al*., 2004; Spangenberg & Theron, 2004). This is particularly relevant to the outcomes discussed later.

In the same trend, the larger organisation must reward the performance of the work unit. However, this is not the only manner in which rewarding takes place. The unit itself must reward the individuals appropriately, both intrinsically and extrinsically, according to the contribution and effort of each member (Henning *et al*, 2004; Spangenberg & Theron, 2004).

It is uncertain, however, in the description of *core people processes*, why Spangenberg and Theron (2004) included integrity and the uniqueness of the individual under core people processes. Integrity is a value that an individual holds and must therefore be considered as a competency potential latent variable. Likewise, the uniqueness of an individual is also seen in the same manner. If one refers to the uniqueness of an individual, it should be considered to be a characteristic. Alternatively, an adjustment is suggested to rather interpret this aspect as referring to interaction amongst unit members that demonstrates respect for the integrity and uniqueness of the individual. This will highlight the behavioural aspect and not consider the value or characteristic aspect of the construct. Moreover, interaction amongst unit members that demonstrates respect for the integrity and uniqueness of the individual probably is a necessary prerequisite for constructive conflict and a productive clashing of ideas.

Despite having been developed a work unit performance measure *core people processes* is the only latent behavioural competency measured by the PI. This clearly raises serious concerns on the content validity of the PI.

2.6.2 Outcome Latent Variables

Outcome latent variables are understood in accordance with the definition of Bartram (2006, p. 4) as:

> The actual or intended outcomes of behaviour, which have been defined either explicitly or implicitly by the individual, his or her line manager or the organization.

The current study adapted the definition to refer to the actual or intended outcomes of the organisational work unit's behaviour, which have been defined either explicitly or implicitly by the unit itself, the unit leader and/or the organisation. In terms of this interpretation outcomes refer to the results that a work unit is held accountable for and, which as a term, is used interchangeably with outcomes. The definition suggests that "results, which are the outcomes of behaviour, that are typically assessed through performance reviews and appraisals" (Bartram, 2006, p. 2). This rationale is accepted in the thesis as it considers outcomes to be the result of behaviours and proposes that the evaluation of a work unit's performance is done through the method of a performance review or appraisal.

In the categorisation of the performance dimensions suggested by Spangenberg and Theron (2004) into the outcome latent variable domain, it is beneficial to differentiate between those outcomes that pertain to overarching organisational goals and those outcomes that are narrower, more exclusive to the work unit and probably positioned upstream from the more downstream outcomes that serve the more overarching organisational goals. The outcomes that can be categorised as pertaining to the organisational goals are *market share/standing*, *future growth* and *production and efficiency*. These factors are specifically important to a work unit as the larger organisation, in accordance to the bottom line, will most likely base their judgement of the success of the work unit on these factors.

2.6.2.1 Market standing

It seems a reasonable position to hold that *production and efficiency*, *market standing* and *future growth* prospects are outcomes that flow from the level of competence that the work unit achieves on the organisational work unit competencies and this, in turn, depends on the unit's standing on the organisational unit competency potential latent variables. No matter the purpose of the work unit, if the unit possess the required characteristics and the unit displays competence on the work unit behaviours, *production and efficiency* should increase, the *market standing* of the unit (and the organisation) should rise as a consequence of the increase in *production and efficiency* and *future growth* prospects should expand.

The the current study would, however, suggest that the standing that organisational units achieve on these factors is not dependent on the level of competence that the work unit achieved on the work unit competencies entirely. The units' standing on these dimensions are to some degree influenced by evaluations of the organisation as a whole and, although the work unit can have a large influence on this, many situational characteristics may influence the levels attained on the latent outcome variables. Therefore, caution must be taken when evaluating the performance of an organisational work unit in terms of these outcome variables (Blum & Naylor, 1968). This caution has been shown in the majority of performance appraisal systems in the workplace that places the focus of the evaluations on competencies and not outcomes (Henning *et al*., 2004; Spangenberg & Theron, 2004) because of the tendency for the latter to be biased by systematic factors not under the control of the unit (Blum & Naylor, 1968). This line of reasoning does, however, not justify the deletion of latent outcome dimensions from the work unit performance construct. If a unit fails to achieve the outcomes it is expected to achieve, this needs to be acknowledged. Even if the unit is not necessarily held responsible for lack of success on the outcomes it needs to be held accountable to respond to it.

Firstly, *market standing,* according to Spangenberg and Theron (2004, p. 23), "is the market share, standing competitiveness and market-directed diversity of products or services, customer satisfaction and reputation for adding value to the organisation". All of these factors are extremely important to an organisation and can be considered outcomes of successful actions taken by the work unit. If an organisational work unit, over a reasonable period of time, consistently delivers a superior output to its clients, it should through that develop a superior market standing, a satisfied client base, and through word-of-mouth, an increased market share. An increase in market standing enhances the overall reputation of the organisational unit. Henning (2002), for this reason, hypothesised that *production and efficiency* would exert a positive influence on *market standing*. The current study therefore confidently proposes that *market standing* should be retained in the conceptualisation of work unit performance as an important latent outcome variable.

2.6.2.2 Future growth

The second consideration in the organisational unit outcome domain is: *future growth*. Spangenberg and Theron (2004, p. 23) consider this to be an "overall index of projected future performance and includes projected/anticipated profits and market share, expected capital investment, growth in staff levels and expansion of the unit".

The current study definitely considers *future growth* to be a latent outcome variable. In previous research Henning *et al*. (2004) and Theron *et al.* (2004) argued that the *future growth* of a work unit is largely dependent on the level of competence that work units achieve on the core people processes competency. As well as the standard achieved on the latent outcome variable *market standing*. Henning *et al.* (2004) and

Theron *et al* (2004) found support for the latter hypotheses but not the former[7]. Many of the characteristics in the *future growth* outcome latent variable are similar to the *market share* outcome latent variable, namely future performance in profit and market share versus current performance in profit and market share. Again, the work unit's standing on future growth can be influenced by other factors than its own performance levels. Therefore, as stated above, great caution must be exhibited for similar reasons when evaluating *future growth* as an outcome latent variable.

Future growth most likely lies further downstream from other latent organisational work unit outcome latent variables. Henning (2002) specifically hypothesised that *production and efficiency* has an effect on *future growth* but that its effect is mediated by *market standing*. She argued that an organisational work unit that has earned itself a high market standing because it consistently and efficiently delivered a superior product/service to the market, the market will evaluate the unit to have high future growth prospects. Further, a feedback loop onto competency potential is suggested for future research as this is directly related to the *capacity* characteristics of the group. Although capital investment should be regarded as part of the competency potential latent variable *capacity* that can contribute to the *future growth* via various organisational unit competencies and up-stream latent outcome variables, the expectation/anticipation of future capital investments may rightfully be seen as part of the *future growth* categorisation, an outcome latent variable.

2.6.2.3 Production and efficiency

Organisational work units are not natural phenomena but rather are man-made phenomena that exist for a definite reason and with a specific purpose. Organisational work units exist to produce either a specific product (or component thereof) or service (or component thereof) that satisfies the needs of society. In order to satisfy the salient needs of society organisational units have to combine and transform scarce production factors into products and services with economic utility. Organisational work units are evaluated in terms of the efficiency with which they combine and transform these production factors. Organisational work units are evaluated in terms of the extent to

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[7] Henning *et al.* (2004) and Theron *et al.* (2004) did, however find evidence to suggest that the level of competence on the *core people processes* work unit competency did indirectly affect *future growth* via its effect on adaptability (as a latent competency potential variable) and the latter's effect on *market standing*.

which they satisfy the expectations of their internal and external clients regarding quality, quantity and distribution of the product or service (Henning, 2002). *Production and efficiency* as suggested by Spangenberg and Theron (2004, p. 23) "refers to qualitative outputs such as meeting goals, quantity, quality and cost effectiveness, and task performance". As this dimension considers outputs to be the pivotal factor, it is appropriate to suggest that this dimension is an outcome latent variable. Further, this dimension suggests that the standard of the outputs must be evaluated in terms of specific criteria such as quality, quantity and cost effectiveness. These criteria will form the basis of the evaluation of the performance level achieved on this dimension. Further, of great importance in the conceptualisation of this dimension is the requirement that outputs should meet goals set on these criteria.

2.6.2.4 Work unit climate

The second broad categorisation of latent work unit outcome variables refers more specifically to outcomes that are of direct concern only really to the work unit. The work unit outcomes suggested in this categorisation are *employee satisfaction* and the *work unit climate*.

According to Spangenberg and Theron (2004, p. 23) the *work unit climate* refers to:

> The environment of the unit, and gives an overall assessment of the integration, commitment and cohesion of the unit. It includes working atmosphere, teamwork, work group cohesion, agreement on core values and consensus regarding the vision, achievement-related attitudes and behaviours and commitment to the unit.

A troublesome question is whether work unit climate should not have been considered a latent work unit competency potential variable rather than a latent outcome variable? The prevailing climate after all does affect the level at which a work unit performs. The current study, however argued that whilst that is true the prevailing *climate* develops from the level of competence that work units achieve on the competency of core people processes. Thus, it should be considered a latent outcome variable in the eventual work unit competency model. The *work unit climate* is suggested to be an outcome latent variable that is closely related, via feedback, to the competency potential latent variables. This aspect of the work unit is arguably the most pivotal as it encourages superior performance in the employees comprising the unit collectively.

A productive and constructive climate can be thought of as synergy that will encourage unit performance that will be greater than the effort of any individual employee. The current study, however, concedes that the distinction between latent outcome variables and latent competency potential variables quite often is ambiguous and that the decision to classify *climate* as a latent work unit outcome variable is to some degree contentious.

2.6.2.5 Employee satisfaction

Employee satisfaction is a further PI dimension that that the current study suggests falls in the outcome domain. According to Spangenberg and Theron (2004, p.23) *employee satisfaction* "centres around satisfaction with the task and work context, empowerment, and career progress, as well as with outcomes of leadership, e.g. trust in and respect for the leader and acceptance of the leader's influence". This dimension is categorised as an outcome latent variable that is related to the work and the freedom that the work unit and the individuals within the work unit have to act in accordance to their judgement. Further, the conceptualisation of satisfaction as a work unit outcome latent variable refers to an important aspect that hasn't been suggested yet, namely that of a leader. A leader is one of the most crucial factors of the work unit. An influential leader will encourage the group to perform better and the satisfaction with such a leader will contribute to the satisfaction of the work unit. The current study would suggest that leadership should not be included in the organisational work unit competency model as a separate latent variable. Rather leadership should be seen as a separate competency model that articulates in series with the organisational work unit competency model.

The manner in which a competency model was defined earlier as a three-domain structural model created a rather stark distinction between outcome latent variables and competency potential latent variables. Moreover, as conceptualised thus far, competency potential latent variables are seen to influence the level of proficiency that is achieved on competencies and that, in turn, affects the standards that are achieved on the outcome latent variables. The standards achieved on the outcome latent variables are, however not without consequence. They do not leave the unit and its behaviour unaffected. This line of reasoning firstly suggests the existence of feedback loops between organisational unit outcome latent variables and organisational unit competency potential latent variables. A case in point would the path proposed by Theron *et al*. (2004) from *market share/standing* to *capacity*. It seems reasonable to argue that the reputation that an organisational unit has in the market will affect its ability to attract scarce financial and human resources. The question should, however, also be posed whether the strict/sharp separation between outcomes and competency potential latent variables is justified in all cases. Can outcomes latent variables also act as competency potential latent variables? Phrased differently the question is therefore whether in some cases the level of competence achieved on competencies do not directly feedback onto competency potential latent variables without the mediating effect of outcome latent variables?

Satisfaction that is currently proposed as an outcome variable presents a relevant case in point. Should *satisfaction* not rather be treated as a competency potential latent variable that is directly affected by the level of competence that is achieved on the competencies? *Satisfaction* can legitimately be argued to affect performance (i.e., competence achieved on the competencies) via its influence on effort exerted via its effect on the valence of high performance via its effect on the valence of the rewards that performance is instrumental in mediating (Van Eerde & Thierry, 1996). According to the expectancy theory of motivation (Van Eerde & Thierry, 1996), *satisfaction* is also affected by performance. The current study would argue from this latter perspective that satisfaction should remain as an outcome latent variable that feeds back onto a one or more competency potential latent variables. *Motivation to perform* could be on a higher level of aggregation an example of a competency potential latent variable that is affected by *satisfaction*. On a lower level of aggregation *satisfaction* would more specifically affect the *valence of performance* and through that the *motivation to perform*.

The suggested categorisation of the current eight PI performance dimensions in one of the three competency model domains is summarised in Table 2.2.

Table 2.2.

The categorisation of the Performance Index into domains

Dimension	Domain	Summary
Production and efficiency	Outcome latent variable	Quantitative outputs such as meeting goals, quantity, quality and cost-effectiveness, and task performance.
Core people processes	Behavioural competency	Organisational effectiveness criteria such as goals and work plans, communication, organisational interaction, conflict management, productive clashing of ideas, integrity and uniqueness of the individual or group, learning through feedback and rewarding performance.
Work unit climate	Outcome latent variable	Psychological environment of the unit, and gives an overall assessment of the integration, commitment and cohesion of the unit. It includes working atmosphere, teamwork, work group cohesion, agreement on core values and consensus regarding the vision, achievement-related attitudes and behaviours and commitment to the unit.
Employee satisfaction	Outcome latent variable	Satisfaction with the task and work context, empowerment, and career progress, as well as with outcomes of leadership
Adaptability	Competency potential latent variable	Flexibility of the unit’s management and administrative systems, core processes and structures, capability to develop new products or services and versatility of staff and technology. Overall, it reflects the capacity of the unit to appropriately and expeditiously change.
Capacity	Competency potential latent variable	Internal strength of the unit, financial resources, profits and investment, physical assets and materials supply and quality and diversity of staff.
Market share/standing	Outcome latent variable	Market share, competitiveness and market-directed diversity of products or services, customer satisfaction and reputation for adding value to the organisation
Future growth	Outcome latent variable	Index of projected future performance and includes profits and market share, capital investment, staff levels and expansion of the unit.

(Spangenberg and Theron, 2004, p.23)

2.7 ADDITIONS TO THE PROPOSED WORK UNIT PERFORMANCE MODEL (OR PARTIAL WORK UNIT COMPETENCY MODEL)

In the categorisation of the PI performance dimension as displayed in Table 2.2, it is clear that the behavioural competency domain requires the greatest number of additions to ensure its adequate representation and to further provide a comprehensive performance model. The same method previously employed of exploring the connotative and denotative meanings of the competency and outcome constructs that are proposed for inclusion will be utilised.

2.7.1 Additional Organisational Work Unit Competencies

A number of different performance models have been proposed to describe the performance of individual employees in terms of behavioural competencies (Bartram, 2002; Campbell, 1990; Campbell and Wiernik, 2015; Myburgh and Theron, 2014; Viswesvaran & Ones, 2000). An organisational work unit is an integrated collection of individual employees working towards a common unit objective. As such the performance of the collective is more than the sum of the performance of the individual members. The question nonetheless should be asked whether at least some of the competencies that are applicable to the individual employee not also have relevance for describing and evaluating the performance of the collective?

The position of the current study is that it could be fruitful to generalise at least some of the competencies relevant to the individual employee to the organisational unit. In terms of this line of reasoning, the organisational unit displays behaviour as a coherent organism similar to that of an individual employee. The suggestions made by Myburgh and Theron (2014) regarding the competencies that should be included in the Generic Individual Non-Managerial Performance Questionnaire will be used as a point of departure in the addition of new organisational unit competencies. The performance dimensions proposed by Myburgh and Theron (2014) for the Myburgh Generic Non-Managerial Performance model are shown in Table 2.3.

Table 2.3.

The Myburgh Generic Non-Managerial Performance Model

Dimension number	First-order dimension name	First-order dimension definition
1	Task performance	The extent to which the employee effectively performs activities that contribute to the organisation's technical core, performs the foundational, substantive or technical tasks that is essential for a specific job effectively, successfully completes role activities prescribed in the job description and achieves personal work objectives. Core task productivity is defined as the quantity or volume of work produced and describes the ratio inputs in relation to the outcomes achieved.
2	Effort	The extent to which the employee devotes constant attention towards his work, uses resources like time and care spend in order to be effective on the job, shows willingness to keep working under detrimental conditions and spends the extra effort required for the task.
3	Adaptability	The extent to which the employee adapts and responds effectively in situations where change is inevitable, manages pressure effectively and copes well with setbacks, shows willingness to change his/her schedules in order to accommodate demands at work.
4	Innovation	The extent to which the employee displays creativity, not only in his/her individual job but also on behalf of the whole organisation, shows openness to new ideas and experiences, handles novel situations and problems with innovation and creativity, thinks broadly and strategically in order to support and drive desired organisational change.
5	Leadership potential	The extent to which the employee empowers others, brings out extra performance in other employees, supports peers, helping them with challenges they face, motivates and inspires other employees, models appropriate behaviour, initiates action, provides direction and takes responsibility.
6	Communication	The extent to which the employee communicates well in writing and orally, networks effectively, successfully persuades and influences others, relates to others in a confident and relaxed manner.
7	Interpersonal relations	The extent to which the employee relates well with others, interacts on a social level with colleagues and gets along with other employees, displays pro-social behaviours, cooperates and collaborates with colleagues, displays solidarity with colleagues, supports others, shows respect and positive regard for colleagues, acts in a consistent manner with clear personal values that compliment those of the organisation.
8	Management	The extent to which the employee plans ahead and works in a systematic and organised way, follows directions and procedures, articulates goals for the unit, organises people and resources, monitors progress, helps to solve problems and to overcome crises, effectively coordinates different work roles.
9	Analysing and problem-solving	The extent to which the employee applies analytical thinking in the job situation, identifies the core issues in complex situations and problems, learns and utilises new technology, resolving problems in a logical and systematic way, behaves intelligently, making decisions by deducing the appropriate option from available information.
10	Counterproductive work behaviour	The extent to which the employee displays behaviour that threatens the wellbeing of an organisation, shows unwillingness to comply with organisational rules, interprets organisational expectations incorrectly, fails to maintain personal discipline, is absent from work, not punctual, steals, misuses drugs, displays confrontational attitudes towards co-workers, supervisors, and work itself, his/her behaviour hinders the accomplishment of organisational goals.

Table 2.3.

The Myburgh Generic Non-Managerial Performance Model (continued)

11	Organisational citizenship behaviour	The extent to which the employee displays voluntary behaviour contributing towards the overall effectiveness of the organisation, volunteers to carry out task activities that are not formally part of his/her job description, follows organisational rules and procedures, endorses, supports, and defends organisational objectives, shows willingness to go the extra mile, voluntary helps colleagues with work, shows willingness to tolerate inconveniences and impositions of work without complaining, is actively and constructively involved in organisational affairs.
12	Self-development	The extent to which the employee takes responsibility for his/her own career development, works on the development of job relevant competency potential and competencies, seeks opportunities for self-development and career advancement.

(Myburgh and Theron, 2014, p. 37)

When comparing the proposed dimensions of Spangenberg and Theron (2004) to the factors suggested Myburgh and Theron (2014) in the Generic Non-Managerial Performance Questionnaire, there are a few dimensions that are seemingly similar in nature. Although often not listed as the same dimension, the description of the dimension alludes to the similar concept. The competencies included in the Myburgh Generic Non-Managerial Performance model that seem to conceptually overlap with latent variables already included in the PI are flagged in Table 2.4. The only competency currently included in the PI is *core people processes*. This competency does seem to some degree to overlap with three of the generic competencies that Myburgh (2013) identified, namely *communication*, *management* and *analysing and problem-solving*. These three are therefore not suggested as additional work unit competencies for consideration in the proposed organisational work unit performance model.

Table 2.4.

Similarities between the PI and GNPM

Performance Index		**Generic Non-managerial Performance Measure**	
Dimension	Domain	Dimension	Domain
Production and efficiency	Latent outcome variable	Task performance	Latent competency
Core people processes	Latent competency	Communication, management and analysing and problem solving	Latent competencies
Climate	Latent outcome variable	Inter-personal relations	Latent competency
Adaptability	Latent Competency potential variable	Adaptability	Latent competency

Production and efficiency, *climate* and *adaptability* some similarity in content as well. The domain interpretation of these latent variables, however differ across the two models as indicated in Table 2.4.

There are, however, variables considered by the Generic Non-Managerial Performance Measure that were not included in the Performance Index but that are considered to provide relevant abstract themes in terms of which the behaviour of the work unit as an organism comprising a collective of individual employees can be described. The variables that were included in the Generic Non-Managerial Performance Measure and not the PI, and that were considered relevant to the description of the behaviour of a work unit, are; *effort, innovation, counterproductive work behaviour, organisational citizenship behaviour and self-development*[8]*.* All of these variables are included in the proposed performance structural model with the exception of *self-development.*

A two-pronged reason is hypothesised as explanation for the differing dimensions that were proposed by the two studies. Firstly, the researchers had different objectives and secondly the studies were conducted a decade apart. The research conducted by Myburgh and Theron (2014) had the benefit of employing a greater amount of previous literature on the topic and dimensions such as *innovation* have only recently gained popularity.

2.7.1.1 Innovation

The first dimension to be considered for inclusion in the work unit performance model as a competency is *innovation*. According to Myburgh and Theron (2014, p. 37) *innovation* is defined as:

> The extent to which an employee illustrates creativity, not only on the prescribed job but also regarding matters related to general organisational functioning, displays an openness to novel notions and experiences, handles unique situations and problems with innovation and creativity, thinks broadly and strategically in order to support and drive organisational change.

[8] On one level all twelve the competencies identified by Myburgh (2013) can be argued to transfer to an organisational work unit. Some do so, however, more convincingly than others. The current study used a rather high threshold permit transfer of the Myburgh (2013) competencies to the conceptualisation of organisational work unit performance

It does not seem inappropriate to suggest that the same description attributed to an individual employee in his/her job can also be applied to a work unit in pursuit of its unit objectives. Operationally, *innovation* is defined as the aggregated perception of the individual members of the extent to which the unit illustrates creativity, not only on the prescribed job but also regarding matters related to general organisational functioning, displays an openness to novel notions and experiences, handles unique situations and problems with innovation and creativity, and thinks broadly and strategically in order to support and drive organisational change.

Innovation is key for an organisational unit to remain relevant and continue to thrive in a market that is continuously changing and has intensifying competition. This behaviour relies considerably on the concept of creativity that, as suggested in the above definition, is core to *innovation*. Further, of particular importance is the large variety of manifestations in which innovating occurs in an organisational unit. This behaviour benefits an organisational unit in the creation of new ideas, handling any problems that may occur and is strategic in nature. Therefore, due to the aforementioned reasons, *innovation* is the first additional organisational unit competency suggested for inclusion in the partial work unit competency model.

2.7.1.2 Effort

In addition, *effort* is a further suggestion to the work unit performance model as a work unit competency. Myburgh and Theron (2014, p. 37) define *effort* as "the extent to which the employee dedicates consistent attention towards his/her work, utilises resources such as time and care in order to be effective on the job". Further, it is conceptualised as displaying a willingness to keep working under detrimental conditions and provide the extra effort required for the task.

Operationally *effort* is defined as the aggregated perception of the individual members of the unit of the extent to which the unit dedicates consistent attention towards its work, utilises resources such as time and care in order to be effective in what they are doing and displays a willingness to keep working under detrimental conditions and give the extra effort required for the task.

Effort is of upmost importance to the success of an organisational unit. The work unit as an organism must be willing to provide the required amount of *effort* necessary to complete the task at hand and the phenomenon of free-riding must not occur. Further, the above definition illustrates the multi-variant aspects of effort such as time, resources and care. This is important as *effort* is commonly associated exclusively with time but by omitting the other facets the concept is not fully represented.

Displaying a willingness to work under detrimental conditions, the last notion that the definition alludes to, is thoroughly important to the success of a work unit. This idea, commonly referred to as grit (Duckworth, Peterson, Matthews & Kelly, 2007), in the researcher's opinion will largely be the deciding factor in the success of a team and displays character.

2.7.1.3 Task performance

According to Myburgh and Theron (2014, p. 37) *task performance* refers to:

> The extent to which the employee effectively performs activities that contribute to the organisations technical core, performs the foundational, substantive or technical tasks that is essential for a specific job effectively, successfully completes role activities prescribed in the job description and achieves personal work objectives. Core task productivity is defined as the quantity or volume of work produced and described the ratio inputs in relation to the outcomes achieved.

The current study considers task performance as a competency that should undoubtedly be considered for inclusion on the conceptualisation of work unit performance. From the above description, however, the current study is somewhat concerned that core task productivity does not overlap with *production and efficiency* and effectively measures the same thing. The idea of *task performance* being related to the extent to which the work unit "performs activities that contribute to the organisation's technical core" and to the extent to which the work unit performs" the foundational, substantive or technical tasks" that the work unit exists for is attractive.

The current study, however, decided that the latter reference to core task productivity should be removed from the constitutive definition of *task performance* as a core work unit competency. The current conceptualisation of work unit performance does not sufficiently acknowledge that the core task of an organisational work unit is to combine and transform scarce factors of production into products and services that the market values. It is acknowledged in the outcome domain via the latent *production and efficiency* outcome variable. Adding *task performance* as a latent competency variable to the conceptualisation of work unit performance rectifies this shortcoming.

Operationally *effort* is defined as the aggregated perception of the individual members of the unit of the extent to which the unit effectively performs the activities that contribute to the organisation's technical core, performs the foundational, substantive and core technical tasks of the work unit effectively, successfully completes role activities prescribed in the work units "job description" and achieves work unit work objectives.

2.7.1.4. Counterproductive work behaviour

Counterproductive work behaviour (CWB)[9] is suggested as a further organisational unit competency in the organisational work unit performance model. It is defined by Myburgh and Theron (2004, p. 37) as:

> The extent to which the employee displays behaviour that jeopardises the wellbeing of an organisation, is deliberately unwilling to comply with organisational rules and interprets organisational expectations incorrectly as not maintaining personal discipline, absenteeism, being unpunctual, stealing, abusing drugs, illustrating confrontational attitudes towards co-workers, supervisors and work itself, overall his/her behaviour hinders the accomplishment of organisational goals.

Operationally *CWB* is defined as the aggregated perception of the individual members of the unit of the extent to which the unit as an organism displays behaviour that jeopardises the wellbeing of the work unit itself as well as the larger organisation, is deliberately unwilling to comply with organisational rules and interprets organisational expectations incorrectly. All of the aforementioned competencies included thus far in the organisational work unit performance model are considered positive behaviours with the absence of their display detrimental to the performance of the work unit. However, *CWB* is the first competency for which an absence of the display thereof is beneficial to the work unit and the organisation at large.

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[9] Counterproductive work behaviour and counterproductive workplace behaviour are used interchangeably in the research to refer to the same construct.

If members of the work unit generally display the aforementioned behaviours that fall into this category, it will detrimentally impact the performance of the unit. However, of particular importance to the success of the unit are the behaviours of confrontation, absenteeism and incorrect expectations. These behaviours are highlighted due to their interpersonal nature that will harmfully affect a unit as it relies considerably on constructive interaction between its members. The importance of this was argued under the competency *core people processes*.

2.7.1.5. Organisational citizenship behaviour

Contrary to *counterproductive work behaviour*, *organisational citizenship behaviour* (OCB) is a positive competency that must be fostered in an organisational work unit. The definition by Myburgh and Theron (2014) is utilised, however it is slightly altered to apply specifically the work unit. *Organisational citizenship behaviour* is the extent to which an employee displays voluntary behaviour contributing towards the overall effectiveness of the organisation or organisational work unit and volunteers to carry out tasks or activities that are not formally part of his/her job description in the work unit.

Further, *OCB* is displayed by an employee or group member that obeys organisational rules and procedures, endorses, supports, and defends organisational or team objectives, shows willingness to go the extra mile, voluntary helps team members with work, shows willingness to tolerate inconveniences and impositions of work without complaining and is actively and constructively involved in organisational and team affairs.

Operationally *OCB* is defined as the aggregated perception of the individual members of the unit of the extent to which the unit as an organism displays voluntary behaviour contributing towards the overall effectiveness of the organisation, volunteers to carry out tasks or activities that are not formally its responsibility, obeys organisational rules and procedures, endorses, supports, and defends organisational objectives, shows willingness to go the extra mile, voluntary helps other units with work, shows willingness to tolerate inconveniences and impositions of work without complaining and is actively and constructively involved in organisational affairs.

Organisational citizenship behaviour is an essential behavioural competency in a successful work unit. The behaviour can be colloquially conceptualised by describing the work unit as a 'team player' in the organisation. It is vital that the work unit is generally characterised by individuals that are willing to go the extra mile to ensure the success of the unit and the larger organisation. Further, members that display this behaviour will encourage others in the team to succeed and display similar behaviour.

2.7.1.6. Employee green behaviour

This competency has not been included by Myburgh (2013) in her conceptualisation of generic non-managerial individual employee performance. Botes (2018), however argued, based on the work of Albertyn (2019), that her omission of this competency fails to acknowledge the triple bottom line conceptualisation of organisational performance (Slaper & Hall, 2011). The additional competency latent variables that the current study have been proposed thus far for inclusion in the work unit performance model can all be categorised to be in service of the profit and people aspirations of the 3-P model. Although *profit* is essential to the survival of the organisation, as argued in Chapter 1, organisations have the equally important responsibility to *people* and the *planet*. These responsibilities of the organisation trickles to the organisational work units comprising the organisation (and eventually to the individual employee as well as argued by Botes (2018).

The responsibility of organisations to the environment has received an increased amount of attention in recent years. The topic is foremost in the minds of organisational leaders, scientists and the general population. Ones and Dilchert (2012) have pioneered research in the field and have conceptualise the phenomenon as *employee green behaviour* (EGB). They define *EGB* as "scalable actions and behaviours that employees engage in that are linked with and contribute to or detract from environmental sustainability" (Ones & Dilchert, 2012, p. 86).

This definition alludes to important considerations for the current study. Firstly, the definition suggests that it is the enactment of employees and not the organisation. Further, the conceptualisation focuses on what individuals actually do or their behaviours. This position is specifically important to the current research study in support of its categorisation of the *EGB* as a competency. The definition of *EGB* furthermore, promotes the idea that these behaviours are measurable. This aspect provides reassurance to the researcher that the creation of a scale is viable. The creation of a scale is further promoted as Ones and Dilchert (2012) identified five higher-order dimensions of *EGB*. Lastly, the conceptualisation suggests that not all environment-directed behaviours are beneficial to its wellbeing (Ones & Dilchert, 2012).

Ones and Dilchert (2012) have pinpointed five second-order behaviours (or competencies) that are core to *EGB*. These behaviours have been categorised into a taxonomy known as the Green Big Five Taxonomy. This categorisation consists of co*nserving, working sustainability, avoiding harm, influencing others* and *taking initiative*. Each of these behaviours will be unpacked in the investigation of the denotative meaning of *EGB.*

Conserving is the first behaviour discussed in the Green Five Taxonomy. The essence of the behaviour is the avoidance of wastefulness and preserving resources. This earth-conscious behaviour is achieved through reducing the use of resources, reusing, repurposing and recycling (Ones & Dilchert, 2012).

Working sustainability is the second aspect of the Green Five Taxonomy. It consists of behaviours that increase the environmental sustainability of work products and processes. The essence of sustainable working is adapting work products and processes to minimise the negative impact on the environment. This is described in the behaviours of choosing responsible alternatives, altering how work is done, creating sustainable products and processes and encouraging innovation and sustainability (Ones and Dilchert, 2012).

Further, according to Ones and Dilchert (2012), *avoiding harm* as a second-order dimension of *EGB* covers the harmful effects that an organisation can have on the environment. The functional core of the behaviour is maintaining a healthy planet through consciously reducing pollution, monitoring environmental impact and strengthening ecosystems.

The Green Five Taxonomy further includes *influencing others.* The foundation of this second-order dimension is the extent to which influence is exerted on the green behaviour of others. This is achieved through (and reflected in) educating and training others to adopt more sustainable behaviours and encouraging and supporting these earth-friendly behaviours. The last second-order dimension of *EGB* comprising the Green Big Five taxonomy is *taking initiative*. This component has a proactive and entrepreneurial nature and a certain level of risk-taking that is required. The behaviours involved in this sub-dimension are initiating programs and policies protecting the environment, lobbying and activism for environmental issues in the company and putting environmental issues first (Ones & Dilchert, 2012).

2.7.2 Additional organisational work unit outcome latent variables

In addition to the competencies, the following additional organisational work unit outcome latent variable are described below.

2.7.2.1 High performance culture

H*igh performance culture* is suggested as an additional outcome latent variable in the work unit competency model. The van den Berg and Wilderom (2004, p. 571) definition of work unit culture is utilised. They define work unit culture as “mutual perceptions of organisational work practices held by the members of organisational units that may differ from other organisational units”. A *high-performance culture* is consequently defined as the shared, enduring perception amongst members of a unit that high and exceptional performance in everything that the unit does is the norm or expectation in the organisational unit.

The constructs climate and culture are often misinterpreted to refer to the same phenomenon. This conceptual confusion is cleared up by Denison (1996) who states that an important distinguishing feature of climate and culture is that the former refers to the evaluation of the current affairs and the latter relates to the norms governing actual work behaviours. Therefore, following the suggestion of Ashkanasy, Wilderom and Peterson (2000) that it is good practice to measure both constructs at the same time, the study will assess both factors. The climate outcome has been retained from the original PI model (Henning, 2002).

It is clear that a strong shared culture within an organisational unit will improve the performance of the work unit. If each individual in the team holds the similar perception of the work practices and work standards the manner in which the work is expected to be done will be congruent and benefit the work unit as a whole. At the same time a *high-performance culture* develops from sustained high unit performance over time. Therefore, like many of the previous categorisations, it is unclear whether culture should be treated as a competency potential latent variable or an outcome latent variable. For the purpose of the current study, culture will be categorised as an outcome latent variable. *High performance culture* is a shared norm that is created over time through prolonged high unit performance.

Operationally, *high performance culture* is defined according to De Waal (2007) as the aggregated perception of the individual members of the unit of the extent to which experimentation and mistakes are allowed, members are held responsible for results and the extent to which unit members hold a ‘can do attitude’. Further this culture is conceptualised as performance-driven, members that push themselves, a strong sense of community, having a customer value orientated and competes and compares themselves with the best in the market.

A summary of the latent behavioural competencies and latent outcome variables that were not originally included in the PI’s conceptualisation of organisational work unit performance, but that were incorporated in the revised conceptualisation offered by the current study, are shown and defined in Table 2.5. A summary of all the latent behavioural competencies and latent outcome variables proposed for inclusion in the organisational work unit performance construct and their definitions are shown and defined in Table 2.6.

Table 2.5

The categorisation of additional dimensions

Dimensions	Categorisation	Definition
1. Innovation	Behavioural competency	The extent to which the employee displays creativity, not only in his/her individual job but also on behalf of the whole organisation, shows openness to new ideas and experiences, handles novel situations and problems with innovation and creativity, thinks broadly and strategically in order to support and drive desired organisational change.

Table 2.5

The categorisation of additional dimensions (continued)

1.	Effort	Behavioural competency	The extent to which the employee devotes constant attention towards his work, uses resources like time and care spend in order to be effective on the job, shows willingness to keep working under detrimental conditions and spends the extra effort required for the task.
		Behavioural competency	The extent to which the employee displays behaviour that threatens the wellbeing of an organisation, shows unwillingness to comply with organisational rules, interprets organisational expectations incorrectly, fails to maintain personal discipline, is absent from work, not punctual, steals, misuses drugs, displays confrontational attitudes towards co-workers, supervisors, and work itself, his/her behaviour hinders the accomplishment of organisational goals.
2.	Organisational citizenship behaviour	Behavioural competency	The extent to which the employee displays voluntary behaviour contributing towards the overall effectiveness of the organisation, volunteers to carry out task activities that are not formally part of his/her job description, follows organisational rules and procedures, endorses, supports, and defends organisational objectives, shows willingness to go the extra mile, voluntary helps colleagues with work, shows willingness to tolerate inconveniences and impositions of work without complaining, is actively and constructively involved in organisational affairs.
3.	Employee green Behaviour	Behavioural competency	Scalable actions and behaviours that employees engage in that are linked with and contribute to or detract from environmental sustainability.
4.	High performance culture	Outcome latent variable	The shared perception amongst members of a unit that high and exceptional performance in everything that the unit does is the norm or expectation in the organisational unit.

(Adapted from De Waal, 2007; Myburgh & Theron, 2014; Ones & Dilchert, 2012

Table 2.6

A summary of the seven latent behavioural competencies and six latent outcome variables included in the organisational work unit performance construct

Dimensions	Categorisation	Definition
1. Innovation	Behavioural competency	The extent to which the employee displays creativity, not only in his/her individual job but also on behalf of the whole organisation, shows openness to new ideas and experiences, handles novel situations and problems with innovation and creativity, thinks broadly and strategically in order to support and drive desired organisational change.
2. Effort	Behavioural competency	The extent to which the employee devotes constant attention towards his work, uses resources like time and care spend in order to be effective on the job, shows willingness to keep working under detrimental conditions and spends the extra effort required for the task.
3. Counterproductive work behaviour	Behavioural competency	The extent to which the employee displays behaviour that threatens the wellbeing of an organisation, shows unwillingness to comply with organisational rules, interprets organisational expectations incorrectly, fails to maintain personal discipline, is absent from work, not punctual, steals, misuses drugs, displays confrontational attitudes towards co-workers, supervisors, and work itself, his/her behaviour hinders the accomplishment of organisational goals.
4. Organisational Citizenship behaviour	Behavioural competency	The extent to which the employee displays voluntary behaviour contributing towards the overall effectiveness of the organisation, volunteers to carry out task activities that are not formally part of his/her job description, follows organisational rules and procedures, endorses, supports, and defends organisational objectives, shows willingness to go the extra mile, voluntary helps colleagues with work, shows willingness to tolerate inconveniences and impositions of work without complaining, is actively and constructively involved in organisational affairs.
5. Employee Green Behaviour	Behavioural competency	Scalable actions and behaviours that employees engage in that are linked with and contribute to or detract from environmental sustainability.
6. Production and efficiency	Outcome latent variable	Quantitative outputs such as meeting goals, quantity, quality and cost-effectiveness.
7. Core people processes	Behavioural competency	Work unit effectiveness criteria such as goals and work plans are used, effective communication, frequent work unit interaction, constructive conflict management, productive clashing of ideas, integrity and uniqueness of the individual or group is valued, learning through feedback and rewarding performance.

Table 2.6

A summary of the seven latent behavioural competencies and six latent outcome variables included in the organisational work unit performance construct (continued)

8. Work unit climate	Outcome latent variable	Psychological environment of the unit, and gives an overall assessment of the integration, commitment and cohesion of the unit. It includes working atmosphere, teamwork, work group cohesion, agreement on core values and consensus regarding the vision, achievement-related attitudes and behaviours and commitment to the unit.
9. Employee satisfaction	Outcome latent variable	Satisfaction with the task and work context, empowerment, and career progress, as well as with outcomes of leadership
10. Market share/standing	Outcome latent variable	Market share, competitiveness and market-directed diversity of products or services, customer satisfaction and reputation for adding value to the organisation
11. High performance culture	Outcome latent variable	The shared perception amongst members of a unit that high and exceptional performance in everything that the unit does is the norm or expectation in the organisational unit.
12. Future growth	Outcome latent variable	Index of projected future performance and includes profits and market share, capital investment, staff levels and expansion of the unit.
13. Task performance	Behavioural competency	The extent to which the work unit effectively performs activities that contribute to the organisation's technical core, performs the foundational, substantive and core technical tasks of the work unit effectively, successfully completes role activities prescribed in the work unit's "job description" and achieves work unit work objectives

2.8 PROPOSED WORK UNIT COMPETENCY MODEL

The connotative meaning of the organisational work unit performance construct, at least in part, lies in the internal structure of the construct. The creation of an organisational work unit performance model that explicates this internal structure will build on the previous work done by Henning *et al.* (2004) in the creation of the original PI unit performance model and utilise some of the originally suggested paths. To illustrate this, the paths that are retained from the original PI model were depicted in blue in the path diagram of the subsequently developed structural model that depicts the internal structure of the work unit performance construct.

The findings on the fit of the organisational unit performance structural model proposed by Henning *et al.* (2004) was reasonably impressive with a sample RMSEA estimate of .066. The close fit null hypothesis had, however to be rejected ($p<.05$).

Henning *et al.* (2004) nonetheless interpreted the basket of fit statistics as indicating a sufficiently reasonable model fit that warranted the interpretation of the structural model parameter estimates. Henning *et al.* (2004) generally found support for the hypothesised cause-and-effect ($p<.05$). However, the Henning *et al.* (2004) study was not without flaws and did not find empirical evidence in support of the hypothesised linkage between *production and efficiency* and *market standing* ($p>.05$). In the same trend, the study did not find evidence to support the hypothesis that *capacity* affects *production and efficiency* ($p>.05$) (Henning *et al.*, 2004). Both these finding came as somewhat of a surprise since both these hypotheses were thought to be theoretically quite convincing.

The Henning (2002) model, and her findings on the statistical significance of the estimates obtained for the freed structural parameters in the model, are important in the current study to assist in the development of hypotheses on the nature of the structural relations between the competencies and outcome latent variable in the newly proposed organisational work unit performance construct. Many of the original paths were retained as they made substantive theoretical sense and their path coefficients were found to be statistically significant ($p<.05$).

The following six paths from the original Henning et al. (2004) work unit performance structural model were retained in the current study:

- A path from core people processes to satisfaction;
- A path from core people processes affect climate;
- A path from core people processes affect future growth;
- A path from production and efficiency affect market standing;
- A path from market standing to future growth;
- A path from satisfaction to climate.

Further, each performance dimension that was categorised into a specific domain was given a specific colour in the path diagram of the performance structural model (Figure 2.3) to show the representation of that domain. For the purpose of the thesis, the circles depicted in the colour green represent the organisational unit competency latent variables and the circles depicted in the colour blue represent the organisational unit outcome latent variables. Additional paths between the newly introduced latent competency and latent outcome variables and between the newly introduced latent variables and the latent variables taken over from the original PI performance model were added to the performance model and depicted in black. A brief explanation of the logic underlying each of the newly proposed paths is provided below.

2.8.1 Additional Cause and Effect Relationships

2.8.1.1 Innovation to market standing

Innovation to *market standing* is the first additional path that was suggested. Innovative behaviour, according to the aforementioned definition, consists of key components such as handling unique situations and problems with innovation and creativity, thinking broadly and strategically in order to support and drive organisational change. Society continues to reward organisations or work units that display these key components of *innovation* in their operations. A couple of examples of major innovations in the last 20 years include Facebook, the social media website, and the iPhone, smart device. Consequentially, the organisations or work units that developed them, namely Facebook and Apple, have strengthened their market standing (or reputation) as a direct result of these innovations.

Furthermore, work units are faced with many unique challenges and situations in the current economic condition of South Africa. Often these challenges are unique and require ‘out-of-the-box thinking’ to fully address them. Once these become known outside the unit in the larger organisation the unit develops a reputation for adding value to the organisation. Therefore, work units that display innovative solutions to these challenges should maintain or gain a favourable *market standing*.

2.8.1.2 Innovation to future growth

Further, a path was hypothesised from *innovation* to *future growth*. *Future growth*, as previously defined, is a broad construct that consists of many components. These include includes projected/anticipated profits and market share, expected capital investment, growth in staff levels and expansion of the unit.

As was suggested, society continues to value and encourage innovation that makes improvements to daily life. Therefore, work units that have a track record of and continue to challenge the *status quo* will have favourable anticipated profits and market share. Furthermore, work units that create innovations which are well received by society and the organisation, will be acknowledged by the organisation that they form part of and this should encourage them to provide similar innovations. The ways of recognising and encouraging these innovation-prone work units includes providing favourable expected capital investment, increasing the staff levels and expanding the unit.

2.8.1.3 Innovation to production and efficiency via task performance

Innovation is hypothesised to positively affect *production and efficiency* but not directly. Rather *Innovation* is hypothesised to positively affect *task performance* and the latter to positively affect *production and efficiency*. *Production and efficiency* consists of quantitative outputs such as meeting goals, formulated in terms of quantity, quality and cost-effectiveness and task performance. Work units consistently face unique situations and problems that pose a threat to the *productivity and efficiency* to which they operate. A work unit must display creatively or reactive innovativeness to resolve these unique problems or situations to ensure that the *production and efficiency* remains at the acceptable level (i.e., that the quantity, quality and cost-effectiveness criteria are met).

It is further argued that many innovations are focused specifically on the core components of *production and efficiency*. More specifically, proactive innovations are often directed towards improving the quantity, cost effectiveness and task performance of the product or service of a work unit. Furthermore, even if innovations are not explicitly focused on these components, they are often a by-product.

Both pro- and reactive *innovation*, however needs to be expressed in the manner in which the work unit performs the activities that contribute to the organisation's technical core, and the manner in which the unit performs the foundational, substantive and core technical tasks of the work unit. *Innovation* cannot in and by itself affect *production and efficiency*. It needs to be channelled through *task performance*.

2.8.1.4 Innovation to employee green behaviour

A positive relationship is hypothesised between *innovation* and *employee green behaviour. EGB* was previously defined as scalable actions and behaviours that employees engage in that are linked with and contribute to or detract from environmental sustainability. Components of *EGB* include working sustainability, avoiding harm, influencing others and taking initiative. In recent times, the concern for the wellbeing of the environment has become a phenomenon. However, many organisations and work units still operate in a nonchalant manner towards the environment and consequently, the key components of *EGB* (influencing others and taking initiative). Therefore, a drastic change in mind-set towards environmentally friendly operations is required. One of the aspects of innovation refers to thinking broadly and strategically in order to support and drive organisational change. It is suggested that this high-level strategic thinking is required by work units to shift the practices of organisations to be more environmentally friendly.

The current environmental crises is a unique situation or problem to many organisations or work units. Further, depending on the product or service that is offered, organisations or work units contribute differently to the detriment to the environment. Therefore, work units must handle this unique situation or problem with innovation and creativity. more so, innovation is required in many of the core components of *EGB* such as working sustainably and avoiding harm (Albertyn, 2019).

2.8.1.5 Effort to production and efficiency via task performance

It is hypothesised that *effort* increases *production and efficiency*. Many organisations or work units have high expectations in terms of *production and efficiency*. This includes the quantitative outputs such as meeting goals, quantity, quality and cost-effectiveness, and task performance. In order to achieve these, work units must display the components of *effort* that include devoting constant attention towards work, using resources like time and care spend in order to be effective on the job, showing a willingness to keep working under detrimental conditions and spending the extra effort required for the task.

The effect of *effort* on *production and efficiency* is, however, hypothesised not to be direct but rather mediated by *task performance*. The devotion of constant attention towards work, using resources like time and care spend in order to be effective on the job, showing a willingness to keep working under detrimental conditions needs to be focussed on the activities that contribute to the organisation's technical core and the foundational, substantive or technical tasks that is essential for the work unit.

2.8.1.6 Satisfaction to effort

Further, a (positive) path is hypothesised from *satisfaction* to *effort*. It was previously identified that *satisfaction* includes satisfaction with the work and work context, empowerment, career progress and the outcomes of leadership. *Effort* refers to devoting constant attention towards work, using resources to be effective on the job, a willingness to keep working under detrimental conditions and putting in the extra effort required to complete the task.

As soon as a work unit experiences the aforementioned aspects of *satisfaction*, there should be a need or motivation for the unit to reciprocate the favourable conditions that it operates in. It is suggested that the manner in which this is done is by putting effort into the work that is required. Stated differently, if a work unit is dissatisfied with the conditions that it operates in, it is highly unlikely that they will be willing to display the components of effort, such as devoting constant energy to the task and working under detrimental conditions etc.

2.8.1.7 Organisational citizenship behaviour and counterproductive work behaviour to high performance culture

A (negative) path is hypothesised from *organisational citizenship behaviour (OCB)* and a (positive) path from *counterproductive workplace behaviour (CWB)* to *high performance culture (HPC)*. *HPC* quiet simply is the shared perception amongst members of the unit that high and exceptional performance in everything that unit does is the norm or expectation.

A *HPC* is not created by chance and is never created within a work unit through doing the bare minimum of what is required. It is essential that members in the work unit consistently conduct the core components of *OCB*. More specifically, it was suggested earlier that a work unit is greater than the sum of its parts and the work unit will produce high quality work if members voluntarily help colleagues with work. Furthermore, the work unit must carry out behaviours that contributes to the overall effectiveness of the organisation and go the extra mile.

Contrary to this, *CWB* consists of behaviours such as unwillingness to comply with organisation rules, not maintaining discipline, displaying confrontational behaviour to work and hinders the accomplishment of goals. These behaviours will inhibit a *HPC* within a work unit and even discourage individuals within a work unit who display exceptional performance to continue at this level. Furthermore, the *CWB* behaviours may become so pervasive that it eventually becomes the norm instead of *HPC*. Alternatively, a work unit may need to address the *CWB* in the work unit and not direct effort to performing at the highest level. Lastly, any individual in the work unit that displays *CWB* may prevent others who are willing to perform highly.

2.8.1.8 Organisational citizenship behaviour and counterproductive work behaviour to employee green behaviour.

A positive and a negative cause and effect relationship is hypothesised between *OCB, CWB* and *EGB*. Many organisations expect or have policies that require a work unit to display behaviours that favours the wellbeing of the environment. An aspect of *CWB* includes an unwillingness to comply with organisational rules. Therefore, the display of *EGB* should tend to be less to the extent that the work unit is unwilling to follow rules that promote environmental wellbeing.

As previously mentioned, the concern for the wellbeing of the environment is a recent phenomenon in many organisations and this opens the possibility for work units to interpret organisational expectations incorrectly, a core aspect of *CWB*. In addition to this, many of the behaviours in *EGB* (i.e. working sustainability and avoiding harm) require personal discipline to consistently carry out. To the extent that *CWB* is displayed in a work unit, the organisation will tend to fail to maintain this required discipline. Lastly, many organisations have the goal of reducing the impact that it has on the environment. A core component of *CWB* is displaying behaviours that hinder the accomplishment of goals.

In contrast to this, *OCB* includes voluntarily carrying out tasks that are not formally part of the job description. The current study's position is that *EGB* is an inherent requirement of every unit member's job. *EGB* is therefore not green *OCB*. Nonetheless it is argued that EGB comes more naturally to units that tend to display OCB. It is therefore hypothesised that displaying the aforementioned aspect of *OCB* will encourage *EGB*. Furthermore, protecting the environment may be a policy of the organisation and following policies and procedures is a core component of *OCB*.

In many instances, conducting behaviours that promote or protect the wellbeing of the environment require additional effort to behaviours that damage or destroy the environment. The work unit will be required to go the extra mile and tolerate inconveniences and impositions without complaining. These are considered *OCB*s. Lastly, the concern for the wellbeing of the environment is an important organisational affair. The work unit must display the *OCB* aspect of being actively and constructively involved in these matters to encourage the uptake of environmentally favourable behaviours.

2.8.1.9 High performance culture to production and efficiency via task performance

Work unit *high performance culture* is hypothesised to positively affect *production and efficiency* but not directly. Rather work unit *high performance culture* is hypothesised to positively affect *task performance* and the latter to positively affect *production and efficiency*. A *high-performance culture* is the shared perception amongst members of a unit that high and exceptional performance in everything that the unit does is the norm or expectation in the organisational unit. The extent to which a *HPC* is present in the unit should encourage the work unit to meet and exceed quantitative outputs such as meeting goals, quantity, quality and cost-effectiveness which are key components of production and efficiency. More so, the task performance of the work unit, in the presence of a *HPC,* should tend to be met and possibly exceeded.

Production and efficiency is a latent outcome variable. Rather than flowing directly from a high performance culture the current study would argue that the norms characterising a high performance culture need to manifest themselves in the manner in which the activities that contribute to the organisation's technical core are performed, in the manner in which he foundational, substantive and core technical tasks that is essential for of the work unit are performed and the manner in which the role activities prescribed in the work unit's "job description" are performed.

2.8.1.10 Production and efficiency to high performance culture

High performance culture refers to the shared perception amongst members of a unit that high and exceptional performance in everything that the unit does is the norm or expectation in the organisational unit. A *high-performance culture* does not materialise out of thin air but rather develops through the actions displayed by the work unit and the successes that are achieved through these actions. The current study therefore hypothesised that high *task performance* should, over time, result in the development of a *high-performance culture*. This effect was, however, hypothesised to be mediated by *production and efficiency*.

2.8.1.11 Climate to task performance

Henning *et al.* (2004) hypothesised that *climate* should exert a direct effect on *production and efficiency*. They, moreover, found support for this path. The current study classified *production and efficiency* as an outcome variable. *Climate* was likewise classified as an outcome variable. Henning *et al*. (2004) hypothesised that the *climate* in a work unit develops as a function of the extent to which the unit displays competence on the *core people processes* competency. They found support for this path. The current study concurs with the original Henning *et al*. (2004) hypothesis that *core people processes* has a positive effect on work unit *climate*. Rather than hypothesising a direct effect of *climate* on *production and efficiency*, like Henning *et al*. (2004) did, the current study hypothesises a mediated effect via *task performance*.

A work unit characterised by strong integration, commitment and cohesion, high agreement on core values, consensus regarding the vision and achievement-related attitudes and behaviours should tend to perform the activities that contribute to the organisation's technical core more effectively, perform the foundational, substantive and core technical tasks that is essential for of the work unit more effectively and complete the role activities prescribed in the work unit's "job description" more successfully.

2.8.1.12 Core people processes to task performance

Henning *et al.* (2004) hypothesised that *core people processes* should exert a direct effect on *production and efficiency*. They, moreover, found support for this path. The current study, however, argued that that the effect of *core people processes* on *production and efficiency* should be mediated by *task performance*.

An organisational work unit with a high standing on *core people processes* will be characterised by the use of goals and work plans, effective communication, the occurrence of frequent work unit interaction, the occurrence of constructive conflict management, productive clashing of ideas and the valuing of the integrity and uniqueness of the individual. Such a work unit should tend to perform the activities that contribute to the organisation's technical core more effectively, perform the foundational, substantive and core technical tasks that is essential for of the work unit more effectively and complete the role activities prescribed in the work unit's "job description" more successfully.

2.8.1.13 Task performance to production and efficiency

The current study regards production and efficiency is a latent outcome variable. It refers to the extent to which the work unit meets its goals defined in terms of criteria like quantity, quality and cost-effectiveness. To successfully meet these criteria, the unit needs to do something; it needs to act. The current study argues that successfully meeting should become more likely as the work unit tends to perform the activities that contribute to the organisation's technical core more effectively, perform the foundational, substantive and core technical tasks that is essential for of the work unit more effectively and complete the role activities prescribed in the work unit's "job description" more successfully.

2.8.1.14 Production and efficiency to future growth

Henning *et al*. (2004) did not hypothesise a direct path from *production and efficiency* to *future growth*. They only hypothesised that the effect of *production and efficiency* on *future growth* was mediated by *market standing*. The found support for the latter part of the mediated effect but not the former part. Henning *et al*. (2004), moreover, did not explicitly test the mediated effect. The current study retained that hypothesised mediated effect. In addition, however, it also hypothesised a direct positive effect of *production and efficiency* on *future growth*.

Projected future performance in terms of expected profits and predicted market share, anticipated capital investment and projections of required staff levels should be positively affected if the work unit succeeds in meeting its goals defined in terms of criteria like quantity, quality and cost-effectiveness.

2.9 STRUCTURAL MODEL

The research objective of the current study is to:

- Explicate the connotative meaning of the organisational unit performance construct (this translates to a partial competency model which structurally maps the latent behavioural unit competencies on the latent unit outcomes);
- Explicate the denotations of the organisational unit performance construct (specifically of the latent behavioural unit competencies and the latent unit outcomes);
- Develop a unit performance competency questionnaire [the Work Unit Competency Questionnaire (WUCQ)];
- Empirically test the reliability and construct validity of the WUCQ by fitting the WUCQ measurement model;
- Develop a unit performance outcome questionnaire [the Work Unit Outcome Questionnaire (WUOQ)];
- Empirically test the reliability and construct validity of the WUOQ by fitting the WUOQ measurement model; and

- Empirically test the construct validity of the WUCQ and the WUOQ by fitting the structural model that maps the latent behavioural unit competencies on the latent unit outcomes.

The theorising presented in Chapter 2 in response to the research initiating question resulted in the derivation of a structural model that depicts the internal structure of the organisational work unit performance construct. This is depicted in Figure 2.3.

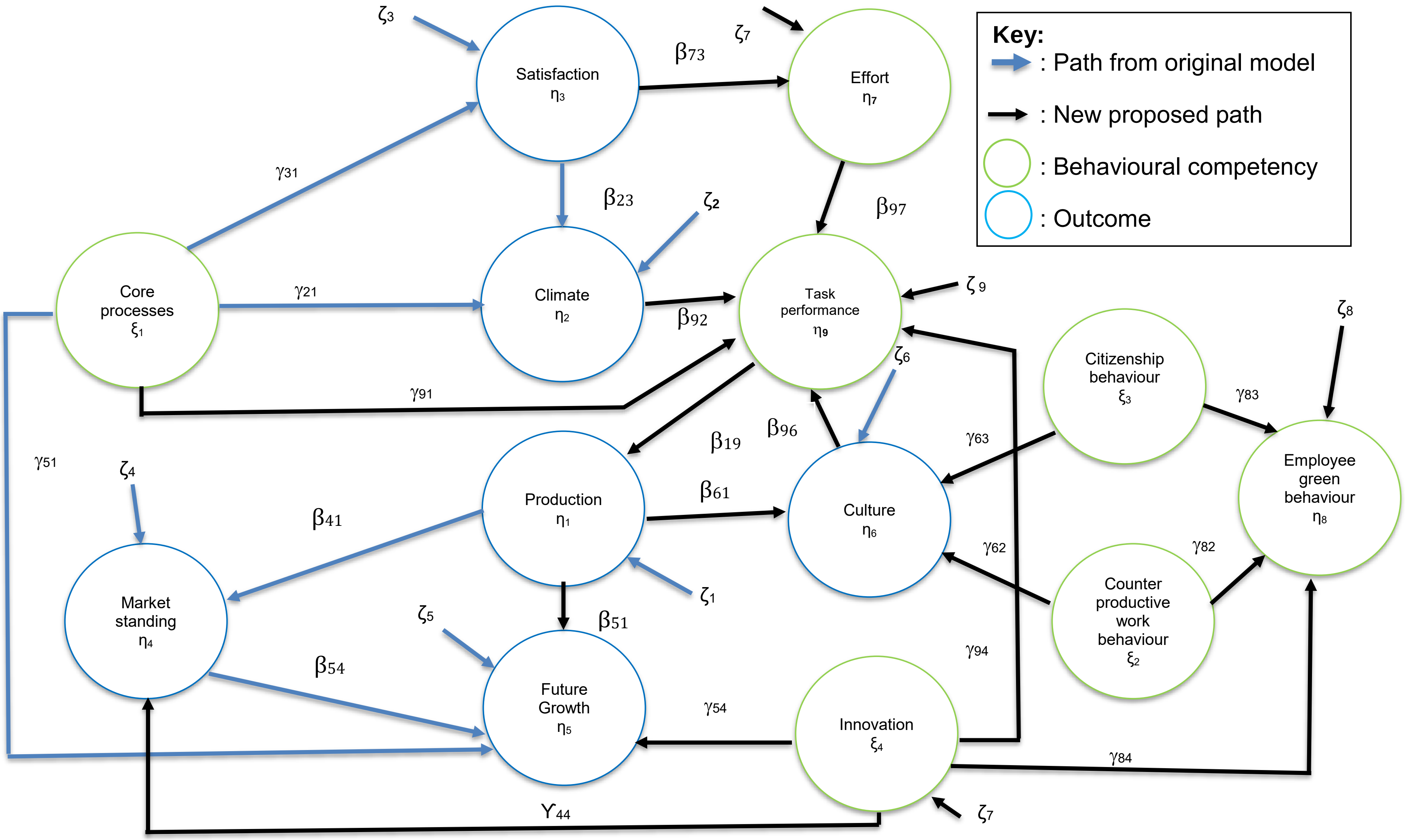

Figure 2.3. **Proposed Work Unit Performance structural model**

Note: Satisfaction refers to *satisfaction*, effort refers to *effort,* core processes refers to *core people processes*, climate refers to the *work unit climate*, task performance refers to *task performance*, citizenship behaviour refers to *organisational citizenship behaviour*, production refers to *production and efficiency*, culture refers to *high performance culture*, employee green behaviour refers to *employee green behaviour*, counterproductive work behaviour refers to *counterproductive work behaviour*, market standing refers to *market standing*, future growth refers to *future growth* and innovation refers to *innovation*.

CHAPTER 3
RESEARCH METHODOLOGY

3.1 INTRODUCTION

The purpose of the current study is to investigate the three-pronged research-initiating question, as stated in Chapter 1, to determine (a) what the connotative meaning of the organisational work unit performance construct is, (b) what the denotative meaning of the organisational work unit performance construct is and (c) whether the WUPQ provides a reliable and construct valid measure of the latent behavioural unit competencies and latent outcome variables constituting organisational work unit performance.

In the review of literature, it was determined that the PI dimensions suggested by Spangenberg and Theron (2004), and subsequently illustrated in the Henning *et al*. (2004) model, to describe organisational unit performance were not sufficiently comprehensive in nature. Later in Chapter 2 it was concluded in that the incompleteness of the model is as a result of the fact that the PI ignored the distinction between outcomes, competencies and competency potential latent variables. Consequently, both of the two categories of performance were underrepresented and competency potential latent variables were inappropriately included in the conceptualisation of the work unit performance construct.

In an attempt to create a comprehensive organisational work unit performance model (or partial organisational work unit competency model), through the process of theorising, additional variables were suggested for inclusion in the latent behavioural competency domain and the latent outcome domain of work unit performance. Further, cause-and-effect relationships were hypothesised between these suggested dimensions and the dimensions suggested by Spangenberg and Theron (2004). This culminated in the creation of a formal organisational work unit performance structural model.

The objective of the research methodology is to test the validity of the overarching substantive research hypotheses, operational hypotheses and path-specific substantive hypotheses in a manner that serves the epistemic ideal of science (i.e., that maximises the probability of coming to a valid verdict on the validity of the hypotheses). According to Babbie and Mouton (2001) the two characteristics of science that encourage valid results is objectivity and rationality. The first characteristic of objectivity refers to the conscious and purposeful reduction of error by the scientist. Further, science is to be considered rational due to the researcher explicating the methodological choices made and submitting them to inspection by knowledgeable peers.

The knowledgeable peer can only find flaws and downgrade confidence in the verdict if the methodology that is used in the research is described in sufficient detail. Therefore, this chapter will endeavour to provide a clear and comprehensive description of the methodology used.

3.2 SUBSTANTIVE RESEARCH HYPOTHESES

The first overarching substantive hypothesis (hypothesis 1) is that the Work Unit Competency Questionnaire (WUCQ) provides a reliable and construct valid measure of the competency domain of the organisational unit performance construct. The substantive hypothesis translates into the following specific operational hypotheses:

- Operational hypothesis 1: The measurement model implied by the scoring key and the design intention of the WUCQ can closely reproduce the co-variances observed between the items comprising each of the WUCQ scales;
- Operational hypothesis 2: The factor loadings of the items on their designated organisational unit competencies are statistically significant ($p<.05$) and large ($\lambda_{ij}\geq.50$);
- Operational hypothesis 3: The measurement error variances associated with each item are statistically significant ($p<.05$) but small,
- Operational hypothesis 4: The organisational unit competencies explain large proportions of the variance in the items that represent them ($\lambda^2_{ij}\geq.25$); and

- Operational hypothesis 5: The organisational unit competencies correlate statistically significantly ($p<.05$) but low to moderately ($\phi_{ij}<.90$) with each other (i.e., the WUCQ organisational unit competencies display discriminant validity).

The second overarching substantive hypothesis (hypothesis 2) is that the Organisational Work Unit Outcome Questionnaire (WUOQ) provides a reliable and construct valid measure of the outcome domain of the organisational unit performance construct. The substantive hypothesis translates into the following specific operational hypotheses:

- Operational hypothesis 6: The measurement model implied by the scoring key and the design intention of the WUOQ can closely reproduce the co-variances observed between the items comprising each of the WUOQ scales;
- Operational hypothesis 7: The factor loadings of the items on their designated organisational unit outcomes are statistically significant ($p<.05$) and large ($\lambda_{ij}\geq.50$);
- Operational hypothesis 8: The measurement error variances associated with each item are statistically significant ($p<.05$) but small.
- Operational hypothesis 9: The organisational unit outcomes explain large proportions of the variance in the items that represent them ($\lambda^2_{ij}\geq.25$).
- Operational hypothesis 10: The organisational unit outcomes correlate statistically significantly ($p<.05$) but low to moderately ($\phi_{ij}<.90$) with each other (i.e., the WUOQ organisational unit outcomes display discriminant validity).

The third overarching substantive hypothesis (hypothesis 3) is that the Organisational Work Unit Performance Questionnaire (WUPQ) provides a reliable and construct valid measure of the organisational unit performance construct. The substantive hypothesis translates into the following specific operational hypotheses:

- Operational hypothesis 11: The comprehensive LISREL model implied by the manner in which the constitutive definition of the organisational unit performance construct structurally links the organisational work unit competencies and organisational work unit outcomes in a nomological network of latent variables as described in Chapter 2 can closely reproduce the co-variances observed between item parcels calculated from the items comprising each of the WUPQ scales.

- Operational hypothesis 12: The slope of the regression of η_j on ξ_i and the regression of η_j on η_i in the structural model implied by the manner in which the constitutive definition of the organisational work unit performance construct structurally links the organisational work unit competencies and organisational work unit outcomes in a nomological network of latent variables are statistically significant ($p<.05$). This results in the following 22 path-specific substantive hypotheses:

Hypothesis 4: In the proposed work unit competency model[10] it is hypothesised that a high level of *core people processes* (ξ_1) will increase the *task performance* (η_9) of the work unit.

Hypothesis 5: In the proposed work unit competency model it is hypothesised that an increase in *core people processes* (ξ_1) will provide a strengthened *climate* of the work unit (η_2).

Hypothesis 6: In the proposed work unit competency model it is hypothesised that improved *core people processes* (ξ_1) increases the *satisfaction* of the work unit (η_3).

Hypothesis 7: In the proposed work unit competency model it is hypothesised that increased *core people processes* (ξ_1) will encourage *future growth* in the work unit (η_5).

[10] The phrase in the proposed organisational work unit performance model has been used on purpose in the formulation of each of the path specific hypotheses to formally acknowledge that the path coefficients associated with the structural paths in the model are partial regression slope coefficients. The estimates obtained for the path therefore describe the average change in the latent variable hypothesised to be affected associated with one unit change in the latent variable that has been hypothesised as the effect, while holding all other effects hypothesised to affect the focal latent variable constant. The path specific hypotheses should therefore not be seen as independent, isolated statements.

Hypothesis 8: In the proposed work unit competency model it is hypothesised that an increase in the *production and efficiency* (η_1) of the work unit will improve the *market standing* (η_4) of the work unit.

Hypothesis 9: In the proposed work unit competency model it is hypothesised that a beneficial *climate* (η_2) will increase the *task performance* (η_9) of a work unit.

Hypothesis 10: In the proposed work unit competency model it is hypothesised that heightened *satisfaction* (η_3) will provide a productive *climate* (η_2).

Hypothesis 11: In the proposed work unit competency model it is hypothesised that a competitive *market standing* (η_4) of the organisation will encourage the *future growth* (η_5) of the work unit.

Hypothesis 12: In the proposed work unit competency model it is hypothesised that an increase in *counterproductive workplace behaviour* (ξ_2) will negatively influence the *high-performance work unit culture* (η_6).

Hypothesis 13: In the proposed work unit competency model it is hypothesised that an increase in *counterproductive work behaviour* (ξ_2) will decrease *employee green behaviour* (η_8).

Hypothesis 14: In the proposed work unit competency model it is hypothesised that increased *citizenship behaviour* (ξ_3) will positively influence the *high-performance culture* of the work unit (η_6).

Hypothesis 15: In the proposed work unit competency model it is suggested that *citizenship behaviour* (ξ_3) will increase *employee green behaviour* (η_8).

Hypothesis 16: In the proposed work unit competency model it is hypothesised that *innovation* (ξ_4) will encourage the *task performance* (η_9) of a work unit.

Hypothesis 17: In the proposed work unit competency model it is hypothesised that *innovation* (ξ_4) will improve the *market standing* of the work unit (η_4).

Hypothesis 18: In the proposed work unit competency model it is hypothesised that *innovation* (ξ_4) will encourage *the future growth* (η_5) of the work unit.

Hypothesis 19: In the proposed work unit competency model it is hypothesised that *innovation* (ξ_4) will increase the *employee green behaviour* (η_8).

Hypothesis 20: In the proposed work unit competency model it is hypothesised that an increase in the *production and efficiency* of a work unit (η_1) will have a positive impact on the *high-performance culture* of a work unit (η_6).

Hypothesis 21: In the proposed work unit competency model it is hypothesised that an increased *satisfaction* (η_3) will increase the *effort* of the members in the work unit (η_7).

Hypothesis 22: In the proposed work unit competency model it is hypothesised that a *high-performance work unit culture* (η_6) will improve the *task performance* of the work unit (η_9).

Hypothesis 23: In the proposed work unit competency model it is hypothesised that an increase in the *effort* (η_7) of the work unit will improve the task performance (η_9) of the work unit.

Hypothesis 24: In the proposed work unit competency model it is hypothesised that an increase in *production and efficiency* (η_1) of the work unit will encourage *future growth* (η_5).

Hypothesis 25: In the proposed work unit competency model it is hypothesised that an increase in the *task performance* (η_9) of the work unit will increase the *production and efficiency* (η_1) of the work unit.

3.3 RESEARCH DESIGN

As positivistic science relies on empirical evidence to support its claims, a plan is required to test the validity of the aforementioned overarching substantive hypotheses and the path-specific substantive hypotheses. More specifically the validity of the twelve operational hypotheses have to be tested. The research design describes the procedure and its underlying logic through which the validity of the stated operational research hypothesis can be empirically tested. This encourages the previously mentioned rationality that Babbie and Mouton (2001) described as it allows the knowledgeable researcher to scrutinise the methodology. The manner in which the overarching substantive hypotheses and the path-specific substantive hypotheses are tested according to the research design must be such that the results obtained can be interpreted unambiguously for or against the operational hypotheses.

According to Kerlinger (1973) the research design is the plan, structure and strategy that guide the investigation with the sole purpose of answering the research questions and to control variance. The research design should control (dependent variable) variance so as to ensure unambiguous results. Control of (dependent variable) variance is achieved by maximising systematic variance, minimising error variance and controlling extraneous variance. Further, the extent in which the research design succeeds in maximising systematic variance, minimising error variance and controlling extraneous variance will determine the credibility of the verdicts on the validity of the operational hypotheses (Kerlinger & Lee, 2001).

Operational hypothesis 1 hypothesised that the measurement model implied by the scoring key and the design intention of the WUCQ can closely reproduce the co-variances observed between the items comprising each of the WUCQ scales. Under operational hypotheses 2-5 it was, in addition, hypothesised that the slope of the regression of specific items on the specific unit performance competency that the item is meant to represent is positive and statistically significant, that the measurement error variances associated with the WUCQ are statistically significant, that the completely standardised factor loadings are large and the completely standardised error variances are small and that the unit performance competencies only correlate moderately positive with each other.

Operational hypothesis 6 suggested that the measurement model implied by the scoring key and the design of the WUOQ can reproduce the co-variances observed between the items comprising each of the WUOQ scales. Further, operational hypotheses 7-10 hypothesised that the slope of the regression of the specific items on the specific work unit outcomes it is supposed to represent is both positive and significant, that the measurement error variances associated with the WUOQ are statistically significant, the completely standardised factor loadings are large, the completely standardised error variances are small and the unit performance outcomes only correlate moderately with each other.

Operational hypothesis 11 claimed that the structural model implied by the manner in which the constitutive definition of the organisational unit performance construct embeds organisational work unit competencies and organisational work unit outcomes in a nomological network of latent variables as described in Chapter 2 can closely reproduce the co-variances observed between item parcels calculated from the items comprising each of the WUPQ scales. Operational hypothesis 12 in addition hypothesised that the slope of the regression of η_j on ξ_i and the regression of η_j on η_i in the structural model implied by the manner in which the constitutive definition of the organisational work unit performance construct embeds organisational work unit competencies and organisational work unit outcomes in a nomological network of latent variables are statistically significant ($p<.05$).

There are numerous types of research designs that are available to the researcher. The appropriateness of the choices differs depending on the stated objectives and the research question that the study attempts to answer. For the purpose of this thesis, the research design that is chosen is an *ex post facto* correlational design with two or more indicator variables per latent variable. According to Kerlinger and Lee (2001), this type of research design is appropriate for an analytical empirical inquiry into independent variables that the researcher does not have direct control over. This inability to control the independent variables is either because the phenomenon has already taken place or the nature of the variable does not allow manipulation. Three versions of the *ex post facto* correlational design will be used. One design is needed to test operational hypotheses 1-5, another to test operational hypotheses 6-10 and another to test operational hypotheses 11 and 12.

The reason for the choice of an *ex post facto* correlational research design in this study is two pronged. Firstly, the *ex post facto* correlational design with the individual items of the WUCQ and WUOQ as observed variables is the only design that would allow the fitting of the WUCQ and WUQO measurement models. Secondly, as depicted in the proposed organisational work unit performance model, there are a large number of endogenous latent variables and there are casual links present between these endogenous latent variables. The *ex post facto* correlational design is the only design that would allow the empirical testing of the partial competency model as an integrated whole and that would allow the empirical testing of hypotheses on structural linkages between endogenous latent variables. Depicted schematically, the research design used to test operational hypotheses 1-5 is shown in Figure 3.1.

$$
\begin{array}{ccccccc}
[X_{11}] & [X_{12}] & [X_{13}] & \ldots & [X_{1J}] & \ldots & [X_{1,70}]^{11} \\
[X_{21}] & [X_{22}] & [X_{23}] & \ldots & [X_{2j}] & \ldots & [X_{2,70}] \\
: & : & : & : & : & : & : \\
[X_{i1}] & [X_{i1}] & [X_{i3}] & \ldots & [X_{ij}] & \ldots & [X_{i,70}] \\
: & : & : & : & : & : & : \\
[X_{n1}] & [X_{n1}] & [X_{n3}] & \ldots & [X_{nj}] & \ldots & [X_{n,70}]
\end{array}
$$

***Figure 3.1.* The research design to test operational hypothesis 1-5**

Further, the operational research design to test operational hypothesis 6-10 is

$$
\begin{array}{ccccccc}
[X_{11}] & [X_{12}] & [X_{13}] & \ldots & [X_{1J}] & \ldots & [X_{1,60}]^{12} \\
[X_{21}] & [X_{22}] & [X_{23}] & \ldots & [X_{2j}] & \ldots & [X_{2,60}] \\
: & : & : & : & : & : & : \\
[X_{i1}] & [X_{i1}] & [X_{i3}] & \ldots & [X_{ij}] & \ldots & [X_{i,60}] \\
: & : & : & : & : & : & : \\
[X_{n1}] & [X_{n1}] & [X_{n3}] & \ldots & [X_{nj}] & \ldots & [X_{n,60}]
\end{array}
$$

***Figure 3.2.* The research design to test operational hypothesis 6-10**

[11] For the purpose of the schematic portrayal of the ex post facto correlational design 10 items are assumed per subscale.
[12] For the purpose of the schematic portrayal of the ex post facto correlational design 10 items are assumed per subscale.

The research design used to test operational hypotheses 11-12 is shown in Figure 3.3.[13]

$[X_{11}]$	…	$[X_{18}]$	Y_{11}	…	$Y_{1,16}$
$[X_{21}]$	…	$[X_{28}]$	Y_{21}	…	$Y_{2,16}$
:		:	:	:	
$[X_{i1}]$	…	$[X_{i8}]$	Y_{i1}	…	Y_{i16}
:		:	:	:	
$[X_{n1}]$		$[X_{n8}]$	Y_{n1}	…	Y_{n16}

***Figure 3.3.* The research design to test operational hypothesis 11-12**

It is necessary to explicate the logic underlying both of the proposed *ex post facto* correlational design before it is employed. This insight will encourage the correct interpretation of the obtained results. The logic underlying the design is as follows; the researcher gathers measurements of the observed variables and calculates the observed covariance matrix. Estimates for the free structural and measurement model parameters are acquired in an iterative fashion with the purpose of replicating the observed covariance matrix as closely as possible (Theron, 2016). If the fitted model does not reproduce the observed covariance matrix it follows that the measurement model/structural model does not offer a plausible explanation for the observed covariance matrix. The conclusion is then warranted that the measurement relations/structural relations hypothesised in the model then do not provide a plausible portrayal of the psychological process shaping the phenomenon that is researched.
Contrary to this, the opposite is not true. If the covariance matrix replicated from the estimated structural and measurement model parameters closely agrees with the observed covariance matrix, it does not suggest that psychological dynamics theorised by the measurement/structural model necessarily produced the observed covariance matrix (Theron, 2016). Therefore, it is not permissible to conclude that the psychological process illustrated in the model *must have* created the levels of the WUCQ and WUOQ items/endogenous latent variables constituting the phenomenon of interest. A high level of fit between the observed and estimated covariance matrices would only mean that the psychological processes depicted in the measurement

[13] For the purpose of the schematic portrayal of the ex post facto correlational design two indicators are assumed per latent variable.

models/structural model provides one plausible explanation for the observed covariance matrix. This conclusion with regards to the structural model is only rational if prior evidence exists that the measurement models fit closely (Theron, 2016).

3.4 STATISTICAL HYPOTHESES

The aforementioned three overarching substantive research hypotheses will be tested by testing the twelve operational research hypotheses. Ten of the twelve operational research hypotheses (excluding operational hypotheses 4 and 9) are now translated into statistical hypothesis. The practice of forming statistical hypothesis is utilised by the researcher to test the operational hypotheses quantitatively and obtain the benefits of quantification. Quantification holds the benefit of unambiguous communication, permit a more precise description and allows for more sophisticated argumentation. It is the latter advantage that primarily motivates the translation of the operational hypotheses to statistical hypotheses. More specifically, quantification allows the researcher to determine whether the discrepancy between sample findings and an assumption (i.e., hypothesis) about the value of a parameter (or a fit statistic) in the population can be attributed to sampling error which would not have been possible if information on the latent variables have been collected quantitatively.

3.4.1 Operational Hypothesis 1

Under operational hypothesis 1 the proposed WUCQ measurement model's fit must be tested by establishing the extent to which the model can reproduce the empirical data/observed inter-item covariance matrix. When the overarching substantive hypothesis 1 is interpreted to mean that the proposed work unit performance measurement model provides an exact description of the process that created the observed covariance matrix, the overarching substantive hypothesis translates to an exact fit hypothesis.

Stated statistically, the exact fit hypothesis is as follows:

H_{01}: RMSEA = 0

H_{a1}: RMSEA > 0

When the overarching substantive hypothesis is interpreted to mean that the proposed work unit performance measurement model provides only an approximate description of the process that created the observed covariance matrix, the overarching substantive hypothesis translates to a close fit hypothesis.

Stated statistically, the close fit hypothesis is as follows:

H_{02}: RMSEA ≤ .05

H_{a2}: RMSEA > .05

If it is found that the measurement model fits the data at least reasonably well, operational hypotheses 2, 3 and 5 must also be translated into statistical hypothesis to be tested empirically and accumulate the aforementioned benefits of creating statistical hypothesis.

3.4.2 Operational Hypothesis 2

Operational hypothesis 2 will be investigated by testing the following 70 null hypotheses on the slope of the regression of item j on organisational unit competency k will be tested:

H_{0i}: λ_{jk}=0; i=3, 4, …, 72; j=1, 2, …, 70; k=1, 2, …, 6

H_{ai}: λ_{jk} >0; i=3, 4, …, 72; j=1, 2, …, 70; k=1, 2, …, 6

3.4.3 Operational Hypothesis 3

Operational hypothesis 3 will be evaluated by testing the following 70 null hypotheses on the freed elements in the variance-co-variance matrixΘ_δ:

H_{0i}: $\Theta_{\delta jj}$ =0; i =73, 74,..., 142; j=1, 2.....6

H_{ai}: $\Theta_{\delta jj}$ > 0; i =73, 74,..., 142; j=1, 2.....6

3.4.4 Operational Hypothesis 5

Operational hypothesis 5 will be tested by investigating the following 15 null hypotheses with regards to the freed elements in the variance-co-variance matrixΦ:

H_{0i}: ϕ_{jk} =0; i =143, 144,..., 157; j=1, 2.....6; k=1, 2.....6; j≠k

H_{Ai}: ϕ_{jk} > 0; i =143, 144,..., 157; j=1, 2.....6; k=1, 2.....6; j≠k[14]

3.4.5 Operational Hypothesis 6

Under operational hypothesis 6 the proposed WUOQ measurement model's fit must be tested by establishing the extent to which the model can reproduce the empirical data/observed inter-item covariance matrix. When overarching substantive hypothesis 2 is interpreted to mean that the proposed work unit performance measurement model provides an exact description of the process that created the observed covariance matrix, the overarching substantive hypothesis translates to an exact fit hypothesis.

Stated statistically, the exact fit hypothesis is as follows:

H_{0158}: RMSEA = 0

H_{a158}: RMSEA > 0

When the overarching substantive hypothesis is interpreted to mean that the proposed work unit performance measurement model provides only an approximate description of the process that created the observed covariance matrix, the overarching substantive hypothesis translates to a close fit hypothesis.

Stated statistically, the close fit hypothesis is as follows:

H_{0159}: RMSEA ≤ .05

H_{a159}: RMSEA > .05

If it is found that the measurement model fits the data at least reasonably well, operational hypotheses 7, 8 and 10 must also be translated into statistical hypothesis to be tested empirically and accumulate the aforementioned benefits of creating statistical hypothesis.

[14] Hai; i =143, 144,..., 157 were formulated as directional alternative hypotheses because CWB was expected to correlate positively with the remaining latent competencies because of the manner in which the CWB items were scored.

3.4.6 Operational Hypothesis 7

Operational hypothesis 7 will be investigated by testing the following 60 null hypotheses on the slope of the regression of item j on organisational unit outcome k will be tested:

H_{0i}: λ_{jk}=0; i=160, 161, …, 219; j=1, 2, …, 60; k=1, 2, …, 6

H_{ai}: λ_{jk}>0; i=160, 161, …, 219; j=1, 2, …, 60; k=1, 2, …, 6

3.4.7 Operational Hypothesis 8

Operational hypothesis 8 will be verified by testing the following 60 null hypotheses on the freed elements in the variance-co-variance matrix $\mathbf{\Theta}_{\delta}$:

H_{0i}: $\Theta_{\delta jj}$ =0; i = 220, 221,..., 279; j=1, 2.....60

H_{ai}: $\Theta_{\delta jj}$ > 0; i =220, 227,..., 279; j=1, 2.....60

3.4.8 Operational Hypothesis 10

Operational hypothesis 10 will be tested by investigating the following 15 null hypotheses with regards to the freed elements in the variance-co-variance matrix $\mathbf{\Phi}$:

H_{0i}: ϕ_{jk} =0; i =280, 281 ,..., 294; j=1, 2.....6; k=1, 2.....6; j≠k

H_{Ai}: ϕ_{jk} > 0; i =280, 281,..., 294; j=1, 2.....6; k=1, 2.....6; j≠k

3.4.9 Operational Hypothesis 11

Under operational hypothesis 11, the proposed structural model's fit must be tested by establishing the extent to which the model can reproduce the empirical data/observed inter-indicator covariance matrix. When the overarching substantive hypothesis is interpreted to convey that the proposed work unit performance structural model provides an exact description of the process that created the observed covariance matrix, the overarching substantive hypothesis translates to the following exact fit hypothesis:

H_{0295}: RMSEA = 0

H_{a295}: RMSEA > 0

If the overarching substantive hypothesis is interpreted to suggest that the proposed work unit performance structural model provides only an approximate description of the process that created the observed covariance matrix, the overarching substantive hypothesis translates to the following close fit hypothesis:

H_{0296}: RMSEA ≤ .05

H_{a296} RMSEA > .05

3.4.10 Operational Hypothesis 12

Operational hypothesis 12 will be tested by testing the following 22 path coefficient null hypotheses on the freed elements in the Γ and **B** matrices:

Path-specific substantive hypothesis 4: In the proposed work unit competency model it is hypothesised that a high level of *core people processes* (ξ_1) will increase the *task performance* (η_9) of the work unit.

H_{0297}: $\gamma_{91}=0$

H_{a297}: $\gamma_{91}>0$

Path-specific substantive hypothesis 5: In the proposed work unit competency model it is hypothesised that an increase in *core people processes* (ξ_1) will provide a strengthened *climate* of the work unit (η_2).

H_{0298} $\gamma_{21}=0$

H_{a298} $\gamma_{21}>0$

Path-specific substantive hypothesis 6: In the proposed work unit competency model it is hypothesised that improved *core people processes* (ξ_1) will increase the s*atisfaction* of the work unit (η_3).

H_{0299}: $\gamma_{31}=0$

H_{a299}: $\gamma_{31}>0$

Path-specific substantive hypothesis 7: In the proposed work unit competency model it is hypothesised that increased *core people processes* (ξ_1) will encourage *future growth* in the work unit (η_5).

H_{0300}: $\gamma_{51}=0$

H_{a300}: $\gamma_{51}>0$

Path-specific substantive hypothesis 8: In the proposed work unit competency model it is hypothesised that an increase in the *production and efficiency* (η_1) of the work unit will improve the *market standing* (η_4) of the work unit.

H_{0301}: $\beta_{41}=0$

H_{a301}: $\beta_{41}>0$

Path-specific substantive hypothesis 9: In the proposed work unit competency model it is hypothesised that a beneficial *climate* (η_2) will increase the *task performance* (η_9) of a work unit.

H_{0302}: $\beta_{92}=0$

H_{a302}: $\beta_{92}>0$

Path-specific substantive hypothesis 10: In the proposed work unit competency model it is hypothesised that heightened *satisfaction* (η_3) will provide a (η_2).

H_{0303}: $\beta_{23}=0$

H_{a303}: $\beta_{23}>0$

Path-specific substantive hypothesis 11: In the proposed work unit competency model it is hypothesised that a competitive *market standing* (η_4) of the work unit will encourage the *future growth* (η_5) of the work unit.

H_{0304}: $\beta_{54}=0$

H_{a304}: $\beta_{54}>0$

Path-specific substantive hypothesis 12: In the proposed work unit competency model it is hypothesised that an increase in *counterproductive workplace behaviour* (ξ_2) will negatively influence *high performance culture* of the work unit (η_6).

H_{0305}: $\gamma_{62}=0$

H_{a305}: $\gamma_{62}<0$

Path-specific substantive hypothesis 13: In the proposed work unit competency model it is hypothesised that an increase in *counterproductive work behaviour* (ξ_2) will decrease *employee green behaviour* (η_8).

H_{0306}: $\gamma_{82}=0$

H_{a306}: $\gamma_{82}<0$

Path-specific substantive hypothesis 14: In the proposed work unit competency model it is hypothesised that increased *citizenship behaviour* (ξ_3) will positively influence the *high-performance culture* of the work unit (η_6).

H_{0307}: $\gamma_{63}=0$

H_{a307}: $\gamma_{63}>0$

Path-specific substantive hypothesis 15: In the proposed work unit competency model it is suggested that *citizenship behaviour* (ξ_3) will increase *employee green behaviour* (η_8).

H_{0308}: $\gamma_{83}=0$

H_{a308}: $\gamma_{83}>0$

Path-specific substantive hypothesis 16: In the proposed work unit competency model it is hypothesised that *innovation* (ξ_4) will encourage the *task performance* (η_9) of a work unit.

H_{0309}: $\gamma_{94}=0$

H_{a309}: $\gamma_{94}>0$

Path-specific substantive hypothesis 17: In the proposed work unit competency model it is hypothesised that *innovation* (ξ_4) will improve the *market standing* of the work unit (η_4).

H_{0310}: $\gamma_{44}=0$

H_{a310}: $\gamma_{44}>0$

Path-specific substantive hypothesis 18: In the proposed work unit competency model it is hypothesised that *innovation* (ξ_4) will encourage the *future growth* (η_5) of the work unit.

H_{0311}: $\gamma_{54}=0$

H_{a311}: $\gamma_{54}>0$

Path-specific substantive hypothesis 19: In the proposed work unit competency model it is hypothesised that *innovation* (ξ_4) will increase the *employee green behaviour* (η_8).

H_{0312}: $\gamma_{84}=0$

H_{a312}: $\gamma_{84}>0$

Path-specific substantive hypothesis 20: In the proposed work unit competency model it is hypothesised that an increase in the *production and efficiency* of a work unit (η_1) will have an impact on the *high-performance culture* of a work unit (η_6).

H_{0313}: $\beta_{61}=0$

H_{a313}: $\beta_{61}>0$

Path-specific substantive hypothesis 21: In the proposed work unit competency model it is hypothesised that an increased *satisfaction* (η_3) will increase the *effort* of the members in the work unit (η_7).

H_{0314}: $\beta_{73}=0$

H_{a314}: $\beta_{73}>0$

Path-specific substantive hypothesis 22: In the proposed work unit competency model it is hypothesised that a positive *high-performance* work unit *culture* (η_6) will improve the *task performance* of the work unit (η_9).

H_{0315}: β_{96}=0

H_{a315}: β_{96}>0

Path-specific substantive hypothesis 23: In the proposed work unit competency model it is hypothesised that an increase in the *effort* (η_7) of the work unit will improve the *task performance* (η_9) of the work unit.

H_{0316}: β_{97}=0

H_{a316}: β_{97}>0

Path specific substantive hypothesis 24: In the proposed work unit competency model it is hypothesised that an increase in *production and efficiency* (η_1) of the work unit will encourage *future growth* (η_5)

H_{0317}: β_{18}=0

H_{a317}: β_{18}>0

Path specific substantive hypothesis 25: In the proposed work unit competency model it is hypothesised that an increase in the *task performance* (η_9) of the work unit will increase the *production and efficiency* (η_1) of the work unit.

H_{0318}: β_{19}=0

H_{a318}: β_{19}>0

To test operational hypotheses 11 and 12 the measurement model that describes the manner in which the thirteen latent performance dimensions comprising the unit performance structural model had been operationalised first had to be fitted. Only if the work unit performance measurement model displayed at least reasonable fit, the unstandardised factor loadings were statistically significant ($p<.05$), the completely standardised factor loadings were large ($\lambda_{ij}>.71$), the unstandardised measurement error variances were statistically significant ($p<.05$), the completely standardised measurement error variances were small ($\Theta_{\delta ii}<.50$) and the inter-latent variable correlations were small (ϕ_{pj}<.90) could the operationalisation of the latent work unit performance dimensions be considered successful. Only if the operationalisation of the latent work unit performance dimensions could be considered successful could the comprehensive LISREL model be fitted so as to evaluate the work unit performance structural model. This fitting of the work unit performance measurement model involved the testing of the following hypotheses:

The exact fit null hypothesis:

H_{0319}: RMSEA = 0

H_{a319}: RMSEA > 0

The close fit hypothesis:

H_{0320}: RMSEA ≤ .05

H_{a320}: RMSEA > .05

To test the statistical significance of the unstandardised factor loadings the following 26 hypotheses were tested:

H_{0i}: λ_{jk}=0; i=321, 322…, 346; j=1, 2, …, 26; k=1, 2, …, 13

H_{ai}: λ_{jk}>0; i=321, 322, …, 346; j=1, , …, 26; k=1, 2, …, 13

To test the statistical significance of the unstandardised measurement error variances the following 26 hypotheses were tested:

H_{0i}: $\theta_{\delta jj}$=0; i = 347, 348,..., 372; j=1, 2.....26

H_{ai}: $\theta_{\delta jj}$>0; i =347, 348,..., 372; j=1, 2.....26

To test the statistical significance of the standardised inter-latent variable correlations the following 78 hypotheses were tested:

H_{0i}: ϕ_{jk} =0; i =373, 374,..., 450; j=1, 2.....13; k=1, 2.....13; j≠k

H_{ai}: ϕ_{jk}>0; i =373, 374,..., 450; j=1, 2.....13; k=1, 2.....13; j≠k[15]

---

[15] Hai; i =372, 373,..., 449 were formulated as directional alternative hypotheses because CWB was expected to correlate positively with the remaining latent competencies and latent outcome variables because of the manner in which the items were scored.

3.5 SAMPLING

In this research proposal, as stated in Chapter 1, the work unit is conceptualised as a permanent or temporary organisational entity that operates in a private, state-owned or not-for-profit organisation. The size of these work units varies from a small team consisting of a leader and three subordinates to a department within a company that is comprised of a large number of individuals (Spangenberg & Theron, 2004). This broad definition provides a vast target population that is applicable to the study.

However, it is not viable and feasible to include and test every work unit in South Africa that meets the criteria described in the above definition. In addition, it is not even practically possible to select a representative sample from this target population because of the lack of a suitable sampling frame. Therefore, a sample population must be considered that can practically allow selection whilst preferably not seriously risking the validity of the findings of the study. The sample population refers to those elements in the target population that will have a positive probability of being selected in the sample.

For the purpose of the research, the chosen sample population for this study was at first a national organisation with a portfolio of different branches and franchises. Therefore, a franchise store or a branch of this national organisation was initially considered a work unit. The reason for this initial choice of an organisation with a diverse range of organisational work units was to acknowledge the generic nature of the work unit performance questionnaire.

Using this initial line of reasoning, the proposed method to select the sample was a two stage cluster sampling procedure in terms of which a random sample of work units would be selected and two managers would then be selected from each selected branch. At the outset the idea was therefore to use a multi-rater system with two branch/franchise managers on differing levels of the hierarchy rating the performance of the work units on the various performance dimensions.

However, there was an extremely disappointing response from the branches and franchises and the minimum required sample size was not reached for the study[16]. Therefore, an alternative means to obtain the required sample size had to be found. It was decided that convenience sampling, a non-probability sampling technique, via a social media network will be used. The social media network that was used was Facebook and friends that met the specific inclusion criteria[17] were sent a link to access the online electronic composite questionnaire. Friends of the researcher were in turn requested to share the post *verbatim* with their friends.

Under the revised sampling procedure, a single rater evaluated each work unit. This had the benefit of simplifying the statistical analysis considerably. Under a multi-rater data collection procedure, rater would have become another source of systematic variance that would have had to be formally acknowledged in the confirmatory factor analysis.

The initial sampling procedure that was proposed was flawed as there is a large sample gap in that the branches/franchises of this one national organisation cannot be considered representative of the target population of all possible work units in the private- and public sector in South Africa. The use of Facebook opened up the possibility of assessing a larger variety of work units in various companies and industries. In this sense the revised sampling strategy was better aligned the generic intent of the WUPQ. It can, however, still not be claimed that the sample that was selected via Facebook was representative of the target population of work units in South Africa. A substantial sampling gap still had to be acknowledged.

After the determination of the representative sample population, the next logical step was to calculate the required sample size. In the determination of this, it initially required to calculate the number of freed parameters in the measurement model with the largest number of freed parameters.

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[16] Only 22 responses had been obtained over the period of a month.
[17] The criteria were that participants had to form part of a work unit either as manager or as subordinate reporting to a manager. A work unit can range from a team of 3 individuals to a large department.

Table 3.1.

The number of freed parameters in the WUCQ measurement model

Parameter	Number
Λ^x	70
Φ	21
θ_δ	70
Total	161

The degrees of freedom are therefore (70 x 71)/2 – 161 = 2485 – 161 = 2324.

In the determination of the required sample the first perspective that is considered is that of statistical power. The sample needs to be sufficiently large to allow the hypothesis of exact and close fit to be tested with sufficient statistical power. Statistical power refers to the probability of rejecting the null hypothesis being tested if it is false. The software that was used to establish the sample size that is required to ensure sufficient statistical power is the Preacher and Coffman R software (Preacher & Coffman, 2006).

Under the premise that the null hypothesis for exact fit is tested for the WUCQ measurement model, and assuming that the population RMSEA value is .05, the significance level is set at .05, the degrees of freedom are 2324 and the desired level of statistical power is .80, the sample size that the Preacher and Coffman R software computed is n = 31.15234 = 31 work units (Preacher & Coffman, 2006).

Under the premise that the null hypothesis for close fit is tested for the WUCQ measurement model, and assuming that the population RMSEA value is .08, the significance level is set at .05 the degrees of freedom are 2324 and the desired level of statistical power is .80, the sample size that the Preacher and Coffman R Software computed is n = 21.24023 = 21 work units (Preacher & Coffman, 2006). The relationship between the statistical power of the test of the hypothesis of close fit and sample size is depicted below in Figure 3.4. The minimum number of sample size to have an acceptable power of .80 is *circa* 21 work units. This is the minimum that the study considers. Further, of interest to the study is the sample size that an increase in the number of participants does not increase the power. This point is illustrated in

Figure 3.4 at the sample size of *circa* 40 participants where the gradient of the line remains at 0.

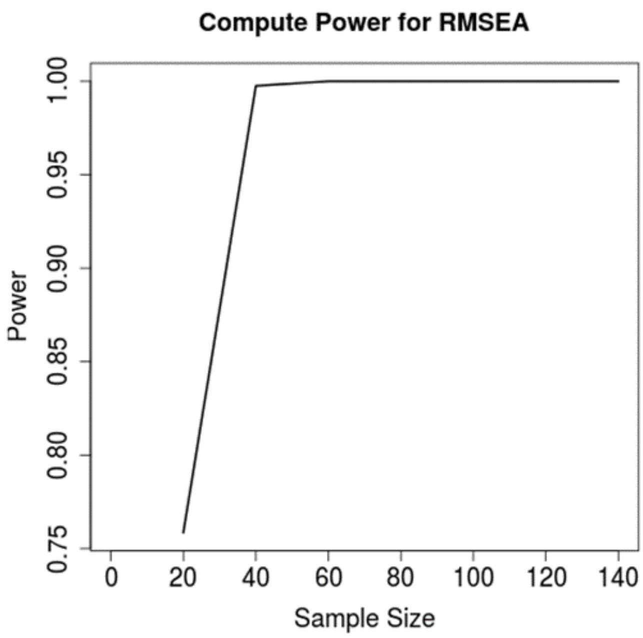

***Figure 3.4.* The minimum sample size with a statistical power of .8 (**Preacher & Coffman, 2006)

The second perspective that was considered in the investigation into the required sample size is the Bentler and Chou (1987) rule of thumb. They suggest that the sample size should be 5-10 times greater than the number of freed parameters in the model. The logic underlying these considerable figures is to obtain trustworthy z-tests on the significance of the parameters and to obtain correct model evaluation chi-square probabilities.

In light of the following logic, the following sample sizes should be considered:

161 x 5= 805 work units

161 x 10= 1610 work units

The time, financial and logistical considerations must also be evaluated in the decision on an adequate sample size. It is not feasible or possible for an individual researcher with limited funds to sample 1610 work units in South Africa as that number will require too large of an investment in resources. Even the number suggested by the lower bound of the Bentler and Chou rule of thumb of 805 is practically speaking most likely beyond the reach of the current study. The number of work units that the current study can realistically sample lies in the region 300-350.

3.6 MEASUREMENT/OPERATIONALISATION

To investigate and evaluate the construct validity of the WUCQ and WUOQ it is necessary to evaluate the fit of the measurement model implied by the design intention of the instrument, the constitutive definition of the internal structure of the unit performance construct and evaluate the fit of the structural model that describes the manner in which the constitutive definition of the unit performance construct embeds the construct in a larger nomological network, measures of the organisational unit competencies and outcomes are required.

The study is in a fortunate position as there has been a number of notable previous research on the topic of choice. Therefore, it is not necessary to develop completely new measures and scales for the latent behavioural competency and latent outcome variables (Myburgh & Theron, 2014; Spangenberg & Theron, 2004). The only exception is the *high-performance culture* outcome and the *employee green behaviour* competency that do not have existing scales and therefore scales had to be created. The study used the Performance Index of Spangenberg and Theron (2004) as a template in the general layout and structure of the questionnaire with behavioural anchors for at least two scale points for the development of the WUCQ as well as the development of the WUOQ.

As the model consists of two domains namely, a competency domain and an outcome domain, two different questionnaires are required to test operational hypotheses 1-5 and 6-10. The original questionnaire, with permission from the authors, that was used to measure the dimensions on the PI will be utilised. The organisational unit competencies that have been added to two competencies taken over from the PI have been based on the research of Myburgh and Theron (2014) in their development of a generic individual non-managerial performance measure. The questionnaire originally used in the study, with permission from the authors, was employed to measure these dimensions. It is acknowledged that these questionnaires were created with the intention to measure individual performance and consequently required some adaptation. The reliability of the existing scales is illustrated below.

Table 3.2.

The reliability of the PI scales

Scale	Cronbach Alpha
Production and efficiency	.7446
Core people processes	.8480
Work unit climate	.8756
Satisfaction	.8870
Market share	.7978
Future growth	.7290

(Henning, *et al*., 2004, p. 30)

Table 3.3.

The Reliability of the Myburgh Generic Non-Managerial Performance scales

Scale	Cronbach alpha
Effort	.847
Innovation	.839
Counterproductive work behaviour	.882
Organisational citizenship behaviour	.867
Task performance	.775

(Myburgh & Theron, 2014, p. 41)

As previously mentioned, the dimensions of a *high-performance culture* and *employee green behaviour* were not measured by either the PI or the Generic non-managerial performance scales. Therefore, to measure these two dimensions of the organisational work unit performance construct, two entirely new subscales had to be created.

3.7 STATISTICAL ANALYSIS

For the purpose of the study, item analysis, dimensionality analysis, the evaluation of statistical assumptions, evaluating the measurement model fit for both the WUCQ and the WUOQ is required. Prior to fitting the proposed work unit competency model, the measurement model part of the comprehensive LISREL model was first fitted.

Four possibilities exist in the test of a structural model using operational definitions. These options are: individual items representing the latent variable, forming item parcels, dimension scores naturally/normally calculated from the items or a combined

score of all the items. Item parcelling was used to fit the structural model that will allow the testing of operational hypotheses 11 and 12. (Theron, 2016).
Further, two options were available to the researcher in the creation of item parcels. The first is through combining either even-number and uneven-number items into two means. The second option, which the current study used, was to use the factor loadings of the items in the exploratory factor analysis to determine the item parcel that an item should be allocated (Theron, 2016).

3.7.1 Item Analysis

The process of item analysis is pivotal to the successful development of a measuring instrument. The overarching purpose of item analysis is to determine if any of the items in a scale do not provide a clear representation of the subscale in question and therefore, whether the inclusion of them has a negative effect on the overall reliability and validity of the scale. Thereafter, if a significant improvement in the reliability statistics of a scale is present after the removal of an item, the item is left out from subsequent factor analysis (Anastasi & Urbina, 1997).

This overarching purpose of an item analysis can further be broken into three subsequent functions, namely: (a) to investigate the reliability of the indicators of each latent variable, (b) to determine the sensitivity/discrimination ability of each item in a subscale and (c) to determine the validity/extent to which they measure a common underlying latent variable of each item in a subscale.

The method to achieve the aforementioned purpose of item analyses is by establishing and investigating the Cronbach Alpha of each subscale and evaluate a basket of relevant item statistics describing the validity and sensitivity/discrimination ability of each of the items. For the purpose of the research proposal, the Cronbach Alpha is set at .80 to represent sufficient homogeneity and reliability of the subscale.

The screening of the items is further based on the following specifications set for specific item statistics; (a) corrected item-total correlations that appear as distinct outliers to the lower end of the distribution of corrected item-total correlations, (b) squared multiple correlations that appear as distinct outliers to the lower end of the distribution of squared multiple correlations, (c) extreme means or low standard deviations, (d) scale variances that drop very little or that increase when the item is deleted and (e) a sufficient increase in the Cronbach Alpha value when the item is deleted.

3.7.2 Dimensionality Analysis

The aim of the creation of subscales for both the WUCQ and the WUOQ was to reflect a unidimensional latent variable (organisational work unit competency or outcome). The items in each subscale are intended to operate as stimulus sets to which the research participant responds and where the level of the response is indicative of the level of the participant's standing on the latent variable.

The objective of the dimensionality analysis is to evaluate the assumptions that the items assigned to each subscale measure a single underlying factor and to evaluate the success of each item in measuring the specific latent variable it is meant to represents. This allows the researcher to identify and remove items that have inadequate factor loadings and split single heterogeneous subscales into two or more subscales.

The method chosen to complete the dimensionality analysis on the WUCQ and WUOQ scales and their various subscales was unrestricted principal axis factor analyses with oblique rotation[18]. Principle axis factor analysis was utilised because it can determine the number of underlying factors that need to be assumed to account for the observed co-variance between the items comprising each scale. Further, oblique rotation is employed due to the fact that it allows extracted factors to correlate in the rotated solution in the case of more than one factor emerging (Tabachnick & Fidell, 1996).

The uni-dimensionality assumption was tested using the method of exploratory factor analysis on SPSS 25. For the purpose of the study, the assumption of uni-dimensionality was supported if a single-factor factor structure was extracted, the

[18] It is acknowledged that the use of confirmatory factor analysis to fit single factor measurement models with the individual items of each subscale as indicators would have more accurately reflected the fact that the subscales have been developed with the design intention to reflect a specific unidimensional underlying latent performance dimension.

factor loadings were greater than .5 ($\lambda_{ij} \geq .5$) and a relatively small percentage (< 40%) of the residual correlations were greater than .05.

3.7.3 Evaluation of the statistical assumptions

3.7.3.1 Missing values

The presence of missing values in the data can produce invalid inferences and render the research substantially meaningless. It is therefore appropriate to mend any data that is omitted from the study. Many methods are suggested to resolve the problem (Du Toit & Du Toit, 2001; Mels, 2003):

- List-wise deletion of cases
- Pair-wise deletion of cases
- Imputation by matching
- Multiple imputation
- Maximum likelihood estimation

The method of multiple imputation was suggested for the current study to impute missing values. Du Toit and Du Toit (2001) explain multiple imputation by suggesting that LISREL essentially obtains a number of estimates of missing values and then provides averages across the data sets for the missing variables. This method is employed in the research as it has the advantage of retaining all the cases that were sampled which many of the other techniques (list-wise, pair-deletion of cases and imputation by matching) does not. The advantage of retaining cases is vital to the study as the success is sensitive to the number of cases sampled.

To use this method of multiple imputation, it is suggested by Mels (2003) that three assumptions must be met. The first assumption is that the missing values on the questionnaire have an ignorable response mechanism and secondly, that the available data values have multivariate normality or are at least not excessively skewed. The third requirement is that not more than 30% of the data should be missing.

3.7.3.2 Variable type

To fit the WUCQ and WUOQ measurement model the original intention was to have each latent competency and latent outcome represented by the individual items of the subscale developed to measure the particular latent performance dimension. For the purpose of fitting the partial work unit performance competency model, the previously discussed method of: item parcelling was used. According to Bandalos (2002), item parcelling is calculating the average item scores from two or more items and using the calculated mean scores as substitutes for the item scores in the SEM analysis.

This decision was essentially forced on the study due to the unrealistic sample size implication if the structural model would have been fitted with individual items as indicators. It is acknowledged that the decision to use item parcels to fit the structural model is a controversial decision. Both advantages and disadvantages can be cited for and against the decision to parcel (Bandalos, 2002). The item parcel indicator variables were treated as continuous variables.

For the purpose of fitting both the measurement models and partial competency model, the indicator variables will be treated as (approximately) continuous variables. This interpretation of the indicator variables as approximately continuous is appropriate as all the items in the questionnaire are measured using a 5-point scale (Muthén and Kaplan, 1985).

3.7.3.3 Multivariate normality

When fitting a measurement model (or structural model) to continuous data the default estimation technique of maximum likelihood estimation assumes that the distribution of indicator variables follows a multivariate normal distribution (Kaplan, 2000). If this assumption is not met, there will be incorrect standard errors and chi-square estimates (Du Toit & Du Toit, 2001; Mels, 2003).

It is suggested by Jöreskog and Sörbom (1996) that the means to test the univariate and multivariate normality of the data is the software PRELIS 2. If the data fails the multivariate normality assumption and the null chi-square test statistic is found to be significant ($p<.05$), an attempt will be made to normalise the distribution through normalising the item indicators. However, if this attempt fails to find an insignificant ($p>.05$) deviation of the normalised indicator variable distribution from the theoretical multivariate normal distribution (i.e., the multivariate assumption is still not met), robust maximum likelihood estimation will be used (Mels, 2003).

3.7.4 Evaluating the Measurement Model Fit

Three measurement models had to be fitted in the current study. To test operational hypotheses 1 to 5 the WUCQ measurement had to be fitted and to test operational hypothesis 6-10 the WUOQ measurement had to be fitted. Before fitting the work unit performance structural model, the fit of the measurement model part of the comprehensive LISREL model needed to be established. To reach a valid and credible conclusion on the validity of the structural model as a psychological explanation for work unit performance, evidence is necessary to establish if the operationalisation of the latent variables was successful.

The first two CFA analyses were performed to evaluate the construct validity of the WUCQ and WUOQ. The third CFA analysis was done to demonstrate that the item parcel indicator variables are valid and reliable measures of the latent variables that they are linked to. If it is not proven that the operational measures validly represent their respective latent variables, any subsequent analysis would be unfruitful as the meaning of good structural fit will be ambiguous (Diamantopoulos and Siguaw, 2000). Further, the fitting of the structural model was also performed to evaluate the construct validity of the WUCQ and WUOQ.

The fit of the measurement models were tested by using LISREL 8.8 and through interpreting the fit indices. The interpretation of the exact fit of the measurement models (RMSEA=0) was done through the Chi-Squared fit statistic if it was found that the model did not show exact fit, then it was tested for close fit (RMSEA≤.05) by inspecting the p-value for close fit (C.C Theron, personal communication, 11 August, 2016).

The second method in establishing the measurement models fit was by interpreting the residual covariances. The residual covariances represent the difference between the observed covariances and the reproduced covariances (the covariances that are estimated from the model parameters estimates). The standardised residual covariance matrix was scrutinised to determine whether there are any large residuals (>±2.58) and these were expressed as a percentage of the total number of estimates. If this percentage is small the model can be considered as satisfactory (C.C Theron, personal communication, 11 August, 2016).

Further, the modification indices calculated for the Λ and Θ_δ matrices of the measurement models were evaluated. These are calculated for the currently fixed parameters of model where there are currently no paths. This indicates the extent by which the model would improve if you do allow for paths where there are currently no paths. A large modification index is a value 6.6449 or larger indicated in the modification lambda and theta delta matrices. If only a small percentage of these modification index values are large, it indicates that there are only a few ways to make the model fit better which comments positively on the model fit (C.C Theron. Personal communication, 11 August, 2016).

If the measurement models fit at least reasonably well (but preferably if the models fit closely), the measurement model parameter estimates were interpreted. This was done by evaluating the unstandardised and the standardised lambda, theta and phi matrices. For the purpose of the study, the value of $z \geq 1.6449$ was used to indicate any significant value and to test the relevant statistical hypotheses as listed under paragraph 3.3 because all alternative hypotheses were formulated as directional hypotheses (C.C Theron, personal communication, 11 August, 2016).

Lastly, in the evaluation of the WUCQ and WUOQ measurement models it was necessary to perform a discriminant analysis. For the purpose of the study, the phi matrix was evaluated for both models and any ϕ_{ij} value larger than or equal to .9 was interpreted to indicate a possible failure of the models to successfully differentiate between two related but quantitatively distinct organisational unit competencies (C.C Theron, personal communication, 11 August, 2016).

Further, the average variance extracted (AVE) was investigated. The AVE indicates the average proportion of variance in the indicator variables that is explained by the latent variable that the indicator variables were tasked to represent (Diamantopoulos & Siguaw, 2000). The AVE should produce a value that is greater than .5 for each latent performance dimension and greater than the squared correlation between latent variables. These assumptions are based on the premise of Farrel (2010) which argues that the latent variable should account for more variance in the indicators that are created to represent the latent variable than measurement error. Further, he suggests that the latent variable should explain more variance in the indicator variables that were created to reflect it than it should explain in another latent variable measured by a different set of items.

It is suggested by Mels (2010) that the absence of high correlations between latent variables in the findings does not provide sufficient evidence in the determination of discriminant validity. The possibility still exists that the latent performance dimensions correlate unity in the parameter but correlate less than unity in the statistic from sampling error. To test for this, a 95% confidence interval was calculated for each sample estimate. Discriminant validity is indicated if the 95% confidence interval does not include unity.

3.7.5 Evaluating the Structural Model Fit

The structural model reflects the manner that the constitutive definition of organisational unit performance defines the internal structure of the work unit performance construct. The fit of the structural model is, therefore evaluated in the current study to assist in determining whether the WUCQ and WUOQ measures the organisational unit performance construct as constitutively defined. The fit of the structural model was evaluated by evaluating the fit of the comprehensive LISREL model[19] after having evaluated the fit of the work unit performance measurement model. According to Diamantopoulos and Siguaw (2000), the evaluation of the comprehensive LISREL model fit is to establish the extent that the sample data

[19] The comprehensive LISREL model comprises the measurement model describing the hypothesised relationships between the latent variables and the indicator variables and the structural model describing the hypothesised relationships between the latent variables.

supports the suggested relationships in the structural model. The structural model suggests structural hypotheses that provide a partial explanation of the processes regulates differences in the performance of a work unit. Further, the comprehensive LISREL model provides a description of why the indicator variables correlate in the way that they do in the observed covariance matrix. The extent to which the comprehensive LISREL model fits the observed data is represented in the extent to which the reproduced covariance matrix is comparable to the empirical covariance matrix.

Like in the evaluation of the measurement models, the evaluation of the comprehensive LISREL model consists of different procedures that must be completed. Similarly, the fit of the structural model was initially evaluated via the fit statistics produced by LISREL8.8. Firstly, the exact fit of the model was tested (H_{0295}: RMSEA=0) through the chi-square fit statistic. If it is found that the model does not a have an exact fit, the close fit of the model was established (H_{0296} RMSEA≥.05) through the interpretation of the p-value of close fit (C.C Theron, personal communication, 11 August, 2016).

Once the interpretation is complete, the residual covariance's was evaluated. This evaluation will be done by examining the stem and leaf plot of standardised residuals. The majority of the residuals should be smaller than ±2.58 indicating that there is an adequate reproduction in the observed covariance matrix (C.C Theron. Personal communication, 11 August, 2016).

Further, it is necessary to examine the modification indices calculated for Γ, **B** and Ψ. As mentioned before, this tests if additional paths were added to the model the fit of the model would improve. The value of 6.6449 was used as an indication that an additional path in the Γ, **B** or Ψ matrix would statistically significantly improve the fit of the comprehensive LISREL model (Diamantopoulos and Siguaw, 2000). A small percentage of large modification indices in these three matrices would comment favourably on the fit of the model.

In the evaluation of structural model, the statistical significance and magnitude of the parameter estimates were analysed. The unstandardized and standardised gamma, beta and psi matrices were interpreted to test H_{0297} to H_{0317}. For the purpose of the study, the score of $z \geq 1.6449$ was considered as significant (C.C Theron. Personal communication, 11 August, 2016) due to the directional nature of the alternative hypotheses.

From the above modification indices calculated for Γ and **B** suggested structural modifications to the gamma and beta matrices were analysed in theoretical and practical terms to determine if the suggestions were adequate. These modifications were considered in the current study if poor fit necessitated it but were preferably treated as data-driven suggestions for future research (C.C Theron. Personal communication, 11 August, 2016).

CHAPTER 4
RESEARCH ETHICAL CONSIDERATIONS

4.1 INTRODUCTION

The purpose of reflecting on the potential ethical risks associated with the thesis is to protect the dignity, rights, safety and well-being of the research participants involved in the study (Standard Operating Procedure, 2012). The empirical research used to determine the permissibility of the proposed work unit performance structural and both measurement models, like the majority of the research in the field of industrial psychology, requires the involvement of people. Therefore, it is necessary to assess and consider the potential ethical risks associated with the study.

4.2 ETHICAL CONSIDERATIONS

The research participant had the right to voluntarily decide if he/she will accept the invitation to participate in the research. Furthermore, this decision was an informed decision. To encourage a decision that was well-informed, the researcher provided the necessary information on the research in a clear and understandable manner. This information included the objective and purpose of the research, what the participation, if the applicant agrees, will entail, how the research results will be disseminated and used, who the researchers are and what their affiliations are. Further, the participant was informed of where further inquiries regarding the research can be made, what their rights are and where more information regarding their rights can be obtained (Standard Operating Procedure, 2012).

Moreover, obtaining informed consent for the participation in research should be considered an agreement between the participants and the researcher. This agreement must include the nature of the research and the responsibilities of the two parties involved in the agreement. Annexure 12 of the Ethical Rules of Conduct for Practitioners Registered under the Health Professions Act (Act no. 56 of 1974) (Republic of South Africa, 2006, p.42) provides the following requirements that are necessary in this agreement:

89. (1) A psychologist shall use language that is reasonably understandable to

The research participant concerned in obtaining his or her informed consent.

(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.

The researcher obtained the necessary informed consent from the participants in the research and adhered to the aforementioned guidelines.

Further, it is required that permission must be obtained from the institution in which the research is proposed. Annexure 12 of the Ethical Rules of Conduct for Practioners Registered under the Health Professions Act (Act no. 56 of 1974) (Republic of South Africa, p. 41) states that:

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 proposals; and

> (c) conduct the research in accordance with the research protocol approved by the institution or organisation concerned.

In light of the above information, informed institutional permission for the thesis was obtained from organisations in which mass invitations were sent to their employees.

Some potential risks or discomforts were foreseen in the study. The battery required *circa* 30 minutes of the participant's time that can be completed at their own convenience and as a result, no physical exertion is foreseen. The questionnaire assessed variables that the participants may consider sensitive due to the potential negative repercussions from organisations as a result of the findings. The objective of the study was not to pinpoint poor-performing work units and therefore, the information gathered from the questionnaire regarding the work unit performance will not state the personal information of the participant that completes the questionnaire or the details of the participating branch/franchise. The obtained data was not used to assess the performance of work unit individually, or on average, but instead to test the hypothesised relationships between the specific variables. Therefore, no inferences that would affect the work units being rated are derived from the findings.

The thesis did not assess variables that could indicate serious threats to the well-being of the participants. The only item that has been identified as sensitive in nature is: *sexual harassment* in the scale of counter-productive work behaviour. With this taken into account, if the participant does not feel comfortable answering this item, or any of the items, the option of not applicable (N/A) was available and the confidentiality of the research will be upheld. The respect of each participant was maintained throughout the study and the opportunity to respond in confidence was sustained. Annexure 12 of the Ethical Rules of Conduct for Practitioners Registered under the Health Professions Act (Act no. 56 of 1974) (Republic of South Africa, 2006, p.41) outlines when it is necessary to disclose confidential information.

> A psychologist may disclose confidential information –
>
> (a) only with the permission of the client concerned;
>
> (b) when permitted by law to do so for a legitimate purpose, such as providing a client with the professional services required;
>
> (c) to appropriate professionals and then for strictly professional

purposes only;

(d) to protect a client or other persons from harm; or

(e) to obtain payment for a psychological service, in which instance disclosure is limited to the minimum necessary to achieve that purpose.

The instruments that will be utilised in the research to collect data from the participants on work unit performance have been adapted, with permission from the authors, by the researcher and are not regarded as psychological tests by the Health Professions Act (Republic of South Africa, 1974).

Research that is conducted in the field of social sciences at Stellenbosch University must be sent to the Departmental Ethics Screening Committee (DESC). The submission encourages research that is in accordance to the standards of the university and provides the opportunity for an external examination. The research proposal, instruments, informed consent, institutional permission and request to use Facebook as a means to collect data were all successfully approved by DESC (Appendix B).

CHAPTER 5
RESEARCH RESULTS

5.1 INTRODUCTION

Chapter 5 presents the results of the various statistical analyses, detailed in Chapter 3, that were performed. The overarching aim of this chapter is to present and examine the results, report the decisions on the statistical hypotheses and infer the implications of these decisions for the overarching and path-specific research hypotheses that were discussed in the previous chapter.

Firstly, the results of the descriptive analyses are presented, more specifically an account of the sampling process and the resultant sample size, the distribution of the missing values across the items and the demographic composition of the sample. Secondly the results of the item analysis and dimensionality analysis are presented. Furthermore, the results of the confirmatory factor analyses (CFA) are presented following on the tests of multivariate normality. A third CFA was subsequently conducted on the two multidimensional scales combined utilising item parcels as indicators to evaluate the success with which the item parcels operationalised the latent variables comprising the proposed organisational work unit performance structural model. Fourthly, the fit of the comprehensive LISREL model is presented and evaluated. Lastly, the estimates obtained for the freed parameters of the structural model are presented and evaluated.

5.2 SAMPLE

Initially in Chapter 3 it was suggested that a franchise store or a branch of a national organisation should be considered a work unit. Therefore, the chosen sampling population was an organisation with a portfolio of different branches and franchises. This was chosen in the hope that a diverse variety of work units could be obtained to evaluate the generic Work Unit Performance Questionnaire (WUPQ). Institutional permission was granted by a large holding company to distribute invitations to their employees to participate in the research study. The invitation was sent to the Head of Human Resources on the 9th of March 2018 and was distributed to the branches on the same day. Two branch employees on differing levels of the hierarchy were required to rate the performance of their work unit on the various performance dimensions comprising the WUPQ.

However, after the first invitation to complete in the study, and after a follow-up reminder had been sent, only 22 complete responses were recorded. Unfortunately, this was well below the required sample size to produce meaningful results. Therefore, ethical clearance was applied for on the 15th of April 2018 to recruit participants on Facebook.

There were additional considerations related to the use of a social media platform that had to be considered to ensure that all ethical considerations were met. More specifically, the Facebook policy regarding research is as follows (Facebook, 2018):

> 7. If you collect information from users, you will: obtain their consent, make it clear you (and not Facebook) are the one collecting their information, and post a privacy policy explaining what information you collect and how you will use it.
> 8. You will not post anyone's identification documents or sensitive financial information on Facebook.
> 9. You will not tag users or send email invitations to non-users without their consent. Facebook offers social reporting tools to enable users to provide feedback about tagging.

The manner in which participants were recruited was to post an invitation on the researcher's Facebook profile that then became visible on the Facebook newsfeed of Facebook friends. Furthermore, individuals were encouraged to share the post by reposting it *verbatim*. This was chosen as it offered the possibility of reaching a potentially very large number of people.

This method of collecting data provided some benefits to the research, but also offered some potential disadvantages. Firstly, this data collection procedure had the benefit of recruiting participants from a wide range of industries and organisations. However, there was the potential disadvantage, albeit small, that more than one respondent from the same work unit could complete the WUPQ.

Further, the decision to use Facebook as a vehicle to distribute the research questionnaire had the advantage of broadening the sampling population and reducing the sampling gap. The initial sampling population, as described in Chapter 3 was very narrowly defined as branches of a large holding company. Although somewhat vaguely defined, this revised sampling population now comprised all work units consisting of at least a leader and three subordinates in which individuals worked that had the potential to come into contact with the Facebook invitation. This redefined sampling population was more in accordance with the conceptualisation of a work unit and the generic intent of the WUPQ as described in Chapter 1 and Chapter 2 than the initial sampling population as it was defined in Chapter 3 and in the beginning of this section (Spangenberg & Theron, 2004):

> The work unit is conceptualised as a temporary or permanent organisational entity that operates in a private, state-owned or not-for-profit organisation. The size of these work units varies from a small team consisting of a leader and three subordinates to a department within a company that is comprised of a large number of individuals.

This method proved to be fruitful and a total of 669 responses to the electronic questionnaire were collected. However, only 205 were indicated as complete responses by the Checkbox system. Thereafter, a further 3 responses were removed due to not providing consent or excessively selecting the N/A option. Therefore, 467 were incomplete or unusable responses and were not used for the purposes of this study. Once the process of elimination was completed, it resulted in a sample of 202 (N=202) complete and usable responses.

This excessive number of incomplete responses could be due to a variety of reasons. Firstly, the questionnaire required participants to complete 92 items and required an estimated 30 minutes of their time. This may have been too lengthy and taxing on the participants, especially when considering the workload that many employees have. Alternatively, individuals that did not complete it may have not have seen the value or importance of research and this could be indicative of the gap that exists between industry and educational institutions.

5.3 MISSING VALUES

The prevailing issue of missing values had to be addressed before starting the various statistical analyses. The presence of missing values was due to the not applicable (N/A) option that participants were able to select in addition to the 5 response options that the 5-point Likert scale offered.

For the purpose of this study multiple imputation (MI), as discussed in Chapter 3, was selected as the method for addressing the missing data. This approach had the advantage that it can be used in combination with other statistical procedures that requires the imputed item data, such as item analysis, and that it does not delete any cases from the original data set. MI performs several imputations for each missing value. Thereafter, each imputation creates a completed data set that should be analysed separately to obtain multiple estimates of the parameters that exist in the model (Davey, Shanahan & Schafer, 2001; Wessels, 2018).

The distribution of missing values across the items of the WUPQ is shown in Table 4.1. The items that had the most missing values were all part of the *future growth* scale. More specifically, items 94 and 95 had the most missing values, at 62 or 30,69% and 61 or 30,19% respectively, followed by item 93 that had 57 or 28,21%. Item 94 measured *market share (market share projections for the next five years are…), item 95* measured *capital investment (projected future capital investments provides for…)* and item 93 measured *profit* (*profit projections for the next five years are…)*.

It is inferred that participants were more prone to select the N/A option for this scale and the aforementioned items as employers may have been unwilling to share this information with employees or individuals may have been unaware due to the uncertain future economic condition of South Africa. Furthermore, many respondents worked in industries that do not consider these aspects relevant. This is especially pertinent to individuals that worked in not for profit or education (primary and tertiary) industries. The similar trend was observed in the original PI research conducted by Spangenberg and Theron (2004) (Callie Theron, personal communication, 14 January 2019).

Multiple imputation (via PRELIS) was conducted on the sample of 202 complete responses. A total number of 680 missing-value were detected. This constituted only 3,47% of the total data set[20]. No cases were deleted since multiple imputation was utilised. The imputed data set was utilised for the subsequent analyses.

[20] The number of missing values per item is shown in Table 4.1. This totals to 680 missing values across 97 items. In total there were 97x202= 19594 data points of which 680 were missing.

Table 5.1
Distribution of missing values across items

Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13
3	1	1	0	1	3	8	0
Q14	Q15	Q16	Q17	Q18	Q19	Q20	Q21
1	1	0	0	0	0	0	1
Q22	Q23	Q24	Q25	Q26	Q27	Q28	Q29
2	1	0	4	1	6	0	4
Q30	Q31	Q32	Q33	Q34	Q35	Q36	Q37
3	1	0	2	1	1	0	0
Q38	Q39	Q40	Q41	Q42	Q43	Q44	Q45
8	11	16	11	11	3	0	0
Q46	Q47	Q48	Q49	Q50	Q51	Q52	Q53
0	2	3	1	0	0	1	6
Q54	Q55	Q56	Q57	Q58	Q59	Q60	Q61
10	2	4	26	4	2	1	6
Q62	Q63	Q64	Q65	Q66	Q67	Q68	Q69
0	0	0	1	1	4	2	0
Q70	Q71	Q72	Q73	Q74	Q75	Q76	Q77
0	6	9	9	1	2	2	3
Q78	Q79	Q80	Q81	Q82	Q83	Q84	Q85
1	6	1	1	3	0	10	20
Q86	Q87	Q88	Q89	Q90	Q91	Q92	Q93
42	36	32	23	29	8	7	57
Q94	Q95	Q96	Q97				
62	61	47	29				

5.4 DEMOGRAPHIC CHARACTERISTICS OF THE SAMPLE

The focus of the current study was on the work units rather than on the respondents *per se*. The work units were the units of analysis. The employees were the units of observation[21]. The biographical characteristics of the sample of work units are portrayed in Table 5.2 – Table 5.5.

Table 5.2
Industry representation in the sample

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Retail	15	7.4	7.4	7.4
	Financial services	32	15.8	15.8	23.3

[21] It is acknowledged that this creates the potential of nested data where employees are nested in work units if more than one employee per work unit is sampled. This aspect will be discussed in greater detail in Chapter 5 when the limitations of the study are discussed.

Table 5.2
Industry representation in the sample(continued)

Banking	5	2.5	2.5	25.7
Communication	3	1.5	1.5	27.2
Education	37	18.3	18.3	45.5
Information technology	20	9.9	9.9	55.4
Food and beverage	4	2.0	2.0	57.4
Non-profit	27	13.4	13.4	70.8
Consulting	23	11.4	11.4	82.2
Other	36	17.8	17.8	100.0
Total	202	100.0	100.0	

Table 5.3
Province representation in the sample

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Gauteng	151	74.8	74.8	74.8
	Western Cape	29	14.4	14.4	89.1
	Eastern Cape	2	1.0	1.0	90.1
	KwaZulu-Natal	5	2.5	2.5	92.6
	Northern Cape	1	.5	.5	93.1
	Limpopo	2	1.0	1.0	94.1
	Mpumalanga	6	3.0	3.0	97.0
	North West	2	1.0	1.0	98.0
	Free State	4	2.0	2.0	100.0
	Total	202	100.0	100.0	

Table 5.4
Number of work unit members in the sample

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less than 10	106	52.5	52.5	52.5
	10-30	48	23.8	23.8	76.2
	30-50	13	6.4	6.4	82.7
	50+	35	17.3	17.3	100.0
	Total	202	100.0	100.0	

Table 5.5
Number of managers and subordinates in the sample

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Manager	96	47.5	47.5	47.5
	Subordinate	106	52.5	52.5	100.0
	Total	202	100.0	100.0	

In general, the work units that were evaluated by the respondents in the sample can be described as operating in the education industry, were based in Gauteng, consisted of less than 10 members and were rated by subordinates.

Table 5.2 indicates that the majority of the respondents were employed in the education industry (18.3%). This is followed by the 'other' option (17.8%) that includes industries, which were not specified (mining, entertainment etc.). Finally, financial services (15.8%) and non-profit (13.4%) are the third and fourth most represented industries. Interestingly, this is in accordance with the employment trends in the formal non-agricultural sector published by Statistics South Africa (2016). They found that 28% of South Africans are employed in the community services, 23% in business services and 21% in trade.

Table 5.3 indicates that the province that was most represented in the study was Gauteng (74.8%) and it was followed by Western Cape (14.4%). This overwhelming proportion of respondents that worked in Gauteng is attributed to two reasons. Firstly, Gauteng has the highest employment levels in South Africa and more than doubles any other province in South Africa (Statistics South Africa, 2016). Secondly, the majority of the researchers Facebook Friends are from Gauteng.

Table 5.4 shows that more than half (52.5%) of the sample rated work units that consist of less than 10 members. The participants may work for a micro-organisation that employs less than 10 people or, in the case of employees at large organisations, they worked in a small work unit.

Table 5.5 shows that surprisingly, there was similar numbers of respondents that were managers (47.5%) and that were subordinates (52.5%). It was anticipated that the majority of the respondents would have been subordinates. Moreover, in retrospect, it needs to be acknowledged that the question was somewhat questionable as there are many individuals that work as both managers and subordinates (i.e. junior manager). Therefore, it may have been more insightful to determine what percentage of the respondents' work 'was managerial in nature (delegating tasks)'.

5.5 PSYCHOMETRIC EVALUATION OF THE MEASUREMENT INSTRUMENTS

After attending to the missing values and analysing the biographical characteristics of the sample, a psychometric evaluation of the two measuring instruments (WUCQ and WUOQ) comprising the WUPQ was conducted. This evaluation was conducted sequentially on each subscale of the WUCQ and the WUOQ. Firstly, all of the unidimensional subscales were analysed through classical measurement theory item analysis and then exploratory factor analysis was performed on each subscale to evaluate the assumption that each subscale measures a unidimensional latent work unit competency (WUCQ) or latent work unit outcome (WUOQ). In the case of unforeseen factor fission, the multidimensional subscales were analysed via confirmatory factor analysis.

5.5.1 Item Analysis

The various different subscales were developed with the intention to measure the latent work unit competencies and the latent work unit outcome variables comprising the multidimensional work unit performance construct. More so, Smuts (2011) suggests that the items comprising these subscales have been specifically developed as stimuli with the intention that manner in which of (knowledgeable) members of the work unit behaviourally respond to them should indirectly indicate an organisational work unit's standing on the specific latent dimensions of the work unit performance construct. In addition, the items have been developed as stimuli with the intention that members of work units should respond differently to them even if the work units differed only a little in their standing on the latent performance dimensions. The overarching objective of the item analysis was to determine whether these design intentions succeeded.

This overarching objective of an item analysis can further be broken into three subsequent functions, namely; (a) to investigate the reliability of the indicators of each latent variable, (b) to determine the sensitivity/discrimination ability of each item in a subscale and (c) to determine the validity/extent to which they measure a common underlying latent variable in a subscale.

Item analysis was used to achieve the aforementioned objective by calculating and interpreting the Cronbach Alpha for each subscale[22] and by calculating and evaluating

[22] It is acknowledged that the Cronbach alpha makes rather stringent assumptions like assumptions of uncorrelated measurement errors, essential unidimensionality, tau-equivalence and normality that are seldom met (Trizano-Hermosilla & Alvarado, 2016). The assumption of tau equivalence implies that all the items have the same loading on the single underlying factor. It is acknowledged that a congeneric measurement model is more realistic in which

a basket of relevant classical measurement theory item statistics, as described in Chapter 3 (the item means, item standard deviation, inter-item correlations, subscale variance if item deleted, Cronbach alpha if item deleted, the corrected item-total correlations and the squared multiple correlations), describing the validity and sensitivity/discrimination ability of each of the items. For the purpose of the current research study, the critical Cronbach Alpha was set at .80 to represent sufficient internal subscale homogeneity and internal consistency reliability of the subscale. The item analysis was conducted using the SPSS 25 Reliability Procedure (SPSS, 2018).

5.5.2 Dimensionality Analysis

The objective of the dimensionality analysis was to determine the assumptions that the items assigned to each subscale measured a single, unidimensional underlying factor and to evaluate the success of each item measure the specific latent variable it is meant to represent.

Exploratory factor analysis was initially conducted by performing unrestricted principal axis factor analysis with oblique rotation via SPSS 25 on the various subscales comprising the WUCQ and the WUOQ. The assumption of unidimensionality was supported if a single-factor was extracted, the factor loadings were greater than .5 ($\lambda_{ij} \geq .5$) and a relatively small percentage (<40%) of the residual correlations were greater than .05.

Furthermore, based on the aforementioned criteria, a confirmatory factory analysis was conducted in the instances that factor fission was found in the EFA. The CFA was firstly used to determine the fit of the first-order measurement model indicated by the EFA (via the pattern matrix). If the first-order measurement model showed close fit (i.e., the close fit null hypothesis was not rejected), a second-order measurement model was fitted in which the extracted factors loaded on a single second-order factor. If the second-order measurement model showed close fit the statistical significance of the indirect effects of the second-order factor on the subscale items were evaluated. This was done by translating the SIMPLIS syntax file for the second-order measurement model to LISREL syntax, requesting the calculation of a number of

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items display different loadings on a common underlying factor. Trizano-Hermosilla and Alvarado (2016) suggest that the omega coefficient ω_t is more appropriate to use when the assumption of tau equivalence is not met.

additional parameters via the AP command on the MO line and defining the indirect effects via the CO command. If the first-order measurement model showed poor fit the modification indices calculated for the off-diagonal elements of the measurement error variance-covariance matrix Θ_δ were inspected. If a reasonably large percentage of the off-diagonal modification index values were statistically significant ($p<.01$) a bi-factor model (Reise, 2012) was fitted in which each of the individual items of the subscale in question loaded on a broad general factor as well as on one of two or more narrower, more specific factors (i.e., those identified via the EFA). If the bi-factor model showed close fit the statistical significance of the loading of each item on the broad, general factor and on the narrower, more specific factor was evaluated.

The objective with the latter two models was to evaluate the items as indicators of either (depending on which model showed superior fit) a second-order factor or of a broad, general factor and/or a narrower, more specific factor.

5.6 PSYCHOMETRIC EVALUATION OF THE WORK UNIT COMPETENCY QUESTIONNAIRE

The WUCQ evaluated the work units' performance on the following seven (presumed) unidimensional latent behavioural competencies of *effort*, *core people processes*, *citizenship behaviour*, *counterproductive work behaviours*, *innovation*, *employee green behaviour* and *task performance*. Each of the competencies were measured on a five-point Likert scale with an additional N/A option.

5.6.1 Psychometric Evaluation of the Innovation Subscale

The *innovation* subscale consisted of eight items. The design intention was to measure the extent to which the work unit displays creativity, not only in the prescribed job but also on behalf of the whole organisation, shows openness to new ideas and experiences, handles novel situations and problems with innovation and creativity, thinks broadly and strategically in order to support and drive desired organisational change.

5.6.1.1 Item analysis

Table 5.6 indicates that a satisfactory (>.80) Cronbach's alpha of .879 was obtained. This indicates that approximately 87.9% of the variance in the items was systematic or true score variance and only 12.1% was random error variance.

Table 5.6 indicates that the item means ranged from 3.188 to 3.698 on the five-point Likert scale and the item standard deviations ranged from .94 to 1.092. This indicates that most participants rated their work unit as slightly above the midpoint of the 5-point scale on this competency. The absence of extreme means indicated that none of the item distributions were truncated and lack of small deviations in the items of the subscale indicated that the items were able to detect relatively small differences in the level of competence of the participants' work unit on the *innovation* competency (Theron, 2016).

The inter-item correlation matrix shown in Table 5.6 reflects the correlations between each item and every other item in the subscale. Problematic or poor items will not correlate with the rest of the items because these poor items do not reflect the same underlying factor or fail to do so sensitively (Theron, 2016). The inter-item correlation matrix ranged between .381 and .573, and the mean was .475. None of the items consistently correlated lower than the mean inter-item correlation with the remaining items of the subscale.

The corrected item-total correlations shown in the item-total statistics section of Table 5.6 ranged from .604 to .681. All of these are considered satisfactory as they are above the cut off of .3 (Mahembe, 2014; Wessels, 2018). The squared multiple correlation indicates the squared multiple correlations when regressing each item on a weighted linear composite of the remaining variables. Good or satisfactory items share a reasonable proportion of variance with the other items since they are supposed to measure the same underlying factor (Theron, 2016). The squared multiple correlations ranged from .380 to .493 and are considered satisfactory. More importantly none of the items showed themselves as outliers in either the corrected item-total correlation distribution or the squared multiple correlation distribution.

Furthermore, the results revealed that none of the items would increase the current Cronbach alpha if deleted. Therefore, based on the basket of evidence, none of the items were deleted from the Innovation subscale.

Table 5.6

Item analysis output for the innovation subscale

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.878	.879	8

Item Statistics

	Mean	Std. Deviation	N
Q6	3.53465	.967783	202
Q7	3.69802	.947842	202
Q8	3.68317	1.001796	202
Q9	3.35149	1.092818	202
Q10	3.47030	1.084311	202
Q11	3.33663	1.005232	202
Q12	3.18812	.994641	202
Q13	3.69802	.993960	202

Inter-Item Correlation Matrix

	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13
Q6	1.000	.573	.463	.433	.532	.433	.386	.489
Q7	.573	1.000	.512	.521	.478	.426	.488	.489
Q8	.463	.512	1.000	.457	.440	.442	.455	.478
Q9	.433	.521	.457	1.000	.515	.485	.447	.520
Q10	.532	.478	.440	.515	1.000	.557	.457	.534
Q11	.433	.426	.442	.485	.557	1.000	.449	.381
Q12	.386	.488	.455	.447	.457	.449	1.000	.475
Q13	.489	.489	.478	.520	.534	.381	.475	1.000

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Q6	24.42574	27.987	.636	.447	.864
Q7	24.26238	27.796	.674	.485	.860
Q8	24.27723	27.853	.622	.396	.865
Q9	24.60891	26.856	.652	.439	.862
Q10	24.49010	26.629	.681	.493	.859
Q11	24.62376	27.937	.610	.411	.867
Q12	24.77228	28.077	.604	.380	.867
Q13	24.26238	27.647	.650	.447	.862

Table 5.6

Item analysis output for the innovation subscale(continued)

Summary Item Statistics							
	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	3.495	3.188	3.698	.510	1.160	.037	8
Item Variances	1.025	.898	1.194	.296	1.329	.011	8
Inter-Item Correlations	.475	.381	.573	.192	1.503	.002	8

5.6.1.2 Dimensionality analysis

All of the eight items in the *innovation* subscale were factor analysed as they all produced satisfactory results in the item analysis. For the subscale to be considered factor analysable the correlation matrix should show numerous statistically significant ($p<.05$) correlations of .3 or greater ($r_{ij}>.3$), the Bartlett's test of Sphericity should be statistically significant ($p<.05$), and the Kaiser-Meyer-Olkin (KMO) values should be .6 or greater (>.6) (Pallant, 2007; Wessels, 2018).

The correlation matrix for the *innovation* subscale indicated that all correlations were larger than .3 and that all the correlations were statistically significant ($p<.05$). Furthermore, a KMO of .908 (>.6) was obtained and the Bartlett's Test returned a statistically significant chi-square statistic (p< 05) that allowed for the identity matrix null hypothesis to be rejected. This presented strong evidence that the correlation matrix was factor analysable.

One factor was extracted since only one factor obtained an eigenvalue greater than one (4.332). The position of the inflection point in the scree plot also suggested that a single factor should be extracted. The factor matrix revealed that all the items loaded onto one factor satisfactorily since all factor loadings were larger than .50 ($\lambda_{i1}>.50$), as shown in the resultant factor structure in Table 5.7.

The findings indicated that all items can be considered satisfactory regarding the proportion of item variance that can be explained by the single factor. Furthermore, only six (21%) of the nonredundant residual correlations obtained absolute values greater larger than .05. This suggests that the factor solution provides a reasonably sound explanation for the observed inter-item correlation matrix. The unidimensionality assumption, for the *innovation* subscale, was thus corroborated.

Table 5.7

Factor matrix for the innovation subscale

Factor Matrix	
	Factor
	1
Q10	.733
Q7	.727
Q9	.701
Q13	.699
Q6	.687
Q8	.669
Q11	.652
Q12	.648

5.6.2 Psychometric Evaluation of the Organisational Citizenship Behaviour Subscale

The *organisational citizenship behaviour* (*OCB*) subscale consisted of seven items and intended to measure the extent to which the members of the work unit display voluntary behaviour contributing towards the overall effectiveness of the organisation, volunteers to carry out task activities that are not formally part of the job description, follows organisational rules and procedures, endorses, supports, and defends organisational objectives, shows willingness to go the extra mile, voluntary helps colleagues with work, shows willingness to tolerate inconveniences and impositions of work without complaining, is actively and constructively involved in organisational affairs.

5.6.2.1 Item analysis

The results for the item analysis are depicted in Table 5.8. A satisfactory (>.80) Cronbach's alpha of .843 was obtained. This indicates that approximately 84.3% of the variance in the items was systematic or true score variance and only 15.7% was random error variance.

The item means ranged from 3.817 to 4.163 on the five-point Likert scale and the item standard deviations ranged from .842 to .957. This indicates that most participants rated their work unit in terms of the second highest response option on this competency. None of the item distributions were truncated due to extreme means. The subscale items were able to detect relatively small differences in the level of the participants' work unit *OCB*.

The inter-item correlations shown in the correlation matrix in Table 5.8 ranged between .288 and .574, and the mean was .434. None of the items consistently correlated lower than the mean inter-item correlation with the remaining items of the subscale. The corrected item-total correlations shown in the item-total statistics section of Table 5.8 ranged from .524 to .688 and were above the cut off (>.3). The squared multiple correlation ranged from .286 to .519 and are considered satisfactory. None of the items showed themselves as outliers in either the corrected item-total correlation distribution or the squared multiple correlation distribution.

Furthermore, the results revealed that none of the items would increase the current Cronbach alpha if deleted. Therefore, based on the basket of evidence, none of the items were deleted from the *organisational citizenship behaviour* subscale.

Table 5.8

Item analysis output for the organisational citizenship behaviour scale

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.843	.843	7

Item Statistics			
	Mean	Std. Deviation	N
Q31	4.16337	.945292	202
Q32	3.81683	.909384	202
Q33	3.98515	.922239	202
Q34	4.01980	.903065	202
Q35	3.96535	.842755	202
Q36	4.11881	.867169	202
Q37	3.84653	.957408	202

Table 5.8
Item analysis output for the organisational citizenship behaviour scale (continued)

Inter-Item Correlation Matrix							
	Q31	Q32	Q33	Q34	Q35	Q36	Q37
Q31	1.000	.498	.294	.369	.288	.486	.385
Q32	.498	1.000	.430	.471	.401	.526	.448
Q33	.294	.430	1.000	.574	.319	.463	.420
Q34	.369	.471	.574	1.000	.491	.550	.498
Q35	.288	.401	.319	.491	1.000	.312	.345
Q36	.486	.526	.463	.550	.312	1.000	.543
Q37	.385	.448	.420	.498	.345	.543	1.000

Item-Total Statistics					
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Q31	23.75248	15.909	.524	.327	.833
Q32	24.09901	15.353	.642	.427	.814
Q33	23.93069	15.736	.570	.382	.825
Q34	23.89604	15.109	.688	.519	.807
Q35	23.95050	16.714	.483	.286	.837
Q36	23.79703	15.416	.673	.486	.810
Q37	24.06931	15.299	.606	.385	.820

Summary Item Statistics							
	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	3.988	3.817	4.163	.347	1.091	.016	7
Item Variances	.824	.710	.917	.206	1.291	.005	7
Inter-Item Correlations	.434	.288	.574	.286	1.991	.008	7

5.6.2.2 Dimensionality analysis

All of the seven items in the *OCB* subscale were factor analysed as they all produced satisfactory results in the item analysis.

The correlation matrix for the *OCB* subscale indicated that all correlations were larger than .3 and that all the correlations were statistically significant ($p<.05$). Furthermore, a KMO of .867 (>.6) was obtained and the Bartlett's Test returned a statistically significant chi-square statistic ($p< 05$) that allowed for the identity matrix null hypothesis to be rejected. This presented strong evidence that the correlation matrix was factor analysable.

One factor was extracted since only one factor obtained an eigenvalue greater than one (3.627). The position of the elbow in the scree plot also suggested that a single factor should be extracted. The factor matrix revealed that all the items loaded onto one factor satisfactorily since all factor loadings were larger than .50 (λ_{i1}>.50), as shown in the resultant factor structure in Table 5.9.

The findings indicated that all items can be considered satisfactory regarding the proportion of item variance that can be explained by the single factor. Furthermore, eight (38%) of the nonredundant residual correlations obtained absolute values greater larger than .05. This suggests that the factor solution provided a reasonably sound explanation for the observed inter-item correlation matrix. The unidimensionality assumption, for the *OCB* subscale was thus corroborated.

Table 5.9

Factor matrix for the organisational citizenship behaviour subscale

Factor Matrix	
	Factor
	1
Q34	.761
Q36	.746
Q32	.701
Q37	.670
Q33	.634
Q31	.577
Q35	.529

5.6.3 Psychometric Evaluation of the Employee Green Behaviour Subscale

The *employee green behaviour (EGB)* subscale consisted of five items and intended to measure scalable actions and behaviours that the work unit engages in, that are linked with and contribute to or detract from environmental sustainability.

5.6.3.1 Item analysis

The results for the item analysis are depicted in Table 5.10. A highly satisfactory (>.80) Cronbach’s alpha of .922 was obtained. This indicates that approximately 92.2% of the variance in the items was systematic or true score variance and only 7.8% was random error variance.

The item means ranged from 2.896 to 3.337 on the five-point Likert scale and the item standard deviations ranged from 1.093 to 1.271 This indicates that most participants utilised the scale midpoint to rate their work unit on this competency. None of the item distribution were truncated due to extreme means. The scale was able to detect relatively small differences in the level of competence that the participants' work units achieved on the *EGB* competency.

The inter-item correlations shown in the correlation matrix in Table 5.10 ranged between .624 and .795, and the mean was .706. None of the items consistently correlated lower than the mean inter-item correlation with the remaining items of the subscale. The corrected item-total correlations in the item-total statistics section of Table 4.10 ranged from .634 to .756 and were above the cut off (>.3). The squared multiple correlation ranged from .634 to .756 and are considered satisfactory. None of the items showed themselves as outliers in either the corrected item-total correlation distribution or the squared multiple correlation distribution.

Furthermore, the results revealed that none of the items would increase the current Cronbach alpha if deleted. The basket of evidence therefore indicates that the responses to all the items reflected a common (but not necessarily unidimensional) source of systematic variance and not necessarily the intended latent performance dimension. The basket of evidence moreover indicates that none of the items were normatively insensitive to relatively small differences in work units' standing on the latent performance dimension. Therefore, based on the basket of evidence, none of the items were deleted from the *EGB* subscale.

Table 5.10

Item analysis output for the employee green behaviour subscale

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.922	.923	5

Table 5.10

Item analysis output for the employee green behaviour subscale (continued)

Item Statistics

	Mean	Std. Deviation	N
Q38	3.11386	1.093584	202
Q39	3.22772	1.100712	202
Q40	3.30693	1.090370	202
Q41	3.33663	1.174160	202
Q42	2.89604	1.271222	202

Inter-Item Correlation Matrix

	Q38	Q39	Q40	Q41	Q42
Q38	1.000	.772	.697	.652	.624
Q39	.772	1.000	.795	.660	.732
Q40	.697	.795	1.000	.692	.694
Q41	.652	.660	.692	1.000	.744
Q42	.624	.732	.694	.744	1.000

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Q38	12.76733	16.975	.769	.637	.910
Q39	12.65347	16.367	.845	.756	.895
Q40	12.57426	16.644	.817	.690	.901
Q41	12.54455	16.349	.776	.634	.908
Q42	12.98515	15.557	.791	.660	.907

Summary Item Statistics

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	3.176	2.896	3.337	.441	1.152	.032	5
Item Variances	1.318	1.189	1.616	.427	1.359	.034	5
Inter-Item Correlations	.706	.624	.795	.171	1.274	.003	5

5.6.3.2 Dimensionality analysis

All of the five items in the *EGB* subscale were factor analysed as they all produced satisfactory results in the item analysis.

The correlation matrix for the *EGB* subscale indicated that all correlations were larger than .3 and that all the correlations were statistically significant ($p<.05$). Furthermore, a KMO of .858 (>.6) was obtained and the Bartlett's Test returned a statistically significant chi-square statistic ($p<.05$) that allowed for the identity matrix null hypothesis to be rejected. This presented strong evidence that the correlation matrix was factor analysable.

One factor was extracted since only one factor obtained an eigenvalue greater than one (3.827). The position of the inflection point in the scree plot also suggested that a single factor should be extracted. The factor matrix revealed that all the items loaded onto one factor satisfactorily since all factor loadings were larger than .50 (λ_{i1}>.50), as shown in the resultant factor structure in Table 5.11.

The findings indicated that all items can be considered satisfactory regarding the proportion of item variance that can be explained by the single factor. Furthermore, only two (20%) of the nonredundant residual correlations obtained absolute values greater larger than .05. This suggests that the factor solution provided a valid and credible explanation for the observed inter-item correlation matrix. The unidimensionality assumption was thus corroborated for the *employee green behaviour (EGB)* subscale.

Table 5.11

Factor Matrix for the employee green behaviour scale

Factor Matrix	
	Factor
	1
Q39	.895
Q40	.862
Q42	.827
Q38	.810
Q41	.808

5.6.4 Psychometric Evaluation of the Task Performance Subscale

The *task performance* subscale consisted of six items and intended to measure the extent to which the work unit effectively performs the foundational, substantive or technical tasks that is essential for a specific job effectively, successfully completes role activities prescribed in the job description and achieves personal work objectives.

5.6.4.1 Item analysis

The results for the item analysis are depicted in Table 5.12. A satisfactory (>.80) Cronbach's alpha of .837 was obtained. This indicates that approximately 83.7% of the variance in the items was systematic or true score variance and only 16.3% was random error variance.

The item means ranged from 3.703 to 3.975 on the five-point Likert scale and the item standard deviations ranged from .724 to .831. This indicates that most participants responded by rating their work unit with the scale midpoint response option on this competency. None of the item distributions were curtailed by extreme means. The items were able to detect relatively small differences in the level of competence that the participants' work units achieved on the *task performance* competency.

The inter-item correlations in the correlation matrix shown in Table 5.12 ranged between .208 and .627, and the mean was .462. Item Q48 consistently correlated lower than the mean inter-item correlation with the remaining items in the subscale. Item Q48 therefore reacted to a different source of systematic variance than the remaining items. The corrected item-total correlations in the item-total statistics section of Table 5.12 ranged from .383 to .708 and were all above the cut off (>.3). The squared multiple correlations ranged from .170 to .543. Item Q48 showed itself as a clear outlier in the squared multiple correlation distribution and, to a somewhat lesser degree, also in the corrected item-total correlation distribution. The item Q48 was therefore somewhat of a closed book to the remaining items of the subscale.

Furthermore, the results revealed that removing item Q48 would increase the current Cronbach alpha if deleted. The deletion of item Q48 improved the internal consistency of the subscale because the item reflected a different source of systemic variance than the remaining items. However, based on the aforementioned findings, it was decided that the item statistic evidence against the item was not severe enough and that the item would be kept for further analyses. Therefore, based on the basket of evidence, none of the items were deleted from the *task performance* subscale.

Table 5.12

Item analysis output for the task performance subscale

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.837	.837	6

Item Statistics

	Mean	Std. Deviation	N
Q43	3.82178	.724772	202
Q44	3.90594	.770129	202
Q45	3.90594	.826227	202
Q46	3.70297	.753691	202
Q47	3.97525	.831220	202
Q48	3.93069	.807396	202

Inter-Item Correlation Matrix

	Q43	Q44	Q45	Q46	Q47	Q48
Q43	1.000	.594	.470	.376	.546	.208
Q44	.594	1.000	.627	.526	.571	.302
Q45	.470	.627	1.000	.562	.591	.303
Q46	.376	.526	.562	1.000	.544	.375
Q47	.546	.571	.591	.544	1.000	.331
Q48	.208	.302	.303	.375	.331	1.000

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Q43	19.42079	9.200	.577	.418	.817
Q44	19.33663	8.493	.708	.543	.791
Q45	19.33663	8.304	.688	.510	.794
Q46	19.53960	8.837	.638	.430	.805
Q47	19.26733	8.247	.697	.501	.792
Q48	19.31188	9.688	.383	.170	.855

Summary Item Statistics

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	3.874	3.703	3.975	.272	1.074	.009	6
Item Variances	.619	.525	.691	.166	1.315	.004	6
Inter-Item Correlations	.462	.208	.627	.419	3.010	.017	6

5.6.4.2 Dimensionality analysis

All of the six items in the *task performance* subscale were factor analysed as they all produced sufficiently satisfactory results in the item analysis (but for item Q48).

The correlation matrix for the *task performance* subscale indicated that all correlations were larger than .3 and that all the correlations were statistically significant ($p<.05$). Furthermore, a KMO of .856 (>.6) was obtained and Bartlett's Test returned a statistically significant chi-square statistic ($p<.05$) that allowed for the identity matrix null hypothesis to be rejected. This presented strong evidence that the correlation matrix was factor analysable.

One factor was extracted since only one factor obtained an eigenvalue greater than one (3.366). The position of the elbow in the scree plot also suggested that a single factor should be extracted. The factor matrix revealed that all the items, but for Q48, loaded onto one factor satisfactorily since all factor loadings were larger than .50 (λ_{i1}>.50) but for λ_{61}, as shown in the resultant factor structure in Table 5.13. The factor loading of item Q48 on the single extracted factor, although falling below the critical cut-off value of .50, was not considered low enough to warrant the deletion of this item in the current research study. Item Q48 was, however, flagged for specific critical scrutiny in subsequent studies.

Table 5.13

Factor matrix for the task performance subscale

Factor Matrix	
	Factor
	1
Q44	.795
Q47	.774
Q45	.772
Q46	.692
Q43	.648
Q48	.413

The findings indicated that all items can be considered satisfactory regarding the proportion of item variance that can be explained by the single factor, but for item Q48. Furthermore, only four (26%) of the nonredundant residual correlations obtained absolute values greater larger than .05. This suggests that the factor solution provided a valid and credible explanation for the observed inter-item correlation matrix. The unidimensionality assumption was thus corroborated for the *task performance* subscale.

5.6.5 Psychometric Evaluation of the Core People Processes Subscale

The *core people processes (CPP)* subscale consisted of nine items and intended to measure the extent to which the work unit has clear goals and plans in place, effective communication takes place in the unit, unit members interact with each other in pursuit of the unit objectives, conflict is managed productively, the integrity and value-add of members are recognised, mistakes and feedback are accepted as learning opportunities and good performance is recognised and celebrated.

5.6.5.1 Item analysis

The results for the item analysis are depicted in Table 5.14. A satisfactory (>.80) Cronbach's alpha of .854 was obtained. This indicates that approximately 85.4% of the variance in the items was systematic or true score variance and only 14.6% was random error variance.

The item means ranged from 3.059 to 3.960 on the five-point Likert scale and the item standard deviations ranged from .913 to 1.377. This indicates that most participants rated their work unit in terms of the midpoint of the scale or the second most favourable response option on this competency. None of the item distributions were curtailed by extreme means. The subscale was able to detect relatively small differences in the level of competence that the participants' work units achieved on the *CPP* competency.

The inter-item correlations in the correlation matrix shown in Table 5.14 ranged between .205 and .572 the mean was .415. Item Q57 consistently correlated lower than the mean inter-item correlation with the remaining items in the subscale. Item Q57 therefore reacted to a different source of systematic variance than the remaining items which caused it to be out of step with the remaining items. The corrected item-total correlations in the item-total statistics section of Table 5.14 ranged from .357 to

.655 and were above the cut off (>.3). The squared multiple correlations ranged from .144 to .476. Item Q57 showed itself as an outlier in the corrected item-total correlation distribution and, especially so, in the squared multiple correlation distribution. This again reflected the fact that the response to item Q57 tended not to agree with the typical response to the remaining items. This stemmed from the fact that item Q57 reacted to a different source of systematic variance than the remaining items.

Furthermore, the results revealed that item Q57 would increase the current Cronbach alpha if deleted. The deletion of item Q57 improved the internal consistency of the subscale because the item reflected a different source of systemic variance than the remaining items. However, based on the aforementioned findings, it was decided that the item statistic evidence against the item was not severe enough to warrant the immediate deletion of the item Q57 and that the item will be kept for further analyses (EFA). Therefore, based on the basket of evidence, none of the items were deleted from the *core people processes (CPP)* subscale.

Table 5.14

Item analysis output for the core people processes subscale

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.854	.865	9

Item Statistics	Mean	Std. Deviation	N
Q49	3.82178	.918533	202
Q50	3.62376	1.035216	202
Q51	3.47030	1.142403	202
Q52	3.74752	.898101	202
Q53	3.71782	1.053107	202
Q54	3.60396	.978162	202
Q55	3.96040	.913370	202
Q56	3.80693	1.049687	202
Q57	3.05941	1.377298	202

Table 5.14

Item analysis output for the core people processes subscale (continued)

Inter-Item Correlation Matrix									
	Q49	Q50	Q51	Q52	Q53	Q54	Q55	Q56	Q57
Q49	1.000	.447	.464	.428	.354	.370	.513	.521	.205
Q50	.447	1.000	.445	.518	.518	.447	.474	.510	.263
Q51	.464	.445	1.000	.572	.367	.412	.385	.412	.308
Q52	.428	.518	.572	1.000	.450	.390	.497	.492	.282
Q53	.354	.518	.367	.450	1.000	.509	.475	.509	.241
Q54	.370	.447	.412	.390	.509	1.000	.461	.419	.224
Q55	.513	.474	.385	.497	.475	.461	1.000	.521	.298
Q56	.521	.510	.412	.492	.509	.419	.521	1.000	.249
Q57	.205	.263	.308	.282	.241	.224	.298	.249	1.000

Item-Total Statistics					
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Q49	28.99010	34.149	.584	.409	.839
Q50	29.18812	32.532	.648	.442	.832
Q51	29.34158	32.186	.599	.428	.837
Q52	29.06436	33.633	.655	.476	.833
Q53	29.09406	32.812	.608	.430	.836
Q54	29.20792	33.787	.573	.368	.839
Q55	28.85149	33.560	.649	.455	.833
Q56	29.00495	32.423	.647	.460	.832
Q57	29.75248	33.650	.357	.144	.870

Summary Item Statistics							
	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	3.646	3.059	3.960	.901	1.294	.069	9
Item Variances	1.103	.807	1.897	1.090	2.352	.115	9
Inter-Item Correlations	.415	.205	.572	.367	2.790	.010	9

5.6.5.2 Dimensionality analysis

All of the nine items in the *CPP* subscale were factor analysed as they all produced sufficiently satisfactory results in the item analysis (but for item Q57).

The correlation matrix for the *CPP* scale indicated that all correlations were larger than .3 and that all the correlations were statistically significant ($p<.05$). Furthermore, a KMO of .901 (>.6) was obtained and the Bartlett's Test returned a statistically significant chi-square statistic ($p<.05$) that allowed for the identity matrix null hypothesis to be rejected. This presented strong evidence that the correlation matrix was factor analysable.

One factor was extracted since only one factor obtained an eigenvalue greater than one (4.384). The position of the inflection point in the scree plot also suggested that a single factor should be extracted. The factor matrix revealed that all the items, but for item Q57, loaded onto the one extracted factor satisfactorily since all factor loadings were larger than .50 (λ_{i1}>.50) but for λ_{91}, as shown in the resultant factor structure in Table 5.15. The factor loading of item Q57 on the single extracted factor, although falling below the critical cut-off value of .50, was not considered low enough to warrant the deletion of this item in the current research study. Item Q57 was, however, flagged for specific critical scrutiny in subsequent studies.

The findings indicated that all items but for item Q57, can be considered satisfactory regarding the proportion of item variance that can be explained by the single extracted factor. Furthermore, only ten (27%) of the nonredundant residual correlations obtained absolute values greater larger than .05. This suggests that the factor solution provided a reasonably valid and credible explanation for the observed inter-item correlation matrix. The unidimensionality assumption was thus corroborated for the *CPP* subscale.

Table 5.15

Factor matrix of the core people processes subscale

Factor Matrix	
	Factor 1
Q56	.715
Q50	.711
Q52	.711
Q55	.708
Q53	.667
Q51	.646
Q49	.644
Q54	.624
Q57	.382

5.6.6 Psychometric Evaluation of the Effort Subscale

The *effort* subscale consisted of seven items that were intended to measure the extent to which the work unit devotes constant attention towards work, uses resources like time and care in order to be effective on the job, shows willingness to keep working under detrimental conditions and spends the extra effort required for the task.

5.6.6.1 Item analysis

The results for the item analysis are depicted in Table 5.16. A satisfactory (>.80) Cronbach's alpha of .853 was obtained. This indicates that approximately 85.3% of the variance in the items was systematic or true score variance and only 14.7% was random error variance.

The item means ranged from 3.847 to 4.213 on the five-point Likert scale and the item standard deviations ranged from .779 to .938. This indicates that most participants rated their work unit on this competency by choosing the second-highest response option. None of the item distributions were truncated due to extreme means. The items of the subscale were able to detect reasonably small differences in the level of competence that the participants' work units achieved on the *effort* competency.

The inter-item correlations in the correlation matrix shown in Table 5.16 ranged between .213 and .639, and the mean was .462. Item Q14 consistently correlated lower than the mean inter-item correlation with the remaining items in the subscale. Item Q14 therefore reflected to a different source of systematic variance than the remaining items of the subscale which caused it to respond out of step with the remaining items. The corrected item-total correlations in the item-total statistics section of Table 5.16 ranged from .374 to .727 and were above the cut off (<.3). The squared multiple correlation ranged from .177 to .565 and are considered satisfactory. Item Q14 showed itself as an outlier in the corrected item-total correlation distribution and, especially so, in the squared multiple correlation distribution. Item Q14 therefore was a bit of a closed book to its colleagues in the sense that they could between them only explain *circa* 18% of the variance in item Q14.

Furthermore, the results revealed that item Q14 from the subscale would increase the current Cronbach alpha if deleted. The deletion of item Q14 improved the internal consistency of the subscale because item Q14 and the remaining items of the subscale responded to different sources of systematic variance. However, based on the aforementioned findings, it was decided that the item statistic evidence against the item was not severe enough to warrant the immediate deletion of the item Q14 and that the item would be kept for further analyses. Therefore, based on the basket of evidence, none of the items were deleted from the scale. Item Q14 was, however, flagged for specific critical scrutiny in subsequent studies

Table 5.16

Item analyses output for the effort subscale

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.853	.858	7

Item Statistics

	Mean	Std. Deviation	N
Q14	4.01485	.938283	202
Q15	3.84653	.914892	202
Q16	4.19802	.858320	202
Q17	4.21287	.874875	202
Q18	4.09406	.878751	202
Q19	3.88119	.789069	202
Q20	4.15347	.779854	202

Inter-Item Correlation Matrix

	Q14	Q15	Q16	Q17	Q18	Q19	Q20
Q14	1.000	.252	.213	.263	.288	.365	.384
Q15	.252	1.000	.558	.513	.476	.381	.479
Q16	.213	.558	1.000	.580	.503	.395	.512
Q17	.263	.513	.580	1.000	.621	.556	.543
Q18	.288	.476	.503	.621	1.000	.561	.639
Q19	.365	.381	.395	.556	.561	1.000	.628
Q20	.384	.479	.512	.543	.639	.628	1.000

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Q14	24.38614	15.781	.374	.177	.870
Q15	24.55446	14.477	.593	.398	.836
Q16	24.20297	14.640	.619	.457	.832
Q17	24.18812	14.094	.698	.535	.821
Q18	24.30693	14.065	.699	.536	.820
Q19	24.51980	14.878	.648	.486	.829
Q20	24.24752	14.516	.727	.565	.819

Table 5.16

Item analyses output for the effort subscale (continued)

Summary Item Statistics							
	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	4.057	3.847	4.213	.366	1.095	.022	7
Item Variances	.746	.608	.880	.272	1.448	.010	7
Inter-Item Correlations	.462	.213	.639	.427	3.009	.017	7

5.6.6.2 Dimensionality analysis

All of the eight items in the *effort* subscale were factor analysed as they all produced satisfactory results in the item analysis but for item Q14.

The correlation matrix for the *effort* subscale indicated that most of the correlations were larger than .3, except for item Q14 that correlated poorly with items Q15 to Q18 (but reasonably with items Q19 and Q20), and that all the correlations were statistically significant ($p<.05$). Furthermore, a KMO of .876 (>.6) was obtained and the Bartlett's Test returned a statistically significant chi-square statistic ($p<.05$) that allowed for the identity matrix null hypothesis to be rejected. This presented strong evidence that the correlation matrix was factor analysable.

Only one factor obtained an eigenvalue greater than one (3.841), however the results hinted towards two factors as the second factor obtained an eigenvalue of .906. The scree plot further suggested that two factors should be extracted. The single-factor factor matrix revealed that all of the items, except item Q14, loaded onto one factor satisfactorily since all factor loadings were larger than .50 (λ_{i1}>.50) but for λ_{71}=.405.

The greatest evidence pointing towards two factors was that nine (42%) of the nonredundant residual correlations obtained absolute values greater larger than .05. The unidimensionality assumption was thus not corroborated for the *effort* subscale.

The extraction of two factors was subsequently requested and oblique rotation (direct oblimin) was utilised in an attempt to rotate the factor matrix to simple structure. The pattern matrix reflects the partial regression slope coefficients when regressing each item on the two extracted factors. The pattern matrix contains the partial slope regression coefficients for the weighted linear combination of the latent variables, were partial regression coefficients reflect the effect of one factor on an item when statistically controlling the effect of the other factors that were extracted in both the item and the focal factor.

The pattern matrix therefore formally recognises that due to the oblique rotation correlations are likely to exist between the extracted factors and therefore they to some degree share variance. As shown in Table 5.17 items Q14, Q18, Q19 and Q20 all grouped together to load positively on factor 1. These items refer to time, commitment, energy investment and dedication. Therefore, based on common themes in these items, the first factor was interpreted as a *giving/investing/applying the unit* Factor. Items Q15, Q16 and Q17 grouped together to load negatively on factor 2. These items refer to care, perseverance and effort. Therefore, based on common themes in these items, the second factor was interpreted as a *continuous focus* factor. Item Q18 showed itself as a complex item. The two extracted factors correlated -.691 in the factor correlation matrix. The factor fission was regarded as subtle but nonetheless meaningful.

Furthermore, zero (0%) of the nonredundant residual correlations obtained absolute values greater larger than .05. This suggests that the two-factor model provided a valid and credible explanation for the observed inter-item correlation matrix.

Table 5.17

Pattern matrix for the effort subscale

	Factor	
	1	**2**
Q19	.810	.025
Q20	.679	-.183
Q18	.495	-.339
Q14	.478	.040
Q16	-.079	-.855
Q15	.065	-.645
Q17	.301	-.532

Two courses of action were possible in response to the factor fission. The first course of action was to divide the effort subscale into two separate subscales designed to measure the two extracted effort factors (and to write additional items for each). The second possible course of action was to acknowledge the (unanticipated) multidimensional nature of the *effort* subscale and to evaluate the ability of the *effort* subscale items to validly reflect *effort* as a second-order factor. Forcing a single factor in the EFA was one possible option that was considered to evaluate the ability of the subscale items to validly reflect *effort* as a second-order factor. The current study, however, would want to question the methodological rigour of this procedure. Firstly, it is not clear in terms of the underlying logic of this procedure whether the single extracted factor should be interpreted as a second-order factor or multidimensional latent variable. Secondly, in as far as the percentage of large residual correlations represent an evaluation of the fit of the factor structure, and given that the forced single-factor factor structure typically fits poorly, the validity and credibility of the factor loadings come into question. The inference that all the items satisfactorily reflected a higher-order factor thus becomes unconvincing because of the inability of the single-factor factor structure to accurately reproduce the observed inter-item correlation matrix (Wessels, 2018).

A methodologically more rigorous approach seemed to fit a second-order measurement model and to evaluate the statistical significance of the indirect effects of the second-order effort factor on the individual effort subscale items. This seemed justifiable only if the first-order measurement model fitted. The first-order measurement model in which items Q14, Q18, Q19 and Q20 loaded only on factor 1, and Q15, Q16 and Q17 loaded only on factor 2 fitted the subscale data reasonably closely (RMSEA=.054, $p>.05$). All factor loadings were statistically significant ($p<.05$). The second-order measurement model in which items Q14, Q18, Q19 and Q20 loaded only on first-order factor 1, items Q15, Q16 and Q17 loaded only on first-order factor 2 and the two first-order factors loaded on a single second-order factor fitted the subscale data closely (RMSEA=.061; $p>.05$). The solution was, however, inadmissible due to a negative structural error variance estimate for factor 1 and a R^2 estimate larger than unity.

Setting starting values for γ_{1j} did not solve the problem. The modification indices suggested, both in the first-order and the second-order model, that a path be added from factor 2 to Q18. This dovetailed with the EFA findings as shown in the pattern matrix (Table 4.17). Adding a path from factor 2 to item Q18 in the second-order effort measurement model produced an admissible solution and a close-fitting model (RMSEA=.049; p>.05).

The factor loadings and gamma estimates for the revised second-order *effort* measurement model are shown in Table 5.18 and in Table 5.19. The completely standardised solution for the second-order *effort* measurement model is shown in Figure 5.1.

Table 5.18

Unstandardised factor matrix for the second-order effort measurement model

	Factor 1	Factor 2
Q14	0.39	
Q15		0.62
Q16		0.62
		(0.57)
		1.10
Q17		0.72
		(0.59)
		1.22
Q18	0.71	
	(4.68)	
	0.15	
Q19	0.58	
	(3.59)	
	0.16	
Q20	0.64	
	(4.58)	
	0.14	

Table 5.18 indicates that all the factor loadings in the second-order *effort* measurement model were statistically insignificant (p>.05)[23].

[23] This finding stands in sharp contrast with the finding that the factor loadings in the first-order *effort* measurement model were all statistically significant (p<.05). This raises the question exactly how the factor loadings should be interpreted in the second-order measurement model. More specifically it raises the question whether the factor loading estimates should be interpreted as estimates of the slope of the regression of the items on the first-order factors when controlling for the second-order factor?

Table 5.19

Unstandardised gamma matrix for the second-order effort measurement model

	EFFORT

FAC1	.995794
	(1.099794)
	.905437
FAC2	.797801
	(.124738)
	6.395800*

* p<.05

Note: EFFORT refers to the *effort* latent variable

Table 5.19 indicates that γ_{11} was statistically insignificant (p>.05) but that γ_{21} was statistically significant (p<.05).

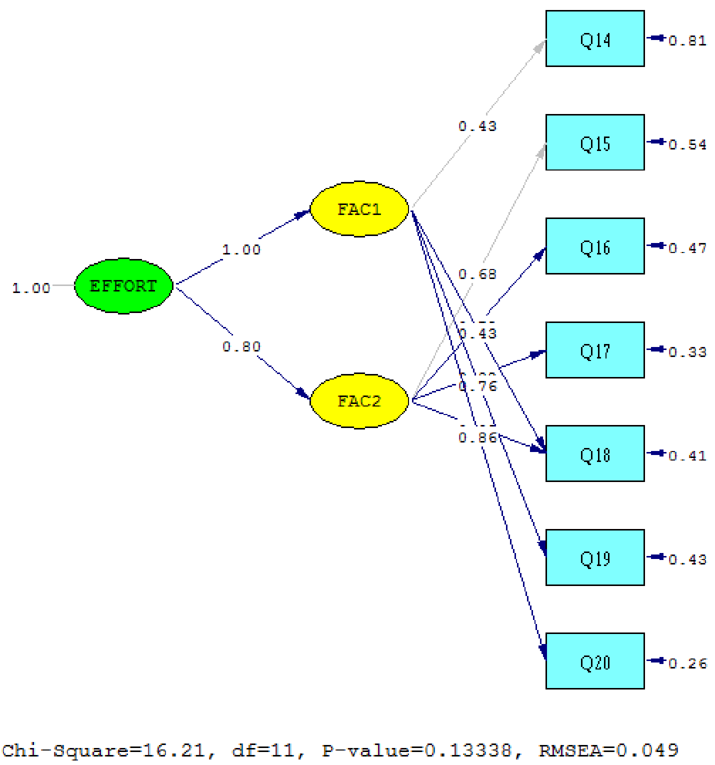

Figure 5.1. **The second-order effort measurement model (completely standardised solution)**

The eight indirect effects were calculated by translating the second-order measurement model SIMPLIS syntax to LISREL syntax, requesting the calculation of eight additional parameters via the AP command on the model (MO) command line, calculating the eight products $\lambda_{ij}\gamma_{ji}$ via the CO command and testing the statistical significance of these indirect effects. The unstandardized indirect effects, their standard errors and the corresponding z-scores are shown in Table 5.20.

Table 5.20

Unstandardised indirect effects for the second-order effort measurement model

PA(1)	PA(2)	PA(3)	PA(4)	PA(5)	PA(6)	PA(7)
0.42	0.75	0.62	0.69	0.49	0.50	0.57
(0.07)	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)
5.94	10.70	8.72	9.72	7.01	7.03	8.08

Table 5.20 indicates that all the indirect effects were statistically significant (p<.05). This means that respondents standing on *effort* as a second-order factor statistically significantly (p<.05) affected the scores obtained on each of the eight items. This justified the use of all eight items of the *effort* subscale as indicators of effort interpreted as a second-order latent competency and in the calculation of two composite indicators for the *effort* latent variable in the model[24].

5.6.7 Psychometric Evaluation of the Counterproductive Workplace Behaviour Subscale

The *counterproductive workplace behaviour* (*CWB*) subscale consisted of 10 items and measured the extent to which the members in the work unit display behaviour that threatens the wellbeing of an organisation, shows unwillingness to comply with organisational rules, interprets organisational expectations incorrectly, fails to maintain personal discipline, is absent from work, not punctual, steals, misuses drugs, displays confrontational attitudes towards co-workers, supervisors, and work itself, his/her behaviour hinders the accomplishment of organisational goals.

5.6.7.1 Item analysis

The results for the item analysis are depicted in Table 5.21. A satisfactory (>.80) Cronbach's alpha of .805 was obtained. This indicates that approximately 80.5% of the variance in the items was systematic or true score variance and only 19.5% was random error variance.

[24] It is acknowledged that the factor fission necessitates the recalculation of the reliability of the effort subscale scores via the formula proposed by Nunnally (1978) for the calculation of the reliability of a linear composite.

The item means ranged from 3.683 to 4.688 on the five-point Likert scale and the item standard deviations ranged from .703 to 1.04 This indicates that most participants rated their work unit in terms of the second highest response option on this competency. Some concern arose about the mean of the Q29 distribution that might have curtailed the variance of this item. With the exception of item Q29, no concern existed with regards to the ability of the items to detect small differences in the level of competence that the participants' work units achieved on the *CWB* competency.

The inter-item correlation matrix ranged between .053 and .584, and the mean was .292. Item Q29 and to a lesser degree items Q27, Q28 and Q30, caught the eye as consistently correlating lower than the mean inter-item correlation with items Q21 – Q26. They, however, correlated moderately amongst themselves. This in turn suggested factor fission. The range restriction on item Q29 was therefore not severe enough to attenuate the inter-item correlations of this items with the remaining items of the subscale. The corrected item-total correlations in the item-total statistics section of Table 5.21 ranged from .334 to .638 and were above the cut off (>.3). The squared multiple correlation ranged from .262 to .485 and are considered satisfactory. Item Q29 to some degree showed itself as an outlier in the corrected item-total correlation distribution and item Q30 to some degree as an outlier in the squared multiple correlation distribution.

Furthermore, the results revealed that none of the items would increase the current Cronbach alpha if deleted. Items Q29 and Q30 therefore were not sufficiently idiosyncrasies to increase the internal consistency of the subscale if they were deleted. Therefore, based on the basket of evidence, none of the items were deleted from the subscale.

Table 5.21

Item analysis for the counterproductive workplace behaviour subscale

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.805	.805	10

Table 5.21

Item analysis for the counterproductive workplace behaviour subscale (continued)

Item Statistics			
	Mean	Std. Deviation	N
Q21	3.81188	.921958	202
Q22	3.88614	.920689	202
Q23	3.91584	.890998	202
Q24	3.68317	1.040768	202
Q25	4.09406	.878751	202
Q26	4.25248	.840883	202
Q27	4.53960	.835122	202
Q28	4.53960	.786020	202
Q29	4.68812	.703055	202
Q30	4.17327	.954006	202

Inter-Item Correlation Matrix										
	Q21	Q22	Q23	Q24	Q25	Q26	Q27	Q28	Q29	Q30
Q21	1.000	.420	.399	.316	.341	.331	.229	.175	.147	.297
Q22	.420	1.000	.407	.352	.493	.410	.242	.202	.145	.221
Q23	.399	.407	1.000	.229	.347	.341	.202	.193	.053	.216
Q24	.316	.352	.229	1.000	.397	.410	.203	.161	.089	.351
Q25	.341	.493	.347	.397	1.000	.594	.330	.351	.241	.307
Q26	.331	.410	.341	.410	.594	1.000	.209	.244	.159	.249
Q27	.229	.242	.202	.203	.330	.209	1.000	.509	.313	.288
Q28	.175	.202	.193	.161	.351	.244	.509	1.000	.441	.266
Q29	.147	.145	.053	.089	.241	.159	.313	.441	1.000	.333
Q30	.297	.221	.216	.351	.307	.249	.288	.266	.333	1.000

Item-Total Statistics					
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Q21	37.77228	23.003	.493	.291	.786
Q22	37.69802	22.640	.540	.363	.781
Q23	37.66832	23.616	.439	.267	.792
Q24	37.90099	22.537	.465	.286	.791
Q25	37.49010	22.162	.638	.485	.770
Q26	37.33168	23.049	.552	.413	.780
Q27	37.04455	23.864	.448	.314	.791
Q28	37.04455	24.152	.446	.374	.792
Q29	36.89604	25.357	.334	.265	.802
Q30	37.41089	23.109	.457	.262	.791

Summary Item Statistics							
	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	4.158	3.683	4.688	1.005	1.273	.118	10
Item Variances	.777	.494	1.083	.589	2.191	.027	10
Inter-Item Correlations	.292	.053	.594	.541	11.164	.013	10

5.6.7.2 Dimensionality analysis

All of the 10 items in the *CWB* subscale were factor analysed as they all produced satisfactory results in the item analysis.

The correlation matrix for the *CWB* subscale indicated that most of the correlations were larger than .3, except for items Q29 and Q30 that correlated poorly with most of the other items, and that all the correlations were statistically significant, except for the correlation between item Q23 and item Q29 ($p<.05$). Furthermore, a KMO of .828 (>.6) was obtained and the Bartlett's Test returned a statistically significant chi-square statistic ($p<.05$) that allowed for the identity matrix null hypothesis to be rejected. This presented reasonably strong evidence that the correlation matrix was factor analysable.

Two factors obtained an eigenvalue greater than one (3.681 and 1.430). The position of the elbow in the scree plot further suggested that two factors should be extracted. The unidimensionality assumption was thus not corroborated for the *CWB sub*scale.

The pattern matrix shown in Table 5.22 indicated that items Q21, Q22, Q23, Q24, Q25 and Q26 all grouped together to load positively on factor 1. These items refer to organisational wellbeing, organisational rules, personal discipline, confrontation and trouble. Therefore, based on common themes in these items, the first factor was interpreted as a *non-criminal offences* factor (*CWB* that disregard organisational rules). Items Q27, Q28, Q29 and Q30 grouped together to load positively on factor 2. These items refer to instructions, sexual harassment, theft, substance abuse and bullying. Therefore, based on common themes in these items, the second factor was interpreted as a *criminal offences* factor (*CWBs* that are serious infringements). The factor fission was regarded as conceptually meaningful. The two extracted factors correlated .472 in the factor correlation matrix.

Furthermore, 10 (22%) of the nonredundant residual correlations obtained absolute values greater larger than .05. This suggests that the 2-factor solution provided a valid and credible explanation for the observed inter-item correlation matrix. Based on these results the unidimensionality assumption for the *CWB* subscale was therefore not corroborated.

Table 5.22

Pattern matrix for the counterproductive workplace behaviour scale

	Factor	
	1	**2**
Q22	.689	-.042
Q26	.674	.000
Q25	.653	.152
Q21	.573	.004
Q23	.562	-.043
Q24	.559	-.006
Q28	-.025	.772
Q29	-.065	.617
Q27	.100	.572
Q30	.281	.307

The first-order measurement model in which item Q21, Q22, Q23, Q24, Q25 and Q26 loaded only on factor 1, and item Q27, Q28, Q29 and Q30 loaded only on factor 2 fitted the subscale data reasonably closely (RMSEA=.051, p>.05). All factor loadings were statistically significant (p<.05). The second-order measurement model in which item Q21, Q22, Q23, Q24, Q25 and Q26 loaded only on first-order factor 1, item Q27, Q28, Q29 and Q30 loaded only on first-order factor 2 and the two first-order factors loaded on a single second-order factor fitted the subscale data closely (RMSEA=.048, p>.05). The unstandardised factor loadings and gamma estimates are shown in Table 5.23 and in Table 5.24. The path diagram for the second-order CWB measurement model, displaying the completely standardised solution, is shown in Figure 5.2.

Table 5.23

Unstandardised factor matrix for the second-order counterproductive workplace behaviour measurement model

	Factor 1	**Factor 2**
Q21	0.54	
Q22	0.60	
	(1.59)	
	0.38	
Q23	0.47	
	(1.24)	

Table 5.23

Unstandardised factor matrix for the second-order counterproductive workplace behaviour measurement model (continued)

	0.38	
Q24	0.56	
	(1.49)	
	0.38	
Q25	0.67	
	(1.92)	
	0.35	
Q26	0.56	
	(1.61)	
	0.35	
Q27		0.50
Q28		0.44
		(1.00)
		0.44
Q29		0.29
		(0.83)
		0.35
Q30		0.61
		(1.52)
		0.40

Table 5.23 indicates that all the CWB items loaded statistically insignificantly (p>.05) on the first-order factors that they were designated to reflect.

Table 5.24

Unstandardised gamma matrix for the second-order counterproductive workplace behaviour measurement model

	CWB
Factor 1	0.81
	(0.39)
	2.10
Factor 2	0.77
	(0.34)
	2.28

Note: CWB refers to the *counterproductive workplace behaviour* latent competency

Table 5.24 shows that the path coefficients describing the slope of the regression of the second-order CWB factor on the two first-order factors were both statistically significant (p<.05).

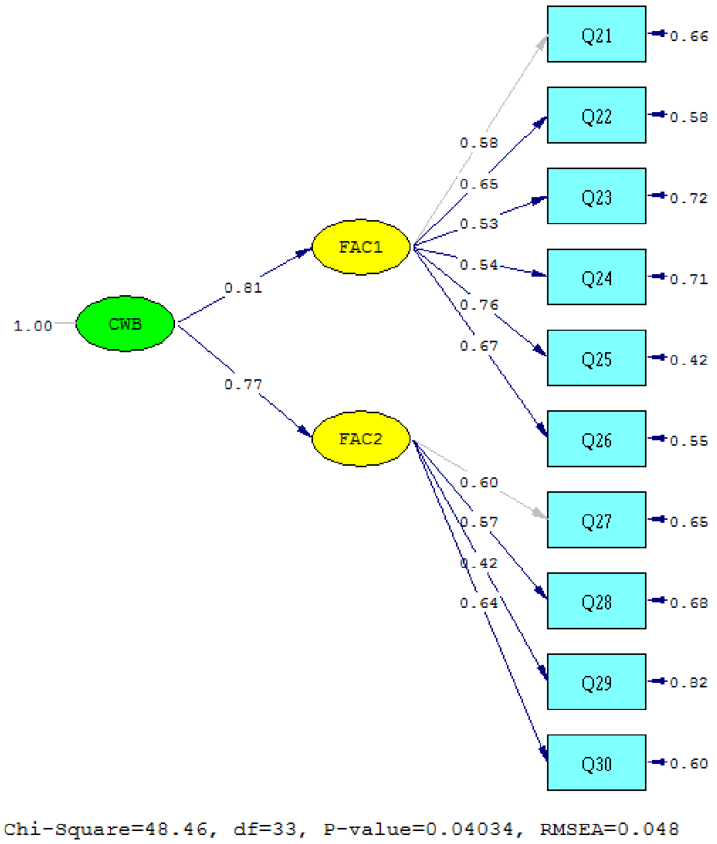

Figure 5.2. **Second-order CWB measurement model (completely standardised solution)**

The ten indirect effects were calculated by translating the SIMPLIS syntax to LISREL syntax, requesting the calculation of ten additional parameters via the AP=10 command on the MO command line, calculating the products $\lambda_{ij}\gamma_{ji}$ via the CO command and testing the statistical significance of these indirect effects. The unstandardised indirect effects of the second-order *CWB* factor on the ten CWB subscale items are shown in Table 5.25.

Table 5.25

Unstandardised indirect effects of the second-order counterproductive workplace behaviour measurement model

PA(1)	PA(2)	PA(3)	PA(4)	PA(5)	PA(6)
0.44	0.48	0.38	0.46	0.54	0.46
(0.07)	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)
6.19	6.88	5.39	6.49	7.67	6.45
PA(7)	**PA(8)**	**PA(9)**	**PA(10)**		
0.38	0.34	0.23	0.47		
(0.07)	(0.07)	(0.07)	(0.07)		
5.44	4.86	3.23	6.64		

Table 5.25 indicates that all the indirect effects were statistically significant (p<.05). This means that respondents standing on *CWB* as a second-order factor statistically significantly (p<.05) affected the scores obtained on each of the ten *CWB* items. This justified the use of all ten items of the *CWB* subscale to represent *structural* as a second-order factor and in the calculation of two composite indicators for the CWB latent variable in the structural model[25].

5.7 PSYCHOMETRIC EVALUATION OF THE WORK UNIT OUTCOME QUESTIONNAIRE

The WUOQ evaluated the work units' performance on the following six (presumed) unidimensional latent outcomes of *production*, *climate*, *satisfaction*, *market standing*, *future growth* and *high-performance culture*. Each of the outcomes were measured on a five-point Likert scale with an additional N/A option.

5.7.1 Psychometric Evaluation of the Production and Efficiency Subscale

The *production and efficiency* subscale consisted of five items and intended to measure the extent the work unit reaches quantitative outputs such as meeting goals, quantity, quality and cost-effectiveness, and task performance.

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[25] It is acknowledged that the factor fission necessitates the recalculation of the reliability of the *CWB* subscale scores via the formula proposed by Nunnally (1978) for the calculation of the reliability of a linear composite.

5.7.1.1 Item analysis

The results for the item analysis are depicted in Table 5.26. A satisfactory (>.80) Cronbach's alpha of .803 was obtained. This indicates that approximately 80.3% of the variance in the items was systematic or true score variance and only 19.7% was random error variance.

The item means ranged from 3.356 to 4 on the five-point Likert scale and the item standard deviations ranged from .741 to .870. This indicates that most participants rated their work unit in terms of the scale midpoint or the second highest response option on this competency. None of the item distributions were truncated by extreme means. The items of the subscale were able to detect relatively small differences in the standard that the participants' work units achieved on the *production and efficiency* outcome variable.

The inter-item correlations in the correlation matrix shown in Table 5.26. ranged between .258 and .617 and the mean inter-item correlation was .457. Item Q61 showed itself as an item that consistently correlated lower than the mean inter-item correlation with the remaining items of the subscale. This implied that item Q61 responded to a somewhat different source of systematic variance than the remaining items of the subscale. This in turn caused item Q61 to respond somewhat out of step with its colleagues in the subscale. The corrected item-total correlations in the item-total statistics section of Table 5.26 ranged from .382 to .699 and were above the cut off (>.3). The squared multiple correlations ranged from .155 to .519. Item Q61 showed itself as a clear outlier in the squared multiple correlation distribution and, albeit to a somewhat lesser degree, also in the corrected item-total correlation distribution. This again illustrates that fact that item Q61 was somewhat of an inexplicable enigma to the remaining items of the subscale because it responded to a different source of systematic variance than the remaining items.

Furthermore, the results reinforced this line of reasoning by indicating that item Q61 would increase the current Cronbach alpha if deleted. However, based on the aforementioned findings, it was decided that the item statistic evidence against the item was not severe enough to warrant the immediate deletion of the item Q61 and that the item will be kept for further analyses. Therefore, based on the basket of evidence, none of the items were deleted from the scale.

Table 5.26

Item analysis out for the production and efficiency subscale

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.803	.808	5

Item Statistics

	Mean	Std. Deviation	N
Q58	3.74257	.741834	202
Q59	3.86139	.760069	202
Q60	3.88119	.769921	202
Q61	3.35644	.870571	202
Q62	4.00000	.828593	202

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Q58	15.09901	6.050	.617	.442	.757
Q59	14.98020	5.980	.617	.405	.756
Q60	14.96040	5.690	.699	.519	.731
Q61	15.48515	6.410	.382	.155	.833
Q62	14.84158	5.587	.658	.456	.742

Summary Item Statistics

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	3.768	3.356	4.000	.644	1.192	.061	5
Item Variances	.633	.550	.758	.208	1.377	.007	5
Inter-Item Correlations	.457	.258	.617	.359	2.388	.017	5

5.7.1.2 Dimensionality analysis

All of the five items in the *production and efficiency* subscale were factor analysed as they all produced satisfactory results in the item analysis.

The correlation matrix for the *production and efficiency* subscale indicated that all correlations were larger than .3 and that all the correlations were statistically significant ($p<.05$). Furthermore, a KMO of .826 (>.6) was obtained and the Bartlett's Test returned a statistically significant chi-square statistic ($p<.05$) that allowed for the identity matrix null hypothesis to be rejected. This presented strong evidence that the correlation matrix was factor analysable.

One factor was extracted since only one factor obtained an eigenvalue greater than one (2.874). The inflection point in the scree plot also suggested that a single factor should be extracted. The factor matrix shown in Table 5.27 revealed that all the items, but for Q61, loaded onto one factor satisfactorily since all factor loadings (but for that of Q61) were larger than .50 (λ_{i1}>.50), as shown in the resultant factor structure in Table 5.27.

The findings indicated that all items, but for item Q61, can be considered satisfactory regarding the proportion of item variance that can be explained by the single factor. Furthermore, zero (0%) of the nonredundant residual correlations obtained absolute values greater larger than .05. This suggests that the factor solution provided a highly valid and credible explanation for the observed inter-item correlation matrix. The unidimensionality assumption was thus corroborated. Item Q61 was also flagged as a somewhat problematic item in the EFA with a factor loading of λ_{51}=.418. Although the factor loading of item Q61 on the single extracted factor was lower than the critical cut-off value of .50 it was nonetheless not considered sufficiently problematic to be deleted at this stage of the development of the WUOQ. Item Q61 was, however, flagged for specific critical scrutiny in subsequent studies

Table 5.27

Factor matrix for the production and efficiency subscale

	Factor
	1
Q60	.810
Q62	.752
Q58	.718
Q59	.703
Q61	.418

5.7.2 Psychometric Evaluation of the Work Unit Climate Subscale

The *work unit climate* subscale consisted of seven items and intended to measure the psychological environment of the unit, and gives an overall assessment of the integration, commitment and cohesion of the unit. It includes working atmosphere, teamwork, work group cohesion, agreement on core values and consensus regarding the vision, achievement-related attitudes and behaviours and commitment to the unit.

5.7.2.1 Item analysis

The results for the item analysis are depicted in Table 5.28.

A highly satisfactory (>.80) Cronbach's alpha of .903 was obtained. This indicates that approximately 90.3% of the variance in the items was systematic or true score variance and only 9.7% was random error variance.

The item means ranged from 3.757 to 3.995 on the five-point Likert scale and the item standard deviations ranged from .877 to .983. This indicates that most participants rated their work unit in terms of the second most favourable response option on this competency. None of the item distributions were truncated due to extreme means. The items of the subscale were able to detect relatively small differences in the standard that the participants' work units achieved on the *work unit climate* outcome variable.

The inter-item correlation shown in the correlation matrix in Table 5.28 ranged between .402 and .705 the mean was .573. none of the items consistently correlated lower than the mean inter-item correlation with the remaining items of the subscale. This implied that all items responded to a common source of systematic variance, although not necessarily a unidimensional source nor necessarily the intended latent outcome variable. The corrected item-total correlations in the section of Table 5.28 total statistics ranged from .660 to .759 and were above the cut off (>.3). The squared multiple correlations ranged from .515 to .640 and are considered satisfactory. None of the items showed themselves as outliers in either the corrected item-total correlation distribution or the squared multiple correlation distribution. This again implied that all items responded to a common source of systematic variance

Furthermore, the results revealed that none of the items would increase the current Cronbach alpha if deleted. This yet again implied that all items responded to a common source of systematic variance, although not necessarily a unidimensional source nor necessarily the intended latent outcome variable. Therefore, based on the basket of evidence, none of the items were deleted from the scale.

Table 5.28

Item analysis output for the work unit climate subscale

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.903	.904	7

Item Statistics			
	Mean	Std. Deviation	N
Q63	3.99505	.900511	202
Q64	3.87129	.877166	202
Q65	3.75743	.895300	202
Q66	3.94554	.983448	202
Q67	3.79703	.958539	202
Q68	3.88119	.889822	202
Q69	3.82673	.979734	202

Inter-Item Correlation Matrix							
	Q63	Q64	Q65	Q66	Q67	Q68	Q69
Q63	1.000	.705	.609	.477	.402	.570	.546
Q64	.705	1.000	.689	.574	.489	.605	.576
Q65	.609	.689	1.000	.544	.505	.576	.576
Q66	.477	.574	.544	1.000	.664	.595	.574
Q67	.402	.489	.505	.664	1.000	.567	.566
Q68	.570	.605	.576	.595	.567	1.000	.615
Q69	.546	.576	.576	.574	.566	.615	1.000

Item-Total Statistics					
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Q63	23.07921	20.292	.680	.554	.892
Q64	23.20297	19.904	.759	.640	.883
Q65	23.31683	19.999	.726	.558	.887
Q66	23.12871	19.456	.714	.556	.888
Q67	23.27723	20.032	.660	.515	.894
Q68	23.19307	19.968	.737	.545	.886
Q69	23.24752	19.451	.718	.521	.888

Table 5.28

Item analysis output for the work unit climate subscale (continued)

Summary Item Statistics							
	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	3.868	3.757	3.995	.238	1.063	.007	7
Item Variances	.860	.769	.967	.198	1.257	.007	7
Inter-Item Correlations	.573	.402	.705	.302	1.751	.005	7

5.7.2.2 Dimensionality analysis

All of the seven items in the *work unit climate* subscale were factor analysed as they all produced satisfactory results in the item analysis.

The correlation matrix for the *work unit climate* subscale indicated that all correlations were larger than .3 and that all the correlations were statistically significant ($p<.05$). Furthermore, a KMO of .904 (>.6) was obtained and the Bartlett's Test returned a statistically significant chi-square statistic ($p<.05$) that allowed for the identity matrix null hypothesis to be rejected. This presented strong evidence that the correlation matrix was factor analysable.

One factor was extracted since only one factor obtained an eigenvalue greater than one (4.440). The position of the elbow in the scree plot also suggested that a single factor should be extracted. The factor matrix revealed that all the items loaded onto one factor satisfactorily since all factor loadings were larger than .50 ($\lambda_{i1}>.50$), as shown in the resultant factor structure in Table 5.29.

Table 5.29

Factor matrix for the work unit climate subscale

	Factor 1
Q64	.811
Q68	.780
Q65	.774
Q69	.760
Q66	.751
Q63	.729
Q67	.693

The findings indicated that all items can be considered satisfactory regarding the proportion of item variance that can be explained by the single factor. Furthermore, six (28%) of the nonredundant residual correlations obtained absolute values greater larger than .05. This suggests that the factor solution provided a reasonably sound explanation for the observed inter-item correlation matrix. The unidimensionality assumption was thus corroborated.

5.7.3 Psychometric Evaluation of the Future Growth Scale

The *future growth* subscale consisted of five items and intended to measure an index of projected future performance and includes profits and market share, capital investment, staff levels and expansion of the unit.

5.7.3.1 Item analysis

The results for the item analysis are depicted in Table 5.30. A satisfactory (>.80) Cronbach's alpha of .844 was obtained. This indicates that approximately 84.4% of the variance in the items was systematic or true score variance and only 15.6% was random error variance.

The item means ranged from 3.173 to 3.569 on the five-point Likert scale and the item standard deviations ranged from .952 to 1.182. This indicates that most participants rated their work unit as slightly above average on this competency. None of the item distributions were truncated due to extreme item means. The items of the subscale were able to detect relatively small differences in the standard that the participants' work units achieved on the *future growth* outcome variable.

The inter-item correlations in the correlation matrix shown in Table 5.30 ranged between .442 and .688 the mean was .529. None of the items consistently correlated lower than the mean inter-item correlation with the remaining items of the subscale. The corrected item-total correlations in the item-total statistics section of Table 5.30 ranged from .577 to .720 and were above the cut off (>.3). The squared multiple correlations ranged from .345 to .574 and are considered satisfactory. None of the items showed themselves as outliers in the corrected item-total correlation distribution or in the squared multiple correlation distribution.

Furthermore, the results revealed that none of the items would increase the current Cronbach alpha if deleted. The findings on the inter-item correlations, corrected item-total correlations, squared multiple correlations and the change in the Cronbach alpha if item deleted all suggest that all items in the *future growth* subscale responded to a common source of systematic variance, although not necessarily a unidimensional source nor necessarily the intended latent outcome variable. Therefore, based on the basket of evidence, none of the items were deleted from the scale.

Table 5.30

Item analysis output for the future growth subscale

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.844	.849	5

Item Statistics

	Mean	Std. Deviation	N
Q93	3.56931	.900511	202
Q94	3.51980	.952663	202
Q95	3.52970	1.027778	202
Q96	3.55446	1.154487	202
Q97	3.17327	1.182239	202

Inter-Item Correlation Matrix

	Q93	Q94	Q95	Q96	Q97
Q93	1.000	.688	.575	.483	.504
Q94	.688	1.000	.561	.442	.595
Q95	.575	.561	1.000	.498	.473
Q96	.483	.442	.498	1.000	.469
Q97	.504	.595	.473	.469	1.000

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Q93	13.77723	11.716	.701	.544	.799
Q94	13.82673	11.945	.720	.574	.796
Q95	13.81683	11.912	.652	.435	.812
Q96	13.79208	11.698	.577	.345	.834
Q97	14.17327	11.219	.628	.419	.820

Table 5.30

Item analysis output for the future growth subscale (continued)

Summary Item Statistics							
	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	3.469	3.173	3.569	.396	1.125	.028	5
Item Variances	1.143	.908	1.398	.490	1.540	.045	5
Inter-Item Correlations	.529	.442	.688	.246	1.555	.005	5

5.7.3.2 Dimensionality analysis

All of the five items in the *future growth* subscale were factor analysed as they all produced satisfactory results in the item analysis.

The correlation matrix for the *future growth* subscale indicated that all correlations were larger than .3 and that all the correlations were statistically significant ($p<.05$). Furthermore, a KMO of .834 (>.6) was obtained and the Bartlett's Test returned a statistically significant chi-square statistic ($p<.05$) that allowed for the identity matrix null hypothesis to be rejected. This presented strong evidence that the correlation matrix was factor analysable.

One factor was extracted since only one factor obtained an eigenvalue greater than one (3.123). The location of the inflection point in the scree plot also suggested that a single factor should be extracted. The factor matrix revealed that all the items loaded onto one factor satisfactorily since all factor loadings were larger than .50 (λ_{i1} >.50), as shown in the resultant factor structure in Table 5.31.

Table 5.31

Factor matrix for the future growth subscale

	Factor
	1
Q94	.813
Q93	.793
Q95	.718
Q97	.691
Q96	.624

The findings indicated that all items can be considered satisfactory regarding the proportion of item variance (λ_{i1}^2) that can be explained by the single factor. Furthermore, only one (10%) of the nonredundant residual correlations obtained absolute values greater larger than .05. This suggests that the factor solution provided a valid and credible explanation for the observed inter-item correlation matrix. The unidimensionality assumption was thus corroborated for the *future growth* subscale

5.7.4 Psychometric Evaluation of the Employee Satisfaction Subscale

The *employee satisfaction* subscale consisted of nine items and intended to measure the satisfaction with the task and work context, empowerment, and career progress, as well as with outcomes of leadership.

5.7.4.1 Item analysis

The results for the item analysis are depicted in Table 5.32. A highly satisfactory (>.80) Cronbach's alpha of .910 was obtained. This indicates that approximately 91% of the variance in the items was systematic or true score variance and only 9% was random error variance.

The item means ranged from 3.114 to 4.069 on the five-point Likert scale and the item standard deviations ranged from .929 to 1.093. This indicates that most participants rated their work unit in terms of the second-most favourable response option on this competency. The items comprising this subscale were able to detect relatively small differences in the standard that the participants' work units achieved on the *employee satisfaction* outcome variable.

The inter-item correlations in the correlation matrix shown in Table 5.32 ranged between .363 and .816 the mean was .535. None of the items consistently correlated lower than the mean inter-item correlation with the remaining items of the subscale. The corrected item-total correlations in the item-total statistics section of Table 5.32 ranged from .572 to .783 and were above the cut off (>.3). The squared multiple correlations ranged from .433 to .737 and are considered satisfactory. None of the items showed themselves as outliers in the corrected item-total correlation distribution or the squared multiple correlation distribution.

Furthermore, the results revealed that none of the items would increase the current Cronbach alpha if deleted. The findings on the inter-item correlations, corrected item-total correlations, squared multiple correlations and the change in the Cronbach alpha if item deleted all suggest that all items in the *employee satisfaction* subscale responded to a common source of systematic variance, although not necessarily a unidimensional source nor necessarily the intended latent outcome variable. Therefore, based on the basket of evidence, none of the items were deleted from the scale.

Table 5.32
Item analysis output for the employee satisfaction subscale

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.910	.912	9

Item Statistics

	Mean	Std. Deviation	N
Q70	3.60891	.946594	202
Q71	3.51485	1.023251	202
Q72	3.11386	1.089025	202
Q73	3.21782	1.093663	202
Q74	3.67822	.977570	202
Q75	4.06931	.949023	202
Q76	4.00990	.987434	202
Q77	3.87129	.958475	202
Q78	3.91584	.929263	202

Inter-Item Correlation Matrix

	Q70	Q71	Q72	Q73	Q74	Q75	Q76	Q77	Q78
Q7	1.000	.589	.569	.568	.514	.390	.499	.487	.454
Q7	.589	1.000	.452	.468	.465	.542	.610	.641	.621
Q7	.569	.452	1.000	.551	.497	.363	.374	.381	.383
Q7	.568	.468	.551	1.000	.606	.364	.491	.468	.468
Q7	.514	.465	.497	.606	1.000	.426	.477	.487	.490
Q7	.390	.542	.363	.364	.426	1.000	.764	.721	.723
Q7	.499	.610	.374	.491	.477	.764	1.000	.816	.771
Q7	.487	.641	.381	.468	.487	.721	.816	1.000	.770
Q7	.454	.621	.383	.468	.490	.723	.771	.770	1.000

Table 5.32
Item analysis output for the employee satisfaction subscale (continued)

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Q70	29.39109	38.160	.664	.520	.902
Q71	29.48515	36.918	.712	.543	.899
Q72	29.88614	37.952	.572	.433	.909
Q73	29.78218	37.037	.645	.514	.904
Q74	29.32178	38.110	.642	.463	.903
Q75	28.93069	37.846	.691	.648	.900
Q76	28.99010	36.497	.783	.762	.893
Q77	29.12871	36.839	.779	.737	.894
Q78	29.08416	37.291	.763	.694	.895

Summary Item Statistics

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	3.667	3.114	4.069	.955	1.307	.115	9
Item Variances	.993	.864	1.196	.333	1.385	.015	9
Inter-Item Correlations	.535	.363	.816	.453	2.248	.016	9

5.7.4.2 Dimensionality analysis

All of the nine items in the *employee satisfaction* subscale were factor analysed as they all produced satisfactory results in the item analysis.

The correlation matrix for the *employee satisfaction* subscale indicated that all of the correlations were larger than .3 and that all the correlations were statistically significant ($p<.05$). Furthermore, a KMO of .912 (>.6) was obtained and the Bartlett's Test returned a statistically significant chi-square statistic ($p<.05$) that allowed for the identity matrix null hypothesis to be rejected. This presented strong evidence that the correlation matrix was factor analysable.

Two factors obtained an eigenvalue greater than one (5.318 and 1.240). The position of the elbow in the scree plot further suggested that two factors should be extracted. The unidimensionality assumption was thus not corroborated for the *employee satisfaction* subscale.

The pattern matrix shown in Table 5.33 indicated that items Q71, Q75, Q76, Q77 and Q78 all grouped together to load positively on factor 1. These items refer to satisfaction with the quality of supervision, respect for the leader, confidence in the leader, satisfaction with the leader and acceptance of the leader's influence. Therefore, based on common themes in these items, the first factor was interpreted as a *satisfaction with the quality of supervision* factor. Items Q70, Q72, Q73 and Q74 grouped together to load positively on factor 2. These items refer to satisfaction with the work and work context, satisfaction with the salary and fringe benefits, satisfaction with career development and work unit empowerment respectively. Therefore, based on common themes in these items, the second factor was interpreted as a *satisfaction with work and surrounding work* only. Theron *et al*. (2004) obtained a similar factor fission on the *satisfaction* subscale of the PI. The two extracted factors correlated .660 in the factor correlation matrix. The factor fission was regarded as conceptually meaningful.

Furthermore, only two (5%) of the nonredundant residual correlations obtained absolute values greater larger than .05. This suggests that the 2-factor solution provides a valid and credible explanation for the observed inter-item correlation matrix. Based on the foregoing results the unidimensionality assumption for the *employee satisfaction* subscale was therefore not corroborated.

Table 5.33

Pattern matrix for the employee satisfaction subscale

	Factor	
	1	**2**
Q76	.900	.009
Q77	.874	.027
Q75	.874	-.072
Q78	.840	.040
Q71	.453	.360
Q73	-.004	.777
Q72	-.081	.773
Q70	.047	.736
Q74	.113	.636

The first-order *employee satisfaction* measurement model in which items Q71, Q75, Q76, Q77 and Q78 loaded only on factor 1, and items Q70, Q72, Q73 and Q74 loaded only on factor 2 fitted the subscale data reasonably closely (RMSEA =.054; p>.05). All factor loadings were statistically significant (p<.05). The second-order *employee satisfaction* measurement model in which items Q71, Q75, Q76, Q77 and Q78 loaded only on first-order factor 1, items Q70, Q72, Q73 and Q74 loaded only on first-order factor 2 and in which the two first-order factors loaded on a single second-order factor fitted the subscale data reasonably closely (RMSEA =.065; p>.05). The unstandardised factor loadings and gamma estimates are shown in Table 5.34 and in Table 5.35. The path diagram showing the completely standardised solution is shown in Figure 5.3.

Table 5.34

Unstandardised factor matrix for the second-order employee satisfaction measurement model

	Factor 1	Factor 2
Q70		0.74
Q71	0.79	
Q72		0.73
		(0.39)
		1.86
Q73		0.84
		(0.52)
		1.61
Q74		0.74
		(0.46)
		1.62
Q75	0.74	
	(0.41)	
	1.78	
Q76	0.87	
	(0.49)	
	1.79	
Q77	0.84	
	(0.47)	
	1.80	
Q78	0.80	
	(0.44)	
	1.80	

Table 5.34 shows that when the statistical significance of the factor loadings in the second-order *employee satisfaction* measurement model were evaluated via a one-tailed test against a directional alternative hypothesis (given the positive loadings in the pattern matrix) the loading of items Q71, Q75, Q76, Q77 and Q78 on factor 1 were

all statistically significant ($p<.05$) but only the loading of item Q70 on factor 2 was statistically significant ($p<.05$)[26].

Table 5.35

Unstandardised gamma matrix for the second-order employee satisfaction measurement model

	Satisfac
Factor 1	0.86
	(0.25)
	3.48
Factor 2	0.84
	(0.12)
	7.23

Note: Satisfac refers to the *satisfaction* latent variable.

Table 5.35 shows that both of the path coefficients estimates γ_{11} and γ_{12} were statistically significant ($p<.05$).

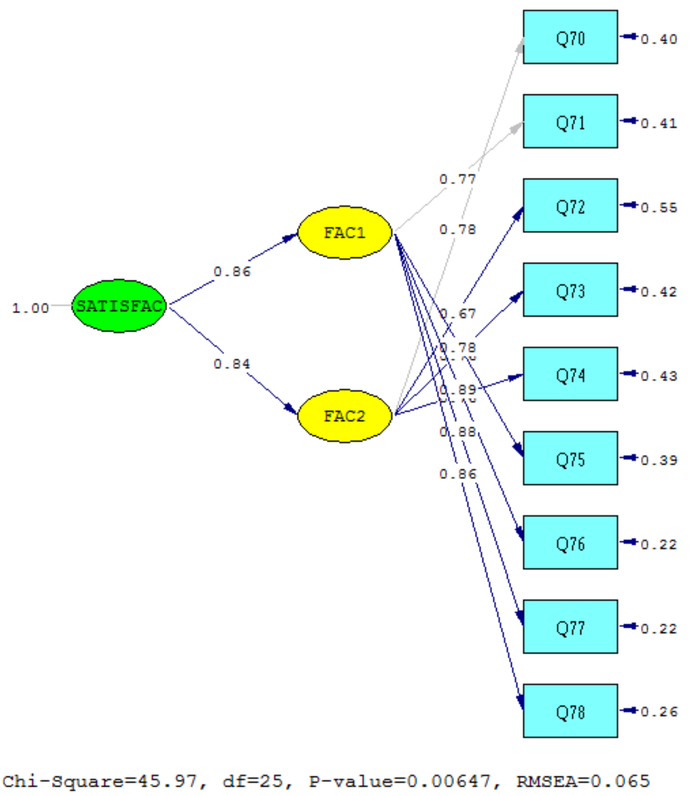

Figure 5.3. **Second-order employee satisfaction measurement model (completely standardised solution)**

[26] When evaluated via a non-directional test none of the factor loadings are statistically significant ($p>.05$).

The eight indirect effects of the second-order employee satisfaction factor on the employee satisfaction subscale items were calculated by translating the SIMPLIS syntax for the second-order measurement model to LISREL syntax, requesting the calculation of nine additional parameters via the AP=9 command on the MO command line, calculating the products $\lambda_{ij}\gamma_{ji}$ via the CO command and testing the statistical significance of these indirect effects. The unstandardised indirect effects are shown in Table 5.36.

Table 5.36

Unstandardised indirect effects for the second-order employee satisfaction measurement model

PA(1)	PA(2)	PA(3)	PA(4)	PA(5)	PA(6)
0.67	0.63	0.75	0.72	0.68	0.62
(0.07)	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)
9.56	8.96	10.60	10.23	9.67	8.78
PA(7)	**PA(8)**	**PA(9)**			
0.62	0.70	0.62			
(0.07)	(0.07)	(0.07)			
8.75	9.98	8.83			

Table 5.36 indicates that all the indirect effects were statistically significant ($p<.05$). This means that respondents standing on *employee satisfaction* as a second-order factor statistically significantly ($p<.05$) affected the scores obtained on each of the nine items. This justified the use of all nine items of the *employee satisfaction* subscale in representing employee satisfaction as a second-order outcome variable and the calculation of two composite indicators for the *employee satisfaction* latent variable in the structural model[27].

5.7.5 Psychometric Evaluation of the High-Performance Culture Subscale

The *high-performance culture* subscale consisted of seven items and intended to measure the shared perception amongst members of a unit that high and exceptional

[27] It is acknowledged that the factor fission necessitates the recalculation of the reliability of the *employee satisfaction* subscale scores via the formula proposed by Nunnally (1978) for the calculation of the reliability of a linear composite.

performance in everything that the unit does is the norm or expectation in the organisational unit.

5.7.5.1 Item analysis

The results for the item analysis are depicted in Table 5.37. A satisfactory (>.80) Cronbach's alpha of .851 was obtained. This indicates that approximately 85.1% of the variance in the items was systematic or true score variance and only 14.9% was random error variance.

The item means ranged from 3.535 to 4.129 on the five-point Likert scale and the item standard deviations ranged from .857 to 1.163. This indicates that most participants rated their work unit in terms of the scale midpoint or the second-most favourable response option on this competency. None of the item distributions were truncated due to extreme means. The items of this subscale were able to detect relatively small differences in the standard that the participants' work units achieved on the *high-performance culture* outcome variable.

The inter-item correlations in the correlation matrix shown in Table 5.37 ranged between .334 and .658 the mean was .464. None of the items consistently correlated lower than the mean inter-item correlation with the remaining items in the subscale. All items therefore responded to a common source of systematic variance. The corrected item-total correlations in the item-total statistics section of Table 5.37 ranged from .509 to .732 and were above the cut off (<.3). The squared multiple correlations ranged from .337 to .613 and are considered satisfactory. None of the items clearly showed themselves as outliers in the corrected item-total correlation or the squared multiple correlation distributions although item Q85 did draw some attention. Because all items tapped into the same source of systematic variance none of them appeared enigmatic and difficult to fathom to the remaining items of the subscale.

Furthermore, the results revealed that none of the items (also not item Q85) would increase the current Cronbach alpha if deleted. Therefore, based on the basket of evidence, none of the items were deleted from the scale.

Table 5.37

Item analysis output for the high-performance subscale

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.851	.858	7

Item Statistics

	Mean	Std. Deviation	N
Q79	3.53465	1.163836	202
Q80	4.09901	.919712	202
Q81	4.02970	.857573	202
Q82	3.93564	.875775	202
Q83	3.75248	.986536	202
Q84	4.12871	.921424	202
Q85	3.74257	1.098651	202

Inter-Item Correlation Matrix

	Q79	Q80	Q81	Q82	Q83	Q84	Q85
Q79	1.000	.438	.552	.385	.484	.334	.338
Q80	.438	1.000	.558	.576	.427	.460	.336
Q81	.552	.558	1.000	.658	.597	.518	.336
Q82	.385	.576	.658	1.000	.477	.436	.360
Q83	.484	.427	.597	.477	1.000	.522	.423
Q84	.334	.460	.518	.436	.522	1.000	.529
Q85	.338	.336	.336	.360	.423	.529	1.000

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Q79	23.68812	18.027	.558	.375	.842
Q80	23.12376	19.074	.620	.433	.830
Q81	23.19307	18.734	.732	.613	.816
Q82	23.28713	19.211	.641	.511	.827
Q83	23.47030	18.340	.661	.462	.823
Q84	23.09406	19.011	.627	.456	.829
Q85	23.48020	18.838	.509	.337	.848

Summary Item Statistics

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	3.889	3.535	4.129	.594	1.168	.048	7
Item Variances	.962	.735	1.355	.619	1.842	.055	7
Inter-Item Correlations	.464	.334	.658	.324	1.968	.009	7

5.7.5.2 Dimensionality analysis

All of the seven items in the *high-performance culture* subscale were factor analysed as they all produced satisfactory results in the item analysis.

The correlation matrix for the *high-performance culture* subscale indicated that all of the correlations were larger than .3 and that all the correlations were statistically significant ($p<.05$). Furthermore, a KMO of .850 (>.6) was obtained and the Bartlett's Test returned a statistically significant chi-square statistic ($p<.05$) that allowed for the identity matrix null hypothesis to be rejected. This presented strong evidence that the correlation matrix was factor analysable.

One factor obtained an eigenvalue greater than one (3.807). The scree plot further suggested that one factor should be extracted. However, nine (42%) of the nonredundant residual correlations obtained absolute values greater larger than .05. The single-factor factor solution therefore did not provide a valid and credible explanation for the observed inter-item correlation matrix. Therefore, the unidimensionality assumption was thus not corroborated for the *high-performance culture* subscale. The extraction of two factors was consequently requested.

The pattern matrix shown in Table 5.38 indicated that items Q79, Q80, Q81, Q82 and Q83 all grouped together to load positively on factor 1. These items refer to risk taking, accountability, ability, performance-driven and community respectively. Therefore, based on the common theme in these items, the first factor was interpreted as an *internal focus/emphasis on high performance* factor. Items Q84 and Q85 grouped together to load positively on factor 2. These items refer to customer orientation and competition respectively. Therefore, based on the common theme in these items, the second factor was interpreted as an *external focus/emphasis on high performance* factor. The factor fission was regarded as conceptually meaningful. The two extracted factors correlated .665 in the factor correlation matrix.

Furthermore, four (19%) of the nonredundant residual correlations obtained absolute values greater larger than .05. This suggests that the 2-factor solution provides a valid and credible explanation for the observed inter-item correlation matrix.

Table 5.38

Pattern matrix for the high-performance scale

	Factor	
	1	2
Q81	.969	-.130
Q82	.742	-.006
Q80	.648	.058
Q79	.560	.071
Q83	.497	.278
Q85	-.042	.761
Q84	.227	.577

The first-order *high performance culture* measurement model in which items Q79, Q80, Q81, Q82 and Q83 loaded only on factor 1, and items Q84 and Q85 loaded only on factor 2 fitted the subscale data reasonably closely (RMSEA=.073; p>.05)[28]. All factor loadings were statistically significant (p<.05). The second-order *high performance* measurement model in which items Q79, Q80, Q81, Q82 and Q83 loaded only on first-order factor 1, items Q84 and Q85 loaded only on first-order factor 2 and the two first-order factors loaded on a single second-order factor fitted the subscale data reasonably closely (RMSEA=.069; p>.05). The unstandardised factor loadings and gamma estimates for the second-order *high performance culture* measurement model are shown in Table 5.39 and in Table 5.40. The path diagram depicting the completely standardised solution of the second-order *high performance culture* measurement model is shown in Figure 5.4.

Table 5.39

Unstandardised factor loadings for the second-order high performance culture measurement model

	Factor 1	Factor 2
Q79	0.72	
Q80	0.63	
	(0.60)	
	1.05	
Q81	0.72	
	(0.73)	
	0.98	
Q82	0.63	
	(0.65)	

[28] It is acknowledged that the statistical power of these analyses are quite low due to the small degrees of freedom and the relatively small sample size.

Table 5.39

Unstandardised factor loadings for the second-order high performance culture measurement model (continued)

	0.97	
Q83	0.71	
	(0.67)	
	1.05	
Q84		0.76
Q85		0.71
		(0.30)
		2.33

The loadings of items Q80, Q81, Q82, Q83 on factor 1 were all statistically insignificant (p>.05). The loading of item Q85 on factor 2 was statistically significant (p<.05).

Table 5.40

Unstandardised gamma matrix for the second-order high performance culture measurement model

	HPC
Factor 1	0.86
	(0.35)
	2.45
Factor 2	0.90
	(0.06)
	14.33

Note: HPC refers to *high performance culture* latent variable

The slope of the regression of the two first-order factors on the second-order high performance culture factor were both statistically significant (p<.05).

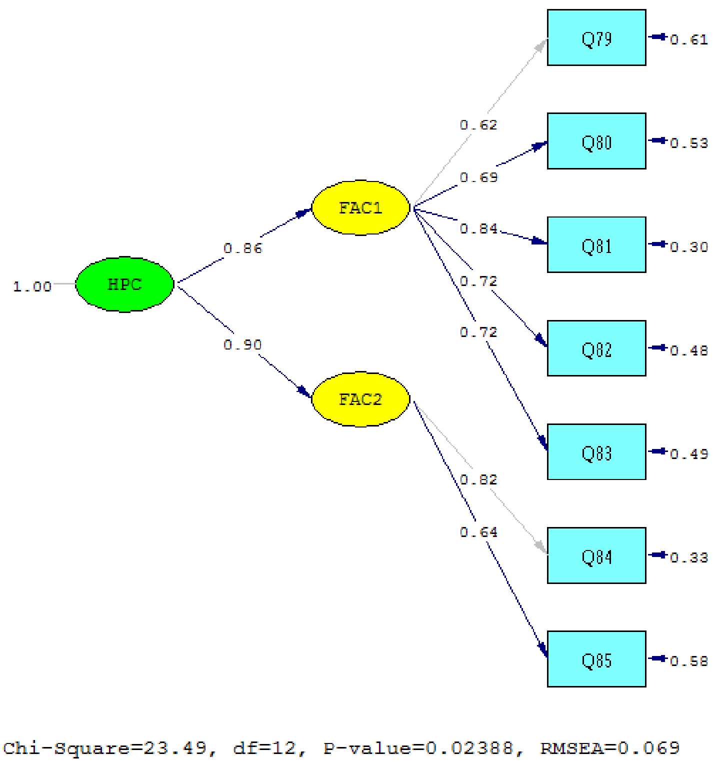

Figure 5.4. **The second-order high performance culture measurement model (completely standardised solution)**

The seven indirect effects of the second-order *high performance culture* factor on the subscale items were calculated by translating the SIMPLIS syntax to LISREL syntax, requesting the calculation of seven additional parameters via the AP=7 command on the MO command line, calculating the products $\lambda_{ij}\gamma_{ji}$ via the CO command and testing the statistical significance of these indirect effects. The unstandardised indirect effect estimates are shown in Table 5.41

Table 5.41

Unstandardised indirect effects for the second-order high performance culture measurement model

PA(1)	**PA(2)**	**PA(3)**	**PA(4)**	**PA(5)**	**PA(6)**
0.62	0.54	0.61	0.54	0.60	0.68
(0.07)	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)
8.78	7.64	8.71	7.67	8.55	9.68
PA(7)					
0.64					
(0.07)					
9.07					

Table 5.41 indicates that all the indirect effects were statistically significant ($p<.05$). This means that respondents standing on *high performance culture* as a second-order factor statistically significantly ($p<.05$) affected the scores obtained on each of the seven items. This justified the use of all seven items of the *high-performance culture* subscale as indicators of the *high-performance culture* second-order factor and in the calculation of two composite indicators for the high-performance culture latent variable in the structural model[29].

5.7.6 Psychometric Evaluation of the Market Standing Subscale

The *market standing* subscale consisted of seven items and intended to measure the market share, competitiveness and market-directed diversity of products or services, customer satisfaction and reputation for adding value to the organisation.

5.7.6.1 Item analysis

The results for the item analysis are depicted in Table 5.42. A satisfactory (>.80) Cronbach's alpha of .862 was obtained. This indicates that approximately 86.2% of the variance in the items was systematic or true score variance and only 13.8% was random error variance.

The item means ranged from 3.351 to 4.074 on the five-point Likert scale and the item standard deviations ranged from .891 to 1.150. This indicates that most participants rated their work unit in terms of the scale midpoint or the second-most favourable response option on this competency. None of the item distributions were truncated to extreme means. The items of the subscale were able to detect relatively small differences in the standard that the participants' work units achieved on the *market standing* outcome variable.

The inter-item correlation matrix ranged between .275 and .653 the mean was .480. None of the items consistently correlated lower than the mean inter-item correlation with the remaining items of the subscale. All the items therefore tended to tap into a

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[29] It is acknowledged that the factor fission necessitates the recalculation of the reliability of the *high performance culture* subscale scores via the formula proposed by Nunnally (1978) for the calculation of the reliability of a linear composite.

common, but not necessarily unidimensional, systematic source of variance. The corrected item-total correlations in the item-total statistics section of Table 5.42 ranged from .540 to .750 and were above the cut off (>.3). The squared multiple correlations ranged from .337 to .584 and are considered satisfactory. None of the items showed themselves as outliers in the corrected item-total correlation distribution or in the distribution of squared multiple correlation values. None of the items therefore were enigmatic and unfathomable to their peers in the subscale because their responses originated from a common underlying source of systematic variance.

Furthermore, the results reinforced this inference by indicating that none of the items would increase the current Cronbach alpha if deleted. Therefore, based on the basket of evidence, none of the items were deleted from the *market standing* subscale.

Table 5.42

Item analysis output for the market standing subscale

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.862	.866	7

Item Statistics

	Mean	Std. Deviation	N
Q86	3.45050	.982445	202
Q87	3.57426	1.068281	202
Q88	3.35149	1.128651	202
Q89	3.85149	.929196	202
Q90	3.54455	1.150598	202
Q91	3.92574	.891882	202
Q92	4.07426	.891882	202

Inter-Item Correlation Matrix

	Q86	Q87	Q88	Q89	Q90	Q91	Q92
Q86	1.000	.492	.372	.515	.275	.402	.456
Q87	.492	1.000	.579	.653	.497	.442	.519
Q88	.372	.579	1.000	.505	.515	.352	.419
Q89	.515	.653	.505	1.000	.490	.539	.626
Q90	.275	.497	.515	.490	1.000	.360	.440
Q91	.402	.442	.352	.539	.360	1.000	.632
Q92	.456	.519	.419	.626	.440	.632	1.000

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if	Corrected Item-Total	Squared Multiple	Cronbach's Alpha if Item

		Item Deleted	Correlation	Correlation	Deleted
Q86	22.32178	21.513	.540	.337	.855
Q87	22.19802	19.483	.719	.545	.829
Q88	22.42079	19.956	.612	.419	.846
Q89	21.92079	20.262	.750	.584	.827
Q90	22.22772	20.207	.567	.369	.854
Q91	21.84653	21.713	.589	.441	.848
Q92	21.69802	21.028	.682	.538	.837

Summary Item Statistics

	Mean	Minimum	Maximum	Range	Maximum /	Variance	N of
Item Means	3.682	3.351	4.074	.723	1.216	.073	7
Item Variances	1.023	.795	1.324	.528	1.664	.050	7
Inter-Item Correlations	.480	.275	.653	.378	2.375	.009	7

5.7.6.2 Dimensionality analysis

All of the seven items in the *market standing* subscale were factor analysed as they all produced satisfactory results in the item analysis.

The correlation matrix for the *market standing* subscale indicated that all of the correlations were larger than .3, except for the correlation between item Q86 and Q90, and that all the correlations were statistically significant (p<.05). Furthermore, a KMO of .880 (>.6) was obtained and the Bartlett's Test returned a statistically significant chi-square statistic (p<.05) that allowed for the identity matrix null hypothesis to be rejected. This presented strong evidence that the correlation matrix was factor analysable.

One factor obtained an eigenvalue greater than one (3.905). The position of the elbow in the scree plot further suggested that one factor should be extracted. However, eight (38%) of the nonredundant residual correlations obtained absolute values greater larger than .05. The single-factor factor solution therefore did not offer a valid and credible explanation for the observed inter-item correlation matric. Therefore, the unidimensionality assumption was thus not corroborated for the *market standing* subscale. The extraction of two factors were consequently requested.

The pattern matrix shown in Table 5.43 indicated that items Q87, Q88 and Q90 all grouped together to load positively on factor 1. These items refer to competitiveness in markets, diversity of markets and diversity of products or services respectively. Therefore, based on the common theme in these items, the first factor was interpreted as an *internal (product offering) focus/evaluation of market standing* factor. Items Q86, Q89, Q91 and Q92 grouped together to load negatively on factor 2. These items refer to market share, competitiveness of products or series, customer satisfaction and reputation for adding value respectively. Therefore, based on common themes in these items, the second factor was interpreted as an *external focus/evaluation of market standing* factor. The factor fission was regarded as conceptually meaningful. The two extracted factors correlated -.713 in the factor correlation matrix. Henning *et al*. (2004) also obtained factor fission on the market standing subscale of the PI. They interpreted factor 1 as a market dominance factor and factor 2 as a reputation factor.

Furthermore, only one (4%) of the nonredundant residual correlations obtained absolute values greater larger than .05. This suggests that the 2-factor solution provided a valid (i.e. permissible) and credible explanation for the observed inter-item correlation matrix.

Table 5.43

Pattern matrix for the market standing scale

	Factor	
	1	**2**
Q88	.815	.096
Q87	.702	-.138
Q90	.596	-.061
Q92	.025	-.813
Q91	-.053	-.782
Q89	.419	-.461
Q86	.257	-.378

The first-order *market standing* measurement model in which item Q87, Q88 and Q90 loaded only on factor 1, and item Q86, Q89, Q91 and Q92 loaded only on factor 2 fitted the subscale data reasonably closely (RMSEA=.068; p>.05). All factor loadings were statistically significant (p<.05). The second-order *market standing* measurement model in which items Q87, Q88 and Q90 loaded only on first-order factor 1, items Q86, Q89, Q91 and Q92 loaded only on first-order factor 2 and in which the two first-order factors loaded on a single second-order factor fitted the subscale data closely (RMSEA=.060; p>.05). The unstandardised factor loadings and gamma estimates for the second-order *market standing* measurement model are shown in Table 5.44 and in Table 5.45. The path diagram for the completely standardised solution of the second-order market standing measurement model is shown in Figure 5.5.

Table 5.44

Unstandardised factor loadings for the second-order employee satisfaction measurement model

	Factor 1	**Factor 2**
Q86		0.60
Q87	0.89	
Q88	0.79	
	(0.19)	
	4.06	
Q89		0.80
		(1.35)
		0.60
Q90	0.74	
	(0.29)	
	2.57	
Q91		0.59
		(1.02)
		0.58
Q92		0.68
		(1.23)
		0.55

Table 5.44 indicates that item Q88 and Q90 statistically significantly($p<.05$) load onto factor 1. Table 5.44, however, indicates that item Q89, Q91 and Q92 statistically insignificantly ($p>.05$) load onto factor 2.

Table 5.45 indicate that the estimates of the slope of the first-order market standing factors on to the second-order factor were both statistically significant ($p<.05$).

Table 5.45

Unstandardised gamma matrix for the second-order market standing measurement model

	MARKET
FAC1	0.90
	(0.16)
	5.46
FAC2	0.94
	(0.39)
	2.39

Note: MARKET refers to the Market standing latent variable

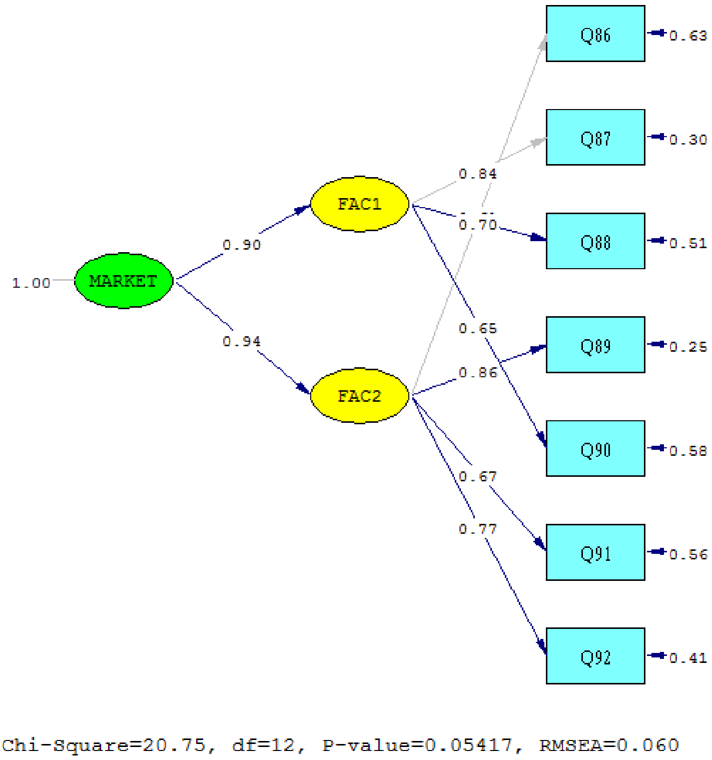

Figure 5.5. **The second-order high performance culture measurement model (completely standardised solution)**

The seven indirect effects of the second-order market standing factor on the subscale items were calculated by translating the LISREL syntax to SIMPLIS syntax, requesting the calculation of seven additional parameters via the AP command, calculating the products $\lambda_{ij}\gamma_{ji}$ via the CO command and testing the statistical significance of these indirect effects. The unstandardised indirect effect estimates are shown in Table 5.46.

Table 5.46

Unstandardised indirect effects for the second-order market standing measurement model

PA(1)	PA(2)	PA(3)	PA(4)	PA(5)	PA(6)
0.56	0.80	0.71	0.75	0.67	0.56
(0.07)	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)
7.90	11.37	10.01	10.66	9.45	7.88
PA(7)					
0.64					
(0.07)					
9.08					

Table 5.46 indicates that all the indirect effects were statistically significant ($p<.05$). This means that respondents standing on *market standing* as a second-order factor statistically significantly ($p<.05$) affected the scores obtained on each of the seven items. This justified the use of all seven items of the *market standing* subscale as indicators of market standing as a second-order factor and in the calculation of two composite indicators for the market standing latent variable in the work unit performance structural model[30].

5.8 ITEM PARCELLING

The reasoning behind the use of item parcelling was discussed in Chapter 3, as the ill-informed use of the technique is never warranted (Little, Rhemyulia, Gibson & Schoemann, 2013; Little, Cunningham, Shahar & Widaman, 2002). All of the items were used in the procedure as all of them remained after the item analysis and dimensionality analysis. Item parcels were created by taking the mean of the items included in the parcel. Two procedures were utilised to determine which items would create each of the parcels. Firstly, in the case where the unidimensionality assumption was met, random assignment (odd-even items) was used to create a parcel. Secondly, in the case where the unidimensionality assumption was not met, the items were grouped based on their factor loadings in the pattern matrix.

[30] It is acknowledged that the factor fission necessitates the recalculation of the reliability of the *market standing* subscale scores via the formula proposed by Nunnally (1978) for the calculation of the reliability of a linear composite.

These parcels served as indicator variables to reflect the latent variables during the fit of the proposed organisational work unit measurement and comprehensive LISREL models.

5.9 EVALUATION OF THE WORK UNIT COMPETENCY MEASUREMENT MODEL AND THE ORGANISATIONAL WORK UNIT OUTCOME MEASUREMENT MODEL

The first overarching substantive hypothesis (hypothesis 1) in this research proposal is that the Work Unit Competency Questionnaire (WUCQ) provides a reliable and construct valid measure of the competency domain of the organisational unit performance construct. The second overarching substantive hypothesis (hypothesis 2) in this research proposal is that the Work Unit Outcome Questionnaire (WUOQ) provides a reliable and construct valid measure of the outcome domain of the organisational unit performance construct.

To empirically test the two overarching substantive research hypothesis, the latent variables comprising the competency (or structural) model were operationalised via composite indicator variables. This was necessitated by the limited sample size. Ideally the WUCQ and the WUOQ measurement models should have been fitted by operationalising the latent competencies measured by the WUCQ and the latent outcome variables measured by the WUOQ via the individual items of these two questionnaires. This is acknowledged as an unfortunate and frustrating methodological limitation. Confirmatory factor analysis was initially conducted on the two organisational work unit performance measurement models separately. This was done in order to test the foregoing two measurement hypotheses by determining the degree to which the two measurement models are consistent with the empirical data obtained on the WUCQ and the WUOQ.

The decision to use item parcels to also test overarching substantive hypotheses 1 (on the construct validity of the WUCQ) and 2 (on the construct validity of the WUOQ) by testing operational hypotheses 1-5 and operational hypotheses 5-10 by operationalizing the latent work unit performance dimensions already here with item parcels necessitated the reformulation of the statistical hypotheses as set out in Chapter 3, paragraphs 3.4.2, 3.4.4 and 3.4.5 and paragraphs 3.4.7, 3.4.8 and 3.4.10.

Operational hypothesis 2

Operational hypothesis 2 was be investigated by testing the following 14 null hypotheses on the slope of the regression of item parcel j on organisational unit competency k:

H_{0i}: $\lambda_{jk}=0$; i=3[31], 4, …, 16; j=1, 2, …, 14; k=1, 2, …, 7

H_{ai}: $\lambda_{jk}>0$; i=3, 4, …, 16; j=1, 2, …, 14; k=1, 2, …, 7

Operational hypothesis 3

Operational hypothesis 3 was be evaluated by testing the following 14 null hypotheses on the freed elements in the variance-co-variance matrix Θ_δ:

H_{0i}: $\theta_{\delta jj}=0$; i =17, 18,..., 30; j=1, 2.....14

H_{ai}: $\theta_{\delta jj}>0$; i =17, 18,..., 30; j=1, 2.....14

Operational hypothesis 5

Operational hypothesis 5 will be tested by investigating the following 21 null hypotheses with regards to the freed elements in the variance-co-variance matrixΦ :

H_{0i}: $\phi_{jk}=0$; i =31, 32,..., 51; j=1, 2.....7; k=1, 2.....7; $j\neq k$

H_{ai}: $\phi_{jk}>0$; i =31, 32,..., 51; j=1, 2.....7; k=1, 2.....7; $j\neq k$[32]

Operational hypothesis 7

Operational hypothesis 7 was be investigated by testing the following 12 null hypotheses on the slope of the regression of item parcel j on organisational unit outcome k:

H_{0i}: $\lambda_{jk}=0$; i=54[33], 55, …, 65; j=1, 2, …, 12; k=1, 2, …, 6

H_{ai}: $\lambda_{jk}>0$; i=54, 55, …, 65; j=1, 2, …, 12; k=1, 2, …, 6

---

[31] H_{01}: RMSEA = 0 and H_{02}: RMSEA $\leq$ .05

[32] H_{ai}; i =31, 32,…, 51 were formulated as directional alternative hypotheses because CWB was expected to correlate positively with the remaining latent competencies because of the manner in which the items were scored.

[33] H_{052}: RMSEA = 0 and H_{053}: RMSEA $\leq$ .05

Operational hypothesis 8

Operational hypothesis 8 was be evaluated by testing the following 12 null hypotheses on the freed elements in the variance-co-variance matrix Θ_δ:

H_{0i}: $\theta_{\delta jj}$ =0; i =66, 67,..., 77; j=1, 2.....12

H_{ai}: $\theta_{\delta jj}$ > 0; i =66, 67,..., 77; j=1, 2.....12

Operational hypothesis 10

Operational hypothesis 5 will be tested by investigating the following 15 null hypotheses with regards to the freed elements in the variance-co-variance matrixΦ :

H_{0i}: ϕ_{jk} =0; i =78, 79,..., 92; j=1, 2.....6; k=1, 2.....6; $j \neq k$

H_{ai}: ϕ_{jk} > 0; i =78, 79,..., 92; j=1, 2.....6; k=1, 2.....6; $j \neq k$

The re-numbering of the statistical hypotheses associated with the empirical testing of overarching substantive hypotheses 1 and 2 also necessitated the renumbering of the statistical hypotheses associated with the empirical testing of substantive hypothesis 3 by testing operational hypotheses 11 and 12.

Operational hypothesis 11

Under operational hypothesis 11, the proposed structural model's fit was tested by establishing the extent to which the model can reproduce the empirical data/observed inter-indicator covariance matrix. When the overarching substantive hypothesis is interpreted to convey that the proposed work unit performance structural model provides an exact description of the process that created the observed covariance matrix, the overarching substantive hypothesis translated to the following exact fit hypothesis:

H_{093}: RMSEA = 0

H_{a93}: RMSEA > 0

If the overarching substantive hypothesis is interpreted to suggest that the proposed work unit performance structural model provides only an approximate description of the process that created the observed covariance matrix, the overarching substantive hypothesis translated to the following close fit hypothesis:

H_{094}: RMSEA ≤ .05

H_{a94}: RMSEA > .05

Operational hypothesis 12

Operational hypothesis 12 was be tested by testing the following 22 path coefficient null hypotheses on the freed elements in the Γ and **B** matrices:

Path-specific substantive hypothesis 4: In the proposed work unit competency model it is hypothesised that a high level of *core people processes* (ξ_1) will increase the *task performance* (η_9) of the work unit.

H_{095}: $\gamma_{91}=0$

H_{a95}: $\gamma_{91}>0$

Path-specific substantive hypothesis 5: In the proposed work unit competency model it is hypothesised that an increase in *core people processes* (ξ_1) will provide a strengthened *climate* of the work unit (η_2).

H_{096}: $\gamma_{21}=0$

H_{a96}: $\gamma_{21}>0$

Path-specific substantive hypothesis 6: In the proposed work unit competency model it is hypothesised that improved *core people processes* (ξ_1) increases the *satisfaction* of the work unit (η_3).

H_{097}: $\gamma_{31}=0$

H_{a97}: $\gamma_{31}>0$

Path-specific substantive hypothesis 7: In the proposed work unit competency model it is hypothesised that increased *core people processes* (ξ_1) will encourage *future growth* in the work unit (η_5).

H_{098}: $\gamma_{51}=0$

Ha_{98}: $\gamma_{51}>0$

Path-specific substantive hypothesis 8: In the proposed work unit competency model it is hypothesised that an increase in the *production and efficiency* (η_1) of the work unit will improve the *market standing* (η_4) of the work unit.

H_{099}: $\beta_{41}=0$

H_{a99}: $\beta_{41}>0$

Path-specific substantive hypothesis 9: In the proposed work unit competency model it is hypothesised that a beneficial *climate* (η_2) will increase the *task performance* (η_9) of a work unit.

H_{0100}: $\beta_{92}=0$

H_{a100}: $\beta_{92}>0$

Path-specific substantive hypothesis 10: In the proposed work unit competency model it is hypothesised that heightened *satisfaction* (η_3) will provide a productive *climate* (η_2).

H_{0101}: $\beta_{23}=0$

H_{a101}: $\beta_{23}>0$

Path-specific substantive hypothesis 11: In the proposed work unit competency model it is hypothesised that a competitive *market standing* (η_4) of the work unit will encourage the *future growth* (η_5) of the work unit.

H_{0102}: $\beta_{54}=0$

H_{a102}: $\beta_{54}>0$

Path-specific substantive hypothesis 12: In the proposed work unit competency model it is hypothesised that an increase in *counterproductive work behaviour* (ξ_2) will negatively influence *high performance culture* of the work unit (η_6).

H_{0103}: $\gamma_{62}=0$

Ha_{103}: $\gamma_{62}<0$

Path-specific substantive hypothesis 13: In the proposed work unit competency model it is hypothesised that an increase in *counterproductive work behaviour* (ξ_2) will decrease *employee green behaviour* (η_8).

H_{0104}: $\gamma_{82}=0$

H_{a104}: $\gamma_{82}<0$

Path-specific substantive hypothesis 14: In the proposed work unit competency model it is hypothesised that increased *citizenship behaviour* (ξ_3) will positively influence the *high-performance culture* of the work unit (η_6).

H_{0105}: $\gamma_{63}=0$

H_{a105}: $\gamma_{63}>0$

Path-specific substantive hypothesis 15: In the proposed work unit competency model it is suggested that *citizenship behaviour* (ξ_3) will increase *employee green behaviour* (η_8).

H_{0106}: $\gamma_{83}=0$

H_{a106}: $\gamma_{83}>0$

Path-specific substantive hypothesis 16: In the proposed work unit competency model it is hypothesised that *innovation* (ξ_4) will encourage the *task performance* (η_9) of a work unit.

H_{0107}: $\gamma_{94}=0$

H_{a107}: $\gamma_{94}>0$

Path-specific substantive hypothesis 17: In the proposed work unit competency model it is hypothesised that *innovation* (ξ_4) will improve the *market standing* of the work unit (η_4).

H_{0108}: $\gamma_{44}=0$

H_{a108}: $\gamma_{44}>0$

Path-specific substantive hypothesis 18: In the proposed work unit competency model it is hypothesised that *innovation* (ξ_4) will encourage the *future growth* (η_5) of the work unit.

H_{0109}: $\gamma_{54}=0$

H_{a109}: $\gamma_{54}>0$

Path-specific substantive hypothesis 19: In the proposed work unit competency model it is hypothesised that *innovation* (ξ_4) will increase the *employee green behaviour* (η_8).

H_{0110}: $\gamma_{84}=0$

H_{a110}: $\gamma_{84}>0$

Path-specific substantive hypothesis 20: In the proposed work unit competency model it is hypothesised that an increase in the *production and efficiency* of a work unit (η_1) will have an impact on the *high-performance culture* of a work unit (η_6).

H_{0111}: $\beta_{61}=0$

H_{a111}: $\beta_{61}>0$

Path-specific substantive hypothesis 21: In the proposed work unit competency model it is hypothesised that an increased *satisfaction* (η_3) will increase the *effort* of the members in the work unit (η_7).

H_{0112}: $\beta_{73}=0$

H_{a112}: $\beta_{73}>0$

Path-specific substantive hypothesis 22: In the proposed work unit competency model it is hypothesised that a positive *high-performance work unit culture* (η_6) will improve the *task performance* of the work unit (η_9).

H_{0113}: $\beta_{96}=0$

H_{a113}: $\beta_{96}>0$

Path-specific substantive hypothesis 23: In the proposed work unit competency model it is hypothesised that an increase in the *effort* (η_7) of the work unit will improve the task performance (η_9) of the work unit.

H_{0114}: $\beta_{97}=0$

H_{a114}: $\beta_{97}>0$

Path specific substantive hypothesis 24: In the proposed work unit competency model it is hypothesised that an increase in *production and efficiency* (η_1) of the work unit will encourage *future growth* (η_5)

H_{0115}: $\beta_{51}=0$

H_{a115}: $\beta_{51}>0$

Path specific substantive hypothesis 25: In the proposed work unit competency model it is hypothesised that an increase in the *task performance* (η_9) of the work unit will increase the *production and efficiency* (η_1) of the work unit.

H_{0116}: $\beta_{19}=0$

H_{a116}: $\beta_{19}>0$

To test operational hypotheses 11 and 12 the measurement model that describes the manner in which the thirteen latent performance dimensions comprising the unit performance structural model had been operationalised first had to be fitted. This fitting of the work unit performance measurement model involved the testing of the following hypotheses:

The exact fit null hypothesis:

H_{0117}: RMSEA = 0

H_{a117}: RMSEA > 0

The close fit hypothesis:

H_{0118}: RMSEA ≤ .05

H_{a118}: RMSEA > .05

To test the statistical significance of the unstandardised factor loadings the following 26 hypotheses were tested:

H_{0i}: $\lambda_{jk}=0$; i=119, 120,…, 144; j=1, 2, …, 26; k=1, 2, …, 13

H_{ai}: $\lambda_{jk}>0$; i=119, 120, …, 144; j=1, , …, 26; k=1, 2, …, 13

To test the statistical significance of the unstandardised measurement error variances the following 26 hypotheses were tested:

H_{0i}: $\theta_{\delta jj}$ =0; i =145, 146,..., 170; j=1, 2.....26

H_{ai}: $\theta_{\delta jj}>0$; i =145, 146,..., 170; j=1, 2.....26

To test the statistical significance of the standardised inter-latent variable correlations the following 78 hypotheses were tested:

H_{0i}: ϕ_{jk} =0; i =171, 172,..., 248; j=1, 2.....13; k=1, 2.....13; j≠k

H_{ai}: ϕ_{jk}>0; i =171, 172,..., 248; j=1, 2.....13; k=1, 2.....13; j≠k[34]

5.9.1 Univariate and Multivariate Normality of the Composite Indicators Calculated for Work Unit Competency Questionnaire Measurement Model

There are a number of critical assumptions, which are associated with multivariate statistics in general and structural equation modelling specifically, that need to be assessed before conducting any analysis (Von Eye & Bogat, 2004). The assumption that the indicator variables follow a multivariate normal distribution is a critical assumption when deriving estimates for freed model parameters by means of maximum likelihood estimation (ML) when analysing continuous data. The fact that the latent work unit competencies were operationalised via composite indicators warranted interpreting these as continuous variables.

5.9.1.1 Results before normalisation

Therefore, the item parcels were evaluated in terms of their univariate and multivariate normality. As shown below in Table 5.47, four of the indicator variables did not pass the test of univariate normality (p<.05). Furthermore, the null hypothesis that the data follows a multivariate normal distribution, as shown in Table 5.48, had to be rejected ($\chi 2$=77.194; p<.05).

Table 5.47

Test of univariate normality before normalisation

	Skewness		Kurtosis		Skewness and Kurtosis	
Variable	Z-Score	P-Value	Z-Score	P-Value	Chi-Square	P-Value
Innov_1	-0.653	0.514	-0.774	0.439	1.026	0.599
Innov_2	-1.205	0.228	-1.537	0.124	3.814	0.149

[34] H_{ai}; i =171, 172,..., 248 were formulated as directional alternative hypotheses because CWB was expected to correlate positively with the remaining latent competencies because of the manner in which the items were scored.

Effort_1	-3.062	0.002	-1.248	0.212	10.932	0.004
Effort_2	-3.068	0.002	-3.060	0.002	18.774	0.000
CWB_1	-2.226	0.026	-1.199	0.230	6.393	0.041
CWB_2	-8.218	0.000	6.099	0.000	104.730	0.000
OCB_1	-3.318	0.001	-1.105	0.269	12.230	0.002
OCB_2	-2.532	0.011	-1.062	0.288	7.539	0.023
EGB_1	0.459	0.647	-2.574	0.010	6.834	0.033
EGB_2	-1.292	0.196	-1.953	0.051	5.484	0.064
TP_1	0.317	0.751	-1.796	0.073	3.325	0.190
TP_2	-2.561	0.010	-0.045	0.964	6.561	0.038
CPP_1	-2.311	0.021	-1.023	0.306	6.389	0.041
CPP_2	-1.444	0.149	-1.188	0.235	3.496	0.174

Note: Innov_1 and Innov_2 refers to the two item parcels operationalising the *innovation* latent variable, Effort_1 and Effort_2 refers to the two item parcels operationalising the *effort* latent variable, CWB_1 and CWB_2 refers to the two item parcels operationalising the *counterproductive work behaviour* latent variable, OCB_1 and OCB_2 refers to the two item parcels operationalising the *organisational citizenship behaviour* scale, EGB_1 and EGB_2 refers to the two item parcels operationalising the *employee green behaviour* scale, TP_1 and TP_2 refers to the two item parcels operationalising the *task performance* latent variable and CPP_1 and CPP_2 refers to the two item parcels operationalising the *core people processes* latent variable.

Table 5.48

Test of multivariate normality before normalisation

Skewness			Kurtosis			Skewness and Kurtosis	
Value	Z-Score	P-Value	Value	Z-Score	P-Value	Chi-Square	P-Value
24.974	7.302	0.000	240.297	4.886	0.000	77.194	0.000

Since the default estimation technique used by LISREL 8.8 when fitting measurement (and structural) models to continuous data (maximum likelihood estimation) assumes multivariate normality and since the inappropriate use of maximum likelihood estimation can result biased fit statistics and standard error estimates (Mels, 2010), it was decided to attempt to normalise the univariate distributions through PRELIS.

5.9.1.2 Results after normalisation

The results Shown in Table 5.49 and Table 5.50 indicated that the normalisation procedure partially succeeded in rectifying the uni- and multivariate normality problem. All of the indicator variables, except CWB_2, passed the test of univariate normality ($p>.05$). Furthermore, the results indicated that, although the normalisation procedure resulted in a distribution that digressed less from a multivariate normal distribution than before normalisation, the null hypothesis that the data follows a multivariate normal distribution still had to be rejected (χ2 =237.348; p<.05). The composite WUCQ indicator distribution, therefore, does not follow a multivariate normal distribution.

Table 5.49

Test of univariate normality after normalisation

	Skewness		Kurtosis		Skewness and Kurtosis	
Variable	Z-Score	P-Value	Z-Score	P-Value	Chi-Square	P-Value
Innov_1	-0.168	0.867	-0.288	0.773	0.111	0.946
Innov_2	-0.245	0.806	-0.384	0.701	0.208	0.901
Effort_1	-0.486	0.627	-0.812	0.417	0.895	0.639
Effort_2	-1.042	0.298	-2.053	0.040	5.299	0.071
CWB_1	-0.259	0.796	-0.421	0.674	0.244	0.885
CWB_2	-2.280	0.023	-2.322	0.020	10.589	0.005
OCB_1	-0.688	0.492	-1.096	0.273	1.673	0.433
OCB_2	-0.443	0.658	-0.644	0.520	0.611	0.737
EGB_1	-0.124	0.901	-0.909	0.363	0.842	0.656
EGB_2	-0.403	0.687	-1.213	0.225	1.634	0.442
TP_1	0.001	0.999	-1.000	0.317	1.000	0.606
TP_2	-0.313	0.754	-0.762	0.446	0.679	0.712

Table 5.49

Test of univariate normality after normalisation (continued)

CPP_1	-0.217	0.828	-0.643	0.520	0.461	0.794
CPP_2	-0.132	0.895	-0.182	0.855	0.051	0.975

Note: Innov_1 and Innov_2 refers to the two item parcels operationalising the *innovation* latent variable, Effort_1 and Effort_2 refers to the two item parcels operationalising the *effort* latent variable, CWB_1 and CWB_2 refers to the two item parcels operationalising the *counterproductive workplace behaviour* latent variable, OCB_1 and OCB_2 refers to the two item parcels operationalising the *organisational citizenship behaviour* latent variable, EGB_1 and EGB_2 refers to the two item parcels operationalising the *employee green behaviour* latent variable, TP_1 and TP_2 refers to the two item parcels operationalising the *task performance* latent variable and CPP_1 and CPP_2 refers to the two item parcels operationalising the *core people processes* latent variable.

Table 5.50

Test of multivariate normality after normalisation

Skewness			Kurtosis			Skewness and Kurtosis	
Value	Z-Score	P-Value	Value	Z-Score	P-Value	Chi-Square	P-Value
18.884	2.189	0.029	233.966	3.488	0.000	16.954	0.000

The decrease in the chi-square statistic (χ2) showed that the normalisation procedure succeeded in reducing the deviation of the observed composite indicator distribution from the theoretical multivariate normal distribution. As a result, the normalised data set was analysed and robust maximum likelihood estimation was selected to derive estimates for the freed parameters in the WUCQ measurement model. This estimation technique is recommended for fitting measurement models of continuous data not satisfying the multivariate normality assumption (Mels, 2010).

5.9.2 Univariate and Multivariate Normality of the Work Unit Outcome Questionnaire Measurement Model

The same reasoning that was used in the previous section also applied to the Organisational Work Unit Outcome Questionnaire measurement model.

5.9.2.1 Results before normalisation

As shown below in Table 5.51, four of the indicator variables did not pass the test of univariate normality ($p<.05$). Furthermore, the null hypothesis that the data follows a multivariate normal distribution, as shown in Table 5.52, had to be rejected ($\chi2=95.034$; $p<.05$).

Table 5.51

Test of univariate normality before normalisation

Skewness			Kurtosis		Skewness and Kurtosis	
Variable	Z-Score	P-Value	Z-Score	P-Value	Chi-Square	P-Value
PE_1	-1.040	0.298	-2.124	0.034	5.592	0.061
PE_2	0.100	0.921	-0.883	0.377	0.789	0.674
WUC_1	-3.281	0.001	0.175	0.861	10.793	0.005
WUC_2	-2.261	0.024	-0.913	0.361	5.947	0.051
Satis_1	-3.228	0.001	-0.813	0.416	11.084	0.004
Satis_2	-1.013	0.311	0.163	0.870	1.052	0.591
HPC_1	-2.909	0.004	-1.170	0.242	9.829	0.007
HPC_2	-3.798	0.000	-0.003	0.998	14.426	0.001
MS_1	-0.931	0.352	-2.649	0.008	7.885	0.019
MS_2	-2.911	0.004	1.264	0.206	10.072	0.007
FG_1	-2.050	0.040	-0.508	0.611	4.461	0.107
FG_2	-1.333	0.183	-1.457	0.145	3.900	0.142

Note: PE_1 and PE_2 refers to the two item parcels operationalising the *production and efficiency* latent variable, WUC_1 and WUC_2 refers to the two item parcels operationalising the *work unit climate* latent variable, Satis_1 and Satis_2 refers to the two item parcels operationalising the *satisfaction* latent variable, HPC_1 and HPC_2 refers to the two item parcels operationalising the *high performance culture* latent variable, MS_1 and MS_2 refers to the two item parcels operationalising the *market standing* latent variable, FG_1 and FG_2 refers to the two item parcels operationalising the *future growth* latent variable.

Table 5.52

Test of multivariate normality before normalisation

Skewness			Kurtosis			Skewness and Kurtosis	
Value	Z-Score	P-Value	Value	Z-Score	P-Value	Chi-Square	P-Value
17.451	7.027	0.000	191.645	6.757	0.000	95.034	0.000

Again, it was decided to attempt to normalise the univariate distributions through PRELIS.

5.9.2.2 Results after normalisation

The results shown in Table 5.53 and Table 5.54 indicated that the normalisation procedure partially succeeded in rectifying the uni- and multivariate normality problem. All of the indicator variables passed the test of univariate normality ($p>.05$). Furthermore, the results indicated that, although the normalisation procedure resulted in a distribution that digressed less from a multivariate normal distribution than before normalisation, the null hypothesis that the data follows a multivariate normal distribution still had to be rejected ($\chi2$ =62.457; $p<.05$). The composite WUOQ indicator distribution, therefore, does not follow a multivariate normal distribution.

Table 5.53

Test of univariate normality after normalisation

Skewness			Kurtosis		Skewness and Kurtosis	
Variable	Z-Score	P-Value	Z-Score	P-Value	Chi-Square	P-Value
PE_1	-0.344	0.731	-1.129	0.259	1.392	0.498
PE_2	-0.088	0.930	-0.307	0.759	0.102	0.950
WUC_1	-0.730	0.465	-1.231	0.218	2.049	0.359
WUC_2	-0.557	0.578	-0.895	0.371	1.110	0.574
Satis_1	-0.634	0.526	-1.061	0.289	1.528	0.466
Satis_2	-0.246	0.806	-0.452	0.651	0.265	0.876
HPC_1	-0.373	0.709	-0.924	0.355	0.994	0.608
HPC_2	-1.396	0.163	-1.849	0.065	5.367	0.068
MS_1	-0.481	0.631	-1.024	0.306	1.280	0.527
MS_2	-0.453	0.651	-0.743	0.457	0.757	0.685
FG_1	-0.478	0.633	-0.870	0.384	0.986	0.611
FG_2	-0.278	0.781	-0.547	0.584	0.377	0.828

Note: PE_1 and PE_2 refers to the two item parcels operationalising the *production and efficiency* latent variable, WUC_1 and WUC_2 refers to the two item parcels operationalising the *work unit climate* latent variable, Satis_1 and Satis_2 refers to the two item parcels operationalising the *satisfaction* latent variable, HPC_1 and HPC_2 refers to the two item parcels operationalising the *high performance culture* latent variable, MS_1 and MS_2 refers to the two item parcels operationalising the *market standing* latent variable, FG_1 and FG_2 refers to the two item parcels operationalising the *future growth* latent variable.

Table 5.54

Test of multivariate normality after normalisation

Skewness			Kurtosis			Skewness and Kurtosis	
Value	Z-Score	P-Value	Value	Z-Score	P-Value	Chi-Square	P-Value
15.594	5.280	0.000	187.142	5.880	0.000	62.451	0.000

Robust maximum likelihood estimation was again selected for the evaluation of the WUOQ measurement model. The normalised data set was utilised in the subsequent (robust maximum likelihood estimation) analysis.

5.10 ASSESSING THE OVERALL GOODNESS OF FIT OF THE WORK UNIT COMPETENCY QUESTIONNAIRE MEASUREMENT MODEL

The fit of the Work Unit Outcome Questionnaire measurement model and the credibility of the parameter estimates are discussed in the follow sections. The results of the measurement model analysis will be discussed by (a) evaluating the overall model fit, based on (i) an array of model fit indices as reported by LISREL, (ii) assessing the standardised residuals, (iii) examining the modification indices calculated for $\mathbf{\Lambda^x}$ and $\mathbf{\Theta_\delta}$; and (b) interpreting the measurement model parameter estimates. The fitted measurement model is visually represented in Figure 5.6 below.

5.10.1 Goodness of Fit Statistics for the Original Work Unit Competency Questionnaire Measurement Model

Table 5.55 depicts the full array of fit statistics calculated by LISREL 8.8 to assess the absolute and comparative fit of the Work Unit Competency Questionnaire measurement model.

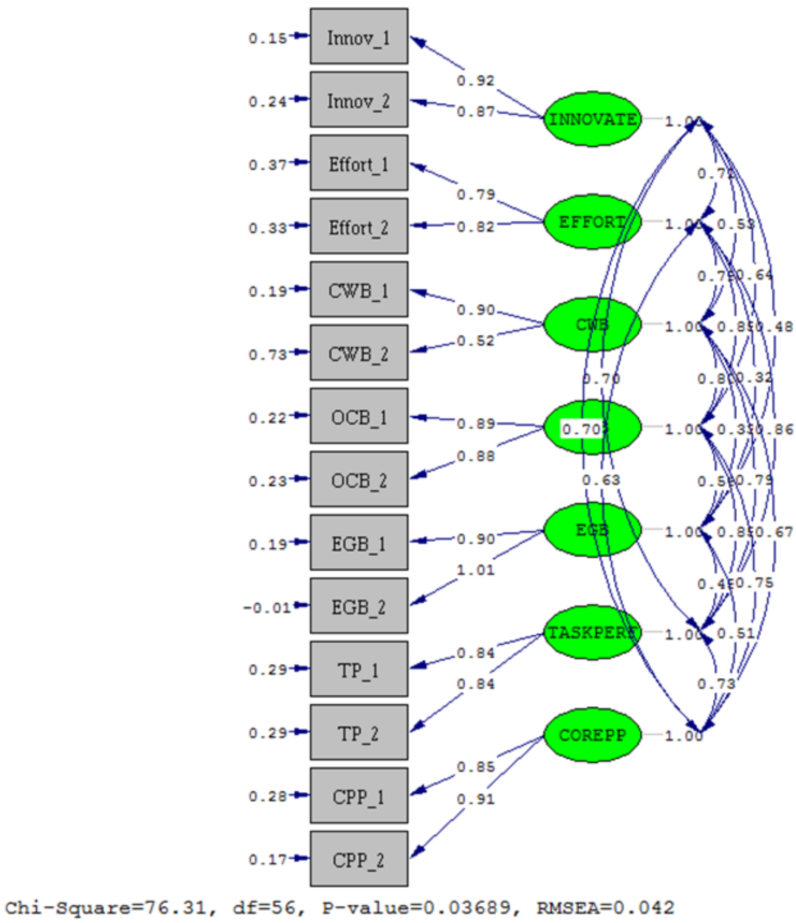

Figure 5.6. **Representation of the fitted Work Unit Competency Questionnaire measurement model (completely standardised solution)**

Table 5.55

The goodness of fit statistics for the work unit competency questionnaire measurement model

Goodness of Fit Statistics
Degrees of Freedom = 56
Minimum Fit Function Chi-Square = 82.64210 (P = 0.011823)
Normal Theory Weighted Least Squares Chi-Square = 80.00626 (P = 0.019317)
Satorra-Bentler Scaled Chi-Square = 76.31289 (P = 0.036886)
Chi-Square Corrected for Non-Normality = 98.31121 (P = 0.00041083)
Estimated Non-centrality Parameter (NCP) = 20.31289
90 Percent Confidence Interval for NCP = (1.39184 ; 47.28599)
Minimum Fit Function Value = 0.41115
Population Discrepancy Function Value (F0) = 0.10106
90 Percent Confidence Interval for F0 = (0.0069246 ; 0.23525)
Root Mean Square Error of Approximation (RMSEA) = 0.042481
90 Percent Confidence Interval for RMSEA = (0.011120 ; 0.064815)
P-Value for Test of Close Fit (RMSEA < 0.05) = 0.68501
Expected Cross-Validation Index (ECVI) = 0.86723
90 Percent Confidence Interval for ECVI = (0.77309 ; 1.00142)
ECVI for Saturated Model = 1.04478
ECVI for Independence Model = 23.58461
Chi-Square for Independence Model with 91 Degrees of Freedom = 4712.50701
Independence AIC = 4740.50701
Model AIC = 174.31289
Saturated AIC = 210.00000
Independence CAIC = 4800.82276
Model CAIC = 385.41800
Saturated CAIC = 662.36811
Normed Fit Index (NFI) = 0.98381
Non-Normed Fit Index (NNFI) = 0.99286
Parsimony Normed Fit Index (PNFI) = 0.60542
Comparative Fit Index (CFI) = 0.99560
Incremental Fit Index (IFI) = 0.99564
Relative Fit Index (RFI) = 0.97369
Critical N (CN) = 220.96758
Root Mean Square Residual (RMR) = 0.013873
Standardized RMR = 0.025404
Goodness of Fit Index (GFI) = 0.94620
Adjusted Goodness of Fit Index (AGFI) = 0.89912
Parsimony Goodness of Fit Index (PGFI) = 0.50464

The Satorra-Bentler chi-square ($\chi 2$) delivered a statistically significant value (76.312; $p<.05$). A significant $\chi 2$ indicates that the WUCQ model does not fit exactly in the parameter. The exact fit null hypothesis (H_{01}: RMSEA = 0) was therefore rejected ($p < .05$). This implies that the measurement model was not able to reproduce the observed covariance matrix to a degree of accuracy that could be explained in terms of sampling error alone.

The Root Mean Square Error of Approximation (RMSEA) value of .0424 indicated good model fit in the sample. The p-value for Test of Close Fit (.685) indicated that the close fit null hypothesis (H_{02}: RMSEA ≤ .05) should not be rejected (p>.05). In conclusion, the WUCQ measurement model showed close model fit in the parameter. The fact that the measurement model showed close fit warranted the interpretation of the WUCQ measurement model parameter estimates.

5.10.2 Evaluation of the Standardised Residuals Obtained for the Work Unit Competency Questionnaire Measurement Model

The large standardised residuals (>2.58 or <-2.58) are summarised in Table 5.56. The fitted WUCQ measurement model underestimated four and overestimated one of the 105 variances and covariances in the observed covariance matrix (4.76%). The small percentage large residuals commented favourably on the fit of the revised WUCQ measurement model. Figure 4.7 indicates that although the median standardised residual is zero the distribution is negatively skewed.

Table 5.56

Summary statistics for the standardised residuals

Largest Negative Standardized Residuals					
Residual for	CWB_1	and	Innov_2	-8.52055
Residual for	CPP_1	and	Innov_1	-5.97408
Residual for	CPP_2	and	TP_1	-3.27895
Largest Positive Standardized Residuals				
Residual for	OCB_2	and	CWB_2	3.14325

Note: Innov_1 and Innov_2 refers to the two item parcels operationalising the *innovation* latent variable, Effort_1 and Effort_2 refers to the two item parcels operationalising the *effort* latent variable, CWB_1 and CWB_2 refers to the two item parcels operationalising the *counterproductive workplace behaviour* latent variable, OCB_1 and OCB_2 refers to the two item parcels operationalising the *organisational citizenship behaviour* latent variable, EGB_1 and EGB_2 refers to the two item parcels operationalising the *employee green behaviour* latent variable, TP_1 and TP_2 refers to the two item parcels operationalising the *task performance* latent variable and CPP_1 and CPP_2 refers to the two item parcels operationalising the *core people processes* latent variable.

```
- 8|5
 - 7|
 - 6|0
 - 5|
 - 4|
 - 3|3
 - 2|11
 - 1|984310
 - 0|9877666443210000000000000000000000000000000000000000000000000000000000
   0|122244555799
   1|001123334
   2|02
   3|1
```

Figure 5.7. **Stem-and-leaf plot for the standardised residuals**

The Q-plot for the measurement model is depicted in Figure 5.8. The Q-plot shows that the data deviates from the 45-degree reference line. This is a negative reference on the fit of the model. The data points rotate away from the 45-degree reference line at the upper end in a positive direction and in the lower end in a negative direction. Thus, the model residuals results appear to suggest that only satisfactory model fit was achieved.

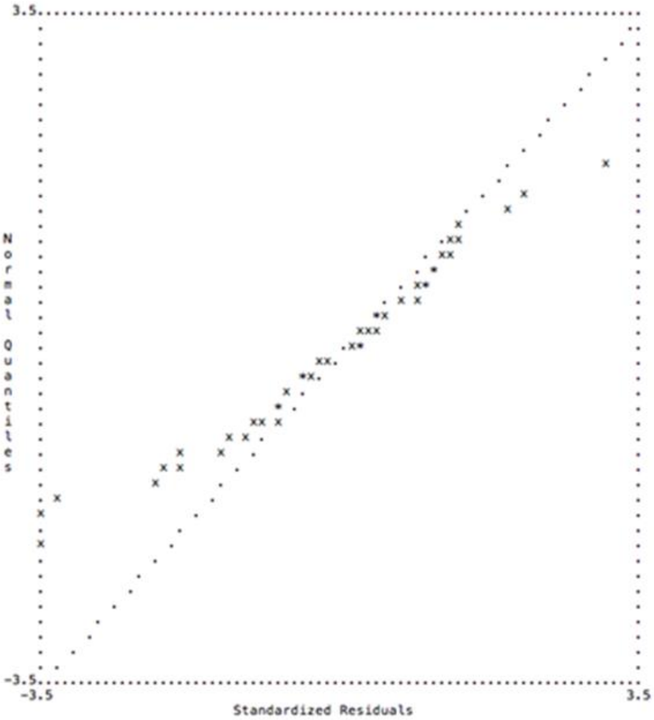

Figure 5.8. **Q-Plot for the Work Unit Competency Questionnaire measurement model**

5.10.3 Evaluation of the Modification Indices Obtained for the Work Unit Outcome Questionnaire Measurement Model

The modification indices calculated for Λ^X for the WUCQ measurement model are shown in Table 5.57.

Table 5.57

Modification indices for the lambda matrix

	INNOVATE	EFFORT	CWB	OCB	EGB	TASKPERF
Innov_1	- -	1.19110	1.31847	0.00748	2.76188	1.42891
Innov_2	- -	1.72319	1.74050	0.01026	2.73771	2.74541
Effort_1	103.79211	- -	4.40167	- -	5.21541	- -
Effort_2	1.88326	- -	0.96788	3.10919	4.76208	0.00379
CWB_1	0.27118	0.02211	- -	0.12478	8.30631	0.13609
CWB_2	0.62482	0.91891	- -	10.55899	0.89284	- -
OCB_1	0.55438	0.54557	3.04283	- -	0.01500	0.65186
OCB_2	0.45936	0.46561	2.76087	- -	0.01418	0.37796
EGB_1	1.61574	0.00051	0.80567	0.71820	- -	0.03166
EGB_2	1.21673	0.00051	0.79188	0.57246	- -	0.02678
TP_1	0.44407	0.14690	4.08481	0.11401	2.52449	- -
TP_2	0.36948	0.10381	3.19241	0.07921	2.33324	- -
CPP_1	0.01743	1.74412	0.19048	2.24451	0.09934	2.65550
CPP_2	0.01873	1.39375	0.10741	1.31956	0.10205	1.36366

Note: Innov_1 and Innov_2 refers to the two item parcels operationalising the *innovation* latent variable, Effort_1 and Effort_2 refers to the two item parcels operationalising the *effort* latent variable, CWB_1 and CWB_2 refers to the two item parcels operationalising the *counterproductive workplace behaviour* latent variable, OCB_1 and OCB_2 refers to the two item parcels operationalising the *organisational citizenship behaviour* latent variable, EGB_1 and EGB_2 refers to the two item parcels operationalising the *employee green behaviour* latent variable, TP_1 and TP_2 refers to the two item parcels operationalising the *task performance* latent variable and CPP_1 and CPP_2 refers to the two item parcels operationalising the *core people processes* latent variable. INNOVATE refers to *innovation*, EFFORT refers to *effort*, CWB refers to *counterproductive workplace behaviour*, OCB refers to *organisational citizenship behaviours*, EGB refers to *employee green behaviour* and TASKPERF refers to *task performance* and COREPP refers to *core people processes.*

As shown in Table 5.57, only two modification indices values were larger than 6.64. The small percentage (2.38%) of large modification index values for Λ^X (2/84) commented favourably on the fit of the WUCQ measurement model. The large modification index value for λ_{31}, however, gave reason for concern. The modification indices calculated for Θ_δ for the revised WUCQ measurement model are shown in Table 5.58.

Table 5.58

Modification indices for the theta-delta matrix

	Innov_1	**Innov_2**	**Effort_1**	**Effort_2**	**CWB_1**	**CWB_2**
Innov_1	- -					
Innov_2	- -	- -				
Effort_1	0.54735	0.08588	- -			
Effort_2	0.36825	0.03756	- -	- -		
CWB_1	0.86211	1.11598	0.38426	0.67310	- -	
CWB_2	0.03731	0.22086	0.32276	0.00238	- -	- -
OCB_1	0.28387	0.40986	0.71865	0.17411	10.49795	1.00785
OCB_2	0.02148	0.00863	0.01081	1.81485	3.42520	2.22765
EGB_1	0.02497	2.21984	0.89133	1.25699	0.64536	0.00690
EGB_2	0.46364	3.56375	2.25739	2.63307	0.24287	0.40341
TP_1	0.00922	0.23611	3.23182	0.10855	6.98016	0.13784
TP_2	0.56016	1.96789	0.66133	0.35146	4.68554	1.84451
CPP_1	6.41870	3.08763	1.76382	0.05301	4.29679	0.03218
CPP_2	5.02055	2.19854	2.29583	0.00698	6.49430	1.87374

	OCB_1	**OCB_2**	**EGB_1**	**EGB_2**	**TP_1**	**TP_2**
OCB_1	- -					
OCB_2	- -	- -				
EGB_1	0.96488	0.02380	- -			
EGB_2	0.76692	0.01925	- -	- -		
TP_1	1.16343	1.24020	0.86698	0.17676	- -	
TP_2	4.54780	4.77525	0.15057	0.58855	- -	- -
CPP_1	0.04943	0.42794	3.54460	3.01035	3.55357	0.72415
CPP_2	0.03101	0.32256	5.47229	4.73262	9.88073	4.82812

	CPP_1	**CPP_2**
CPP_1	- -	
CPP_2	- -	- -

Note: Innov_1 and Innov_2 refers to the two item parcels operationalising the *innovation* latent variable, Effort_1 and Effort_2 refers to the two item parcels operationalising the *effort* latent variable, CWB_1 and CWB_2 refers to the two item parcels operationalising the *counterproductive workplace behaviour* latent variable, OCB_1 and OCB_2 refers to the two item parcels operationalising the *organisational citizenship behaviour* latent variable, EGB_1 and EGB_2 refers to the two item parcels operationalising the *employee green behaviour* latent variable, TP_1 and TP_2 refers to the two item parcels operationalising the *task performance* latent variable and CPP_1 and CPP_2 refers to the two item parcels operationalising the *core people processes* latent variable.

Furthermore, as shown in Table 5.58, three of the modification index values calculated for the off-diagonal of Θ_δ were larger than 6.64. This small percentage (3.3%) of modification indices greater than the cut-off value (3/91=.033), commented positively on the fit of the WUCQ measurement model. The basket of evidence obtained from the fit statistics, the standardised residuals and the modification indices warranted the interpretation of the WUCQ measurement model parameter estimates.

5.10.4 Interpreting the Work Unit Outcome Questionnaire Measurement Model Parameter Estimates

The close fit of the Work Unit Competency Questionnaire measurement model warranted the interpretation of the magnitude and the significance of the slope of the regression of the observed variables (item parcels) on their respective latent variables in the unstandardised and completely standardised lambda- X matrix ($\mathbf{\Lambda}^X$) and the magnitude and the significance of the measurement error variances in the unstandardised and completely standardised theta-delta matrix (Θ_δ). When an indicator is designed to provide a valid reflection of a specific latent variable, then the slope of the regression of X_j on ξ_i in the fitted measurement model firstly has to be statistically significant ($p<.05$) and large and the measurement error variance associated with X_j needs to be statistically significant ($p<.05$) but small (Diamantopoulos & Siguaw, 2000).

5.10.4.1 Lambda-X hypothesis

The unstandardised $\mathbf{\Lambda}^X$ shown in Table 5.59 indicated that all (14) the slope coefficients that describe the regression of the item parcels on the latent variables they were designed to reflect were statistically significant ($p<.05$). All the indicator variables loaded statistically significantly on the latent variables that they were designed to reflect. Therefore, H_{0i}: $\lambda_{jk}=0$; i=3, 4, …, 16; j=1, 2, …, 14; k=1, 2, …, 7 were rejected in favour of H_{ai}: $\lambda_{jk}>0$; i=3, 4, …, 16; j=1, 2, …, 14; k=1, 2, …, 7.

Table 5.59

Unstandardised lambda-X matrix

	INNOVATE	EFFORT	CWB	OCB	EGB	TASKPERF	COREPP
Innov_1	0.71929 (0.04194) 17.15120	- -	- -	- -	- -	- -	- -
Innov_2	0.68354 (0.04563) 14.97885	- -	- -	- -	- -	- -	- -
Effort_1	- -	0.51982 (0.03932) 13.21881	- -	- -	- -	- -	- -
Effort_2	- -	0.60251	- -	- -	- -	- -	- -

Table 5.59

Unstandardised lambda-X matrix (continued)

		(0.04073)					
		14.79451					
CWB_1	- -	- -	0.57479	- -	- -	- -	- -
			(0.03914)				
			14.68686				
CWB_2	- -	- -	0.30767	- -	- -	- -	- -
			(0.04129)				
			7.45135				
OCB_1	- -	- -	- -	0.65093	- -	- -	- -
				(0.03932)			
				16.55372			
OCB_2	- -	- -	- -	0.57337	- -	- -	- -
				(0.03437)			
				16.68324			
EGB_1	- -	- -	- -	- -	0.91821	- -	- -
					(0.05578)		
					16.46160		
EGB_2	- -	- -	- -	- -	1.04177	- -	- -
					(0.04916)		
					21.19144		
TP_1	- -	- -	- -	- -	- -	0.50698	- -
						(0.03434)	
						14.76417	
TP_2	- -	- -	- -	- -	- -	0.55812	- -
						(0.03490)	
						15.99180	
CPP_1	- -	- -	- -	- -	- -	- -	0.65097
	- -	- -	- -	- -	- -	- -	(0.04257)
							15.29007
CPP_2							0.68413
							(0.04418)
							15.48525

Note: Innov_1 and Innov_2 refers to the two item parcels operationalising the *innovation* latent variable, Effort_1 and Effort_2 refers to the two item parcels operationalising the *effort* latent variable, CWB_1 and CWB_2 refers to the two item parcels operationalising the *counterproductive workplace behaviour* latent variable, OCB_1 and OCB_2 refers to the two item parcels operationalising the *organisational citizenship behaviour* latent variable, EGB_1 and EGB_2 refers to the two item parcels operationalising the *employee green behaviour* latent variable, TP_1 and TP_2 refers to the two item parcels operationalising the *task performance* latent variable and CPP_1 and CPP_2 refers to the two item parcels operationalising the *core people processes* latent variable. INNOVATE refers to *innovation*, EFFORT refers to *effort*, CWB refers to *counterproductive workplace behaviour*, OCB refers to *organisational citizenship behaviours*, EGB refers to *employee green behaviour* and TASKPERF refers to *task performance* and COREPP refers to *core people processes.*

As shown below in the completely standardised Λ^X matrix for the WUCQ measurement model shown in Table 5.60, all of the indicators provided satisfactory valid explanations of the underlying latent variable they were designed to reflect but for CWB_2 and EGB_2. CWB explained less than 50% of the variance in CWB_2

(.52246²=.273). Far greater reason for concern, however, is the fact that the correlation between *employee green behaviour* and EGB_2 is greater than 1 and exceeds unity which is logically impossible. This suggests that there is an inadmissable solution.

Table 5.60

Completely standardised lambda-X matrix

	INNOVATE	EFFORT	CWB	OCB	EGB	TASKPERF	COREPP
Innov_1	.92327	- -	- -	- -	- -	- -	- -
Innov_2	.87079	- -	- -	- -	- -	- -	- -
Effort_1	- -	.79216	- -	- -	- -	- -	- -
Effort_2	- -	.81585	- -	- -	- -	- -	- -
CWB_1	- -	- -	.90048	- -	- -	- -	- -
CWB_2	- -	- -	.52246	- -	- -	- -	- -
OCB_1	- -	- -	- -	.88593	- -	- -	- -
OCB_2	- -	- -	- -	.87730	- -	- -	- -
EGB_1	- -	- -	- -	- -	.90221	- -	- -
EGB_2	- -	- -	- -	- -	1.00514	- -	- -
TP_1	- -	- -	- -	- -	- -	.84306	- -
TP_2	- -	- -	- -	- -	- -	.84448	- -
CPP_1	- -	- -	- -	- -	- -	- -	.84996
CPP_2	- -	- -	- -	- -	- -	- -	.91262

Note: : Innov_1 and Innov_2 refers to the two item parcels operationalising the *innovation* latent variable, Effort_1 and Effort_2 refers to the two item parcels operationalising the *effort* latent variable, CWB_1 and CWB_2 refers to the two item parcels operationalising the *counterproductive workplace behaviour* latent variable, OCB_1 and OCB_2 refers to the two item parcels operationalising the *organisational citizenship behaviour* latent variable, EGB_1 and EGB_2 refers to the two item parcels operationalising the *employee green behaviour* latent variable, TP_1 and TP_2 refers to the two item parcels operationalising the *task performance* latent variable and CPP_1 and CPP_2 refers to the two item parcels operationalising the *core people processes* latent variable. INNOVATE refers to *innovation*, EFFORT refers to *effort*, CWB refers to *counterproductive workplace behaviour*, OCB refers to *organisational citizenship behaviour*, EGB refers to *employee green behaviour* and TASKPERF refers to *task performance* and COREPP refers to *core people processes.*

5.10.4.2 Theta-delta hypotheses

The unstandardised measurement error variances for the item parcels for the WUCQ measurement model are shown in Table 5.61. As shown below, there is a negative measurement error variance for EGB_2. This again points to an inadmissible solution.

Table 5.61

Unstandardised theta-delta matrix

Innov_1	Innov_2	Effort_1	Effort_2	CWB_1	CWB_2
0.08956	0.14894	0.16040	0.18238	0.07707	0.25213
(0.02435)	(0.03101)	(0.01876)	(0.02495)	(0.03319)	(0.02798)
3.67779	4.80312	8.55165	7.30891	2.32198	9.00964

Table 5.61

Unstandardised theta-delta matrix (continued)

OCB_1	OCB_2	EGB_1	EGB_2	TP_1	TP_2
0.11614	0.09839	0.19267	-0.01107	0.10460	0.12530
(0.01706)	(0.01363)	(0.04280)	(0.04519)	(0.01595)	(0.01971)
6.80837	7.21928	4.50139	-0.24490	6.55784	6.35850
CPP_1	**CPP_2**				
0.16281	0.09392				
(0.02562)	(0.02412)				
6.35563	3.89320				

Note: Innov_1 and Innov_2 refers to the two item parcels operationalising the *innovation* latent variable, Effort_1 and Effort_2 refers to the two item parcels operationalising the *effort* latent variable, CWB_1 and CWB_2 refers to the two item parcels operationalising the *counterproductive workplace behaviour* latent variable, OCB_1 and OCB_2 refers to the two item parcels operationalising the *organisational citizenship behaviour* latent variable, EGB_1 and EGB_2 refers to the two item parcels operationalising the *employee green behaviour* latent variable, TP_1 and TP_2 refers to the two item parcels operationalising the *task performance* latent variable and CPP_1 and CPP_2 refers to the two item parcels operationalising the *core people processes* latent variable.

The completely standardised measurement error variances are reflected in Table 5.62. This theta-delta matrix reveals percentage of variance in the indicator variable (i.e., item parcel) that cannot be explained by the latent variable the indicator variable was designed to reflect but has to be ascribed to systematic and random measurement error (Wessels, 2018). Generally, except for CWB_2, only small amounts of variance remained unaccounted for by the latent variables the indicators were designated to reflect but rather were explained by random error and systematic non-relevant latent variables. The negative error variance associated with EGB_2 in Table 5.62 is logical impossibility and indicates an inadmissible solution.

Table 5.62

Completely standardised theta-delta matrix

Innov_1	Innov_2	Effort_1	Effort_2	CWB_1	CWB_2
0.14756	0.24172	0.37249	0.33439	0.18914	0.72704
OCB_1	**OCB_2**	**EGB_1**	**EGB_2**	**TP_1**	**TP_2**
0.21514	0.23034	0.18601	-0.01030	0.28924	0.28686
CPP_1	**CPP_2**				
0.27757	0.16713				

Note: Innov_1 and Innov_2 refers to the two item parcels operationalising the *innovation* latent variable, Effort_1 and Effort_2 refers to the two item parcels operationalising the *effort* latent variable, CWB_1 and CWB_2 refers to the two item parcels operationalising the *counterproductive workplace behaviour* latent variable, OCB_1 and OCB_2 refers to the two item parcels operationalising the *organisational citizenship behaviour* latent variable, EGB_1 and EGB_2 refers to the two item parcels operationalising the *employee green behaviour* latent variable, TP_1 and TP_2 refers to the two item parcels operationalising the *task performance* latent variable and CPP_1 and CPP_2 refers to the two item parcels operationalising the *core people processes* latent variable.

5.11 ASSESSING THE OVERALL GOODNESS OF FIT OF THE REVISED WORK UNIT COMPETENCY QUESTIONNAIRE MEASUREMENT MODEL

5.11.1 Goodness of Fit Statistics for the Revised Work Unit Competency Questionnaire Measurement Model

It could have been argued that the negative measurement error variance estimate for EGB_2 did statistically significantly ($p>.05$) deviate from zero and hence could be regarded as ignorable. It was, however, decided to first to attempt to circumvent the problem. In a first attempt to rectify the inadmissible solution, a range of starting values were specified for the factor loadings of EGB_1 and EGB_2. This did not solve the problem. An alternative estimation method for RML, namely diagonally weighted least squares (DWLS), was also used in an attempt to solve the problem. Changing the estimation technique did, however, also not solve the problem. In a final attempt to rectify the inadmissible solution, the lambda estimates for EGB_1 and EGB_2 were fixed to .95. This solved the problem and provided a close fit, albeit slightly poorer than when the lambdas were freely estimated, as shown below in Table 5.63. The path diagram depicting the completely standardised solution of the fitted WUCQ measurement model is shown in Figure 5.9.

Table 5.63

The Goodness of fit statistics for the Work Unit Outcome Questionnaire measurement model with EGB_1 and EGB_2 lambdas fixed to .95

Goodness of Fit Statistics
Degrees of Freedom = 57
Minimum Fit Function Chi-Square = 88.07278 (P = 0.0051689)
Normal Theory Weighted Least Squares Chi-Square = 86.06809 (P = 0.0077134)
Satorra-Bentler Scaled Chi-Square = 82.41779 (P = 0.015470)
Chi-Square Corrected for Non-Normality = 102.72202 (P = 0.00019642)
Estimated Non-centrality Parameter (NCP) = 25.41779
90 Percent Confidence Interval for NCP = (5.18102 ; 53.65180)
Minimum Fit Function Value = 0.43817
Population Discrepancy Function Value (F0) = 0.12646
90 Percent Confidence Interval for F0 = (0.025776 ; 0.26692)
Root Mean Square Error of Approximation (RMSEA) = 0.047101
90 Percent Confidence Interval for RMSEA = (0.021265 ; 0.068432)
P-Value for Test of Close Fit (RMSEA < 0.05) = 0.56367
Expected Cross-Validation Index (ECVI) = 0.88765

Table 5.63

The Goodness of fit statistics for the Work Unit Outcome Questionnaire measurement model with EGB_1 and EGB_2 lambdas fixed to .95 (continued)

90 Percent Confidence Interval for ECVI = (0.78697 ; 1.02812)
ECVI for Saturated Model = 1.04478
ECVI for Independence Model = 23.58461
Chi-Square for Independence Model with 91 Degrees of Freedom = 4712.50701
Independence AIC = 4740.50701
Model AIC = 178.41779
Saturated AIC = 210.00000
Independence CAIC = 4800.82276
Model CAIC = 385.21464
Saturated CAIC = 662.36811
Normed Fit Index (NFI) = 0.98251
Non-Normed Fit Index (NNFI) = 0.99122
Parsimony Normed Fit Index (PNFI) = 0.61542
Comparative Fit Index (CFI) = 0.99450
Incremental Fit Index (IFI) = 0.99454
Relative Fit Index (RFI) = 0.97208
Root Mean Square Residual (RMR) = 0.017289
Standardized RMR = 0.028283
Goodness of Fit Index (GFI) = 0.94235
Adjusted Goodness of Fit Index (AGFI) = 0.89381
Parsimony Goodness of Fit Index (PGFI) = 0.51156

The Satorra-Bentler chi-square ($\chi 2$) shown in Table 5.63 delivered a statistically significant value (82.418; $p<.05$). A significant $\chi 2$ indicates that the revised WUCQ measurement model does not fit exactly in the parameter. The exact fit null hypothesis (H_{01}: RMSEA = 0) was therefore rejected ($p < .05$). This implies is that the measurement model was not able to reproduce the observed covariance matrix to a degree of accuracy that could be explained in terms of sampling error alone.

The Root Mean Square Error of Approximation (RMSEA) value of .0471 (versus .0424 of the original WUCQ measurement model) indicated good model fit in the sample. The p-value for test of close fit (.56367) indicated that the close fit null hypothesis (H_{02}: RMSEA $\leq$ 0.05) should not be rejected ($p>.05$). In conclusion, the revised WUCQ measurement model showed close model fit in the parameter. The fact that the measurement model showed close fit warranted the interpretation of the revised WUCQ measurement model parameter estimates.

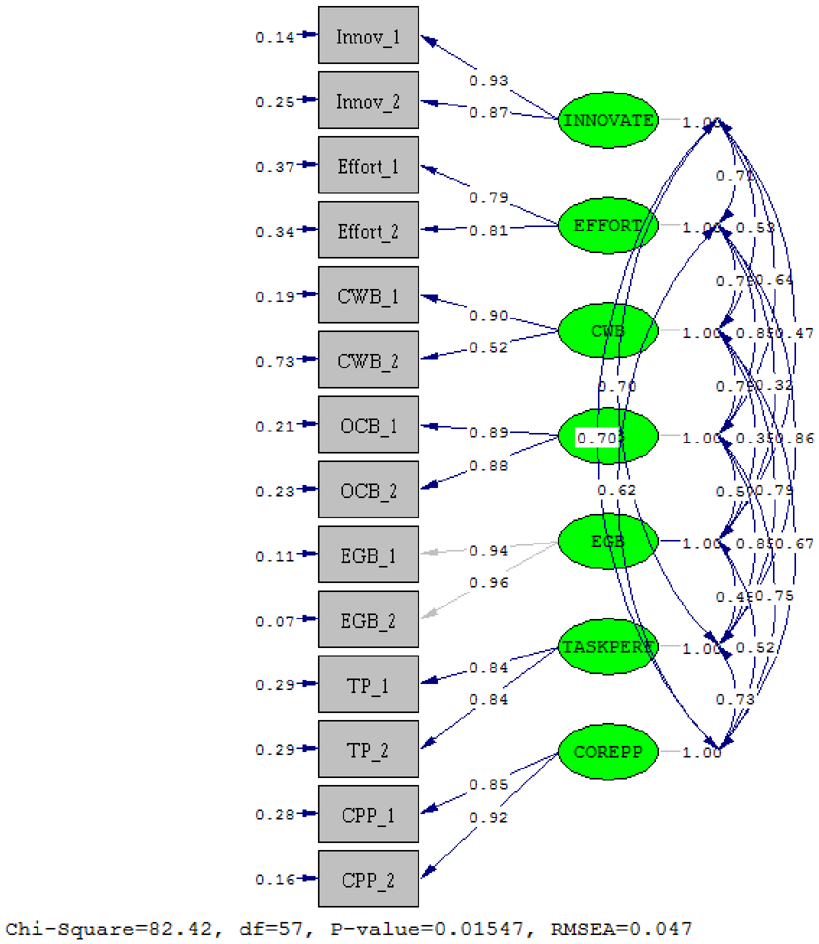

Figure 5.9. **Representation of the revised fitted Work Unit Competency Questionnaire measurement model with EGB_1 and EGB_2 *lambdas fixed to .95* (completely standardised solution)**

5.11.2 Evaluation of the Standardised Residuals Obtained for the Revised Work Unit Outcome Questionnaire Measurement Model with *EGB_1 And EGB_2* Lambdas *Fixed to .95*

The large standardised residuals (>2.58 or <-2.58) are summarised in Table 5.64. The fitted revised WUCQ measurement model underestimated two and overestimated five of the 105 variances and covariances in the observed covariance matrix (6.67%). The small percentage large residuals commented favourably on the fit of the revised WUCQ measurement model. Figure 5.10 indicates that although the median standardised residual is zero the distribution is negatively skewed. The large negative outlier standardised residual of -17.51 provided some reason for concern.

Table 5.64

Summary statistics for the standardised residuals

Largest Negative Standardized Residuals
Residual for CWB_1 and Innov_2: -4.25044
Residual for EGB_1 and Innov_1: -7.19039
Residual for EGB_1 and OCB_2: -17.50751
Residual for CPP_1 and Innov_1: -4.67745
Residual for CPP_2 and TP_1: -3.38271
Largest Positive Standardized Residuals
Residual for OCB_2 and CWB_2: 3.17276
Residual for TP_2 and EGB_2: 4.04450

Note: Innov_1 and Innov_2 refers to the two item parcels operationalising the *innovation* latent variable, Effort_1 and Effort_2 refers to the two item parcels operationalising the *effort* latent variable, CWB_1 and CWB_2 refers to the two item parcels operationalising the *counterproductive workplace behaviour* latent variable, OCB_1 and OCB_2 refers to the two item parcels operationalising the *organisational citizenship behaviour* latent variable, EGB_1 and EGB_2 refers to the two item parcels operationalising the *employee green behaviour* latent variable, TP_1 and TP_2 refers to the two item parcels operationalising the *task performance* latent variable and CPP_1 and CPP_2 refers to the two item parcels operationalising the *core people processes* latent variable.

The Q-plot for the measurement model is depicted in Figure 5.11. The Q-plot shows that the data deviates from the 45-degree reference line. This is a negative reference on the fit of the model. The data points rotate away from the 45-degree reference line at the upper end in a positive direction and in the lower end in a negative direction. Thus, the model residuals results appear to suggest that only satisfactory model fit was achieved.

```
-17|5
 -16|
 -15|
 -14|
 -13|
 -12|
 -11|
 -10|
 - 9|
 - 8|
 - 7|2
 - 6|
 - 5|
 - 4|73
 - 3|4
 - 2|311
 - 1|7632220
 - 0|998776663300000000000000000000000000000000000000000000000000000000000
   0|124445555689
   1|0244569
   2|2
   3|2
   4|0
```

Figure 5.10. **Stem-and-leaf plot for the standardised residuals**

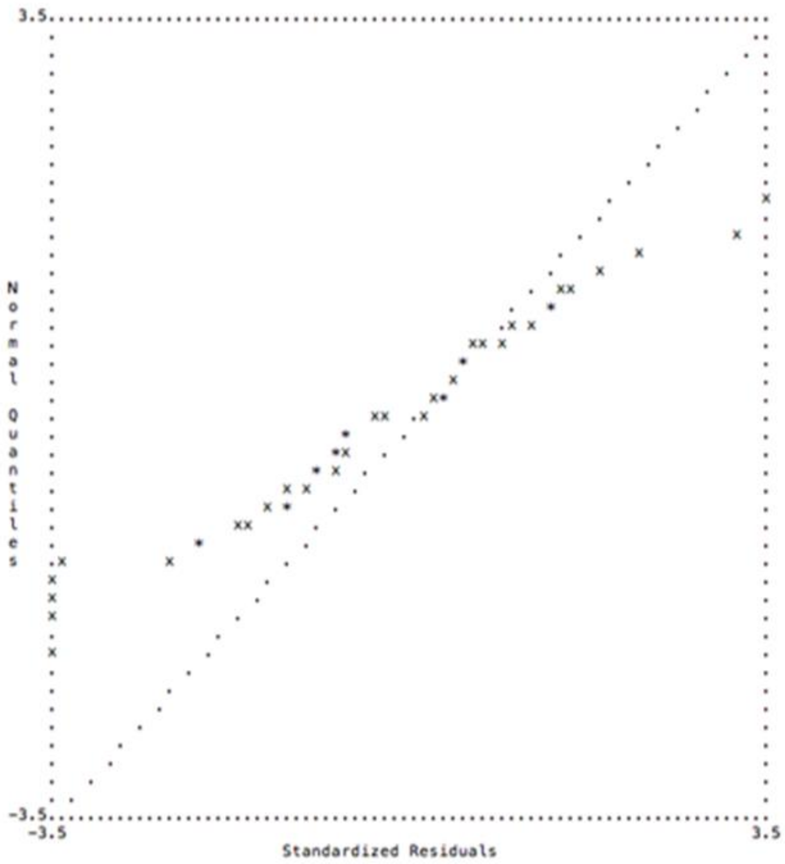

Figure 5.11. **Q-Plot for the fitted revised Work Unit Competency Questionnaire measurement model**

5.11.3 Evaluation of the Modification Indices Obtained for the Revised Work Unit Outcome Questionnaire Measurement Model with *EGB_1 and EGB_2* Lambda Estimates Fixed *to .95*

The modification indices calculated for Λ^X for the revised WUCQ measurement model are shown in Table 5.65.

Table 5.65

Modification indices for the lambda matrix

	INNOVATE	EFFORT	CWB	OCB	EGB	TASKPERF	COREPP
Innov_1	- -	0.87637	1.06870	0.04751	2.00726	1.15874	0.03603
Innov_2	- -	1.31556	1.42095	0.06667	1.99262	2.18674	0.05191
Effort_1	294.67821	- -	5.03543	- -	3.96694	- -	0.84874
Effort_2	1.58208	- -	1.19778	2.38124	3.48579	0.09332	0.24522
CWB_1	0.25868	0.02680	- -	0.13999	- -	0.11243	1.23112
CWB_2	0.59236	1.12149	- -	32.00465	0.84812	- -	2.95852

Table 5.65

Modification indices for the lambda matrix (continued)

OCB_1	0.50056	0.38706	3.42576	- -	0.05206	0.49589	0.06035
OCB_2	0.39308	0.31553	3.00251	- -	0.04731	0.27273	0.05142
EGB_1	7.19417	2.57257	0.64886	2.41024	4.10178	3.78195	2.87166
EGB_2	7.23148	2.60279	0.64917	2.42217	5.83320	3.77082	2.88405
TP_1	0.45059	0.13716	4.04839	0.14173	2.63567	- -	2.43975
TP_2	0.37604	0.09679	3.18962	0.10027	2.42779	- -	1.81487
CPP_1	0.00492	2.42467	0.09593	2.52178	0.03277	3.24445	- -
CPP_2	0.00525	1.97511	0.05360	1.57900	0.03593	1.68641	- -

Note: Innov_1 and Innov_2 refers to the two item parcels operationalising the *innovation* latent variable, Effort_1 and Effort_2 refers to the two item parcels operationalising the *effort* latent variable, CWB_1 and CWB_2 refers to the two item parcels operationalising the *counterproductive workplace behaviour* latent variable, OCB_1 and OCB_2 refers to the two item parcels operationalising the *organisational citizenship behaviour* latent variable, EGB_1 and EGB_2 refers to the two item parcels operationalising the *employee green behaviour* latent variable, TP_1 and TP_2 refers to the two item parcels operationalising the *task performance* latent variable and CPP_1 and CPP_2 refers to the two item parcels operationalising the *core people processes* latent variable. INNOVATE refers to *innovation*, EFFORT refers to *effort*, CWB refers to *counterproductive workplace behaviour*, OCB refers to *organisational citizenship behaviour*, EGB refers to *employee green behaviour* and TASKPERF refers to *task performance* and COREPP refers to *core people processes.*

As shown in Table 5.65, only four modification indices values were larger than 6.64. the small percentage (4.76%) of large modification index values for Λ^X (4/84) commented favourably on the fit of the WUCQ measurement model. The large modification index value for λ_{31}, however, gave reason for concern. The modification indices calculated for Θ_δ for the revised WUCQ measurement model are shown in Table 5.66.

Table 5.66

Modification indices for the theta-delta matrix

	Innov_1	**Innov_2**	**Effort_1**	**Effort_2**	**CWB_1**	**CWB_2**
Innov_1	- -					
Innov_2	- -	- -				
Effort_1	0.61409	0.08123	- -			
Effort_2	0.39581	0.02607	- -	- -		
CWB_1	0.95171	1.19759	0.46654	0.76907	- -	
CWB_2	0.03834	0.20006	0.32892	0.00436	- -	- -
OCB_1	0.36075	0.47081	0.78725	0.14748	10.51688	1.06275
OCB_2	0.02674	0.02078	0.01372	1.88668	3.44381	2.23243
EGB_1	0.01103	2.93682	0.47153	2.62075	1.06344	0.00733
EGB_2	0.10552	4.60013	1.41790	4.30198	0.56860	0.45917

Table 5.66

Modification indices for the theta-delta matrix (continued)

	Innov_1	Innov_2	Effort_1	Effort_2	CWB_1	CWB_2
TP_1	0.00416	0.25933	3.24264	0.10957	7.08673	0.13050
TP_2	0.50368	1.83667	0.68341	0.34751	4.75903	1.86003
CPP_1	6.25707	3.38453	1.66944	0.02254	4.38732	0.03798
CPP_2	4.58331	2.20759	2.10003	0.01813	6.53873	1.86241

	OCB_1	OCB_2	EGB_1	EGB_2	TP_1	TP_2
OCB_1	- -					
OCB_2	- -	- -				
EGB_1	0.10561	0.49444	- -			
EGB_2	0.05938	0.37140	- -	- -		
TP_1	1.16175	1.30283	0.79960	0.18385	- -	
TP_2	4.41327	4.78937	0.27937	0.92628	- -	- -
CPP_1	0.01630	0.58709	4.24127	3.44027	3.71391	0.69669
CPP_2	0.00347	0.39857	4.22490	3.53628	10.01843	4.73095

Note: Innov_1 and Innov_2 refers to the two item parcels operationalising the *innovation* latent variable, Effort_1 and Effort_2 refers to the two item parcels operationalising the *effort* latent variable, CWB_1 and CWB_2 refers to the two item parcels operationalising the *counterproductive workplace behaviour* latent variable, OCB_1 and OCB_2 refers to the two item parcels operationalising the *organisational citizenship behaviour* latent variable, EGB_1 and EGB_2 refers to the two item parcels operationalising the *employee green behaviour* latent variable, TP_1 and TP_2 refers to the two item parcels operationalising the *task performance* latent variable and CPP_1 and CPP_2 refers to the two item parcels operationalising the *core people processes* latent variable.

Furthermore, as shown in Table 5.66, three of the modification index values calculated for the off-diagonal of Θ_δ were larger than 6.64. This small percentage (3.3%) of modification indices greater than the cut-off value (3/91=.033), commented positively on the fit of the WUCQ measurement model.

5.12 INTERPRETING THE WORK UNIT COMPETENCY QUESTIONNAIRE MEASUREMENT MODEL PARAMETER ESTIMATES WITH *EGB_1 AND EGB_2 LAMBDA ESTIMATES FIXED TO .95*

The close fit of the Work Unit Outcome Questionnaire measurement model warranted the interpretation of the magnitude and the significance of the slope of the regression of the observed variables (item parcels) on their respective latent variables in the unstandardised and completely standardised lambda-X matrix [Λ^X and the magnitude and the significance of the measurement error variances in the unstandardised and completely standardised theta-delta matrix (Θ_δ)]. When an indicator (X_j) is designed to provide a valid reflection of a specific latent variable (ξ_i), then the slope of the regression of X_j on ξ_i in the fitted measurement model firstly has to be statistically significant ($p<.05$) and large and the measurement error variance associated with X_j needs to be statistically significant ($p<.05$) but small (Diamantopoulos & Siguaw, 2000)

5.12.1 Lambda-X Hypotheses

The unstandardised $\mathbf{\Lambda^X}$ matrix shown in Table 5.67 indicated that all (12) the slope coefficients that describe the slope of the regression of the item parcels on the latent variables they were earmarked to reflect (that were freed to be estimated[35]) were statistically significant ($p<.05$). All the indicator variables loaded statistically significantly on the latent variables that they were designed to reflect. Therefore, H_{0i}: $\lambda_{jk}=0$; i=3, 4, …, 8, 11, …, 16; j=1, 2, …, 14; k=1, 2, …, 7 were rejected in favour of H_{ai}: $\lambda_{jk}>0$; i=3, 4, …, 16; j=1, 2, …, 14; k=1, 2, …, 8, 11, …, 16. H_{0i}: $\lambda_{jk}=0$; i=11, 12; j=9, 10; k=5 were not tested. Because λ_{95} and $\lambda_{10,5}$ were fixed to .95.

Table 5.67

Unstandardised lambda-X matrix

	INNOVATE	EFFORT	CWB	OCB	EGB	TASKPERF	COREPP
Innov_1	0.72149	- -	-	-	-	- -	- -
	(0.04202)						
	17.17073						
Innov_2	0.68145	- -	-	-	-	- -	- -
	(0.04574)						
	14.89737						
Effort_1	- -	0.52117	-	-	-	- -	- -
		(0.03931)					
		13.25779					- -
Effort_2	- -	0.60094	-	-	-	- -	
		(0.04073)					
		14.75273					
CWB_1	- -	- -	0.57575	-	-	- -	- -
			(0.03924)				
			14.67252				
CWB_2	- -	- -	0.30716	-	-	- -	- -
			(0.04135)				
			7.42816				
OCB_1	- -	- -	-	0.65191	-	- -	- -
				(0.03929)			
				16.59160			

[35] λ_{95} and $\lambda_{10,5}$ were fixed to .95

Table 5.67

Unstandardised lambda-X matrix (continued)

	INNOVATE	EFFORT	CWB	OCB	EGB	TASKPERF	COREPP
OCB_2	- -	- -	-	0.57251	-	- -	- -
				(0.03442)			
				16.63523			
EGB_1	- -	- -	-	-	0.95000	- -	- -
EGB_2	- -	- -	-	-	0.95000	- -	- -
TP_1	- -	- -	-	-	-	0.50711	- -
						(0.03429)	
						14.78971	
TP_2	- -	- -	-	-	-	0.55798	- -
						(0.03488)	
						15.99525	
CPP_1	- -	- -	-	-	-	- -	- -
CPP_2	- -	- -	-	-	-	- -	0.64916
							(0.04266)
							15.21596

Note: Innov_1 and Innov_2 refers to the two item parcels operationalising the *innovation* latent variable, Effort_1 and Effort_2 refers to the two item parcels operationalising the *effort* latent variable, CWB_1 and CWB_2 refers to the two item parcels operationalising the *counterproductive workplace behaviour* latent variable, OCB_1 and OCB_2 refers to the two item parcels operationalising the *organisational citizenship behaviour* latent variable, EGB_1 and EGB_2 refers to the two item parcels operationalising the *employee green behaviour* latent variable, TP_1 and TP_2 refers to the two item parcels operationalising the *task performance* latent variable and CPP_1 and CPP_2 refers to the two item parcels operationalising the *core people processes* latent variable. INNOVATE refers to *innovation*, EFFORT refers to *effort*, CWB refers to *counterproductive workplace behaviour*, OCB refers to *organisational citizenship behaviour*, EGB refers to *employee green behaviour* and TASKPERF refers to *task performance* and COREPP refers to *core people processes.*

Table 5.68 indicates that all the completely standardised factor loadings obtained for the revised WUCQ measurement model had admissible values. In the completely standardised factor loading matrix (Table 5.68), all the factor loadings were greater than .71 but for the loading of CWB_2 on the latent counterproductive work behaviour competency.

Table 5.68

Completely standardised lambda-X matrix

	INNOVATE	EFFORT	CWB	OCB	EGB	TASKPERF	COREPP
Innov_1	.92610	- -	- -	- -	- -	- -	- -
Innov_2	.86814	- -	- -	- -	- -	- -	- -
Effort_1	- -	.79422	- -	- -	- -	- -	- -
Effort_2	- -	.81372	- -	- -	- -	- -	- -
CWB_1	- -	- -	.90198	- -	- -	- -	- -
CWB_2	- -	- -	.52159	- -	- -	- -	- -
OCB_1	- -	- -	- -	.88725	- -	- -	- -
OCB_2	- -	- -	- -	.87599	- -	- -	- -
EGB_1	- -	- -	- -	- -	.94254	- -	- -
EGB_2	- -	- -	- -	- -	.96312	- -	- -
TP_1	- -	- -	- -	- -	- -	.84327	- -
TP_2	- -	- -	- -	- -	- -	.84426	- -

Table 5.68

Completely standardised lambda-X matrix (continued)

	INNOVATE	EFFORT	CWB	OCB	EGB	TASKPERF	COREPP
CPP_1	- -	- -	- -	- -	- -	- -	.84760
CPP_2	- -	- -	- -	- -	- -	- -	.91516

Note: Innov_1 and Innov_2 refers to the two item parcels operationalising the *innovation* latent variable, Effort_1 and Effort_2 refers to the two item parcels operationalising the *effort* latent variable, CWB_1 and CWB_2 refers to the two item parcels operationalising the *counterproductive workplace behaviour* latent variable, OCB_1 and OCB_2 refers to the two item parcels operationalising the *organisational citizenship behaviour* latent variable, EGB_1 and EGB_2 refers to the two item parcels operationalising the *employee green behaviour* latent variable, TP_1 and TP_2 refers to the two item parcels operationalising the *task performance* latent variable and CPP_1 and CPP_2 refers to the two item parcels operationalising the *core people processes* latent variable. INNOVATE refers to *innovation*, EFFORT refers to *effort*, CWB refers to *counterproductive workplace behaviour*, OCB refers to *organisational citizenship behaviour*, EGB refers to *employee green behaviour* and TASKPERF refers to *task performance* and COREPP refers to *core people processes.*

As shown below in Table 5.69, all of the indicators, except CWB_2 provided satisfactory valid explanations of the underlying latent variables they were designed to reflect. This suggests that the majority of the variance in the aforementioned item parcels can be attributed to the latent variable it was designated to reflect and not systematic and random measurement error.

Table 5.69

Squared multiple correlations

Innov_1	Innov_2	Effort_1	Effort_2	CWB_1	CWB_2
0.85766	0.75366	0.63079	0.66215	0.81356	0.27205
OCB_1	OCB_2	EGB_1	EGB_2	TP_1	TP_2
0.78722	0.76736	0.88838	0.92759	0.71111	0.71278
CPP_1	**CPP_2**				
0.71843	0.83752				

Note: Innov_1 and Innov_2 refers to the two item parcels operationalising the *innovation* latent variable, Effort_1 and Effort_2 refers to the two item parcels operationalising the *effort* latent variable, CWB_1 and CWB_2 refers to the two item parcels operationalising the *counterproductive workplace behaviour* latent variable, OCB_1 and OCB_2 refers to the two item parcels operationalising the *organisational citizenship behaviour* latent variable, EGB_1 and EGB_2 refers to the two item parcels operationalising the *employee green behaviour* latent variable, TP_1 and TP_2 refers to the two item parcels operationalising the *task performance* latent variable and CPP_1 and CPP_2 refers to the two item parcels operationalising the *core people processes* latent variable.

5.12.2 Theta-delta Hypotheses

The unstandardised measurement error variances for the item parcels are shown in Table 5.70. All error variance estimates for the revised WUCQ measurement model obtained admissible positive values. All of the measurement error terms were found to be statistically significant ($p<.05$) as all of them, when transformed to z-scores, were greater than the critical value of 1.6449. This indicates that H_{0i}: $\theta_{\delta jj}$ =0; i =17, 18,..., 30; j=1, 2.....14 had to be rejected in favour of H_{ai}: $\theta_{\delta jj}$ > 0; i =17, 18,..., 30; j=1, 2.....14.

Table 5.70

Unstandardised theta-delta matrix

Innov_1	Innov_2	Effort_1	Effort_2	CWB_1	CWB_2
0.08639	0.15178	0.15899	0.18426	0.07596	0.25245
(0.02463)	(0.03110)	(0.01867)	(0.02512)	(0.03349)	(0.02802)
3.50744	4.88094	8.51502	7.33485	2.26802	9.00936
OCB_1	**OCB_2**	**EGB_1**	**EGB_2**	**TP_1**	**TP_2**
0.11487	0.09937	0.12143	0.07544	0.10447	0.12546
(0.01686)	(0.01380)	(0.03011)	(0.02440)	(0.01590)	(0.01974)
6.81371	7.19923	4.03351	3.09163	6.57025	6.35592
CPP_1	**CPP_2**				
0.16516	0.09131				
(0.02559)	(0.02428)				
6.45486	3.76133				

Note: Innov_1 and Innov_2 refers to the two item parcels operationalising the *innovation* latent variable, Effort_1 and Effort_2 refers to the two item parcels operationalising the *effort* latent variable, CWB_1 and CWB_2 refers to the two item parcels operationalising the *counterproductive workplace behaviour* latent variable, OCB_1 and OCB_2 refers to the two item parcels operationalising the *organisational citizenship behaviour* latent variable, EGB_1 and EGB_2 refers to the two item parcels operationalising the *employee green behaviour* latent variable, TP_1 and TP_2 refers to the two item parcels operationalising the *task performance* latent variable and CPP_1 and CPP_2 refers to the two item parcels operationalising the *core people processes* latent variable.

The completely standardised measurement error variances are illustrated in Table 5.71. Generally, except for CWB_2, only small amounts of variance remained unaccounted for by the latent variables that the composite indicators were tasked to reflect but that were rather explained by random error and systematic latent variables.

Table 5.71

Completely Standardised theta-delta matrix

Innov_1	Innov_2	Effort_1	Effort_2	CWB_1	CWB_2
0.14234	0.24634	0.36921	0.33785	0.18644	0.72795
OCB_1	**OCB_2**	**EGB_1**	**EGB_2**	**TP_1**	**TP_2**
0.21278	0.23264	0.11162	0.07241	0.28889	0.28722
CPP_1	**CPP_2**				
0.28157	0.16248				

Note: Innov_1 and Innov_2 refers to the two item parcels operationalising the *innovation* latent variable, Effort_1 and Effort_2 refers to the two item parcels operationalising the *effort* latent variable, CWB_1 and CWB_2 refers to the two item parcels operationalising the *counterproductive workplace behaviour* latent variable, OCB_1 and OCB_2 refers to the two item parcels operationalising the *organisational citizenship behaviour* latent variable, EGB_1 and EGB_2 refers to the two item parcels operationalising the *employee green behaviour* latent variable, TP_1 and TP_2 refers to the two item parcels operationalising the *task performance* latent variable and CPP_1 and CPP_2 refers to the two item parcels operationalising the *core people processes* latent variable.

5.12.3 Discriminant Validity

The unstandardised phi matrix is shown in Table 5.72. Table 5.72 indicates that all the correlations between the latent work unit competencies were statistically significant ($p<.05$). H_{0i}: $\phi_{jk} = 0$; i =31, 32,..., 51; j=1, 2.....7; k=1, 2.....7; $j \neq k$ were therefore all rejected in favour of H_{ai}: $\phi_{jk} > 0$; i =31, 32,..., 51; j=1, 2.....7; k=1, 2.....7; $j \neq k$.

Table 5.72

Unstandardised phi matrix

	INNOVATE	EFFORT	CWB	OCB	EGB	TASKPERF	COREPP
INNOVATE	1.00000						
EFFORT	0.70776	1.00000					
	(0.05241)						
	13.50410						
CWB	0.53169	0.78548	1.00000				
	(0.06426)	(0.04941)					
	8.27350	15.89655					
OCB	0.63971	0.84603	0.79417	1.00000			
	(0.05683)	(0.04574)	(0.05169)				
	11.25703	18.49783	15.36282				
EGB	0.48689	0.33440	0.36218	0.59207	1.07083		
	(0.07689)	(0.08548)	(0.08064)	(0.07207)	(0.10106)		
	6.33240	3.91205	4.49122	8.21495	10.59571		
TASKPERF	0.69678	0.86479	0.79005	0.84793	0.46502	1.00000	
	(0.05092)	(0.04601)	(0.05289)	(0.03823)	(0.07106)		
	13.68316	18.79375	14.93761	22.17794	6.54387		
COREPP	0.70164	0.62425	0.67168	0.74550	0.54158	0.73041	1.00000
	(0.05308)	(0.05780)	(0.05768)	(0.04304)	(0.07605)	(0.05393)	
	13.21973	10.79935	11.64565	17.32018	7.12145	13.54422	

Note: INNOVATE refers to *innovation*, EFFORT refers to *effort*, CWB refers to *counterproductive workplace behaviour*, OCB refers to *organisational citizenship behaviour*, EGB refers to *employee green behaviour* and TASKPERF refers to *task performance* and COREPP refers to *core people processes.*

Correlations are seen as excessively high if they exceed a value of .90. None of the correlations in the phi matrix exceeded this cut-off. Furthermore, it was found that only three of the correlations were between .80 and .899. The 95% confidence interval was calculated for the three correlations that exceeded .80. Table 5.73 indicates that none of these confidence intervals include the value one. The item parcels therefore succeeded in operationalising the latent competency variables in a manner that allows one to distinguish between the latent variables as qualitatively distinct, separate constructs

Table 5.73

95% confidence intervals calculated for the WUCQ measurement model for ϕ_{ij}>.80

ESTIMATE	STANDARD ERROR ESTIMATE	LOWER LIMIT OF 95% CONFIDENCE INTERVAL	UPPER LIMIT OF 95% CONFIDENCE INTERVAL	PHI
0.846030	0.046	0.729	0.915	ϕ_{42}
0.864790	0.046	0.742	0.932	ϕ_{62}
0.847930	0.038	0.754	0.908	ϕ_{64}

5.13 ASSESSING THE OVERALL GOODNESS OF FIT OF THE WORK UNIT OUTCOME QUESTIONNAIRE MEASUREMENT MODEL

The fit of the work unit outcome questionnaire measurement model and the credibility of the parameter estimates are discussed in the follow sections. The results of the measurement model analysis will be discussed by; (a) evaluating the overall model fit, based on (i) an array of model fit indices as reported by LISREL, (ii) assessing the standardised residuals, (iii) examining the modification indices calculated for $\mathbf{\Lambda}^x$ and $\mathbf{\Theta}^\delta$, and (b) interpreting the measurement model parameter estimates. The fitted measurement model is visually represented in Figure 5.12 below.

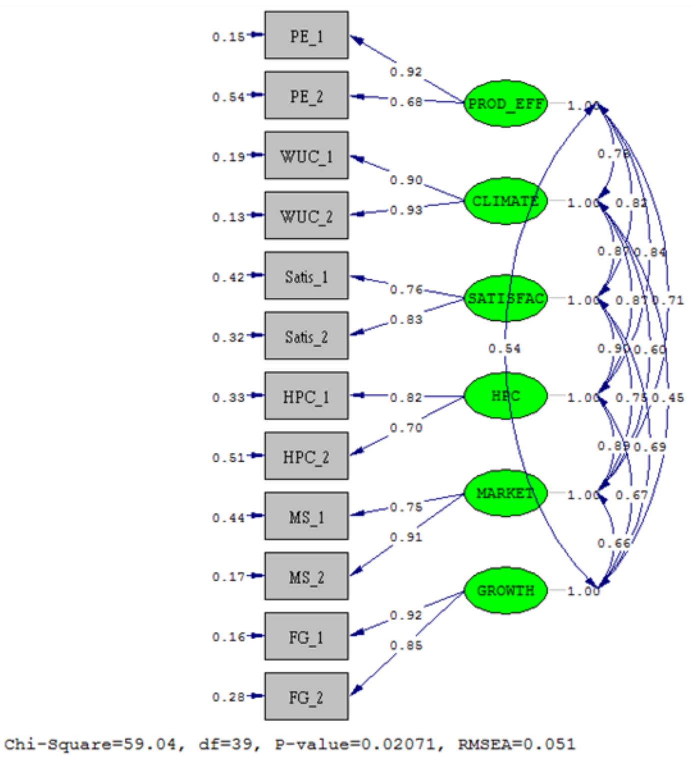

Figure 5.12. **Representation of the fitted Work Unit Outcome Questionnaire measurement model (completely standardised solution)**

5.13.1 Goodness of fit Statistics for the Work Unit Outcome Questionnaire Measurement Model

Table 5.74 depicts the full array of fit statistics calculated by LISREL 8.8 to assess the absolute and comparative fit of the Work Unit Outcome Questionnaire measurement model.

Table 5.74

The Goodness of fit statistics for the work unit outcome questionnaire measurement model

Goodness of Fit Statistics
Degrees of Freedom = 39
Minimum Fit Function Chi-Square = 69.66264 (P = 0.0018257)
Normal Theory Weighted Least Squares Chi-Square = 68.33894 (P = 0.0025270)
Satorra-Bentler Scaled Chi-Square = 59.03686 (P = 0.020707)
Chi-Square Corrected for Non-Normality = 80.12994 (P = 0.00011550)
Estimated Non-centrality Parameter (NCP) = 20.03686
90 Percent Confidence Interval for NCP = (3.23123 ; 44.79424)
Minimum Fit Function Value = 0.34658
Population Discrepancy Function Value (F0) = 0.099686
90 Percent Confidence Interval for F0 = (0.016076 ; 0.22286)
Root Mean Square Error of Approximation (RMSEA) = 0.050557
90 Percent Confidence Interval for RMSEA = (0.020303 ; 0.075593)
P-Value for Test of Close Fit (RMSEA < 0.05) = 0.45946
Expected Cross-Validation Index (ECVI) = 0.68178
90 Percent Confidence Interval for ECVI = (0.59817 ; 0.80495)
ECVI for Saturated Model = 0.77612
ECVI for Independence Model = 18.67114
Chi-Square for Independence Model with 66 Degrees of Freedom = 3728.89883
Independence AIC = 3752.89883
Model AIC = 137.03686
Saturated AIC = 156.00000
Independence CAIC = 3804.59805
Model CAIC = 305.05930
Saturated CAIC = 492.04488
Normed Fit Index (NFI) = 0.98417
Non-Normed Fit Index (NNFI) = 0.99074
Parsimony Normed Fit Index (PNFI) = 0.58155
Comparative Fit Index (CFI) = 0.99453
Incremental Fit Index (IFI) = 0.99457
Relative Fit Index (RFI) = 0.97321
Critical N (CN) = 213.54837
Root Mean Square Residual (RMR) = 0.025171
Standardized RMR = 0.037273

Table 5.74

The Goodness of fit statistics for the work unit outcome questionnaire measurement model (continued)

Goodness of Fit Index (GFI) = 0.94637
Adjusted Goodness of Fit Index (AGFI) = 0.89275
Parsimony Goodness of Fit Index (PGFI) = 0.47319

The Satorra-Bentler chi-square, calculated in terms of the robust maximum likelihood estimation procedure, delivered a statistically significant value (59.036; $p<.05$). A significant $\chi 2$ indicates that the model does not fit exactly in the parameter. The exact fit null hypothesis (H_{052}: RMSEA = 0) was therefore rejected ($p<.05$). This implies is that the measurement model was not able to reproduce the observed covariance matrix to a degree of accuracy that could be explained in terms of sampling error alone.

The Root Mean Square Error of Approximation (RMSEA) provides an indication of "...how well the model, with unknown but optimally chosen parameter values, fit the population covariance matrix if it were available" (Diamantopoulos & Siguaw, 2000, p. 85). The RMSEA value of .0505 indicates reasonable model fit in the sample approximating good fit.

The p-value for test of close fit (.459) indicated that the close fit null hypothesis (H_{053}: RMSEA ≤ 0.05) should not be rejected ($p>.05$). In conclusion, the WUOQ measurement model showed close model fit in the parameter (Diamantopoulos & Siguaw, 2000). The fact that the measurement model showed close fit warrants the interpretation of the WUOQ measurement model parameter estimates.

5.13.2 Evaluation of the Standardised Residuals Obtained for The Work Unit Outcome Questionnaire Measurement Model

The number and distribution of large positive and negative standardised variance and covariance residuals were also considered in the evaluation of the fit of the measurement model. The large standardised residuals are shown in Table 5.75. Standardised residuals are z-scores that should interpreted as large if they exceed +2.58 or –2.58. Table 5.75 indicates only three large negative standardised residuals and one large positive standardised residual. This means that only a small percentage (5%)[36] of the total number of unique variance and covariance terms in the observed variance-covariance matrix were poorly estimated from the parameter estimates obtained for the fitted WUOQ measurement model. This commented favourably on the fit (i.e. on the ability of the fitted model to explain the observed variance-covariance matrix) of the WUOQ measurement model.

Residuals should also be distributed approximately symmetrical around zero, which is the case as shown in Figure 5.13. Positive residuals indicate underestimation and thus imply the need for additional explanatory paths. Negative residuals indicate overestimation and thus suggest the need to prune paths away (Diamantopoulos & Siguaw, 2000). Negative residuals dominated in Figure 5.13, although limited in number. It was, however, not clear how paths could be pruned from the measurement model.

Table 5.75

Summary statistics for the standardised residuals

Largest Negative Standardized Residuals
Residual for HPC_2 and Satis_1: -3.43824
Residual for MS_1 and HPC_1: -3.52830
Residual for FG_2 and Satis_1: -2.84905
Largest Positive Standardized Residuals
Residual for MS_1 and HPC_2: 3.11905

```
-3|54
-2|833210
-1|9763200
0|96655311000000000000000000000000000000000
0|11455689
1|0124779
2|55
3|1
```

Figure 5.13. **Stem-and-leaf plot of the standardised residuals**

The Q-plot for the WUOQ measurement model is depicted in Figure 5.14. The Q-plot shows that the data deviates from the 45-degree reference line. This is a negative

[36] There were (12 x 13)/2 =78 unique variance and covariance terms in the observed variance-covariance matrix

reference on the fit of the model. The data points rotate away from the 45-degree reference line at the upper end in a positive direction and in the lower end in a negative direction. Thus, the model residuals results appear to suggest that only satisfactory model fit was achieved.

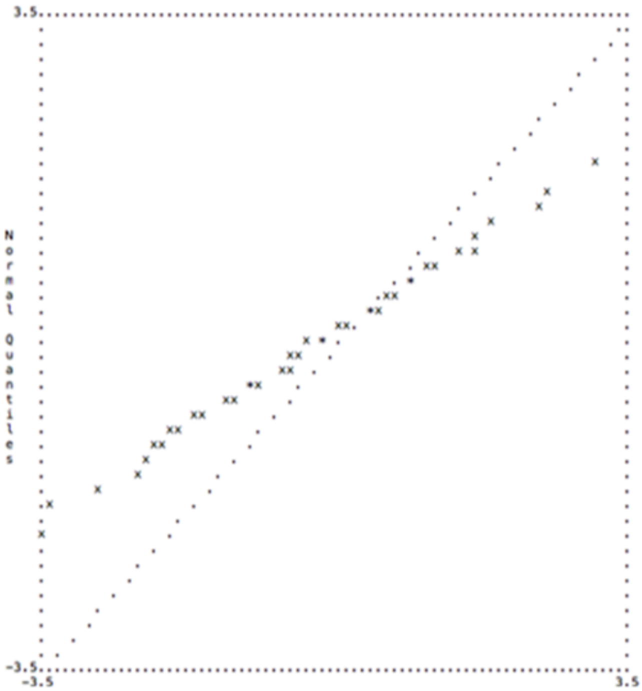

Figure 5.14. **Q-Plot for the fitted Work Unit Outcome Questionnaire measurement model**

5.13.3 Evaluation of The Modification Indices Obtained for the Work Unit Outcome Questionnaire Measurement Model

Examining modification indices of currently fixed parameters in a model can provide an additional way of evaluating the fit of the model by determining the extent to which adding one or more paths would significantly improve the fit of a model. The aim of examining modification indices is thus to assess the decrease that would occur in the $\chi 2$ statistic if parameters, that are currently fixed, are set free and if the model is re-estimated. The modification indices calculated for Λ^X and Θ_δ are shown in Table 5.76 and Table 5.77.

Table 5.76

Modification indices for the lambda matrix

	PROD_EFF	CLIMATE	SATISFACC	HPC	MARKET	GROWTH
PE_1	- -	0.41584	0.17299	0.00482	0.27740	2.73405
PE_2	- -	- -	- -	- -	2.71480	6.82658
WUC_1	0.22145	- -	0.02608	0.28430	0.88858	0.04465
WUC_2	0.20516	- -	0.02028	0.22270	0.74351	0.03719
Satis_1	0.38352	0.25508	- -	0.05767	0.55740	0.09398
Satis_2	1.00786	3.00836	- -	- -	1.47808	0.12339
HPC_1	1.02352	4.57266	1.34713	- -	4.75890	1.49563
HPC_2	0.58442	7.35673	2.09538	- -	4.75653	1.79251
MS_1	1.20331	4.99111	3.02690	1.90476	- -	0.58148
MS_2	0.52083	3.30935	1.40465	0.90437	- -	0.43262
FG_1	5.34084	9.90912	6.08334	5.02497	0.16573	- -
FG_2	5.10873	8.69219	5.52245	4.00921	0.10056	- -

Note: Note: PE_1 and PE_2 refers to the two item parcels operationalising the *production and efficiency* latent variable, WUC_1 and WUC_2 refers to the two item parcels operationalising the *work unit climate* latent variable, Satis_1 and Satis_2 refers to the two item parcels operationalising the *satisfaction* latent variable, HPC_1 and HPC_2 refers to the two item parcels operationalising the *high performance culture* latent variable, MS_1 and MS_2 refers to the two item parcels operationalising the *market standing* latent variable, FG_1 and FG_2 refers to the two item parcels operationalising the *future growth* latent variable.
PROD_EFF refers to *production and efficiency*, CLIMATE refers to *work unit climate*, SATIFAC refers to *satisfaction with the work unit*, HPC refers to *high performance culture*, MARKET refers to *market standing of the work unit* and GROWTH refers to the *future growth of the work unit*.

Modification indices with values larger than 6.64 identify currently fixed parameters that would enhance the fit of a model significantly (p<.01) if set free (Diamantopoulos & Siguaw, 2000). As shown in Table 5.77, only four modification indices were larger than 6.64. Furthermore, as shown in Table 5.77, none of the modification indices were larger than 6.64. This small percentage of modification indices greater than the cut-off value (6.67% and 0%)[37], comments favourably on the fit of the WUOQ measurement model.

Table 5.77

Modification indices for the theta-delta matrix

	PE_1	PE_2	WUC_1	WUC_2	Satis_1	Satis_2
PE_1	- -					
PE_2	- -	- -				
WUC_1	1.15788	1.62041	- -			
WUC_2	0.59144	0.49711	- -	- -		
Satis_1	0.34117	0.17248	1.35620	4.25384	- -	
Satis_2	0.03087	1.86047	0.19728	1.78893	- -	- -
HPC_1	3.54989	3.63391	0.11040	1.22399	0.00675	2.90681

[37] There were (12 x 6) – 12 =60 modification indices calculated for Λ^X of which only four were large.

Table 5.77
***Modification indices for the theta-delta matrix* (continued)**

	PE_1	PE_2	WUC_1	WUC_2	Satis_1	Satis_2
HPC_2	0.06994	0.18116	0.13374	0.35040	0.01865	3.56669
MS_1	0.02659	0.70401	0.01320	2.68647	0.48017	0.39143
MS_2	0.12850	0.00625	1.50352	0.01575	0.01432	0.01903
FG_1	0.00819	1.41988	2.35922	0.03612	3.62815	5.66495
FG_2	0.82867	0.10970	3.45010	0.00418	3.59753	5.56309

	HPC_1	HPC_2	MS_1	MS_2	FG_1	FG_2
HPC_1	- -					
HPC_2	- -	- -				
MS_1	0.32751	4.49916	- -			
MS_2	2.47761	0.54441	- -	- -		
FG_1	0.32400	0.20154	0.77729	1.04623	- -	
FG_2	1.59353	1.93924	2.18047	0.45046	- -	- -

Note: PE_1 and PE_2 refers to the two item parcels operationalising the *production and efficiency* latent variable, WUC_1 and WUC_2 refers to the two item parcels operationalising the *work unit climate* latent variable, Satis_1 and Satis_2 refers to the two item parcels operationalising the *satisfaction* latent variable, HPC_1 and HPC_2 refers to the two item parcels operationalising the *high performance culture* latent variable, MS_1 and MS_2 refers to the two item parcels operationalising the *market standing* latent variable, FG_1 and FG_2 refers to the two item parcels operationalising the *future growth* latent variable.

5.13.4 Interpreting the Work Unit Outcome Questionnaire Measurement Model Parameter Estimates

The reasonable to good fit of the Work Unit Outcome Questionnaire measurement model as signalled by the basket of evidence on the fit statistics, the standardised residuals and the modification indices warranted the interpretation of the magnitude and the significance of the slope of the regression of the observed variables (item parcels) on their respective latent variables in the unstandardised and completely standardised lambda-X matrix (Λ^X) and the magnitude and the significance of the measurement error variances in the unstandardised and completely standardised theta-delta matrix (Θ_δ). When an indicator is designed to provide a valid reflection of a specific latent variable, then the slope of the regression of X_j on ξ_i in the fitted measurement model firstly has to be statistically significant ($p<.05$) and large and the measurement error variance associated with X_j needs to be statistically significant but small (Diamantopoulos & Siguaw, 2000).

5.13.4.1 Lambda-X hypotheses

The unstandardised Λ^X shown in Table 5.78 indicated that all (12) the slope coefficients that describe the regression of the item parcels on the latent variables they were designated to reflect were statistically significant (p<.05). All the indicator variables loaded statistically significantly (p<.05) on the latent variables that they were designed to reflect. Therefore, H_{0i}: $\lambda_{jk}=0$; i=54[38], 55, …, 65; j=1, 2, …, 12; k=1, 2, …, 6 were rejected in favour of H_{ai}: $\lambda_{jk}>0$; i=54, 55, …, 65; j=1, 2, …, 12; k=1, 2, …, 6.

Table 5.78

Unstandardised lambda-X matrix

	PROD_EFF	CLIMATE	SATISFAC	HPC	MARKET	GROWTH
PE_1	0.60810	- -	- -	- -	- -	- -
	(0.03797)					
	16.01417					
PE_2	0.44672	- -	- -	- -	- -	- -
	(0.04568)					
	9.77939					
WUC_1	- -	0.70336	- -	- -	- -	- -
		(0.03950)				
		17.80545				
WUC_2	- -	0.70135	- -	- -	- -	- -
		(0.03683)				
		19.04489				
Satis_1	- -	- -	0.64250	- -	- -	- -
			(0.04702)			
			13.66586			
Satis_2	- -	- -	0.69176	- -	- -	- -
			(0.05066)			
			13.65477			
HPC_1	- -	- -	- -	0.61128	- -	- -
				(0.04427)		
				13.80801		
HPC_2	- -	- -	- -	0.62067	- -	- -
				(0.05554)		
				11.17594		
MS_1	- -	- -	- -	- -	0.69471	- -
					(0.05759)	
					12.06297	
MS_2	- -	- -	- -	- -	0.67741	- -
					(0.04238)	
					15.98417	

[38] H_{052}: RMSEA = 0 and H_{053}: RMSEA ≤ .05

Table 5.78

Unstandardised lambda-X matrix (continued)

	PROD_EFF	CLIMATE	SATISFAC	HPC	MARKET	GROWTH
FG_1	- -	- -	- -	- -	- -	0.82332
						(0.04945)
						16.64835
FG_2	- -	- -	- -	- -	- -	0.75155
						(0.05243)
						14.33360

Note: PE_1 and PE_2 refers to the two item parcels operationalising the *production and efficiency* latent variable, WUC_1 and WUC_2 refers to the two item parcels operationalising the *work unit climate* latent variable, Satis_1 and Satis_2 refers to the two item parcels operationalising the *satisfaction* latent variable, HPC_1 and HPC_2 refers to the two item parcels operationalising the *high performance culture* latent variable, MS_1 and MS_2 refers to the two item parcels operationalising the *market standing* latent variable, FG_1 and FG_2 refers to the two item parcels operationalising the *future growth* latent variable. PROD_EFF refers to *production and efficiency*, CLIMATE refers to *work unit climate*, SATIFAC refers to *satisfaction with the work unit*, HPC refers to *high performance culture*, MARKET refers to *market standing of the work unit* and GROWTH refers to the *future growth of the work unit*.

However, solely relying only on unstandardised factor loadings and their associated z-values to assess the validity of the indicator variables may be problematic since it makes comparing the validity of different indicators measuring different constructs difficult (Diamantopoulos & Siguaw, 2000). The completely standardised factor loadings (see Table 5.79) reflect the average change expressed in standard deviation units in an indicator variable (X_i), directly resulting from a one standard deviation change in an exogenous latent variable (ξ_j) to which it has been designed to reflect (Spangenberg & Theron, 2005).

Table 5.79

Completely standardised lambda-X matrix

	PROD_EFF	CLIMATE	SATISFAC	HPC	MARKET	GROWTH
PE_1	0.92055	- -	- -	- -	- -	- -
PE_2	0.68056	- -	- -	- -	- -	- -
WUC_1	- -	0.89930	- -	- -	- -	- -
WUC_2	- -	0.93143	- -	- -	- -	- -
Satis_1	- -	- -	0.76188	- -	- -	- -
Satis_2	- -	- -	0.82673	- -	- -	- -
HPC_1	- -	- -	- -	0.81627	- -	- -
HPC_2	- -	- -	- -	0.70191	- -	- -
MS_1	- -	- -	- -	- -	0.75140	- -
MS_2	- -	- -	- -	- -	0.91348	- -
FG_1	- -	- -	- -	- -	- -	0.91859
FG_2	- -	- -	- -	- -	- -	0.85066

Note: PE_1 and PE_2 refers to the two item parcels operationalising the *production and efficiency* latent variable, WUC_1 and WUC_2 refers to the two item parcels operationalising the *work unit climate* latent variable, Satis_1 and Satis_2 refers to the two item parcels operationalising the *satisfaction* latent variable, HPC_1 and HPC_2 refers to the two item parcels operationalising the *high performance culture* latent variable, MS_1 and MS_2 refers to the two item parcels operationalising the *market standing* latent variable, FG_1 and FG_2 refers to the two item parcels operationalising the *future growth* latent variable.
PROD_EFF refers to *production and efficiency*, CLIMATE refers to *work unit climate*, SATIFAC refers to *satisfaction with the work unit*, HPC refers to *high performance culture*, MARKET refers to *market standing of the work unit* and GROWTH refers to the *future growth of the work unit*.

Only the completely standardised loading of the second *production and efficiency* parcel on the latent *production and efficiency* outcome variable and the completely standardised loading of the second *high performance culture* item parcel on the latent *high-performance culture* outcome variable were smaller than .71.

Additionally, the squared multiple correlations (R^2) of the indicators shown in Table 5.80 were examined in order to determine the validity of the indicators (item parcels). Large R^2 values (>.50) reveal valid indicators as a satisfactory proportion of variance in each indicator variable is explained by the underlying latent variable it was designed to reflect (Wessels, 2018).

Table 5.80 echoes the results obtained in Table 5.79 since in a simple linear regression model the completely standardised factor loadings can be interpreted as correlation coefficients. The squared completely standardised factor loadings therefore reflect the proportion of variance in the indicator that can be explained in terms of the latent variable that the indicator has been structurally linked to. In PE_2 and HPC_2 less than 50% of the variance can be explained by the latent variable the composite indicator was earmarked to reflect. In the remaing ten composite indicators the majority of the variance can be attributed to the latent variable it had been designated to reflect.

Table 5.80

Squared multiple correlations for indicator variables

PE_1	PE_2	WUC_1	WUC_2	Satis_1	Satis_2
0.84741	0.46316	0.80875	0.86757	0.58046	0.68349
HPC_1	**HPC_2**	**MS_1**	**MS_2**	**FG_1**	**FG_2**
0.66629	0.49268	0.56460	0.83445	0.84380	0.72363

Note: PE_1 and PE_2 refers to the two item parcels operationalising the *production and efficiency* latent variable, WUC_1 and WUC_2 refers to the two item parcels operationalising the *work unit climate* latent variable, Satis_1 and Satis_2 refers to the two item parcels operationalising the *satisfaction* latent variable, HPC_1 and HPC_2 refers to the two item parcels operationalising the *high performance culture* latent variable, MS_1 and MS_2 refers to the two item parcels operationalising the *market standing* latent variable, FG_1 and FG_2 refers to the two item parcels operationalising the *future growth* latent variable.

Table 5.81 gives the proportion of variance in the indicator variables that were not explained by the latent performance dimension the indicator was designated to reflect.

Table 5.81

Proportion unexplained variance (1-R²) for indicator variables

PE_1	PE_2	WUC_1	WUC_2	Satis_1	Satis_2
0.15259	0.53684	0.19125	0.13243	0.41954	0.31651
HPC_1	**HPC_2**	**MS_1**	**MS_2**	**FG_1**	**FG_2**
0.33371	0.50732	0.43540	0.16555	0.15620	0.27637

Note: PE_1 and PE_2 refers to the two item parcels operationalising the *production and efficiency* latent variable, WUC_1 and WUC_2 refers to the two item parcels operationalising the *work unit climate* latent variable, Satis_1 and Satis_2 refers to the two item parcels operationalising the *satisfaction* latent variable, HPC_1 and HPC_2 refers to the two item parcels operationalising the *high performance culture* latent variable, MS_1 and MS_2 refers to the two item parcels operationalising the *market standing* latent variable, FG_1 and FG_2 refers to the two item parcels operationalising the *future growth* latent variable.

The results shown in Table 5.79, Table 5.80 and Table 5.81 provides confidence in the use of the composite indicators to operationalise the latent outcome variables when evaluating the structural relationships that have been hypothesised to exist between the latent outcome variables, between the latent competencies and between the latent competencies and the latent outcome variables. It needs to be acknowledged though that it does not really serve to shed light on the construct validity of the WUOQ.

5.13.4.2 Theta-delta hypotheses

The unstandardised measurement error variances for the item parcels are shown in Table 5.82. All of the measurement error terms were found to be statistically significant (p<.05) as, when transformed to z-scores they were all greater than the critical z-value of 1.6449. This indicates that H_{0i}: $\theta_{\delta jj}$ =0; i =66, 67,..., 77; j=1, 2.....12 had to be rejected in favour of H_{ai}: $\theta_{\delta jj} > 0$; i =66, 67,..., 77; j=1, 2.....12.

Table 5.82
Unstandardised theta-delta matrix

PE_1	PE_2	WUC_1	WUC_2	Satis_1	Satis_2
0.06659	0.23131	0.11699	0.07509	0.29836	0.22160
(0.02561)	(0.02708)	(0.02396)	(0.01678)	(0.04359)	(0.03073)
2.60051	8.54146	4.88308	4.47378	6.84509	7.21023
HPC_1	**HPC_2**	**MS_1**	**MS_2**	**FG_1**	**FG_2**
0.18714	0.39668	0.37218	0.09104	0.12548	0.21573
(0.03041)	(0.04865)	(0.04982)	(0.02825)	(0.04068)	(0.03891)
6.15406	8.15400	7.47071	3.22258	3.08431	5.54382

Note: PE_1 and PE_2 refers to the two item parcels operationalising the *production and efficiency* latent variable, WUC_1 and WUC_2 refers to the two item parcels operationalising the *work unit climate* latent variable, Satis_1 and Satis_2 refers to the two item parcels operationalising the *satisfaction* latent variable, HPC_1 and HPC_2 refers to the two item parcels operationalising the *high performance culture* latent variable, MS_1 and MS_2 refers to the two item parcels operationalising the *market standing* latent variable, FG_1 and FG_2 refers to the two item parcels operationalising the *future growth* latent variable.

The completely standardised measurement error variances are illustrated in Table 5.83. This theta-delta matrix reveals the percentage of variance in the indicator variable (i.e. item parcel) ascribed to systematic and random measurement error that cannot be explained by the latent variable the indicator variable was designed to reflect (Wessels, 2018). Generally, except for PE_2 and HPC_2, only small amounts of variance remain unaccounted for by the latent variables but rather explained by random error and systematic latent variables.

Table 5.83

Completely standardised theta-delta matrix

PE_1	PE_2	WUC_1	WUC_2	Satis_1	Satis_2
0.15259	0.53684	0.19125	0.13243	0.41954	0.31651
HPC_1	**HPC_2**	**MS_1**	**MS_2**	**FG_1**	**FG_2**
0.33371	0.50732	0.43540	0.16555	0.15620	0.27637

Note: PE_1 and PE_2 refers to the two item parcels operationalising the *production and efficiency* latent variable, WUC_1 and WUC_2 refers to the two item parcels operationalising the *work unit climate* latent variable, Satis_1 and Satis_2 refers to the two item parcels operationalising the *satisfaction* latent variable, HPC_1 and HPC_2 refers to the two item parcels operationalising the *high performance culture* latent variable, MS_1 and MS_2 refers to the two item parcels operationalising the *market standing* latent variable, FG_1 and FG_2 refers to the two item parcels operationalising the *future growth* latent variable.

5.13.4.3 Discriminant validity of the Work Unit Outcome Questionnaire measurement model

The latent outcome variables in the WUOQ measurement model (and in the work unit performance structural model) are in terms of the conceptualisation of the work unit performance construct and the theorising underling the work unit performance structural model assumed to be qualitatively distinct, separate, but nonetheless correlated, constructs. It is important to determine whether one succeeded in operationalising the latent variables in a manner that allows one to distinguish the latent variables as separate constructs. Table 5.84 indicated that the latent variable inter correlations are statistically significant ($p<.05$). Therefore, H_{0i}: $\phi_{jk}=0$; i =78, 79,..., 92; j=1, 2.....6; k=1, 2.....6; $j\neq k$ had to be rejected in favour of H_{ai}: $\phi_{jk} > 0$; i =78, 79,..., 92; j=1, 2.....6; k=1, 2.....6; $j\neq k$.

Table 5.84

Unstandardised phi matrix

	PROD_EFF	CLIMATE	SATISFAC	HPC	MARKET	GROWTH
PROD_EFF	1.00000					
CLIMATE	0.77655	1.00000				
	(0.04328)					
	17.94382					
SATISFAC	0.82106	0.87288	1.00000			
	(0.04775)	(0.03756)				
	17.19426	23.23931				
HPC	0.84354	0.86926	0.90477	1.00000		
	(0.05906)	(0.04297)	(0.05233)			
	14.28371	20.23090	17.28815			
MARKET	0.71101	0.60375	0.74622	0.88803	1.00000	
	(0.05224)	(0.06427)	(0.06074)	(0.04462)		
	13.60961	9.39456	12.28595	19.89999		
GROWTH	0.54448	0.44810	0.68511	0.67155	0.66086	1.00000
	(0.06910)	(0.07683)	(0.05234)	(0.05767)	(0.06600)	
	7.87911	5.83264	13.08907	11.64405	10.01270	

PROD_EFF refers to *production and efficiency*, CLIMATE refers to *work unit climate*, SATIFAC refers to *satisfaction with the work unit*, HPC refers to *high performance culture*, MARKET refers to *market standing of the work unit* and GROWTH refers to the *future growth of the work unit*.

Correlations are seen as excessively high if they exceed a value of .90. Only one of the correlations in the phi matrix exceeded this cut-off, namely the correlation between *high performance culture* and *satisfaction with the work unit*, with a value of .904. This was not initially hypothesised, however a great amount of *high-performance culture* leading *to satisfaction with the work unit* does seem to make sense as people take pride in the performance of their work unit. Furthermore, it was found that five of the correlations are between .8 and .899. The 95% confidence interval was calculated for the six correlations that exceeded .80. Table 5.85 indicates that none of these confidence intervals included the value one. The item parcels therefore succeeded in operationalising the latent outcome variables in a manner that allows one to distinguish between the latent variables as qualitatively distinct, separate constructs[39].

[39] It is acknowledged that this constitutes insufficient ground to conclude that the WUOQ displays discriminant validity in its measurement of the six latent outcome variables forming part of the work unit performance construct.

Table 5.85

95% confidence intervals calculated for the six ϕ_{ij} estimates that exceeded .80

ESTIMATE	STANDARD ERROR ESTIMATE	LOWER LIMIT OF 95% CONFIDENCE INTERVAL	UPPER LIMIT OF 95% CONFIDENCE INTERVAL	PHI
0.821060	0.048	0.703	0.895	31
0.843540	0.059	0.682	0.927	41
0.872880	0.038	0.776	0.929	32
0.869260	0.043	0.755	0.932	42
0.904770	0.052	0.732	0.968	43
0.888030	0.045	0.761	0.949	54

5.14 EVALUATION OF THE WORK UNIT PERFORMANCE STRUCTURAL MODEL

The connotative meaning of a construct lies in items internal structure and in the manner in which it is embedded in a larger nomological network of constructs. The *work unit performance* construct was conceptualised a construct comprising seven latent competencies and six latent outcome variables. The connotative meaning of the *work unit performance* lies on the manner in which these latent performance dimensions are understood to structurally, directly and indirectly, affect each other. In conceptualising the connotative meaning the identity of the thirteen latent performance dimensions were explicated as well as the manner in which these latent performance dimensions are understood to, directly and indirectly, influence each other.

The WUCQ and the WUOQ were developed by designing specific test stimuli for each latent performance dimension such that the manner in which employees knowledgeable on a work units performance level respond to the test stimuli will reflect the standing of the latent (performance dimension). The conceptualisation of the work unit performance construct was in terms of seven latent competencies and six latent outcome variables in combination with the design intention underpinning the WUCQ and the WUOQ implied two measurement models in which each latent competency and each latent outcome is represented by specific test items. If the construct-referenced inferences derived from the dimension scores of the WUCQ and the WUOQ were construct valid the WUCQ measurement model and the WUOQ measurement model (in which the individual items represent the latent performance dimensions) would show at least close fit, the factor loadings of the individual items on the latent performance dimensions would be statistically significant ($p<.05$) and large, the measurement error variances would be statistically significant ($p<.05$) but small and the inter-latent performance dimension correlations would be statistically significant ($p<.01$) but moderate in magnitude.

The original intention of the current study, as set out in Chapter 3, was to fit the WUCQ and WUOQ measurement model in which the latent performance dimensions are operationalised by means of the individual items of these two scales. An insufficiently large sample prevented this. The current study would want to argue that if the construct-referenced inferences derived from the dimension scores of the WUCQ and the WUOQ were construct valid the WUCQ measurement model and the WUOQ measurement model (in which the item parcels represent the latent performance dimensions) would show at least close fit, the factor loadings of the item parcels on the latent performance dimensions would be statistically significant ($p<.05$) and large, the measurement error variances associated with the item parcels would be statistically significant ($p<.05$) but small and the inter-latent performance dimension correlations would be statistically significant ($p<.01$) but moderate in magnitude. The current study has in this sense lead empirical evidence that supports the claim that the construct-referenced inferences derived from the WUCQ and WUOQ dimensions scores are construct valid. The current study would acknowledge though that leading evidence on the fit of the WUCQ and WUOQ measurement models when operationalising the latent performance dimensions by means of the individuals items of these two scales would constitute stronger evidence that supports the claim that the construct-referenced inferences derived from the WUCQ and WUOQ dimensions scores are construct valid.

Demonstrating the latter would, however, still not constitute sufficient evidence to claim the construct validity of the construct-referenced inferences. To demonstrate that the WUCQ and WUOQ collectively reflect (or measure) the *construct* as constitutively defined, the structural relations that constitute the internal structure of the construct need to be empirically demonstrated when the latent performance dimensions comprising the construct had been measured using these two instruments.

The Work Unit Performance structural model hypothesised specific relationships between specific latent performance dimensions. When examining and evaluating the structural part of the comprehensive LISREL model, the focus was on these substantive relationships of interest (i.e., the hypothesised structural linkages between the various endogenous and exogenous latent variables in the structural model). The aim was to determine whether the structural relationships that emerged through the conceptualisation of the *work unit performance* construct are supported by the data (Diamantopoulos & Siguaw, 2000). The aim was therefore to lead evidence in support of the claim that the WUCQ and the WUOQ allow construct valid inferences on the work unit performance construct as constitutively defined. The structural model on its own could, however, not be empirically evaluated. The comprehensive LISREL model, comprising the measurement and the structural model, had to be empirically confronted with data.

5.14.1 Examining the Fit of the Work Unit Performance Questionnaire (WUPQ) Measurement Model

To permissibly infer that the structural model fitted the data from a finding of close or reasonable fit for the comprehensive LISREL model it needs to be shown that the measurement model showed close fit (Vandenberg & Grelle, 2009).

The results of the test of multivariate normality for the original combined item parcel data set are shown in Table 5.86.

Table 5.86

Test of multivariate normality of the WUPQ original item parcel data

Skewness			Kurtosis			Skewness and Kurtosis	
Value	Z-Score	P-Value	Value	Z-Score	P-Value	Chi-Square	P-Value
130.660	12.542	0.000	793.614	8.947	0.000	237.348	0.000

An attempt was made to normalise the data. The results of the test of multivariate normality for the normalised data are shown in Table 5.87

Table 5.87

Test of multivariate normality of the WUPQ normalised item parcel data

Skewness			Kurtosis			Skewness and Kurtosis	
Value	Z-Score	P-Value	Value	Z-Score	P-Value	Chi-Square	P-Value
119.654	8.670	0.000	775.538	7.333	0.000	128.945	0.000

Comparing the results in Table 5.87 to those shown in Table 5.86 indicates that the normalisation reduced the deviation from multivariate normality but not sufficiently so not to reject the null hypothesis of multivariate normality. The WUPQ measurement model was consequently fitted to normalised item parcel data using robust maximum likelihood estimation.

The WUPQ measurement model converged in 14 iterations. The path diagram of the completely standardised solution of the WUPQ measurement model is shown in Figure 5.15. The full array of fit statistics produced by LISREL 8.8 is shown in Table 5.88.

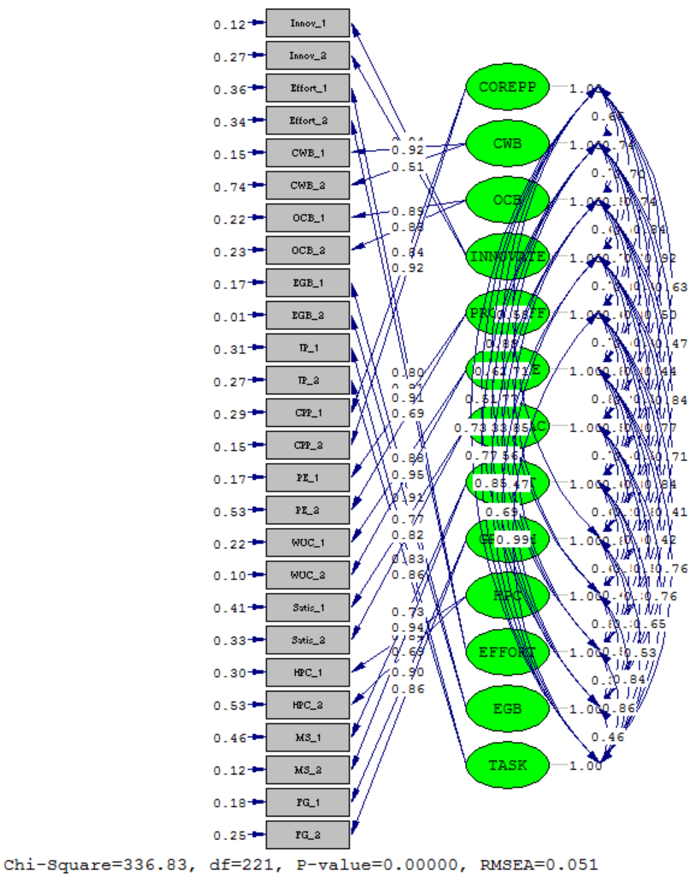

Figure 5.15. **Path diagram of the WUPQ measurement model (completely standardised solution)**

Table 5.88

Goodness of fit statistics for the WUPQ measurement model

Goodness of Fit Statistics
Degrees of Freedom = 221
Minimum Fit Function Chi-Square = 396.66847 (P = 0.00)
Normal Theory Weighted Least Squares Chi-Square = 365.50751 (P = 0.00)
Satorra-Bentler Scaled Chi-Square = 336.83310 (P = 0.00000)
Estimated Non-centrality Parameter (NCP) = 115.83310
90 Percent Confidence Interval for NCP = (70.28109 ; 169.34507)
Minimum Fit Function Value = 1.97347
Population Discrepancy Function Value (F0) = 0.57628
90 Percent Confidence Interval for F0 = (0.34966 ; 0.84251)
Root Mean Square Error of Approximation (RMSEA) = 0.051065
90 Percent Confidence Interval for RMSEA = (0.039776 ; 0.061744)
P-Value for Test of Close Fit (RMSEA < 0.05) = 0.42551
Expected Cross-Validation Index (ECVI) = 2.96932
90 Percent Confidence Interval for ECVI = (2.74269 ; 3.23555)
ECVI for Saturated Model = 3.49254
ECVI for Independence Model = 81.08765
Chi-Square for Independence Model with 325 Degrees of Freedom = 16246.61752
Independence AIC = 16298.61752
Model AIC = 596.83310
Saturated AIC = 702.00000
Independence CAIC = 16410.63248
Model CAIC = 1156.90790
Saturated CAIC = 2214.20196
Normed Fit Index (NFI) = 0.97927
Non-Normed Fit Index (NNFI) = 0.98930
Parsimony Normed Fit Index (PNFI) = 0.66590
Comparative Fit Index (CFI) = 0.99272
Incremental Fit Index (IFI) = 0.99277
Relative Fit Index (RFI) = 0.96951
Critical N (CN) = 163.80636
Root Mean Square Residual (RMR) = 0.025468
Standardized RMR = 0.040299
Goodness of Fit Index (GFI) = 0.87729
Adjusted Goodness of Fit Index (AGFI) = 0.80510
Parsimony Goodness of Fit Index (PGFI) = 0.55236

The Satorra-Bentler chi-square, calculated in terms of the robust maximum likelihood estimation procedure, delivered a statistically significant value (336.833; $p<.05$). A significant $\chi 2$ indicates that the model does not fit exactly in the parameter. The exact fit null hypothesis (H_{0117}: RMSEA = 0) was therefore rejected ($p<.05$). This implies is that the measurement model was not able to reproduce the observed covariance matrix to a degree of accuracy that could be explained in terms of sampling error alone.

The Root Mean Square Error of Approximation (RMSEA) provides an indication of "...how well the model, with unknown but optimally chosen parameter values, fit the population covariance matrix if it were available" (Diamantopoulos & Siguaw, 2000, p. 85). The RMSEA value of .0510 indicates reasonable model fit in the sample approximating good fit.

The p-value for test of close fit (.425) indicated that the close fit null hypothesis (H_{0118}: RMSEA ≤ 0.05) should not be rejected (p>.05). In conclusion, the WUPQ measurement model showed close model fit in the parameter (Diamantopoulos & Siguaw, 2000). The fact that the measurement model showed close fit warrants the interpretation of the WUPQ measurement model parameter estimates.

5.14.2 Evaluation of the Standardised Residuals Obtained for the Work Unit Performance Questionnaire Measurement Model

The large standardised residuals (>2.58 or <-2.58) are summarised in Table 5.89. The fitted WUPQ measurement model overestimated fourteen and underestimated nine of the 351 variances and covariances in the observed covariance matrix (6,5%)[40] The small percentage large residuals commented favourably on the fit of the WUPQ measurement model. Figure 5.16 indicates that the median standardised residual is zero and the distribution is spread relatively evenly.

Table 5.89

Summary statistics for the standardised residuals

Largest Negative Standardized Residuals				
Residual for	TP_1 and	EGB_2	-5.03798	
Residual for	PE_2 and	Effort_1	-2.75364	
Residual for	PE_2 and	OCB_1	-3.11150	
Residual for	WUC_1 and	CPP_2	-3.42357	
Residual for	HPC_2 and	EGB_1	-2.77002	
Residual for	HPC_2 and	EGB_2	-3.12435	
Residual for	HPC_2 and	TP_1	-4.33892	
Residual for	HPC_2 and	WUC_2	-5.25685	
Residual for	MS_1 and	CWB_2	-3.22493	
Residual for	FG_1 and	CWB_2	-2.88958	
Residual for	FG_2 and	Effort_2	-2.85621	
Residual for	FG_2 and	OCB_1	-3.41925	
Residual for	FG_2 and	Satis_1	-3.31480	
Residual for	FG_2 and	HPC_1	-2.78399	
Largest Positive Standardized Residuals				
Residual for	OCB_2 and	CWB_2	3.30919	
Residual for	CPP_1 and	OCB_2	5.00563	
Residual for	HPC_1 and	EGB_1	3.05573	
Residual for	HPC_1 and	CPP_1	3.09717	
Residual for	MS_1 and	EGB_2	2.59747	
Residual for	MS_1 and	HPC_2	3.54135	
Residual for	MS_2 and	WUC_1	5.06749	

[40] There were (26 x 27)/2 =351 unique variance and covariance terms in the observed variance-covariance matrix

Table 5.89

Summary statistics for the standardised residuals (continued)

Residual for	MS_2 and	HPC_2	2.82079
Residual for	FG_1 and	CWB_1	4.75136

Note: PE_1 and PE_2 refers to the two item parcels operationalising the *production and efficiency* latent variable, WUC_1 and WUC_2 refers to the two item parcels operationalising the *work unit climate* latent variable, Satis_1 and Satis_2 refers to the two item parcels operationalising the *satisfaction* latent variable, HPC_1 and HPC_2 refers to the two item parcels operationalising the *high performance culture* latent variable, MS_1 and MS_2 refers to the two item parcels operationalising the *market standing* latent variable, FG_1 and FG_2 refers to the two item parcels operationalising the *future growth* latent variable. TP_1 and TP_2 refers to the two item parcels operationalising the *task performance* latent variable. OCB_1 and OCB_2 refers to the two item parcels operationalising the *organisational citizenship behaviour* latent variable, EGB_1 and EGB_2 refers to the two items operationalising the *employee green behaviour* latent variable, CPP_1 and CPP_2 refers to the two items parcels operationalising the *core people processes* latent variable, Effort_1 and Effort_2 refers to the two items operationalising the *effort* latent variable. CWB_1 and CWB_2 refers to the two item parcels operationalising the *counterproductive workplace behaviour* latent variable and Innov_1 and Innov_2 refers to the two items operationalising the *innovation* latent variable.

```
- 5|30
 - 4|3
 - 3|443211
 - 2|9988865543322000
 - 1|99998886666665554444443332221
 - 0|9988888888887777776554444333333222222111100000000000000000000000000000000+25
   0|11111222222222233344444444455555666666666677777777788888999
   1|0000011122333333344556677799
   2|112335568
   3|1135
   4|8
   5|01
```

Figure 5.16. **Stem-and-leaf plot of the standardised residuals**

The Q-plot for the WUPQ measurement model is depicted in Figure 5.17. The Q-plot shows that the data deviates from the 45-degree reference line. This is a negative comment on the fit of the model. The data points rotate away from the 45-degree reference line at the upper end in a positive direction and in the lower end in a negative direction. Thus, the model residuals results appear to suggest that only satisfactory model fit was achieved.

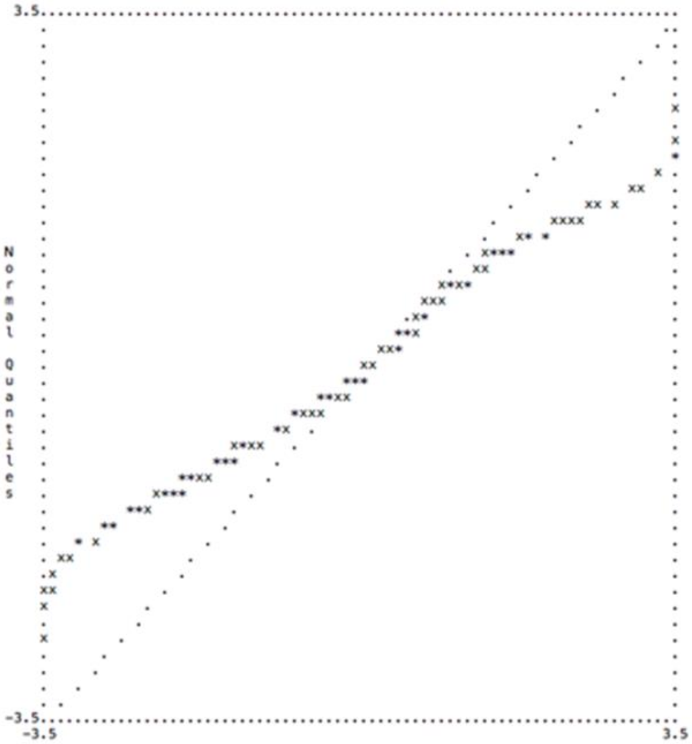

Figure 5.17. **Stem-and-leaf plot of the standardised residuals**

5.14.3 Evaluation of the Modification Indices Obtained for the Work Unit Performance Questionnaire Measurement Model

Examining modification indices of currently fixed parameters in a model can provide an additional way of evaluating the fit of the model by determining the extent to which adding one or more paths would significantly improve the fit of a model. The aim of examining modification indices is thus to assess the decrease that would occur in the χ2 statistic if parameters, that are currently fixed, are set free and if the model is re-estimated. The modification indices calculated for Λ^X and Θ_δ are shown in Table 5.90 and Table 5.91.

Table 5.90

Modification indices for the lambda matrix

	COREPP	CWB	OCB	INNOVATE	PROD_EFF	CLIMATE	TASK
Innov_1	0.57652	0.48263	0.80481	- -	0.61060	0.31711	0.26940
Innov_2	0.35724	0.52868	0.80106	- -	0.64600	0.26575	0.27460
Effort_1	1.73283	1.35342	- -	9.45836	- -	95.45433	- -
Effort_2	0.43778	0.64715	1.59347	1.42992	0.00004	1.78433	0.02829
CWB_1	0.52188	- -	0.17429	0.08631	0.27371	0.20445	0.02454
CWB_2	2.88054	- -	4.66735	0.27552	2.93052	2.47091	0.32973

Table 5.90

Modification indices for the lambda matrix (continued)

	COREPP	CWB	OCB	INNOVATE	PROD_EFF	CLIMATE	TASK
OCB_1	0.08478	3.34899	- -	0.50272	1.19648	0.19074	0.48295
OCB_2	0.09825	3.88508	- -	0.46424	0.98656	0.36158	0.39063
EGB_1	0.04505	0.45871	0.15605	2.38901	1.13137	0.00485	0.54922
EGB_2	0.03510	0.42999	0.12363	1.83210	1.00213	0.00496	0.46566
TP_1	0.78133	7.30034	0.19819	0.05062	1.78670	0.58887	- -
TP_2	0.68985	6.39423	0.18202	0.03983	1.73874	0.50650	- -
CPP_1	- -	0.03626	1.75696	0.00044	0.99237	1.74062	0.83880
CPP_2	- -	0.02702	1.34354	0.00039	0.74798	1.23820	0.63155
PE_1	0.08148	0.22723	1.94597	0.22422	- -	0.62921	0.41706
PE_2	0.24272	0.59959	4.52043	0.46369	- -	1.67046	1.09219
WUC_1	0.19512	0.12510	0.12925	0.18074	0.98717	- -	0.51374
WUC_2	0.15172	0.09308	0.08384	0.15235	0.74884	- -	0.33086
Satis_1	0.45690	4.33097	0.10211	2.09653	1.04698	0.49545	0.15501
Satis_2	0.83393	5.61219	0.16730	4.14739	1.29405	0.92230	0.19324
HPC_1	2.17384	0.14210	1.82783	0.76710	- -	2.33172	0.61885
HPC_2	3.27050	0.19063	3.48199	0.81899	0.04704	4.04866	0.24051
MS_1	0.02735	0.32186	0.26365	17.99141	0.01467	2.71207	0.00060
MS_2	0.02044	0.15925	0.14426	14.42048	0.00634	1.55717	0.00023
FG_1	3.57395	6.71376	6.97147	0.89317	4.39065	9.90299	5.52746
FG_2	4.07385	7.83083	7.28738	0.91350	4.61304	10.23043	5.98805

	SATISFAC	MARKET	GROWTH	HPC	EFFORT	EGB
Innov_1	0.00081	1.30699	5.72474	0.20287	0.13836	4.07415
Innov_2	0.00074	1.29193	5.13324	0.18365	0.14317	3.52743
Effort_1	17.04015	0.13720	2.91446	- -	- -	5.16322
Effort_2	2.64320	0.08519	2.55559	0.28466	- -	4.31512
CWB_1	0.73493	4.08409	3.06083	0.80571	0.03027	7.25958
CWB_2	5.67688	6.13059	9.18486	7.64994	0.63797	0.60593
OCB_1	0.57998	0.11407	3.39815	0.00189	0.54566	0.03094
OCB_2	0.64742	0.10448	3.20927	0.00219	0.73080	0.02989
EGB_1	0.00095	0.28465	0.01405	0.03136	0.21519	- -
EGB_2	0.00070	0.24853	0.01210	0.02382	0.21356	- -
TP_1	2.76867	7.28279	0.94921	1.97518	2.10576	1.73824
TP_2	1.90790	8.09792	0.90838	1.88362	1.46275	1.87093
CPP_1	0.00158	0.10260	2.41731	0.57240	1.82731	0.15474
CPP_2	0.00131	0.17010	4.10240	0.51409	1.43328	0.21490
PE_1	0.06196	0.10368	2.17621	0.01614	5.41697	0.68430
PE_2	0.19940	0.19442	4.48764	0.06323	6.86999	0.93960
WUC_1	0.36074	2.40950	0.45760	0.69376	0.00289	0.00020
WUC_2	0.25037	1.71527	0.37595	0.44085	0.00280	0.00019
Satis_1	- -	0.76207	0.26024	0.06902	0.00099	0.52270
Satis_2	- -	1.15026	0.28220	0.15851	0.00158	0.55129
HPC_1	0.59117	6.35869	2.12829	- -	0.50185	3.51876
HPC_2	0.98410	7.43168	3.09859	- -	0.52503	4.14169

Table 5.90

Modification indices for the lambda matrix (continued)

	SATISFAC	MARKET	GROWTH	HPC	EFFORT	EGB
MS_1	0.08852	- -	3.38518	0.44912	0.00643	7.26700
MS_2	0.04245	- -	2.56152	0.17811	0.00316	15.20083
FG_1	4.99857	0.12816	- -	4.43928	9.60620	0.01112
FG_2	5.38186	0.13536	- -	5.05976	10.05931	0.01005

Note: PE_1 and PE_2 refers to the two item parcels operationalising the *production and efficiency* latent variable, WUC_1 and WUC_2 refers to the two item parcels operationalising the *work unit climate* latent variable, Satis_1 and Satis_2 refers to the two item parcels operationalising the *satisfaction* latent variable, HPC_1 and HPC_2 refers to the two item parcels operationalising the *high performance culture* latent variable, MS_1 and MS_2 refers to the two item parcels operationalising the *market standing* latent variable, FG_1 and FG_2 refers to the two item parcels operationalising the *future growth* latent variable. TP_1 and TP_2 refers to the two item parcels operationalising the *task performance* latent variable. OCB_1 and OCB_2 refers to the two item parcels operationalising the *organisational citizenship behaviour* latent variable, EGB_1 and EGB_2 refers to the two items operationalising the *employee green behaviour* latent variable, CPP_1 and CPP_2 refers to the two items parcels operationalising the *core people processes* latent variable, Effort_1 and Effort_2 refers to the two items operationalising the *effort* latent variable. CWB_1 and CWB_2 refers to the two item parcels operationalising the *counterproductive workplace behaviour* latent variable and Innov_1 and Innov_2 refers to the two items operationalising the *innovation* latent variable. INNOVATE refers to *innovation*, EFFORT refers to *effort*, CWB refers to *counterproductive workplace behaviour*, OCB refers to *organisational citizenship behaviour*, EGB refers to *employee green behaviour* and TASKPERF refers to *task performance*, COREPP refers to *core people processes.* PROD_EFF refers to *production and efficiency*, CLIMATE refers to *work unit climate*, SATIFAC refers to *satisfaction with the work unit*, HPC refers to *high performance culture*, MARKET refers to *market standing of the work unit* and GROWTH refers to the *future growth of the work unit*.

Modification indices with values larger than 6.64 identify currently fixed parameters that would enhance the fit of a model significantly ($p<.01$) if set free (Diamantopoulos & Siguaw, 2000). As shown in Table 5.90, only seventeen modification indices were larger than 6.64. Furthermore, as shown in Table 5.91, nine of the modification indices were larger than 6.64. This small percentage of modification indices greater than the cut-off value (5,685% and 3,01%)[41], comments favourably on the fit of the WUPQ measurement model.

Table 5.91
Modification indices for the theta-delta matrix

	Innov_1	Innov_2	Effort_1	Effort_2	CWB_1	CWB_2
Innov_1	- -					
Innov_2	- -	- -				
Effort_1	0.14045	0.06923	- -			
Effort_2	0.23659	0.16359	- -	- -		
CWB_1	0.47932	0.79646	1.63168	1.13428	- -	
CWB_2	0.00191	0.30219	0.05205	0.23133	- -	- -
OCB_1	0.17259	0.36607	0.43065	0.29412	8.47007	2.14243

[41] There were (26 x 13) – 26 =299 modification indices calculated for Λ^X of which only nine were large.

Table 5.91

Modification indices for the theta-delta matrix (continued)

	Innov_1	Innov_2	Effort_1	Effort_2	CWB_1	CWB_2
OCB_2	0.01601	0.00004	0.00391	1.28890	1.82149	3.04541
EGB_1	0.00001	2.21470	0.42727	1.81857	0.64056	0.00147
EGB_2	0.37723	4.06939	1.53928	3.44996	0.23656	0.46469
TP_1	0.00001	0.49319	3.38209	0.04230	5.45472	0.33386
TP_2	0.11228	1.02882	0.53843	0.58684	4.73614	0.75094
CPP_1	5.35597	4.42784	0.77028	0.11098	4.46753	0.59507
CPP_2	1.90133	1.08601	3.55625	0.67796	4.42611	0.19696
PE_1	0.03519	0.52380	0.79837	0.00972	0.99656	0.12211
PE_2	0.03412	1.56285	1.46558	0.26730	1.45400	0.42972
WUC_1	0.94871	0.63248	0.00060	1.94769	2.33169	0.81449
WUC_2	0.48740	0.23644	1.46978	0.00210	0.20354	1.79627
Satis_1	2.53312	0.29384	0.43413	2.06083	3.96630	2.13763
Satis_2	1.41735	0.04511	1.22943	3.17279	5.37079	0.20877
HPC_1	0.37532	0.44253	0.03455	0.10431	2.25131	2.37574
HPC_2	0.29550	0.46618	1.14694	0.12887	1.26196	1.10725
MS_1	0.34623	10.96989	0.17928	0.77382	2.62915	6.32131
MS_2	0.00092	6.69379	0.78649	0.26744	0.60603	0.02550
FG_1	0.83895	0.01248	4.59177	0.12825	3.57320	5.69072
FG_2	5.52431	2.20991	0.27650	1.66790	1.26218	0.62267

	OCB_1	OCB_2	EGB_1	EGB_2	TP_1	TP_2
OCB_1	- -					
OCB_2	- -	- -				
EGB_1	0.63759	0.08137	- -			
EGB_2	0.54493	0.07100	- -	- -		
TP_1	0.91192	0.93088	0.34261	0.05256	- -	
TP_2	4.26003	4.23724	0.00860	0.13541	- -	- -
CPP_1	0.00794	0.18106	3.60565	3.36774	3.89244	0.20427
CPP_2	0.25210	0.61325	4.18224	4.08224	9.39549	2.95587
PE_1	1.03944	0.37647	0.95236	0.33941	0.70863	0.02993
PE_2	2.74159	1.17508	0.04478	0.74484	1.37735	0.00634
WUC_1	0.78079	0.42918	0.02555	0.00809	0.06645	0.03614
WUC_2	0.14383	2.76140	0.92943	0.73789	2.95475	2.43902
Satis_1	0.79760	1.29017	0.20071	0.25150	1.48646	0.26919
Satis_2	0.66846	1.05712	0.04707	0.01497	0.03215	2.76402
HPC_1	4.55157	3.58959	3.26958	1.71468	4.31456	3.18638
HPC_2	0.00000	0.13266	1.69541	0.28388	2.16418	1.13993
MS_1	0.43989	0.10848	1.59136	5.05681	0.26273	0.20517
MS_2	0.00443	0.59865	1.52039	3.91017	2.52728	5.09013
FG_1	1.16066	0.54063	0.19040	0.07315	1.45510	9.32289
FG_2	6.76358	5.16549	0.14510	0.04266	0.94071	8.57016

	CPP_1	CPP_2	PE_1	PE_2	WUC_1	WUC_2
CPP_1	- -					
CPP_2	- -	- -				
PE_1	0.00001	0.00704	- -			

Table 5.91
Modification indices for the theta-delta matrix (continued)

	CPP_1	CPP_2	PE_1	PE_2	WUC_1	WUC_2
PE_2	1.26800	1.05458	- -	- -		
WUC_1	5.73914	7.47250	1.52132	0.46993	- -	
WUC_2	1.73363	3.01935	2.33055	1.25807	- -	- -
Satis_1	0.12632	2.93838	0.04592	0.11703	1.08224	0.53197
Satis_2	0.88874	0.20860	0.47272	0.93599	1.83050	1.11753
HPC_1	4.10514	1.45651	1.02567	3.84611	0.04335	0.00887
HPC_2	3.91993	0.40577	0.40291	0.05440	0.13681	0.21322
MS_1	0.45754	0.67301	0.27840	0.52251	0.00452	2.53975
MS_2	0.03631	0.16565	0.00995	0.13302	1.34460	0.02654
FG_1	3.80541	3.76590	0.78317	1.09866	1.08927	0.00011
FG_2	9.12371	7.58008	1.97725	0.02164	3.07023	0.28213

	Satis_1	Satis_2	HPC_1	HPC_2	MS_1	MS_2
Satis_1	- -					
Satis_2	- -	- -				
HPC_1	0.37412	2.12493	- -			
HPC_2	0.00531	1.49099	- -	- -		
MS_1	0.68449	0.12649	1.35502	2.73166	- -	
MS_2	0.10831	0.00139	1.55627	1.70533	- -	- -
FG_1	3.86148	2.60621	0.65456	0.01368	1.24703	0.73493
FG_2	5.05747	3.36092	2.41638	1.50978	1.25856	0.87876

	FG_1	FG_2
FG_1	- -	
FG_2	- -	- -

Note: PE_1 and PE_2 refers to the two item parcels operationalising the *production and efficiency* latent variable, WUC_1 and WUC_2 refers to the two item parcels operationalising the *work unit climate* latent variable, Satis_1 and Satis_2 refers to the two item parcels operationalising the *satisfaction* latent variable, HPC_1 and HPC_2 refers to the two item parcels operationalising the *high performance culture* latent variable, MS_1 and MS_2 refers to the two item parcels operationalising the *market standing* latent variable, FG_1 and FG_2 refers to the two item parcels operationalising the *future growth* latent variable. TP_1 and TP_2 refers to the two item parcels operationalising the *task performance* latent variable. OCB_1 and OCB_2 refers to the two item parcels operationalising the *organisational citizenship behaviour* latent variable, EGB_1 and EGB_2 refers to the two items operationalising the *employee green behaviour* latent variable, CPP_1 and CPP_2 refers to the two items parcels operationalising the *core people processes* latent variable, Effort_1 and Effort_2 refers to the two items operationalising the *effort* latent variable. CWB_1 and CWB_2 refers to the two item parcels operationalising the *counterproductive workplace behaviour* latent variable and Innov_1 and Innov_2 refers to the two items operationalising the *innovation* latent variable.

5.14.4 Interpreting the Work Unit Performance Questionnaire measurement model parameter estimates

The reasonable to good fit of the Work Unit Performance Questionnaire measurement model as signalled by the basket of evidence on the fit statistics, the standardised residuals and the modification indices warranted the interpretation of the magnitude and the significance of the slope of the regression of the observed variables (item parcels) on their respective latent variables in the unstandardised and completely standardised lambda-X matrix ($\mathbf{\Lambda}^X$) and the magnitude and the significance of the measurement error variances in the unstandardised and completely standardised theta-delta matrix (Θ_δ). When an indicator is designed to provide a valid reflection of a specific latent variable, then the slope of the regression of X_j on ξ_i in the fitted measurement model firstly has to be statistically significant (p<.05) and large and the measurement error variance associated with X_j needs to be statistically significant but small (Diamantopoulos & Siguaw, 2000).

5.14.4.1 Lambda-X hypotheses

The unstandardised $\mathbf{\Lambda}^X$ shown in Table 5.92 indicated that all (26) the slope coefficients that describe the regression of the item parcels on the latent variables they were designated to reflect were statistically significant (p<.05). All the indicator variables loaded statistically significantly (p<.05) on the latent variables that they were designed to reflect. Therefore, H_{0i}: $\lambda_{jk}=0$; i=119, 120,…, 144; j=1, 2, …, 26; k=1, 2, …, 13 were rejected in favour of H_{ai}: $\lambda_{jk}>0$; i=119, 120, …, 144; j=1, , …, 26; k=1, 2, …, 13.

Table 5.92
Unstandardised lambda matrix

	COREPP	CWB	OCB	INNOVATE	PROD_EFF	CLIMATE
Innov_1	- -	- -	- -	0.73074	- -	- -
				(0.04100)		
				17.82233		
Innov_2	- -	- -	- -	0.67282	- -	- -
				(0.04523)		
				14.87610		
Effort_1	- -	- -	- -	- -	- -	- -
Effort_2	- -	- -	- -	- -	- -	- -
CWB_1	- -	0.58973	- -	- -	- -	- -
		(0.03984)				
		14.80104				
CWB_2	- -	0.29988	- -	- -	- -	- -
		(0.04107)				
		7.30239				
OCB_1	- -	- -	0.65028	- -	- -	- -
			(0.03908)			
			16.64161			

Table 5.92
Unstandardised lambda matrix (continued)

	COREPP	CWB	OCB	INNOVATE	PROD_EFF	CLIMATE
OCB_2	- -	- -	0.57395	- -	- -	- -
			(0.03446)			
			16.65691			
EGB_1	- -	- -	- -	- -	- -	- -
EGB_2	- -	- -	- -	- -	- -	- -
TP_1	- -	- -	- -	- -	- -	- -
TP_2	- -	- -	- -	- -	- -	- -
CPP_1	0.64418	- -	- -	- -	- -	- -
	(0.04163)					
	15.47228					
CPP_2	0.69134	- -	- -	- -	- -	- -
	(0.04057)					
	17.04206					
PE_1	- -	- -	- -	- -	0.60282	- -
					(0.03372)	
					17.87818	
PE_2	- -	- -	- -	- -	0.45063	- -
					(0.04245)	
					10.61489	
WUC_1	- -	- -	- -	- -	- -	0.69129
						(0.04002)
						17.27285
WUC_2	- -	- -	- -	- -	- -	0.71360
						(0.03598)
						19.83099
Satis_1	- -	- -	- -	- -	- -	- -
Satis_2	- -	- -	- -	- -	- -	- -
HPC_1	- -	- -	- -	- -	- -	- -
HPC_2	- -	- -	- -	- -	- -	- -
MS_1	- -	- -	- -	- -	- -	- -
MS_2	- -	- -	- -	- -	- -	- -
FG_1	- -	- -	- -	- -	- -	- -
FG_2	- -	- -	- -	- -	- -	- -

	SATISFAC	MARKET	GROWTH	HPC	EFFORT	EGB
Innov_1	- -	- -	- -	- -	- -	- -
Innov_2	- -	- -	- -	- -	- -	- -
Effort_1	- -	- -	- -	- -	0.52318	- -
					(0.03888)	
					13.45610	
Effort_2	- -	- -	- -	- -	0.59864	- -
					(0.03967)	
					15.09208	
CWB_1	- -	- -	- -	- -	- -	- -
CWB_2	- -	- -	- -	- -	- -	- -

Table 5.92
Unstandardised lambda matrix (continued)

	SATISFAC	MARKET	GROWTH	HPC	EFFORT	EGB
OCB_1	- -	- -	- -	- -	- -	- -
OCB_2	- -	- -	- -	- -	- -	- -
EGB_1	- -	- -	- -	- -	- -	0.92659
						(0.05510)
						16.81614
EGB_2	- -	- -	- -	- -	- -	1.03234
						(0.04932)
						20.92978
TP_1	- -	- -	- -	- -	- -	- -
TP_2	- -	- -	- -	- -	- -	- -
CPP_1	- -	- -	- -	- -	- -	- -
CPP_2	- -	- -	- -	- -	- -	- -
PE_1	- -	- -	- -	- -	- -	- -
PE_2	- -	- -	- -	- -	- -	- -
WUC_1	- -	- -	- -	- -	- -	- -
WUC_2	- -	- -	- -	- -	- -	- -
Satis_1	0.64676	- -	- -	- -	- -	- -
	(0.04550)					
	14.21454					
Satis_2	0.68721	- -	- -	- -	- -	- -
	(0.05097)					
	13.48211					
HPC_1	- -	- -	- -	0.62610	- -	- -
				(0.04339)		
				14.43125		
HPC_2	- -	- -	- -	0.60597	- -	- -
				(0.05444)		
				11.13042		
MS_1	- -	0.67776	- -	- -	- -	- -
		(0.0585)				
		11.57234				
MS_2	- -	0.69435	- -	- -	- -	- -
		(0.0419)				
		16.56337				
FG_1	- -	- -	0.81046	- -	- -	- -
			(0.04910)			
			16.50530			
FG_2	- -	- -	0.76348	- -	- -	- -
			(0.05110)			
			14.94004			

	TASK
Innov_1	- -
Innov_2	- -

Table 5.92
Unstandardised lambda matrix (continued)

	TASK
Effort_1	- -
Effort_2	- -
CWB_1	- -
CWB_2	- -
OCB_1	- -
OCB_2	- -
EGB_1	- -
EGB_2	- -
TP_1	0.49947
	(0.03514)
	14.21538
TP_2	0.56651
	(0.03435)
	16.49076
CPP_1	- -
CPP_2	- -
PE_1	- -
PE_2	- -
WUC_1	- -
WUC_2	- -
Satis_1	- -
Satis_2	- -
HPC_1	- -
HPC_2	- -
MS_1	- -
MS_2	- -
FG_1	- -
FG_2	- -

Note: PE_1 and PE_2 refers to the two item parcels operationalising the *production and efficiency* latent variable, WUC_1 and WUC_2 refers to the two item parcels operationalising the *work unit climate* latent variable, Satis_1 and Satis_2 refers to the two item parcels operationalising the *satisfaction* latent variable, HPC_1 and HPC_2 refers to the two item parcels operationalising the *high performance culture* latent variable, MS_1 and MS_2 refers to the two item parcels operationalising the *market standing* latent variable, FG_1 and FG_2 refers to the two item parcels operationalising the *future growth* latent variable. TP_1 and TP_2 refers to the two item parcels operationalising the *task performance* latent variable. OCB_1 and OCB_2 refers to the two item parcels operationalising the *organisational citizenship behaviour* latent variable, EGB_1 and EGB_2 refers to the two items operationalising the *employee green behaviour* latent variable, CPP_1 and CPP_2 refers to the two items parcels operationalising the *core people processes* latent variable, Effort_1 and Effort_2 refers to the two items operationalising the *effort* latent variable. CWB_1 and CWB_2 refers to the two item parcels operationalising the *counterproductive workplace behaviour* latent variable and Innov_1 and Innov_2 refers to the two items operationalising the *innovation* latent variable. INNOVATE refers to *innovation*, EFFORT refers to *effort*, CWB refers to *counterproductive workplace behaviour*, OCB refers to *organisational citizenship behaviour*, EGB refers to *employee green behaviour* and TASKPERF refers to *task performance*, COREPP refers to *core people processes.* PROD_EFF refers to *production and efficiency*, CLIMATE refers to *work unit climate*, SATIFAC refers to *satisfaction with the work unit*, HPC refers to *high performance culture*, MARKET refers to *market standing of the work unit* and GROWTH refers to the *future growth of the work unit*.

However, solely relying only on unstandardised factor loadings and their associated z-values to assess the validity of the indicator variables may be problematic since it makes comparing the validity of different indicators measuring different constructs difficult (Diamantopoulos & Siguaw, 2000). The completely standardised factor loadings (see Table 5.93) reflect the average change expressed in standard deviation units in an indicator variable (X_i), directly resulting from a one standard deviation change in an exogenous latent variable (ξ_j) to which it has been designed to reflect (Spangenberg & Theron, 2005). Two of the twenty-six completely standardised factor loadings were smaller than .71. CWB_2 (0.50922) and HPC_2 (0.68529) completely standardised loading that fell below the .71 cut-off value but not dramatically so. The operationalisation of the latent variables in the Work Unit Performance Questionnaire structural model was therefore generally quite successful.

Table 5.93
Completely standardised lambda matrix

	COREPP	CWB	OCB	INNOVATE	PROD_EFF	CLIMATE
Innov_1	- -	- -	- -	0.93798	- -	- -
Innov_2	- -	- -	- -	0.85714	- -	- -
Effort_1	- -	- -	- -	- -	- -	- -
Effort_2	- -	- -	- -	- -	- -	- -
CWB_1	- -	0.92388	- -	- -	- -	- -
CWB_2	- -	0.50922	- -	- -	- -	- -
OCB_1	- -	- -	0.88504	- -	- -	- -
OCB_2	- -	- -	0.87818	- -	- -	- -
EGB_1	- -	- -	- -	- -	- -	- -
EGB_2	- -	- -	- -	- -	- -	- -
TP_1	- -	- -	- -	- -	- -	- -
TP_2	- -	- -	- -	- -	- -	- -
CPP_1	0.84110	- -	- -	- -	- -	- -
CPP_2	0.92224	- -	- -	- -	- -	- -
PE_1	- -	- -	- -	- -	0.91255	- -
PE_2	- -	- -	- -	- -	0.81060	- -
WUC_1	- -	- -	- -	- -	- -	0.88387
WUC_2	- -	- -	- -	- -	- -	0.94770
Satis_1	- -	- -	- -	- -	- -	- -
Satis_2	- -	- -	- -	- -	- -	- -
HPC_1	- -	- -	- -	- -	- -	- -
HPC_2	- -	- -	- -	- -	- -	- -
MS_1	- -	- -	- -	- -	- -	- -
MS_2	- -	- -	- -	- -	- -	- -
FG_1	- -	- -	- -	- -	- -	- -
FG_2	- -	- -	- -	- -	- -	- -

	SATISFAC	MARKET	GROWTH	HPC	EFFORT	EGB
Innov_1	- -	- -	- -	- -	- -	- -
Innov_2	- -	- -	- -	- -	- -	- -

Table 5.93
Completely standardised lambda matrix (continued)

	SATISFAC	MARKET	GROWTH	HPC	EFFORT	EGB
Effort_1	- -	- -	- -	- -	0.79728	- -
Effort_2	- -	- -	- -	- -	0.81060	- -
CWB_1	- -	- -	- -	- -	- -	- -
CWB_2	- -	- -	- -	- -	- -	- -
OCB_1	- -	- -	- -	- -	- -	- -
OCB_2	- -	- -	- -	- -	- -	- -
EGB_1	- -	- -	- -	- -	- -	0.91045
EGB_2	- -	- -	- -	- -	- -	0.99605
TP_1	- -	- -	- -	- -	- -	- -
TP_2	- -	- -	- -	- -	- -	- -
CPP_1	- -	- -	- -	- -	- -	- -
CPP_2	- -	- -	- -	- -	- -	- -
PE_1	- -	- -	- -	- -	- -	- -
PE_2	- -	- -	- -	- -	- -	- -
WUC_1	- -	- -	- -	- -	- -	- -
WUC_2	- -	- -	- -	- -	- -	- -
Satis_1	0.76693	- -	- -	- -	- -	- -
Satis_2	0.82129	- -	- -	- -	- -	- -
HPC_1	- -	- -	- -	0.83607	- -	- -
HPC_2	- -	- -	- -	0.68529	- -	- -
MS_1	- -	0.73307	- -	- -	- -	- -
MS_2	- -	0.93632	- -	- -	- -	- -
FG_1	- -	- -	0.90424	- -	- -	- -
FG_2	- -	- -	0.86416	- -	- -	- -

	TASK
Innov_1	- -
Innov_2	- -
Effort_1	- -
Effort_2	- -
CWB_1	- -
CWB_2	- -
OCB_1	- -
OCB_2	- -
EGB_1	- -
EGB_2	- -
TP_1	0.83058
TP_2	0.85717
CPP_1	- -
CPP_2	- -
PE_1	- -
PE_2	- -
WUC_1	- -
WUC_2	- -
Satis_1	- -

Table 5.93
Completely standardised lambda matrix (continued)

	TASK
Satis_2	- -
HPC_1	- -
HPC_2	- -
MS_1	- -
MS_2	- -
FG_1	- -
FG_2	- -

Note: PE_1 and PE_2 refers to the two item parcels operationalising the *production and efficiency* latent variable, WUC_1 and WUC_2 refers to the two item parcels operationalising the *work unit climate* latent variable, Satis_1 and Satis_2 refers to the two item parcels operationalising the *satisfaction* latent variable, HPC_1 and HPC_2 refers to the two item parcels operationalising the *high performance culture* latent variable, MS_1 and MS_2 refers to the two item parcels operationalising the *market standing* latent variable, FG_1 and FG_2 refers to the two item parcels operationalising the *future growth* latent variable. TP_1 and TP_2 refers to the two item parcels operationalising the *task performance* latent variable. OCB_1 and OCB_2 refers to the two item parcels operationalising the *organisational citizenship behaviour* latent variable, EGB_1 and EGB_2 refers to the two items operationalising the *employee green behaviour* latent variable, CPP_1 and CPP_2 refers to the two items parcels operationalising the *core people processes* latent variable, Effort_1 and Effort_2 refers to the two items operationalising the *effort* latent variable. CWB_1 and CWB_2 refers to the two item parcels operationalising the *counterproductive workplace behaviour* latent variable and Innov_1 and Innov_2 refers to the two items operationalising the *innovation* latent variable. INNOVATE refers to *innovation*, EFFORT refers to *effort*, CWB refers to *counterproductive workplace behaviour*, OCB refers to *organisational citizenship behaviour*, EGB refers to *employee green behaviour* and TASKPERF refers to *task performance*, COREPP refers to *core people processes.* PROD_EFF refers to *production and efficiency*, CLIMATE refers to *work unit climate*, SATIFAC refers to *satisfaction with the work unit*, HPC refers to *high performance culture*, MARKET refers to *market standing of the work unit* and GROWTH refers to the *future growth of the work unit*.

Additionally, the squared multiple correlations (R^2) of the indicators shown in Table 5.94 were examined in order to determine the validity of the indicators (item parcels). Large R^2 values (>.50) reveal valid indicators as a satisfactory proportion of variance in each indicator variable is explained by the underlying latent variable it was designed to reflect (Wessels, 2018). In CWB_2 and HPC_2 less than 50% of the variance can be explained by the latent variable the composite indicator was earmarked to reflect. In the remaing twenty four composite indicators the majority of the variance can be attributed to the latent variable it had been designated to reflect.

Table 5.94
Squared multiple correlations for indicator variables

Innov_1	**Innov_2**	**Effort_1**	**Effort_2**	**CWB_1**	**CWB_2**
0.87981	0.73469	0.63566	0.65708	0.85356	0.25931
OCB_1	**OCB_2**	**EGB_1**	**EGB_2**	**TP_1**	**TP_2**
0.78329	0.77121	0.82891	0.99211	0.68986	0.73474
CPP_1	**CPP_2**	**PE_1**	**PE_2**	**WUC_1**	**WUC_2**
0.70745	0.85052	0.83275	0.47131	0.78123	0.89813
Satis_1	**Satis_2**	**HPC_1**	**HPC_2**	**MS_1**	**MS_2**
0.58819	0.67452	0.69901	0.46962	0.53740	0.87669

Table 5.94
Squared multiple correlations for indicator variables (continued)

FG_1	FG_2
0.81764	0.74678

Note: PE_1 and PE_2 refers to the two item parcels operationalising the *production and efficiency* latent variable, WUC_1 and WUC_2 refers to the two item parcels operationalising the *work unit climate* latent variable, Satis_1 and Satis_2 refers to the two item parcels operationalising the *satisfaction* latent variable, HPC_1 and HPC_2 refers to the two item parcels operationalising the *high performance culture* latent variable, MS_1 and MS_2 refers to the two item parcels operationalising the *market standing* latent variable, FG_1 and FG_2 refers to the two item parcels operationalising the *future growth* latent variable. TP_1 and TP_2 refers to the two item parcels operationalising the *task performance* latent variable. OCB_1 and OCB_2 refers to the two item parcels operationalising the *organisational citizenship behaviour* latent variable, EGB_1 and EGB_2 refers to the two items operationalising the *employee green behaviour* latent variable, CPP_1 and CPP_2 refers to the two items parcels operationalising the *core people processes* latent variable, Effort_1 and Effort_2 refers to the two items operationalising the *effort* latent variable. CWB_1 and CWB_2 refers to the two item parcels operationalising the *counterproductive workplace behaviour* latent variable and Innov_1 and Innov_2 refers to the two items operationalising the *innovation* latent variable.

The results shown in Table 5.92, Table 5.93 and Table 5.94 provides confidence in the use of the composite indicators to operationalise the latent outcome variables when evaluating the structural relationships that have been hypothesised to exist between the latent outcome variables, between the latent competencies and between the latent competencies and the latent outcome variables.

5.14.4.2 Theta-delta hypotheses

The unstandardised measurement error variances for the item parcels are shown in Table 5.95. All of the measurement error terms, but for EGB_2, were found to be statistically significant (p<.05) as, when transformed to z-scores they were all greater than the critical z-value of 1.6449. This indicates that H_{0i}: $\theta_{\delta jj}=0$; i =145, 146,..., 153, 155, …170; j=1, 2,..., 9, 11,...26 had to be rejected in favour of H_{ai}: $\theta_{\delta jj}>0$; i =145, 146,..., 153, 155, …170; j=1, 2,..., 9, 11,...26. H_{0154}: $\theta_{\delta 10,10}=0$ could not be rejected. Although perfectly valid and reliable indicator variables are highly desirable in principle, actually attaining this ideal in reality causes concern as an outcome that is simply too good to be true.

Table 5.95
Unstandardised theta-delta matrix

Innov_1	Innov_2	Effort_1	Effort_2	CWB_1	CWB_2
0.07295	0.16347	0.15689	0.18703	0.05967	0.25687
(0.02105)	(0.02776)	(0.01803)	(0.02385)	(0.03614)	(0.02786)
3.46510	5.88936	8.69978	7.84160	1.65127	9.21947
OCB_1	**OCB_2**	**EGB_1**	**EGB_2**	**TP_1**	**TP_2**

Table 5.95

Unstandardised theta-delta matrix (continued)

0.11699	0.09773	0.17721	0.00847	0.11215	0.11587
(0.01640)	(0.01288)	(0.04139)	(0.04208)	(0.01543)	(0.01656)
7.13283	7.59009	4.28136	0.20139	7.26777	6.99501
CPP_1	**CPP_2**	**PE_1**	**PE_2**	**WUC_1**	**WUC_2**
0.17160	0.08400	0.07298	0.22779	0.13383	0.05776
(0.02317)	(0.01724)	(0.01564)	(0.02326)	(0.02395)	(0.01572)
7.40773	4.87272	4.66583	9.79536	5.58722	3.67444
Satis_1	**Satis_2**	**HPC_1**	**HPC_2**	**MS_1**	**MS_2**
0.29287	0.22788	0.16880	0.41471	0.39543	0.06781
(0.04121)	(0.03034)	(0.03003)	(0.04883)	(0.05138)	(0.02893)
7.10609	7.51156	5.62143	8.49351	7.69578	2.34369
FG_1	**FG_2**				
0.14650	0.19765				
(0.03666)	(0.03510)				
3.99645	5.63187				

Note: PE_1 and PE_2 refers to the two item parcels operationalising the *production and efficiency* latent variable, WUC_1 and WUC_2 refers to the two item parcels operationalising the *work unit climate* latent variable, Satis_1 and Satis_2 refers to the two item parcels operationalising the *satisfaction* latent variable, HPC_1 and HPC_2 refers to the two item parcels operationalising the *high performance culture* latent variable, MS_1 and MS_2 refers to the two item parcels operationalising the *market standing* latent variable, FG_1 and FG_2 refers to the two item parcels operationalising the *future growth* latent variable. TP_1 and TP_2 refers to the two item parcels operationalising the *task performance* latent variable. OCB_1 and OCB_2 refers to the two item parcels operationalising the *organisational citizenship behaviour* latent variable, EGB_1 and EGB_2 refers to the two items operationalising the *employee green behaviour* latent variable, CPP_1 and CPP_2 refers to the two items parcels operationalising the *core people processes* latent variable, Effort_1 and Effort_2 refers to the two items operationalising the *effort* latent variable. CWB_1 and CWB_2 refers to the two item parcels operationalising the *counterproductive workplace behaviour* latent variable and Innov_1 and Innov_2 refers to the two items operationalising the *innovation* latent variable.

The completely standardised measurement error variances are illustrated in Table 5.96. This theta-delta matrix reveals the percentage of variance in the indicator variable (i.e. item parcel) ascribed to systematic and random measurement error that cannot be explained by the latent variable the indicator variable was designed to reflect (Wessels, 2018). Generally, except for CWB_2, PE_2 and HPC_2 only small amounts of variance remains unaccounted for by the latent variables but rather explained by random error and systematic latent variables.

Table 5.96

Completely standardised theta-delta matrix

Innov_1	Innov_2	Effort_1	Effort_2	CWB_1	CWB_2
0.12019	0.26531	0.36434	0.34292	0.14644	0.74069
OCB_1	**OCB_2**	**EGB_1**	**EGB_2**	**TP_1**	**TP_2**
0.21671	0.22879	0.17109	0.00789	0.31014	0.26526
CPP_1	**CPP_2**	**PE_1**	**PE_2**	**WUC_1**	**WUC_2**
0.29255	0.14948	0.16725	0.52869	0.21877	0.10187

Table 5.96

Completely standardised theta-delta matrix (continued)

Satis_1	Satis_2	HPC_1	HPC_2	MS_1	MS_2
0.41181	0.32548	0.30099	0.53038	0.46260	0.12331
FG_1	**FG_2**				
0.18236	0.25322				

Note: PE_1 and PE_2 refers to the two item parcels operationalising the *production and efficiency* latent variable, WUC_1 and WUC_2 refers to the two item parcels operationalising the *work unit climate* latent variable, Satis_1 and Satis_2 refers to the two item parcels operationalising the *satisfaction* latent variable, HPC_1 and HPC_2 refers to the two item parcels operationalising the *high performance culture* latent variable, MS_1 and MS_2 refers to the two item parcels operationalising the *market standing* latent variable, FG_1 and FG_2 refers to the two item parcels operationalising the *future growth* latent variable. TP_1 and TP_2 refers to the two item parcels operationalising the *task performance* latent variable. OCB_1 and OCB_2 refers to the two item parcels operationalising the *organisational citizenship behaviour* latent variable, EGB_1 and EGB_2 refers to the two items operationalising the *employee green behaviour* latent variable, CPP_1 and CPP_2 refers to the two items parcels operationalising the *core people processes* latent variable, Effort_1 and Effort_2 refers to the two items operationalising the *effort* latent variable. CWB_1 and CWB_2 refers to the two item parcels operationalising the *counterproductive workplace behaviour* latent variable and Innov_1 and Innov_2 refers to the two items operationalising the *innovation* latent variable.

5.14.4.3 Discriminant validity of the Work Unit Outcome Questionnaire measurement model

The latent outcome variables in the WUPQ measurement model (and in the work unit performance structural model) are in terms of the conceptualisation of the work unit performance construct and the theorising underling the work unit performance structural model assumed to be qualitatively distinct, separate, but nonetheless correlated, constructs. It is important to determine whether one succeeded in operationalising the latent variables in a manner that allows one to distinguish the latent variables as separate constructs. Table 5.97 indicates that the latent variable inter-correlations were statistically significant ($p<.05$). Therefore, H_{0i}: ϕ_{jk} =0; i =171, 172,..., 248; j=1, 2.....13; k=1, 2.....13; $j \neq k$ had to be rejected in favour of H_{ai}: $\phi_{jk}>0$; i =171, 172,..., 248; j=1, 2.....13; k=1, 2.....13; $j \neq k$.

Table 5.97

Phi matrix

	COREPP	CWB	OCB	INNOVATE	PROD_EFF	CLIMATE
COREPP	1.00000					
CWB	0.65925*	1.00000				
	(0.05777)					
	11.41233					

Table 5.97

Phi matrix (continued)

	COREPP	CWB	OCB	INNOVATE	PROD_EFF	CLIMATE
OCB	0.74221*	0.77651*	1.00000			
	(0.04348)	(0.05246)				
	17.06955	14.80263				
INNOVATE	0.69568*	0.52119*	0.63508*	1.00000		
	(0.05255)	(0.06419)	(0.05698)			
	13.23914	8.12001	11.14521			
PROD_EFF	0.73760*	0.65180*	0.75385*	0.72854*	1.00000	
	(0.04935)	(0.05733)	(0.05149)	(0.04551)		
	14.94580	11.36905	14.64154	16.00820		
CLIMATE	0.83681*	0.71354*	0.85255*	0.62844*	0.77337*	1.00000
	(0.02929)	(0.05190)	(0.03222)	(0.05469)	(0.04111)	
	28.56625	13.74911	26.46013	11.48996	18.81119	
SATISFAC	0.91860*	0.64365*	0.81697*	0.69358*	0.82728*	0.86878*
	(0.03412)	(0.06302)	(0.05094)	(0.06648)	(0.04540)	(0.03747)
	26.91918	10.21342	16.03739	10.43217	18.22039	23.18342
MARKET	0.62945*	0.49557*	0.61217*	0.53031*	0.70560*	0.59193*
	(0.06200)	(0.06995)	(0.06337)	(0.06558)	(0.05006)	(0.06256)
	10.15307	7.08449	9.66066	8.08620	14.09396	9.46233
GROWTH	0.58061*	0.47234*	0.44070*	0.55193*	0.54668*	0.43763*
	(0.07288)	(0.06627)	(0.07199)	(0.06603)	(0.06861)	(0.07694)
	7.96633	7.12715	6.12184	8.35849	7.96829	5.68797
HPC	0.88506*	0.71216*	0.84214*	0.76733*	0.84024*	0.85974*
	(0.04160)	(0.06194)	(0.04720)	(0.05385)	(0.05292)	(0.04399)
	21.27340	11.49779	17.84384	14.25027	15.87797	19.54279
EFFORT	0.62063*	0.76866*	0.84639*	0.70582*	0.84181*	0.81486*
	(0.05774)	(0.04977)	(0.04575)	(0.05239)	(0.04812)	(0.04085)
	10.74886	15.44564	18.50059	13.47126	17.49378	19.94858
EGB	0.51474*	0.33411*	0.56342*	0.47355*	0.41077*	0.42371*
	(0.06164)	(0.07075)	(0.05640)	(0.06238)	(0.06267)	(0.07232)
	8.35083	4.72248	9.98973	7.59112	6.55442	5.85881
TASK	0.72896*	0.76815*	0.84685*	0.69465*	0.98920*	0.76327*
	(0.05389)	(0.05406)	(0.03826)	(0.05036)	(0.02949)	(0.04124)
	13.52759	14.20907	22.13635	13.79335	33.53800	18.50619

	SATISFAC	MARKET	GROWTH	HPC	EFFORT	EGB	TASK
SATISFAC	1.00000						
MARKET	0.73659*	1.00000					
	(0.05953)						
	12.37336						
GROWTH	0.68432*	0.65126*	1.00000				
	(0.05229)	(0.06600)					
	13.08587	9.86801					

Table 5.97

Phi matrix (continued)

	SATISFAC	MARKET	GROWTH	HPC	EFFORT	EGB	TASK
HPC	0.90178*	0.85771*	0.65803*	1.00000			
	(0.05121)	(0.04361)	(0.05822)				
	17.61031	19.66833	11.30229				
EFFORT	0.67708*	0.57609*	0.41112*	0.81276*	1.00000		
	(0.05987)	(0.06531)	(0.07561)	(0.05994)			
	11.31004	8.82067	5.43714	13.55844			
EGB	0.53868*	0.36934*	0.34409*	0.52077*	0.32250*	1.00000	
	(0.06545)	(0.07159)	(0.06758)	(0.06307)	(0.07653)		
	8.23045	5.15902	5.09177	8.25640	4.21413		
TASK	0.76402*	0.65323*	0.52994*	0.84228*	0.86434*	0.45580*	1.00000
	(0.05862)	(0.05697)	(0.06842)	(0.05490)	(0.04583)	(0.06257)	
	13.03282	11.46716	7.74561	15.34240	18.85944	7.28460	

Note: INNOVATE refers to *innovation*, EFFORT refers to *effort*, CWB refers to *counterproductive workplace behaviour*, OCB refers to *organisational citizenship behaviour*, EGB refers to *employee green behaviour* and TASKPERF refers to *task performance*, COREPP refers to *core people processes.* PROD_EFF refers to *production and efficiency*, CLIMATE refers to *work unit climate*, SATIFAC refers to *satisfaction with the work unit*, HPC refers to *high performance culture*, MARKET refers to *market standing of the work unit* and GROWTH refers to the *future growth of the work unit*.

Correlations are seen as excessively high if they exceed a value of .90. Three of the correlations in the phi matrix exceeded this cut-off, namely the correlation between *satisfaction with the work unit* and *core people processes*, with a value of .918. Further, the correlation between *production and efficiency* and *task performance* was above .90, with a value of .989. Lastly, the correlation between *satisfaction with the work unit* and *HPC* had a value of .901. These high inter-correlations are problematic, especially when paths have been hypothesised between the latent variables involved, because it gives rise to the concern that a statistically significant (and often then quite substantial) path coefficient can then be an artefact of the inability to operationalise the latent variables in a manner that allows one to distinguish between the latent variables as qualitatively distinct, separate constructs. Furthermore, it was found that seventeen of the correlations are between .8 and .899.

The 95% confidence interval was calculated for the twenty correlations that exceeded .80. Table 5.98 indicates that the confidence interval for $\phi_{13,5}$ included the value one. The item parcels designated to reflect *task performance* and *production and efficiency* failed to measure these two latent variables as qualitatively distinct, separate constructs. The fact that the 95% confidence included unity means that the possibility cannot be ruled out that the composite indicators of these two latent variables in effect measured the same variable twice (or only measured the common variance shared by these two latent variables. This is disconcerting because it was hypothesised that task performance influences *production and efficiency*. A finding of a statistically significant ($p<.05$) path coefficient for this hypothesised effect would therefore be ambiguous in that it would not be clear whether the finding was due to the hypothesised effect or due to a lack of discriminant validity. The remaining item parcels did succeed in operationalising the latent outcome variables in a manner that allows one to distinguish between the latent variables as qualitatively distinct, separate constructs[42].

Table 5.98

95% confidence interval calculated for the WUPQ ϕ_{ij} estimates that exceeded .80

ESTIMATE	STANDARD ERROR ESTIMATE	LOWER LIMIT OF 95% CONFIDENCE INTERVAL	UPPER LIMIT OF 95% CONFIDENCE INTERVAL	PHI
0.83681	0.02929	0.769	0.886	$\phi_{6,1}$
0.85255	0.03222	0.776	0.905	$\phi_{6,3}$
0.9186	0.03412	0.818	0.965	$\phi_{7,1}$
0.81697	0.05094	0.690	0.895	$\phi_{7,3}$
0.82728	0.0454	0.715	0.898	$\phi_{7,5}$
0.86878	0.03747	0.773	0.926	$\phi_{7,6}$
0.88506	0.0416	0.771	0.944	$\phi_{10,1}$
0.84214	0.0472	0.721	0.913	$\phi_{10,3}$
0.84024	0.05292	0.701	0.918	$\phi_{10,5}$
0.85974	0.04399	0.745	0.925	$\phi_{10,6}$
0.84639	0.04575	0.729	0.915	$\phi_{11,3}$
0.84181	0.04812	0.718	0.914	$\phi_{11,5}$
0.81486	0.04085	0.718	0.881	$\phi_{11,6}$
0.84685	0.03826	0.753	0.907	$\phi_{13,3}$
0.9892	0.02949	-0.082	1.000	$\phi_{13,5}$
0.90178	0.05121	0.737	0.965	$\phi_{10,7}$
0.85771	0.04361	0.745	0.923	$\phi_{10,8}$
0.81276	0.05994	0.658	0.902	$\phi_{11,10}$
0.84228	0.0549	0.696	0.922	$\phi_{13,10}$
0.86434	0.04583	0.742	0.931	$\phi_{13,11}$

[42] It is acknowledged that this constitutes insufficient ground to conclude that the WUPQ displays discriminant validity in its measurement of the thirteen latent variables forming part of the work unit performance construct.

5.14.5 Examining the Fit of the Comprehensive Work Unit Performance LISREL Model

The initial comprehensive work unit performance LISREL model failed to converge. An inadmissible solution was obtained due to a statistically significant ($p<.05$) negative structural variance estimate. Various solutions to circumvent the problem were tried. Specifying various starting values did not solve the problem. The paths from *core people processes* and *climate* to *satisfaction* were subsequently fixed to .35 The comprehensive work unit performance LISREL model in which the paths from *core people processes* and *climate* to *satisfaction* were fixed to .35 converged in 31 iterations. The model, however, still returned an inadmissible negative structural error variance estimate for the *satisfaction* latent outcome variable and a negative measurement error variance estimate for the EGB_2 composite indicator variable. Both the structural variance estimate and the measurement variance estimate, however, no longer deviated statistically significantly ($p>.05$) from zero. It was therefore argued that, just as much as any (admissible) statistically insignificant ($p>.05$) parameter estimate should not be interpreted in terms of value or sign, so too the negative sign associated with these estimates should not be interpreted. The null hypotheses H_0: $\psi_{33}=0$ and H_0: $\Theta\delta44=0$ could not be rejected. Consequently, it was decided to interpret the fit statistics.

Table 5.99 depicts the full array of fit statistics calculated by LISREL to assess the fit of the comprehensive LISREL model. The completely standardised solution obtained for the comprehensive work unit performance LISREL model is depicted in Figure 5.18.

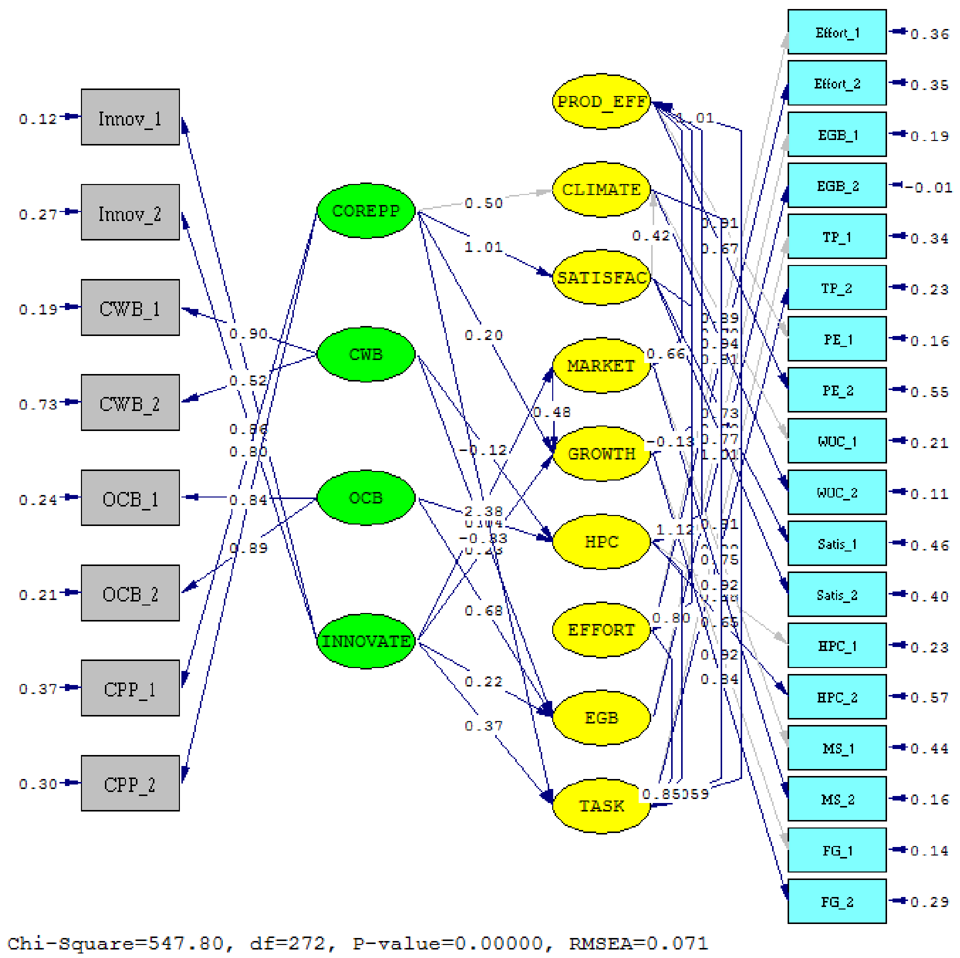

Figure 5.18. **Representation of the comprehensive work unit performance LISREL model (completely standardised solution)**

Table 5.99

Goodness of fit statistics for the comprehensive work unit performance LISREL model

Goodness of Fit Statistics
Degrees of Freedom = 272
Minimum Fit Function Chi-Square = 631.84471 (P = 0.0)
Normal Theory Weighted Least Squares Chi-Square = 609.31360 (P = 0.0)
Satorra-Bentler Scaled Chi-Square = 547.80257 (P = 0.0)
Estimated Non-centrality Parameter (NCP) = 275.80257
90 Percent Confidence Interval for NCP = (212.89789 ; 346.48500)
Minimum Fit Function Value = 3.14351
Population Discrepancy Function Value (F0) = 1.37215
90 Percent Confidence Interval for F0 = (1.05919 ; 1.72381)
Root Mean Square Error of Approximation (RMSEA) = 0.071026
90 Percent Confidence Interval for RMSEA = (0.062403 ; 0.079609)
P-Value for Test of Close Fit (RMSEA < 0.05) = 0.00006
Expected Cross-Validation Index (ECVI) = 3.51146

Table 5.99

Goodness of fit statistics for the comprehensive work unit performance LISREL model (continued)

90 Percent Confidence Interval for ECVI = (3.19850 ; 3.86311)
ECVI for Saturated Model = 3.49254
ECVI for Independence Model = 81.08765
Chi-Square for Independence Model with 325 Degrees of Freedom = 16246.61752
Independence AIC = 16298.61752
Model AIC = 705.80257
Saturated AIC = 702.00000
Independence CAIC = 16410.63248
Model CAIC = 1046.15572
Saturated CAIC = 2214.20196
Normed Fit Index (NFI) = 0.96628
Non-Normed Fit Index (NNFI) = 0.97930
Parsimony Normed Fit Index (PNFI) = 0.80870
Comparative Fit Index (CFI) = 0.98268
Incremental Fit Index (IFI) = 0.98273
Relative Fit Index (RFI) = 0.95971
Critical N (CN) = 121.78359
Root Mean Square Residual (RMR) = 0.035620
Standardized RMR = 0.057000
Goodness of Fit Index (GFI) = 0.81096
Adjusted Goodness of Fit Index (AGFI) = 0.75606
Parsimony Goodness of Fit Index (PGFI) = 0.62844

The Satorra-Bentler chi-square ($\chi 2$), calculated in terms of the robust maximum likelihood estimation procedure, delivered a statistically significant value (547.80257; $p<.05$). The exact fit null hypothesis (H_{093}: RMSEA = 0) is therefore rejected ($p<.05$) (Vieira, 2011). The comprehensive work unit performance LISREL model was not able to reproduce the observed covariance matrix to a degree of accuracy that could be explained in terms of sampling error alone.

The RMSEA value of .071026 indicated a reasonable model fit in the sample. The close fit null hypothesis (H_{094}: RMSEA $\leq$ .05) was rejected ($p<.05$) because the probability of observing this RMSEA value in the sample if the close fit null hypothesis was true in the parameter was too small (.00006) not to question the close fit null hypothesis. The model showed reasonable fit in the sample, but it did not show close fit in the parameter.

The 90 percent confidence interval for RMSEA shown in Table 5.99 (.062403; .079609) suggested that the fit of the model could be regarded as reasonable to mediocre since the lower bound of the 90 percent confidence interval is above the critical cut-off value of .05 but the upper bound fell below the critical cut-off value of .08 indicating mediocre fit (Spangenberg & Theron, 2005) albeit only marginally. According to Kenny (2015), the lower value of the 90 percent confidence interval should ideally include or be close to zero, but no worse than .05, and the upper value should not be very large or larger than .08.

The expected cross-validation index (ECVI) focuses on the discrepancy between the reproduced covariance matrix (Σ^) and the expected covariance matrix that would be obtained in an unrelated sample of equal size, but from the same population (Diamantopoulos & Siguaw, 2000; Spangenberg & Theron, 2005). To assess the ECVI of the comprehensive LISREL model, the model's ECVI was compared to the independent model and the saturated model. The comprehensive work unit performance LISREL model's ECVI (3.51146) was smaller than the ECVI for independence model (81.08765) and larger than the ECVI for saturated model (3.49254). A model more closely resembling the saturated thus has a better chance of being replicated in a cross-validation sample than the independence or fitted model (Diamantopoulos & Siguaw, 2000; Spangenberg & Theron, 2005). The results obtained for the Akaike Information Criterion (AIC) echoed the results obtained for the ECVI. The results for the Consistent Akaike Information Criterion (CAIC), however, indicated that the fitted model has a better chance of being replicated in a cross-validation sample than the independence or saturated model.

The various incremental fit indices are also presented in Table 5.99. The incremental fit indices include; (a) the normed fit index (NFI=. 96628), (b) the non-normed fit index (NNFI=.97930), (c) the comparative fit index (CFI=.98268), (d) the incremental fit index (IFI=.98273) and (e) the relative fit index (RFI=.95971). The cut-off criteria for the aforementioned incremental fit indices is a value above .90 for good model fit (Spangenberg & Theron, 2005; Vieira, 2011). All of the aforementioned indices exceeded the critical value of .90 and are considered to have good comparative fit relative to the independence model.

The critical sample size statistic (CN) suggests the size of the sample that would have obtained the minimum fit function chi-square (χ^2) statistic at the .05 significance level (Spangenberg & Theron, 2005). The estimated CN value (121.78359) fell below the recommended minimum value of 200 (Diamantopoulos & Siguaw, 2000; Spangenberg & Theron, 2005). This implies that the model may have offered a poor representation of the data.

The root mean square residual (RMR) and the standardised root mean square residual (SRMR) reflect the mean squared difference between the sample covariance matrix and the reproduced or hypothesised covariance matrix derived from the fitted comprehensive LISREL model (Hooper *et al*., 2008). The range of the RMR is calculated using the scales of each indicator variable (i.e. item parcel). This makes the index sensitive to the unit of measurement of the model variables and, therefore it becomes difficult to interpret or determine what a low score is (Diamantopoulos & Siguaw, 2000; Wessels, 2018). This problem is resolved by referring to the SRMR that makes it more meaningful to interpret (Hooper *et al*., 2008). The SRMR is defined as the standardised difference between the observed correlation and the predicted correlation (Kenny, 2015). The SRMR (.057000) indicated good fit as it is below the critical value of .08 (Hu & Bentler, 1999; Kenny, 2015).

The goodness of fit index (GFI), the adjusted goodness of fit index (AGFI) and the parsimony goodness of fit index (PGFI) all illustrate the success that the reproduced sample covariance matrix recovered the observed sample covariance matrix (Diamantopoulos & Siguaw, 2000; Spangenberg & Theron, 2005). The GFI calculates the proportion of variance that is accounted for by the estimated population covariance. Therefore, it determines how closely the model comes to replicating the observed covariance matrix (Diamantopoulos & Siguaw, 2000; Hooper *et al*., 2008). Furthermore, the AGFI is the GFI that has been adjusted for the degrees of freedom (Hooper *et al*., 2008; Vieira, 2011). These indices favour more parsimonious models, but they get penalised for model complexity. More so, GFI and AGFI tend to be impacted by the size of the sample (Hooper *et al*., 2008; Kenny, 2015). The GFI and AGFI measures should ideally be between zero and unity, and have values exceeding .90 to indicate good fit to the data (Hooper *et al*., 2008; Spangenberg & Theron, 2005).

Evaluating the fit of the model in terms of these two indices, both GFI (0.81096) and AGFI (.75606) were below the recommended cut-off.

The Parsimony goodness of fit index (PGFI) and the Parsimonious normed fit index (PNFI) recognise that model fit can be improved by adding paths to the model and by estimating more parameters until perfect fit is achieved. Perfect fit being a saturated or just identified model with no degrees of freedom (Kelloway, 1998). These to fit statistics penalise for model complexity. The PGFI (.62844) and the PNFI (.80870) shows reasonable model fit. Both of these indices have a range from 0 to 1 (where higher values indicate a more parsimonious fit). However, neither is likely to reach the .90 cut-off value as used for other indices and there is no recommendation for how high either index should be to indicate parsimonious fit (Hooper, 2008; Kelloway, 1998).

Evaluated as a basket of evidence the array of fit statistics suggested reasonable model fit.

5.14.5.1 Examination of the model residuals

The summary of the standardised residuals are shown in Table 5.100. The standardised residuals were interpreted as large if they exceeded +2.58 or –2.58 (Diamantopoulos & Siguaw, 2000). Large positive residuals show that the model underestimated the covariance between two variables and negative residuals show that a model overestimates the covariance between variables (Van der Westhuizen, 2015). According to Table 5.100, there were 16 variance and covariance terms in the observed sample variance-covariance matrix that were substantially overestimated and 24 terms in the observed sample covariance matrix that were substantially underestimated. The fact that only 40 out of 351 variance and covariance terms in the observed covariance matrix (11.40%) extreme residuals were found is indicative of reasonably good comprehensive LISREL model fit.

Table 5.100

Summary statistics for the standardised residuals

Smallest Standardized Residual = -7.27010
Median Standardized Residual = 0.00000
Largest Standardized Residual = 43.21113

Largest Negative Standardized Residuals	
Residual for Satis_1 and Effort_2	-5.57817
Residual for Satis_1 and TP_1	-3.15086
Residual for FG_2 and Effort_2	-2.98129
Residual for FG_2 and WUC_2	-2.89542
Residual for Innov_1 and WUC_1	-2.85916
Residual for CWB_1 and Satis_2	-7.27010
Residual for CWB_2 and Satis_2	-3.82692
Residual for CWB_2 and MS_1	-3.38736
Residual for OCB_1 and Satis_2	-2.85927
Residual for OCB_1 and FG_2	-3.24558
Residual for CPP_1 and Effort_2	-3.76765
Residual for CPP_1 and HPC_2	-2.89414
Residual for CPP_1 and CWB_1	-6.38116
Residual for CPP_2 and TP_1	-3.33053
Residual for CPP_2 and WUC_1	-2.95261
Residual for CPP_2 and OCB_2	-6.94349
Largest Positive Standardized Residuals	
Residual for TP_1 and Effort_2	3.56891
Residual for WUC_2 and Effort_1	4.05070
Residual for Satis_2 and Satis_1	4.67020
Residual for HPC_2 and TP_2	4.37560
Residual for MS_1 and HPC_2	4.66721
Residual for MS_2 and Satis_1	3.10209
Residual for MS_2 and Satis_2	3.14110
Residual for MS_2 and HPC_1	3.64570
Residual for MS_2 and HPC_2	4.74281
Residual for FG_1 and Satis_1	2.98431
Residual for FG_1 and Satis_2	3.03558
Residual for FG_1 and HPC_2	3.13333
Residual for FG_2 and Satis_2	2.78022
Residual for CWB_1 and Effort_1	6.10811
Residual for CWB_1 and Effort_2	7.90144
Residual for CWB_1 and TP_1	5.95106
Residual for OCB_1 and Effort_1	3.30712
Residual for OCB_1 and Effort_2	12.03682
Residual for OCB_1 and TP_1	9.08443
Residual for OCB_1 and Innov_2	2.61379
Residual for OCB_2 and Effort_1	5.07325
Residual for OCB_2 and TP_1	43.21113
Residual for OCB_2 and CWB_2	5.72757
Residual for CPP_2 and CPP_1	4.26324

Note: Innov_1 and Innov_2 refers to the two item parcels operationalising the *innovation* latent variable, Effort_1 and Effort_2 refers to the two item parcels operationalising the *effort* latent variable, CWB_1 and CWB_2 refers to the two item parcels operationalising the *counterproductive workplace behaviour* latent variable, OCB_1 and OCB_2 refers to the two item parcels operationalising the *organisational citizenship behaviour* latent variable, EGB_1 and EGB_2 refers to the two item parcels operationalising the *employee green behaviour* latent variable, TP_1 and TP_2 refers to the two item parcels operationalising the *task performance* latent variable and CPP_1 and CPP_2 refers to the two item parcels operationalising the *core people processes* latent variable.

The stem-and-leaf plot for the comprehensive work unit performance LISREL model is illustrated in Figure 5.19. A good fitting model is characterised by a stem-and-leaf plot in which the residuals are distributed evenly around zero. The location of the stem-and-leaf plot seems to be at zero, but the distributions seems to be somewhat positively skewed. The estimated model parameters, therefore, tended to underestimate the observed covariance terms more than they tended to overestimate them.

```
- 0|7766
 - 0|44333333333333222222222222222222222222221111111111111111111111111111111+66
  0|111111111111111111111111111111111111111111111111111111111222222222222222+26
  0|555566689
  1|2
  1|
  2|
  2|
  3|
  3|
  4|3
```

***Figure 5.19.* Stem-and-leaf plot of the standardised residuals for the comprehensive LISREL model**

The Q-plot for the final comprehensive work unit performance LISREL model is depicted in Figure 5.20.

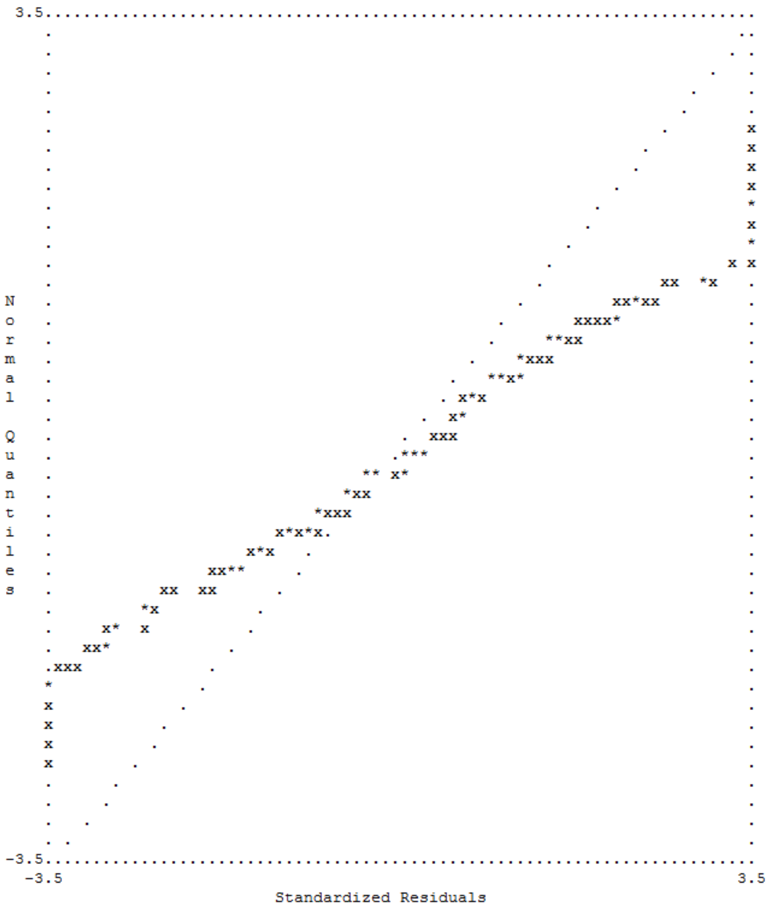

***Figure 5.20.* Q-plot of the standardised residuals for the comprehensive LISREL model**

The Q-plot shows that the data deviated from the 45- degree reference line, which reflected negatively on the fit of the comprehensive model. The data points rotated away from the 45-degree reference line at the upper end in a negative direction and in the lower end in a positive direction. Thus, the model residuals results appear to suggest that only reasonably satisfactory comprehensive LISREL model fit was achieved.

The fit statistics and the variance-covariance residuals suggested a reasonably fitting comprehensive LISREL model. The WUPQ measurement model showed close fit. This implies that the structural model can be assumed to display at least reasonable model fit. This in turn warranted the interpretation of the structural model parameter estimates.

5.14.6 Assessing the Structural Relationships in the Structural Model

The primary objective of the evaluation of the structural model parameter estimates was to determine if each of the hypothesised path-specific relationships, as theoretically motivated in Chapter 2 and formulated as path-specific statistical hypotheses in Chapter 3, were supported by the data.

When evaluating these path-specific hypotheses, four elements were taken into consideration (Diamantopoulos & Siguaw, 2000):

a) The signs (positive/negative) of the parameters representing the paths between the latent variables to determine whether the direction of the relationships was as theorised and predicted
b) The statistical significance ($p<.05$) of the estimated path coefficient to determine whether the estimate can be generalised to the parameter
c) The magnitude of the (completely standardised) estimated parameters to determine the strength of the hypothesised relationships
d) The squared multiple correlations (R^2) of the structural equations to establish the proportion of variance in each endogenous latent variable that was accounted for by the latent variables that were hypothesised to impact upon it.

The unstandardised parameter estimates for the beta (**B**) and gamma (Γ) matrices, more specifically their standard error and z- values, provide a way to evaluate the causal linkages between the exogenous and endogenous latent variables. The unstandardised beta matrix, as illustrated in Table 5.101, describes the slope of the regression of the 9 endogenous latent variables in the work unit performance structural model on the endogenous latent variables that were hypothesised to affect them. These parameter estimates are statistically significant ($p<.05$) if $|z|>|1.6449|$ given the directional nature of the alternative hypotheses (Theron, 2017).

Table 5.101

Unstandardised beta matrix

	PROD_EFF	CLIMATE	SATISFAC	MARKET	GROWTH	HPC
PROD_EFF	- -	- -	- -	- -	- -	- -
CLIMATE	- -	- -	0.50473	- -	- -	- -
SATISFAC	- -	- -	- -	- -	- -	- -
MARKET	0.65873* (0.09671) 6.81154	- -	- -	- -	- -	- -
GROWTH	-0.12684 (0.22501) -0.56370	- -	- -	0.48124* (0.13657) 3.52380	- -	- -
HPC	1.12337* (0.18056) 6.22166	- -	- -	- -	- -	- -
EFFORT	- -	- -	0.97565* (0.13669) 7.13747	- -	- -	- -
EGB	- -	- -	- -	- -	- -	- -
TASK	- -	-0.59096 (0.55665) -1.06163	- -	- -	- -	-2.09909 (1.54363) -1.35984

	EFFORT	EGB	TASK
PROD_EFF	- -	- -	1.00959* (0.06171) 16.36138
CLIMATE	- -	- -	- -
SATISFAC	- -	- -	- -
MARKET	- -	- -	- -
GROWTH	- -	- -	- -
HPC	- -	- -	- -
EFFORT	- -	- -	- -
EGB	- -	- -	- -
TASK	0.85189 (0.65435) 1.30190	- -	- -

*(p<.05)

PROD_EFF refers to *production and efficiency*, CLIMATE refers to *work unit climate*, SATIFAC refers to *satisfaction with the work unit*, HPC refers to *high performance culture*, MARKET refers to *market standing of the work unit* and GROWTH refers to the *future growth of the work unit*, TASK refers to *task performance,* HPC refers to *high performance culture*, EFFORT refers to *effort* and EGB refers to *employee green behaviour*.

The unstandardised beta matrix indicated that five, of the ten hypothesised paths were statistically significant ($p<.05$) with $|z|$-values greater than 1.6449. Therefore, H_{099}:

β_{41}=0, H_{0102}: β_{54}=0, H_{0111}: β_{61}=0, H_{0112}: β_{73}=0 and H_{0116}: β_{19}=0 were rejected in favour of H_{ai}: β >0 i= 99, 102, 111, 112 and 116.

Therefore, support was found for the following 5 of the original 10 beta hypotheses:

- Path-specific substantive hypothesis 8: An increase in the *production and efficiency* (η_1) of the work unit will improve the *market standing*(η_4) of the work unit.
- Path-specific substantive hypothesis 11: A competitive *market standing* (η_4) of the work unit will encourage the *future growth* (η_5) of the work unit.
- Path-specific substantive hypothesis 20: An increase in the *production and efficiency* of a work unit (η_1) will have an impact on the *high-performance culture* of a work unit (η_6).
- Path-specific substantive hypothesis 21: An increased *satisfaction* (η_3) will increase the *effort* of the members in the work unit (η_7).
- Path specific substantive hypothesis 25: An increase in the *task performance* (η_9) of the work unit will increase the *production and efficiency* (η_1) of the work unit[43].

The unstandardised beta matrix indicated that four of the paths were not statistically significant ($p<.05$) Therefore H_{0100}: β_{92}=0, H_{0113}: β_{96}=0, H_{0114}: β_{97}=0, H_{0115}: β_{51}=0 were not rejected in favour of H_{0i}: β >0 i=100, 113, 114 and 115. H_{0101}: β_{23}=0 was not tested because β_{23} was fixed to .35.

Therefore, support was not found for the following 5 of the original 10 beta hypotheses:

- Path-specific substantive hypothesis 9: A beneficial *climate* (η_2) will increase the *task performance* (η_9) of a work unit.
- Path-specific substantive hypothesis 10: Heightened *satisfaction* (η_3) will provide a productive *climate* (η_2)[44].

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[43] The claim to have found support for path specific substantive hypothesis 25 should, however, be tempered by the fact that serious concerns exist about the discriminant validity with which the composite indicators reflected task performance and production and efficiency. The concern therefore needs to be acknowledged that the significant β_{19} estimate reflects nothing more than the fact that the respective composite indicators both effectively measured the same latent variable (or the common variance shared by the two latent variables)

[44] This hypothesis was not empirically tested because β_{23} was fixed to .35

- Path-specific substantive hypothesis 22: A positive *high-performance* work unit *culture* (η_6) will improve the *task performance* of the work unit (η_9).
- Path-specific substantive hypothesis 23: An increase in the *effort* (η_7) of the work unit will improve the *task performance* (η_9) of the work unit.
- Path specific substantive hypothesis 24: An increase in *production and efficiency* (η_1) of the work unit will encourage *future growth* (η_5)

The unstandardised gamma matrix (Table 5.102) describes the slope of the regression of the endogenous latent variables on specific exogenous latent variables. These parameters are statistically significant ($p< .05$) if $z>1.6449$ given the directional nature of H_{ai} (Theron, 2017).

Table 5.102

Unstandardised gamma matrix

	COREPP	**CWB**	**OCB**	**INNOVATE**
PROD_EFF	- -	- -	- -	- -
CLIMATE	0.50473	- -	- -	- -
SATISFAC	0.83684* (0.11985) 6.98226	- -	- -	- -
MARKET	- -	- -	- -	0.09336 (0.09303) 1.00350
GROWTH	0.19708 (0.19468) 1.01230	- -	- -	0.23353* (0.09958) 2.34520
HPC	- -	-0.12327 (0.13984) -0.88149	0.03684 (0.18585) 0.19824	- -
EFFORT	- -	- -	- -	- -
EGB	- -	-0.33092* (0.14727) -2.24704	0.68031* (0.15078) 4.51211	0.22021* (0.09259) 2.37821
TASK	2.37967* (1.22136) 1.94837	- -	- -	0.37059 (0.31147) 1.18984

*(p<.05)

Note: INNOVATE refers to *innovation*, EFFORT refers to *effort*, CWB refers to *counterproductive workplace behaviour*, OCB refers to *organisational citizenship behaviour*, EGB refers to *employee green behaviour* and TASKPERF refers to *task performance*, COREPP refers to *core people processes.* PROD_EFF refers to *production and efficiency*, CLIMATE refers to *work unit climate*, SATIFAC refers to *satisfaction with the work unit*, HPC refers to *high performance culture*, MARKET refers to *market standing of the work unit* and GROWTH refers to the *future growth of the work unit*.

Analysis of the gamma matrix indicated that 6, of the 12 paths were statistically significant ($p<.05$) with |z|-values greater than |1.6449|. Specifically, the statistically significant parameter estimate ($p<.05$) in combination with the appropriate sign of the γ_{ij} estimate allowed H_{095}: $\gamma_{91}=0$, H_{097}: $\gamma_{31}=0$, H_{0104}: $\gamma_{82}=0$, H_{0106}: $\gamma_{83}=0$, H_{0109}: $\gamma_{54}=0$ and H_{0110}: $\gamma_{84}=0$ had to be rejected in favour of H_{a95}, H_{a97}, H_{a104}, H_{a106}, H_{a109}, and H_{a110}.

Therefore, support was found for the following 6 of the original 12 gamma hypotheses:

- Path-specific substantive hypothesis 4: A high level of *core people processes* (ξ_1) will increase the *task performance* (η_9) of the work unit.
- Path-specific substantive hypothesis 6: Improved *core people processes* (ξ_1) will increase the *satisfaction* of the work unit (η_3).
- Path-specific substantive hypothesis 13: An increase in *counterproductive work behaviour* (ξ_2) will decrease *employee green behaviour* (η_8).
- Path-specific substantive hypothesis 15: *Citizenship behaviour* (ξ_3) will increase *employee green behaviour* (η_8).
- Path-specific substantive hypothesis 18: *Innovation* (ξ_4) will encourage the *future growth* (η_5) of the work unit.
- Path-specific substantive hypothesis 19: *Innovation* (ξ_4) will increase the *employee green behaviour* (η_8).

It was found that the following 5 paths were statistically insignificant ($p<.05$) with |z|-values less than |1.6449|. Therefore H_{098}: $\gamma_{51}=0$, H_{0103}: $\gamma_{62}=0$, H_{0105}: $\gamma_{63}=0$, H_{0107}: $\gamma_{94}=0$ and H_{0108}: $\gamma_{44}=0$ were not rejected in favour of H_{a98}, H_{a103} $H_{a105,}$ H_{a107} and H_{a108}. H_{096}: $\gamma_{21}=0$ was not tested because γ_{21} was fixed to .35.

Therefore, support was not found for the following 6 hypotheses:

- Path-specific substantive hypothesis 7: Increased *core people processes* (ξ_1) will encourage *future growth* in the organisation (η_5).
- Path-specific substantive hypothesis 12: An increase in *counterproductive workplace behaviour* (ξ_2) will negatively influence *high performance culture* of the work unit (η_6).
- Path-specific substantive hypothesis 14: Increased *citizenship behaviour* (ξ_3) will positively influence the *high-performance culture* of the work unit (η_6).

- Path-specific substantive hypothesis 5: An increase in *core people processes* (ξ_1) will provide a strengthened *climate* of the work unit (η_2).
- Path-specific substantive hypothesis 16: *Innovation* (ξ_4) will encourage the *task performance* (η_9) of a work unit.
- Path-specific substantive hypothesis 17: *Innovation* (ξ_4) will improve the *market standing* of the organisation (η_4).

Only relying on the interpretation of the unstandardised regression slope estimates was considered problematic as the metric in which these are expressed are different and not comparable across the different latent variables. Thus, the magnitudes of the completely standardised regression slope estimates were interpreted (Diamantopoulos & Siguaw, 2000).

The completely standardised beta and gamma estimates reflect the average change expressed in standard deviation units in an endogenous latent variable (η_j), associated with a one standard deviation change in an endogenous (η_j) or exogenous latent variable (ξ_j) that had been structurally linked to it in the structural model, when holding constant all other η_k and/or ξ_k linked to it (Spangenberg & Theron, 2005). It is therefore important to interpret the (statistically significant) completely standardised beta and gamma estimates as partial regression coefficients. The completely standardised parameter estimates for **B** and Γ are presented in Tables 5.103 and 5.104 respectively.

Table 5.103

Completely standardised beta matrix

	PROD_EFF	CLIMATE	SATISFAC	MARKET	GROWTH	HPC
PROD_EFF	- -	- -	- -	- -	- -	- -
CLIMATE	- -	- -	0.41616	- -	- -	- -
SATISFAC	- -	- -	- -	- -	- -	- -
MARKET	**0.65873**	- -	- -	- -	- -	- -
GROWTH	-0.12684	- -	- -	**0.48124**	- -	- -
HPC	**1.12337**	- -	- -	- -	- -	- -
EFFORT	- -	- -	**0.80443**	- -	- -	- -
EGB	- -	- -	- -	- -	- -	- -
TASK	- -	-0.59096	- -	- -	- -	-2.09909

Table 5.103

Completely standardised beta matrix (continued)

	EFFORT	EGB	TASK
PROD_EFF	- -	-	**1.00959**[45]
CLIMATE	- -	-	- -
SATISFAC	- -	-	- -
MARKET	- -	-	- -
GROWTH	- -	-	- -
HPC	- -	-	- -
EFFORT	- -	-	- -
EGB	- -	-	- -
TASK	0.85189	-	- -

Note: PROD_EFF refers to *production and efficiency*, CLIMATE refers to *work unit climate*, SATIFAC refers to *satisfaction with the work unit*, HPC refers to *high performance culture*, MARKET refers to *market standing of the work unit* and GROWTH refers to the *future growth of the work unit*, TASK refers to *task performance,* HPC refers to *high performance culture*, EFFORT refers to *effort* and EGB refers to *employee green behaviour*.

Table 5.104

Completely standardised gamma matrix

	COREPP	CWB	OCB	INNOVATE
PROD_EFF	- -	- -	- -	- -
CLIMATE	0.50473	- -	- -	- -
SATISFAC	**1.01496**[46]	- -	- -	- -
MARKET	- -	- -	- -	0.09336
GROWTH	0.19708	- -	- -	**0.23353**
HPC	- -	--0.12327	0.03684	- -
EFFORT	- -	- -	- -	- -
EGB	- -	**-0.33092**	**0.68031**	0.22021
TASK	**2.37967**	- -	- -	**0.37059**

Note: INNOVATE refers to *innovation*, EFFORT refers to *effort*, CWB refers to *counterproductive workplace behaviour*, OCB refers to *organisational citizenship behaviour*, EGB refers to *employee green behaviour* and TASKPERF refers to *task performance*, COREPP refers to *core people processes.* PROD_EFF refers to *production and efficiency*, CLIMATE refers to *work unit climate*, SATIFAC refers to *satisfaction with the work unit*, HPC refers to *high performance culture*, MARKET refers to *market standing of the work unit* and GROWTH refers to the *future growth of the work unit*.

[45] The completely standardised regression slope parameter estimate when regressing *production and efficiency* on *task performance* that exceeds unity provides reason for concern. In the case of a simple linear regression model with both the dependent and independent variables standardised to z-score the slope parameter cannot exceed unity.

[46] The completely standardised regression slope parameter estimate when regressing satisfaction on core people processes that exceeds unity again reflects the inadmissible structural error variance estimate (and R^2 estimate) In the case of a simple linear regression model with both the dependent and independent variables standardised to z-score the slope parameter cannot exceed unity. Given that the structural error variance estimate does not significantly deviate from zero the assumption is that the slope parameter does not significantly deviate from unity. In the case of multiple regression equations, the slope parameter can exceed unity. The implied R^2=1 nonetheless provides reason for concern simply because it seems highly unlikely that a single latent variable will explain all the variance in the satisfaction latent variable.

Overall, the effect of heightened *core people processes* on *task performance,* when holding constant *innovation, effort, climate* and *high-performance culture,* was the greatest. This is followed by the effect of *production and efficiency* on *high performance culture when holding constant HPC and OCB, and task performance* on *production* and efficiency. *Production and efficiency* also had a reasonable influence on *market standing* when holding constant *innovation*. *Satisfaction* had a noteworthy impact on *effort. Core people processes* had noteworthy influence on *satisfaction.* Lastly*, organisational citizenship behaviour* influenced the level of *employee green behaviour* at a reasonable level, when holding constant the effect of *CWB* and *innovation*. For all the remaining statistically significant effects the effect size was less than .50.

The unstandardised Ψ shown in Table 5.105 assessed the statistical significance of the structural error variance estimates (Diamantopoulos & Siguaw, 2000). As shown below*, production and efficiency, satisfaction* and *task performance* were not statistically significantly affected by structural error. It no doubt is the ideal of science to gradually reduce the influence of structural error in explanatory structural models by gradually, through cumulative research studies that elaborate on previous structural models, identifying previously excluded systematic sources of variance. Actually, achieving this ideal in reality, however, creates apprehension. The statistically insignificant ($p>.05$) negative structural variance estimate associated with satisfaction is at the same time, however, a positive finding in that it implies that the position that $\psi_{33}=0$ should not be questioned.

Table 5.105
Unstandardised psi matrix

PROD_EFF	CLIMATE	SATISFAC	MARKET	GROWTH	HPC
0.04720	0.14568*	-0.02049	0.47255*	0.51917*	0.35293*
(0.04934)	(0.03123)	(0.02873)	(0.08938)	(0.09457)	(0.10946)
0.95668	4.66453	-0.71323	5.28671	5.48967	3.22437
EFFORT	**EGB**	**TASK**			
0.35289*	0.62816*	0.66043			
(0.07699)	(0.08575)	(0.60946)			
4.58335	7.32560	1.08363			

*(p<.05)

Note: EFFORT refers to *effort*, EGB refers to *employee green behaviour,* TASK refers to *task performance*, PROD_EFF refers to *production and efficiency*, CLIMATE refers to *work unit climate*, SATIFAC refers to *satisfaction with the work unit*, HPC refers to *high performance culture*, MARKET refers to *market standing of the work unit* and GROWTH refers to the *future growth of the work unit*.

The completely standardised Ψ is shown in Table 5.106.

Table 5.106
Completely standardised psi matrix

PROD_EFF	CLIMATE	SATISFAC	MARKET	GROWTH	HPC
0.04720	0.14568	-0.03014	0.47255	0.51917	0.35293
EFFORT	**EGB**	**TASK**			
0.35289	0.62816	0.66043			

Note: EFFORT refers to *effort*, EGB refers to *employee green behaviour* and TASK refers to *task performance*, PROD_EFF refers to *production and efficiency*, CLIMATE refers to *work unit climate*, SATIFAC refers to *satisfaction with the work unit*, HPC refers to *high performance culture*, MARKET refers to *market standing of the work unit* and GROWTH refers to the *future growth of the work unit*.

The completely standardised Ψ reflects the proportions of variance in the endogenous latent variables that are not explained by the structural model. This echoes the findings of the unstandardized psi matrix and therefore the same cautionary note therefore applies.

The standardised Φ is shown in Table 5.107

Table 5.107 indicates that all the exogenous latent variables in the structural model correlated statistically significantly ($p<.05$) with each other. *Core people processes* and *OCB* correlated quite high (.87902) as did *CWB* and *OCB*[47] (.8004).

Table 5.107
Standardised phi matrix

	COREPP	CWB	OCB	INNOVATE
COREPP	1.00000			
CWB	0.75772*	1.00000		
	(0.04885)			
	15.51246			
OCB	0.87902*	0.80040*	1.00000	
	(0.02815)	(0.05238)		
	31.22237	15.28183		
INNOVATE	0.73173*	0.53327*	0.63119*	1.00000
	(0.04904)	(0.06459)	(0.05824)	
	14.92253	8.25689	10.83830	

*(p<.05)

Note: INNOVATE refers to *innovation*, EFFORT refers to *effort*, CWB refers to *counterproductive workplace behaviour*, OCB refers to *organisational citizenship behaviour*, EGB refers to *employee green behaviour* and TASKPERF refers to *task performance*, COREPP refers to *core people processes.* PROD_EFF refers to *production and efficiency*, CLIMATE refers to *work unit climate*, SATIFAC refers to *satisfaction with the work unit*, HPC refers to *high performance culture*, MARKET refers to *market standing of the work unit* and GROWTH refers to the *future growth of the work unit*.

[47] *CWB* was sored so that high scores indicated the absence of *CWB*. The correlation thus implies that units that are characterised by high *OCB* quite strongly tend to be associated with the absence of *CWB*.

5.14.7 Modification indices of the comprehensive work unit performance LISREL model

Although the final comprehensive work unit performance LISREL model fitted the data the question reasonably well, it should always be considered whether the model could be revised further, through the addition of freed paths, for future research.

According to Theron (2017) modification indices with values greater than 6.64 indicate that the freeing the current fixed parameters would improve the fit of the model significantly (p<.01). However, Diamantopoulos and Siguaw (2000) advocated that these modifications must also be theoretically or substantially justified. Table 5.108 shows the modification indices for **B** and Table 5.109 for Γ.

Table 5.108

Modification indices for beta matrix

	PROD_EFF	CLIMATE	SATISFAC	MARKET	GROWTH	HPC
PROD_EFF	- -	0.60145	0.20998	7.37611*	1.52818	0.14779
CLIMATE	0.11338	- -	- -	2.06337	11.12909*	0.25613
SATISFAC	0.33295	0.67400	- -	1.00891	1.12709	0.76867
MARKET	- -	1.06652	7.15772*	- -	- -	19.68826*
GROWTH	- -	5.81120	0.01672	- -	- -	0.00280
HPC	- -	2.14654	3.58668	18.62808*	7.27665*	- -
EFFORT	5.01496	7.65160*	- -	0.26520	1.64003	1.98015
EGB	0.45623	1.67174	0.07071	0.00998	0.60878	0.04357
TASK	0.00211	- -	0.00042	3.50496	1.50958	- -

	EFFORT	EGB	TASK
PROD_EFF	1.01596	0.43502	- -
CLIMATE	5.06995	3.93945	0.05902
SATISFAC	0.81632	1.31175	0.08426
MARKET	0.13447	0.94518	0.30309
GROWTH	2.17063	0.02501	0.00008
HPC	7.91356*	0.49038	- -
EFFORT	- -	4.26207	6.18700
EGB	5.17775	- -	0.32479
TASK	- -	0.40301	- -

*(p<.01)

Note: EFFORT refers to *effort*, EGB refers to *employee green behaviour,* TASK refers to *task performance*, PROD_EFF refers to *production and efficiency*, CLIMATE refers to *work unit climate*, SATIFAC refers to *satisfaction with the work unit*, HPC refers to *high performance culture*, MARKET refers to *market standing of the work unit* and GROWTH refers to the *future growth of the work unit*.

The results shown in Table 5.108 and Table 5.109 were not used to modify the existing model in the current study but rather to derive data-driven suggestions for future research.

Table 5.109

Modification indices for gamma matrix

	COREPP	CWB	OCB	INNOVATE
PROD_EFF	0.43577	6.96362*	4.13486	0.70998
CLIMATE	0.01919	1.79413	1.71118	4.66153
SATISFAC	- -	1.29645	2.66131	0.08406
MARKET	7.36900*	0.03683	1.64041	- -
GROWTH	- -	0.63904	1.32889	- -
HPC	3.43760	- -	- -	0.00187
EFFORT	0.08674	28.82473*	24.14562*	8.24030*
EGB	0.00002	- -	- -	- -
TASK	- -	0.04619	0.42728	- -

*(p<.01)

Note: INNOVATE refers to *innovation*, EFFORT refers to *effort*, CWB refers to *counterproductive workplace behaviour*, OCB refers to *organisational citizenship behaviour*, EGB refers to *employee green behaviour* and TASK refers to *task performance*, COREPP refers to *core people processes,* PROD_EFF refers to *production and efficiency*, CLIMATE refers to *work unit climate*, SATIFAC refers to *satisfaction with the work unit*, HPC refers to *high performance culture*, MARKET refers to *market standing of the work unit* and GROWTH refers to the *future growth of the work unit*.

Inspection of the magnitude of the modification index values across the two matrices indicate that the two largest statistically significant modification index values all occurred in Γ. According to the modification indices for the gamma matrix (Table 5.109), the highest medication index (28.82473) was for the path γ_{72} from *counterproductive workplace behaviour* to *effort*. The completely standardised change associated with this path (0.67870) suggests that CWB has a positive impact on effort. A positive relationship between *CWB* and *effort* initially does not make logical sense. When, however, it is taken into account that the CWB items were scored so that high scores indicate the absence of *CWB* the proposed relationship does make sense. The proposed path therefore suggests that when the work unit displays productive workplace behaviours such as willingly following the rules and maintaining personal discipline etc., the behaviours associated with *effort* such as working under detrimental conditions and devoting constant attention will increase because of the productive workplace. Although a correlational relationship makes logical sense the current study was not convinced that a causal relationship makes theoretical sense.

Furthermore, the second highest value (24.14562) was for the path γ_{73} from *OCB* to *effort.* The completely standardised expected change associated with this path was substantial and positive (0.92773). Similar to the previous proposed path the suggested path from *OCB* to *effort* was also judged not to be convincing as a causal path. It seems unlikely that a work unit will exert *effort* because it displays *OCB*. What does make sense is that units that tend to display *OCB* will also tend to exert effort. The latter, however, implies a third latent variable as a common source of variance rather than a direct effect.

The third and fourth largest modification index values were associated with β_{46} (19.68826) and β_{64} (18.62808). Paths are therefore suggested from *HPC* to *market standing* and vice versa from *market standing* to *HPC*. These two paths make theoretical sense in a correlational sense as units that have the shared perception of exceptional performance, the *market standing* will tend to also be relatively high with for example a strong reputation for adding value. Rather than a direct causal effect between these two latent variables the current indirect effect in which the *high-performance culture* affects *task performance* that affects *production and efficiency* that affects *market standing* makes much more theoretical sense[48]. Market reputation must be earned through proven results (i.e. production and efficiency). That outcome, in turn, must be achieved by displaying competence in some action; by doing something well.

Figure 5.21 illustrates the proposed work unit performance structural model and highlights the paths that were supported, the additional path and the paths that were not supported.

[48] It is acknowledged that empirical support was not obtained in the current study for the first component of this indirect effect.

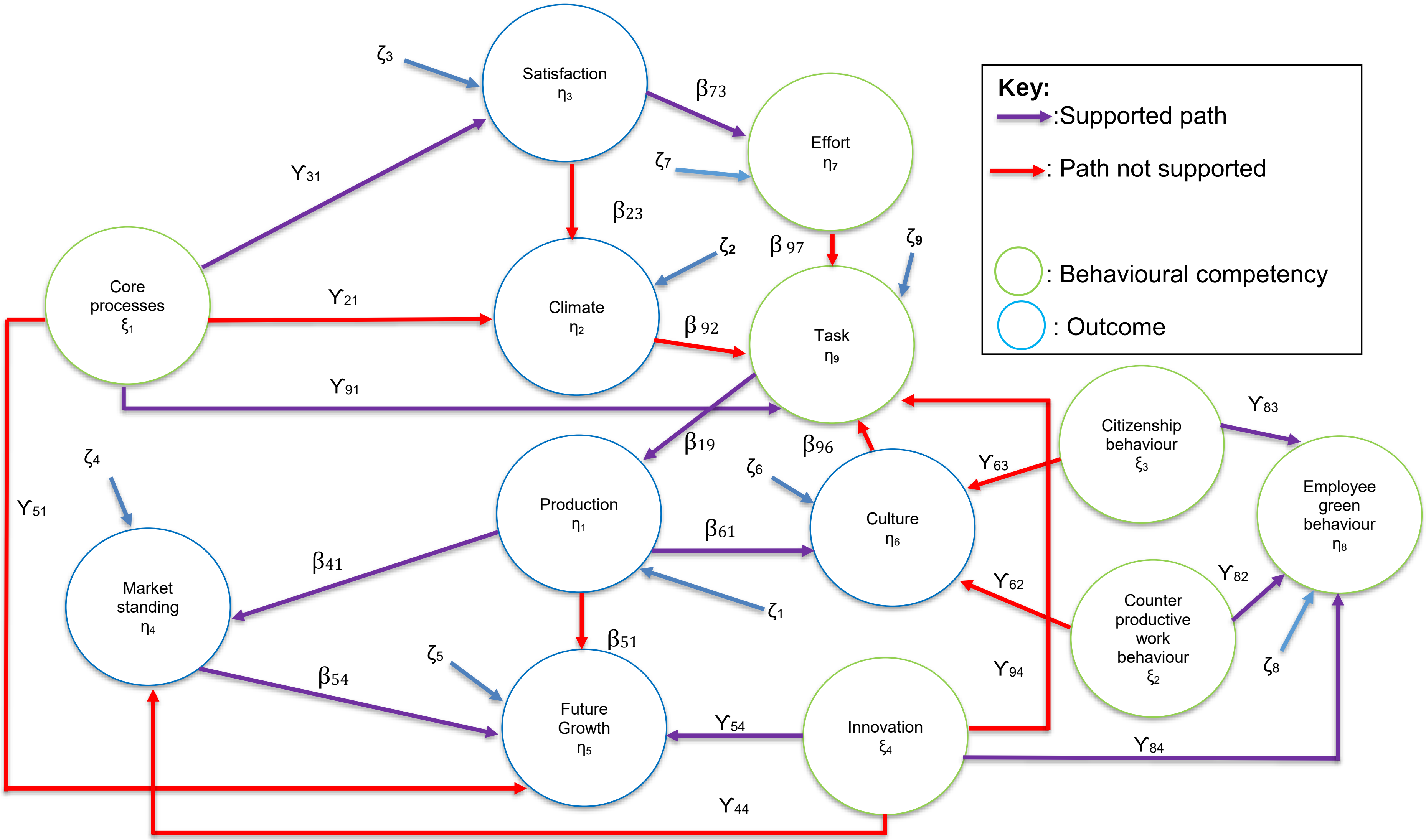

Figure 5.21. **The Work Unit Performance final model**

Note: Satisfaction refers to *satisfaction*, effort refers to *effort,* core processes refers to *core people processes*, climate refers to the *work unit climate*, task performance refers to *task performance*, citizenship behaviour refers to *organisational citizenship behaviour*, production refers to *production and efficiency*, culture refers to *high performance culture*, employee green behaviour refers to *employee green behaviour*, counterproductive work behaviour refers to *counterproductive work behaviour*, market standing refers to *market standing*, future growth refers to *future growth* and innovation refers to *innovation*.

CHAPTER 6
DISCUSSION AND CONCLUSION

6.1 INTRODUCTION

The purpose of Chapter 6, the final chapter of the thesis, is to provide a comprehensive discussion of the results, the main limitations of the study and recommendations for future research in this particular field. This chapter will conclude with the implications of the findings for industrial psychology practitioners. However, firstly the research objectives of the current study and a brief overview of the study will (again) be provided.

6.2 RESEARCH OBJECTIVES

The current research focused on the conceptualisation and operationalisation of the organisational work unit performance construct. The research objective consisted of the following seven parts namely to:

- Explicate the connotative meaning of the organisational work unit performance construct (this translates to a partial competency model which structurally maps the latent behavioural unit competencies on the latent unit outcomes);
- Explicate the denotations of the organisational unit performance construct (specifically of the latent behavioural unit competencies and the latent unit outcomes);
- Develop a unit performance competency questionnaire [the Work Unit Competency Questionnaire (WUCQ)];
- Empirically test the reliability and construct validity of the WUCQ by fitting the WUCQ measurement model;
- Develop a unit performance outcome questionnaire [the Work Unit Outcome Questionnaire (WUOQ)];
- Empirically test the reliability and construct validity of the WUOQ by fitting the WUOQ measurement model; and
- Empirically test the construct validity of the WUCQ and the WUOQ by fitting the structural model that maps the latent behavioural unit competencies on the latent unit outcomes.

6.3 OVERVIEW OF THE CURRENT STUDY

In Chapter 1, it was argued that human resource interventions have concentrated their effort on measuring and improving the performance of the individual employee in the workplace, with little attention given to the understanding, monitoring and improvement of the performance of the work unit (Christensen, 2006; Gelade & Ivery, 2003).

The gap in the understanding of the performance in the work unit is considered a major flaw in the discipline of industrial psychology. Organisations, in effect, are a conglomeration of work units that are guided by a single vision and mission (Spangenberg & Theron, 2004).

The level of performance that any organisational work unit achieves is, similarly to the performance of the individual employee, the result of the operation of a complex identifiable nomological network of latent variables characterising the unit and they wider organisational context in which it operates. Interventions conducted by human resource practitioners aimed at enhancing the performance of the work unit will only succeed if it is clear what constitutes work unit-performance, if the determinants of the work unit performance are established and if a valid, reliable and unbiased instrument has been developed to measure work unit performance.

The work unit was defined as a temporary or permanent organisational entity that operates in a private, state-owned or not-for-profit organisation. The size of these work units varies from a small team consisting of a leader and three subordinates to a department within a company that is comprised of a leader and large number of subordinates possibly structured in a work unit hierarchy (Spangenberg & Theron, 2004)

The study incorporated the Performance Index (PI) of Spangenberg and Theron (2004), and the partial competency model proposed by Henning *et al*. (2004) as a theoretical foundation. However, it was suggested that the current

PI performance model seems to incorrectly incorporate a limited number of latent variables from the domain of latent organisational unit competency potential variables, and to correctly incorporate latent variables from the domain of latent behavioural competencies and the domain of latent outcome variables but fails to fully represent the latter two domains. Neither does the current PI performance model formally distinguish between the competency and outcome domains.

A revision of the PI's conceptualisation of organisational unit performance was therefore done. More specifically, all latent organisational unit competency potential variables were removed from the organisational unit performance model and an attempt was made to correct the failure of the current model to acknowledge all relevant latent organisational unit competencies and latent organisational unit outcome variables. This revision of the PI's conceptualisation of organisational unit performance necessitated the development and validation of a new version of the Performance Index [Work Unit Performance Questionnaire (WUPQ)] comprising of two subscales, namely the Work Unit Competency Questionnaire (WUCQ) and the Work Unit Outcome Questionnaire (WUOQ).

The following variables from the PI were categorised as latent unit competency potential variables, and therefore removed from the study; *adaptability* and *capacity.* Furthermore, the following variable currently measured by the PI was categorised as a latent behavioural competency; *core people processes*. Lastly, the following dimensions currently measured by the PI were categorised as outcome variables; *production and efficiency, work unit climate, employee satisfaction, market share/standing* and *future growth.*

Furthermore, through theorising in the in Chapter 2, additional variables were proposed to be added to the PI to increase the extent to which it content validly covers a more comprehensive conceptualisation of the work unit performance domain. Firstly, in the behavioural competency domain; *innovation, effort, counterproductive workplace behaviour, organisational citizenship behaviour and employee green behaviour* were proposed. Furthermore, in the outcome domain, *high performance culture* was proposed as an additional variable. This resulted in seven latent behavioural competencies variables in the Work Unit Competency Questionnaire and six latent outcome variables in the Work Unit Outcome Questionnaire. The Work Unit Performance Questionnaire therefore measured work unit performance in terms of thirteen work unit performance dimensions.

Finally, the theorising presented in Chapter 2 in response to the research initiating question on the connotative meaning of the organisational work unit performance construct resulted in the derivation of a structural model that depicts the internal structure of the organisational work unit performance construct.

6.4 DISCUSSION OF RESULTS

6.4.1 Work Unit Competency Questionnaire Measurement Model

The seven behavioural competencies of the Work Unit Competency Questionnaire (WUCQ) had satisfactory statistics in the item analysis. In the dimensionality analysis through an exploratory factor analysis, the unidimensionality assumption was corroborated for *innovation, organisational citizenship behaviour, employee green behaviour, task performance and core people processes.* The unidimensionality assumption was not corroborated for *effort* and *counterproductive work behaviours.* The two *effort* factors were interpreted as a *giving/investing/applying the unit* factor and as a *continuous focus* factor. The two *counterproductive work behaviour* factors were interpreted as a *non-criminal offences* factor (*CWBs* that disregard organisational rules) and as a *criminal offences* factor (*CWBs* that are serious infringements). The factor fission on both subscales was considered theoretically meaningful.

The items were subsequently grouped on the common themes derived from the loading pattern in the pattern matrix and second-order confirmatory factor analysis was conducted. The statistical significance of the indirect effects of the second-order factor on the indicator variables were subsequently evaluated. In all cases the indirect effect of the second-order factor on the composite indicators were found to be statistically significant ($p<.05$). This justifies the use of the individual items of these two subscales as indicators of the second-order *effort* and *counterproductive work behaviour competencies.*

The fit of the Work Unit Competency Questionnaire measurement model was evaluated to determine the extent that the indicator variables (item parcels) successfully operationalise the latent variables in the model. The overall goodness of fit of the measurement model was tested through structural equation modelling (SEM). Various indices were interpreted to evaluate the goodness of fit of the measurement model and it was found that the measurement model fitted the data reasonably well in the sample. The close fit null hypothesis was not rejected ($p>.05$).

The initial measurement model parameters indicated an inadmissible solution. To resolve this inadmissible solution, the lambda estimates for *employee green behaviour* (EGB_1 & EGB_2) were fixed to .95. Similarly, it was found that the measurement model with EGB_1 and EGB_2 fixed at .95 fitted the data reasonably well in the sample. The close fit null hypothesis was still not rejected ($p>.05$). Important to note is that no large percentage of statistically significant ($p<.01$) modification index values were found for the off-diagonal elements of Θ_δ. The presence of a broad, general performance factor in addition to the conceptualised narrow, more specific performance dimensions was therefore not indicated.

All the item parcels loaded statistically significantly ($p<.05$) on the latent variables they were designed to reflect. Therefore, all the lambda null hypotheses were rejected. Furthermore, the values of the squared multiple correlations were high (>.50), except for CWB_2 (R^2=.272). More so, CWB_2 was further flagged as a problematic indicator of its respective latent variable as more variance (.727) was explained by measurement error than was explained by the latent variable that this indicator was designed to reflect. Discriminant validity was not indicated as a problem.

6.4.1.1 Work Unit Outcome Questionnaire Measurement Model

The six outcome variables of the Work Unit Competency Questionnaire (WUCQ) had satisfactory statistics in the item analysis. In the dimensionality analysis through an exploratory factor analysis, the unidimensionality assumption was corroborated for *production and efficiency, work unit climate and future growth.* The unidimensionality assumption was not corroborated for *employee satisfaction*, *market standing* and *high-performance culture.* The two *employee satisfaction* factors were interpreted as a *satisfaction with the quality of supervision* factor and as a *satisfaction with work and surrounding work* factor. The two *high performance culture* factors were interpreted as an *internal focus/emphasis on high performance* factor and as an *external focus/emphasis on high performance* factor. The two *market standing* factors were interpreted as an *internal (product offering) focus/evaluation of market standing* factor and as an *external focus/evaluation of market standing* factor. The items were subsequently grouped on the common themes derived from the loading pattern in the pattern matrix and second-order confirmatory factor analysis was conducted. The statistical significance of the indirect effects of the second-order factor on the indicator variables was evaluated. In all cases the indirect effect of the second-order factor on the composite indicators were found to be statistically significant ($p<.05$). This justifies the use of the individual items of these three subscales as indicators of the second-order *effort* and *counterproductive work behaviour employee satisfaction*, *market standing* and *high-performance culture* outcomes.

The fit of the Work Unit Outcome Questionnaire measurement model was evaluated to determine the extent that the indicator variables (item parcels) successfully operationalise the latent variables in the model. The overall goodness of fit of the measurement model was tested through structural equation modelling (SEM). Various indices were interpreted to evaluate the goodness of fit of the measurement model and it was found that the measurement model fitted the data reasonably well in the sample, approximating close fit. The close fit null hypothesis was not rejected ($p>.05$).

Important to note is that no large percentage of statistically significant (p<.01) modification index values were found for the off-diagonal elements of Θ_δ. The presence of a broad, general performance factor in addition to the conceptualised narrow, more specific performance dimensions was therefore not indicated.

All the item parcels loaded statistically significantly (p<.05) on the latent variables they were designed to reflect. Therefore, all the lambda null hypotheses were rejected. Furthermore, the values of the squared multiple correlations were high (>.50), except for PE_2 and HPC_2 (R^2=.463 and R^2=.492). More so, PE_2 and HPC_2 were further flagged as a problematic indicator of their respective latent variable as more variance (.536 and .507) was explained by measurement error than was explained by the latent variables that these indicators were designed to reflect. Discriminant validity was not indicated as a problem.

There appeared to be sufficient evidence to conclude that the operationalisation of the latent variables in the WUCQ and WUOQ measurement models was adequately successful. Therefore, further analysis of the Work Unit Performance structural model was allowed with the aim of investigating the relationship between the latent variables.

6.4.2 Results of the Comprehensive Work Unit Performance LISREL Model

The WUPQ measurement model demonstrated close fit (p>.05). The measurement model parameter estimates were interpreted to warrant the evaluation of the WUPQ structural model by fitting the comprehensive WUPQ LISREL model. The initial comprehensive work unit performance LISREL model did not converge. An inadmissible solution was obtained due to a statistically significant (p<.05) negative structural variance estimate. Various solutions to circumvent the problem were tried. Specifying various starting values did not solve the problem. The paths from *core people processes* and *climate* to *satisfaction* were subsequently fixed to .35. The comprehensive work unit performance LISREL model in which the paths from *core people processes* and *climate* to *satisfaction* were fixed to .35 converged. The model, however, still returned an inadmissible negative structural error variance estimate for the *satisfaction* latent outcome variable and a negative measurement error variance estimate for the EGB_2 composite indicator variable. Both the structural variance estimate and the measurement variance estimate, however, no longer deviated statistically significantly ($p>.05$) from zero. It was therefore argued that, just as much as any (admissible) statistically insignificant ($p>.05$) parameter estimate should not be interpreted in terms of value or sign, so too the negative sign associated with these estimates should not be interpreted. Consequently, it was decided to interpret the fit statistics. The structural model fit was considered sufficient to warrant the interpretation of the structural model parameter estimates and to test the path-specific hypotheses.

Support was found for the following 5 of the original 10 beta hypotheses:

- Path-specific substantive hypothesis 8: An increase in the *production and efficiency* (η_1) of the work unit will improve the *market standing* (η_4) of the work unit.
- Path-specific substantive hypothesis 11: A competitive *market standing* (η_4) of the work unit will encourage the *future growth* (η_5) of the work unit.
- Path-specific substantive hypothesis 20: An increase in the *production and efficiency* of a work unit (η_1) will have an impact on the *high-performance culture* of a work unit (η_6).
- Path-specific substantive hypothesis 21: An increased *satisfaction* (η_3) will increase the *effort* of the members in the work unit (η_7).
- Path specific substantive hypothesis 25: An increase in the *task performance* (η_9) of the work unit will increase the *production and efficiency* (η_1) of the work unit.

Henning et al. (2004), in contrast to the current study, did not find support for the effect of *production and efficiency* of *market standing*. Theron et al (2004) did though find support for the effect of *production and efficiency* on *market* *reputation* as a dimension of market standing[49]. Henning et al. (2004), like the current study, found support for the effect of *market standing* on *future growth*. The find that *task performance* effected *production and efficiency* was gratifying since *task performance* really constitutes the core of the work unit performance construct. The elation was, however, seriously dampened by the concern over the discriminant validity with which the WUPQ measured the two unit performance dimensions involved.

Therefore, support was not found for the following 5 of the original 10 beta hypotheses:

- Path-specific substantive hypothesis 9: A beneficial *climate* (η_2) will increase the *task performance* (η_9) of a work unit.
- Path-specific substantive hypothesis 10: Heightened *satisfaction* (η_3) will provide a productive *climate* (η_2)
- Path-specific substantive hypothesis 22: A positive *high-performance* work unit *culture* (η_6) will improve the *task performance* of the work unit (η_9).
- Path-specific substantive hypothesis 23: An increase in the *effort* (η_7) of the work unit will improve the *task performance* (η_9) of the work unit.
- Path specific substantive hypothesis 24: An increase in *production and efficiency* (η_1) of the work unit will encourage *future growth* (η_5)

The lack of support for the first two hypotheses was rather unexpected and surprising. Henning et al. (2004) obtained support for the effect of *climate* on *production and efficiency*. Henning et al. (2004) also found support for the effect of *satisfaction* on *climate*. Especially hypothesis 23 seemed to have been rooted in sound theorising. The lack of support for hypothesis 24 is less disconcerting since the indirect effect of *production and efficiency* of the work unit on *future growth* via the *market standing* of the work unit still allows *production and efficiency* to affect *future growth* albeit indirectly. One possible explanation for the finding on hypothesis 23 is that it oversimplifies the

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[49] Spangenberg and Theron (2002) found that the market standing subscale subdivided in an exploratory factor analysis into two unidimensional subscales, namely market dominance subscale. and a market reputation subscale. The first dimension referred to market share, competitiveness in markets and the diversity of markets whereas the second dimension referred to competitiveness and diversity of products or services customer satisfaction and a reputation for adding value.

psychological mechanism actually at work. Effort refers to the extent to which the work unit devotes constant attention towards work, uses resources like time and care in order to be effective on the job, shows willingness to keep working under detrimental conditions and spends the extra effort required for the task. It might be that work unit competency potential variables (like for example *capacity* or *wealth of resources*) need to be brought into play as well in interaction with *effort*. In addition, it needs to be considered that the foregoing findings mean that *effort* and *climate* do not statistically significantly explain variance in *production and efficiency* when statistically controlling for the effect of *innovation* and *core people processes*.

Furthermore, support was found for the following 6 of the original 12 gamma hypotheses:

- Path-specific substantive hypothesis 4: A high level of *core people processes* (ξ_1) will increase the *task performance* (η_9) of the work unit.
- Path-specific substantive hypothesis 6: Improved *core people processes* (ξ_1) will increase the *satisfaction* of the work unit (η_3).
- Path-specific substantive hypothesis 13: An increase in *counterproductive work behaviour* (ξ_2) will decrease *employee green behaviour* (η_8).
- Path-specific substantive hypothesis 15: *Citizenship behaviour* (ξ_3) will increase *employee green behaviour* (η_8).
- Path-specific substantive hypothesis 18: *Innovation* (ξ_4) will encourage the *future growth* (η_5) of the work unit.
- Path-specific substantive hypothesis 19: *Innovation* (ξ_4) will increase the *employee green behaviour* (η_8).

Henning et al. (2004), like the current study, did find support for the effect of *core people processes* on *production and efficiency* and for the effect of *core people processes* on *satisfaction.* The current study, in contrast to Henning et al. (2004) found that the effect of *core people processes* on *production and efficiency* was mediated by *task performance.* The concern over the discriminant validity with which the WUPQ measured the *production and* *efficiency* and *task performance work* unit performance dimensions seriously attenuated confidence in this latter finding though.

Support was not found for the following 6 hypotheses:

- Path-specific substantive hypothesis 7: Increased *core people processes* (ξ_1) will encourage *future growth* in the organisation (η_5).
- Path-specific substantive hypothesis 12: An increase in *counterproductive workplace behaviour* (ξ_2) will negatively influence *high performance culture* of the work unit (η_6).
- Path-specific substantive hypothesis 14: Increased *citizenship behaviour* (ξ_3) will positively influence the *high-performance culture* of the work unit (η_6).

  Path-specific substantive hypothesis 5: An increase in *core people processes* (ξ_1) will provide a strengthened *climate* of the work unit (η_2).
- Path-specific substantive hypothesis 16: *Innovation* (ξ_4) will encourage the *task performance* (η_9) of a work unit.
- Path-specific substantive hypothesis 17: *Innovation* (ξ_4) will improve the *market standing* of the organisation (η_4).

Henning et al. (2004), like the current study, did not find support for the effect of *core people processes* on *future growth*. They did, however, in contrast to the current study, find support for the effect of *core people processes* on *climate*. The negative finding on hypothesis 17 only means that no support was found for a direct effect of *innovation* on *market standing*. The current study did find support that *innovation* indirectly effects *market standing* via the mediating effect of *production and efficiency*.

6.5 PRACTICAL IMPLICATIONS

In the implementation of the proposed model, practitioners will be able to assess the work unit performance through the evaluation of the suggested competencies in the WUCQ and outcome variables in the WUOQ. Once the level of performance for any given organisational unit is established on the various competencies and outcome variables and the variables are identified that the work unit performs relatively poorly on, the practitioner, using the organisational work unit performance model, will be able to determine the competencies and outcomes that require improvement.

It is acknowledged that the practical use of the current model is restricted and any practitioner that uses the current model must do so with caution. This low applicability is due to the omittance of the competency potential latent variables and the situational variables. If the model were to include these variables through future research, the comprehensiveness of the model would allow the derivation of more specific diagnoses and interventions on how the affect an increase in the level of competence on specific competencies and through that in specific outcomes. The current work unit performance structural model is nonetheless not without practical value in that it:

- Offers the possibility of developing a comprehensive understanding of the performance of a work unit; and
- Allows the verification of performance problems in specific competencies or outcomes by demonstrating problems in up-stream competencies and/or down-stream outcomes.

6.6 LIMITATIONS

There are a few limitations that need to be considered. Firstly, a pre-test should have been done on the WUCQ and WUOQ with the aim of refining and deleting poor items in order to avoid issues of validity and reliability when the final model is analysed. This should have ideally been conducted in an identical manner to the testing of the final model analysis.

However, the current research study did not conduct a pre-test, on the newly developed items, due to several resource constraints. The psychometric integrity of the selected measurement instruments was therefore only empirically evaluated for the first time as part of the final model analysis. The same data that was used to psychometrically evaluate (and possibly refine) the newly developed scales was therefore also used to empirically evaluate the measurement and structural models. This is acknowledged as a methodological limitation.

The fitting of the WUCQ and WUOQ measurement models with item parcels rather than individual items as indicator variables is also acknowledged as a methodological limitation. In the evaluation of the construct validity of the two scales the interest resides in the individual items and the extent to which each of them individually satisfactorily perform the task assigned to them of reflecting the specific latent work unit performance dimension. Problematic items may be hiding away in item parcels.

Discriminant validity was evaluated for both the WUCQ measurement model and the WUOQ measurement model. Discriminant validity was evaluated by establishing whether any extreme ϕ_{ij} estimates were obtained that exceeded .90 and whether any 95% confidence interval calculated around ϕ_{ij} contained 1. The current study did not calculate the average variance extracted (AVE) for each latent performance dimension and consequently was unable to compare the AVE_i and AVE_j with ϕ^2_{ij}. This is acknowledged as a methodological limitation. AVE_i reflects the average proportion of variance in the indicator variables that is accounted for by ξ_i that the indicator variables were tasked to represent (Diamantopoulos & Siguaw, 2000). Farrell (2010) argues that AVE_i and AVE_j should be greater than .50 and should be greater than ϕ^2_{ij}. His argument is that the latent variable should account for more variance in the indicators that were tasked to represent them than measurement variance. Secondly the argument is that ξ_i should account for more variance in the indicator variables that it was tasked to reflect than it explains in ξ_j.

The decision to continue with the interpretation of the goodness of fit statistics of the comprehensive WUPQ LISREL model despite the negative structural error variance estimate for the *satisfaction* latent outcome variable and a negative measurement error variance estimate for the EGB_2 composite indicator variable is acknowledged as a methodologically contentious decision. The current study argued that the interpretation of statistically insignificant (p>.05) parameter estimates should be applied consistently. The evaluation of the statistical significance of parameter estimates involves the testing of the null hypothesis that sets the value of the parameter to zero (in the population). If the probability of the sample estimate for the parameter condition on H0, exceeds a critical value (.05), the null hypothesis cannot be rejected/questioned. Hence when a parameter estimate is found to be statistically insignificant (p>.05) the position that the parameter is zero should not be questioned and nothing should be read into the numerical value (and sign) of the estimates.

Furthermore, the data was collected by means of self-report measuring instruments. According to Babbie and Mouton (2002), this method of data collection is frequently used in social science research, but nonetheless, poses a few disadvantages. Firstly, the problem of common method variance exists. More specifically, the inferences made by the researcher may be artificially inflated. Secondly, self-report data is more susceptible to response biases from the respondents. One such response bias that is very common is social desirable responding.

Lastly, the use of Facebook as a data collection method could be a limitation. More specifically, a very specific pool of participants was invited to take part in this study, and the sample was restricted in terms of age, geographical residency, level of education and native languages. Therefore, it is a consideration if the sample is a representation of the economically active population in South Africa, which one would ideally want in a research study like this.

However, the use of Facebook had some advantages. Firstly, it enabled the researcher to tap into a pool of possible participants from various industries and occupations, which would not have easily have been obtained by other data collection methods. This variety further allowed for less contaminated inferences, as the data was not uniformly influenced by organisation specific factors, such as a unique culture that is embedded within an organisation. It could, therefore be argued that the data collection method allowed for more valid inferences for a generic measure of work unit performance. It also had the benefit of accumulating a relatively large sample in a short period of time (Boers 2014).

6.7 RECOMMENDATIONS FOR FUTURE RESEARCH

Throughout the research proposal, the suggestions for future research have been proposed or at least hinted. These suggestions have been based on the domains that have been omitted, namely: the competency potential latent variables and the situational variables. It is hoped that in the addition of these variables to the proposed partial work unit competency model, a greater understanding will occur of the determinants that shape the level of work unit performance that organisational units achieve which will further the field of industrial psychology and inform human resource interventions.

As the topic for this research proposal was decided on through a culmination of previous research on work unit performance and, in particular, the suggestions made by Theron and Spangenberg (2016), it is necessary to share the insight gained on the topic for future research. It is hoped that by sharing the knowledge acquired, the possibility of fruitful future research will be increased.

6.7.1 Proposed Additional Variables

It is a difficult process to decide on the variables that should be included in a competency model and one always feels that it is never entirely complete. However, the researcher has to find a tricky balance between the complexity and practical usability of the model. The variables that were suggested for inclusion in the current organisational work unit performance model (or the partial organisational work unit competency model) were, in the mind of the researcher, the most pertinent work unit competencies and outcome variables.

To encourage the process of cumulative research, suggestions will be made on additional competency potential latent variables that should be considered in future research.

6.7.1.1 Proposed additional competency potential latent variables

For the purpose of future research, it is suggested that competency potential latent variables (rather than situational latent variables) should be firstly added to the current organisational work unit performance model to start creating the comprehensive work unit competency model. It is moreover proposed that the PI variables of Spangenberg and Theron (2004) that the current research study classified as competency potential variables should be used as a starting point. The variables that were suggested in Chapter 2 for inclusion in the domain of competency potential and justified with theoretical reasoning are *adaptability* and *capacity*.

6.7.1.2 Proposed additional behavioural competency latent variables

The suggestion of additional competency latent variables for inclusion in the model for future research are based, like in the initial categorisation of Chapter 2, on the work of Myburgh and Theron (2014). The argument here remains that a work unit can be seen as a living organism, analogous to an individual employee, with specific attributes that allow it display specific degrees of competence on specific competencies and through these achieve specific outcomes.

6.7.1.2.1 Communication

The first variable that should be considered is *communication*. According to Myburgh and Theron (2014, p. 37) *communication* refers to the “extent to which the employee communicates well in writing and orally, networks effectively, successfully persuades and influences others, relates to others in a confident and relaxed manner”.

It is logical to suggest that communication is behaviour and not an outcome that an individual produces. *Communication* in a team is of upmost importance and it is necessary that each member of the work unit display at least a basic competence in communication. In the context of a work unit, special cognisance must be given to the behavioural attributes of persuasion, influencing and relating to others.

6.7.1.2.2 Self-development

Further, the dimension of *self-development* should be considered as an addition to the partial work unit performance model in future research. Myburgh and Theron (2014, p. 37) conceptualise *self-development* as “the extent to which the employee takes responsibility for his/her own career development, works on the development of job relevant competency potential and competencies, seeks opportunities for self-development and career advancement”.

Although a work unit is greater than the sum of its parts and an individual that has a high level of skill will not ensure the success of the unit, the continual improvement of all the members will improve work unit performance. A work unit that displays competence on the self-development competency could be referred to a learning organisation. What is important to note in the above definition is the idea that the work unit will improve on the relevant work unit competency potential latent variables and latent competencies. In line with this, the model, when completed, will identify the necessary areas for improvement that the self-development should focus on.

6.7.2 Fitting of the WUCQ and WUOQ Measurement Models with Individual Items as Indicators

The ideal, when evaluating the construct validity of the construct-referenced inferences derived from a multi-indicator measuring instrument is to fit the measurement model implied by the constitutive definition of the (multidimensional) construct and the design intention of the instrument with the individual items as indicator variables. The current study was unable to do so because of sample size limitations. It is recommended that the WUCQ and

WUOQ measurement models be fitted with individual items as indicators in future research.

6.8 CONCLUDING THOUGHT

Organisations are a created for a definitive purpose and goal. This man-made phenomenon has the task to provide society with products and services that sufficiently satisfy the needs of its people. In pursuit of this objective, an organisation has the duty to society of using the earth's finite and scarce resources in an efficient and effective manner. The efficiency and effectiveness with which organisations serve society to a significant degree depends on the performance of its employees. Typically, this position is interpreted to mean that organisational success is dependent on the performance of the individual employees throughout the whole organisational hierarchy. That is undeniably true. But this position should also be interpreted to mean that that organisational success is dependent on the performance of collectives of employees organised in organisational work units.

The work performance of employees should not be left to chance. Rather both the performance of individual employees and the performance of organisational work units should be purposefully and rationally managed to greater heights[50]. To do so requires (a) a valid conceptualisation as to what constitutes individual employee work performance and what constitutes organisational work unit performance, (b) reliable, construct valid and unbiased measures of individual employee work performance and organisational work unit performance and (c) a valid understanding of the manner in which competency potential latent variables and situational latent variables determine of individual employee work performance and organisational work unit performance.

The current research study modestly contributed to the achievement of these prerequisites. The current study expresses the hope that it will stimulate further

[50] This invariably raises the question *by whom*? Typically, the response would be *by (line) management assisted and advised by the human resource function*. The question should be asked though whether the typical, spontaneous response should not be *by the employees themselves as individuals and as collectives*?

research towards the development of a comprehensive organisational work unit competency model that will describe enough of the cunning logic and elegant design of the psychological mechanism regulating work unit performance (Eherenreich, 1991) to allow it to be influenced[51].

[51] This line of reasoning presupposes that (line) management, assisted and advised by the human resource function, will influence the performance of work units by diagnosing performance deficiencies via the competency model and inferring appropriate treatments/interventions from the competency model. If work unit performance should rather be managed first and foremost by the work unit itself (assisted and advised by the human resource function) a valid understanding of the psychological mechanism regulating performance would still constitute a necessary prerequisite. The question, however, then becomes whether this valid understanding would be best achieved via an explanatory structural model developed through quantitative positivistic research or whether it would be best achieved via an explanatory structural model developed through interactive qualitative analysis (Northcutt & McCoy, 2004)?

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APPENDIX A: THE WORK UNIT PERFORMANCE QUESTIONNAIRE

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THE DEVELOPMENT AND EMPIRICAL TESTING OF A REVISED PERFORMANCE INDEX

You are asked to participate in a research study conducted by Mr. Jonathan Mark Seland (BCom Hons Industrial Psychology) and Professor Callie Theron, from the department of Industrial Psychology at The University of Stellenbosch. The results of this study will contribute to the completion of the thesis component in the Masters of Commerce degree in Industrial Psychology. You were selected as a possible participant in this study because you are a manager/subordinate of a work unit in an organisation that can provide valuable input to the data gathering process of the study.

PURPOSE OF THE STUDY

Organisational performance is not only affected by the performance level achieved by individual employees but also by the performance levels achieved by organisational work units as collectives of employees. Organisational work units are therefore vital components of an organisation. Despite this, human resource management interventions, nonetheless, tend to predominantly focus on attempts to improve the performance of individual employees. In addition, organisational work unit performance is a topic that has not received the necessary attention in research.

The current study will reconceptualise organisational work unit performance through the identification of the latent organisational work unit outcomes that constitute satisfactory performance and the latent behavioural organisational work unit competencies that are hypothesised to contribute to these outcomes of the work unit. The intention is to develop a work unit competency questionnaire (WUCQ), a work unit outcome questionnaire (WUOQ) and to empirically examine the construct validity of these two questionnaires by fitting the structural model that maps the work unit competencies on the structurally interrelated work unit outcomes.

PROCEDURES

If you agree to participate in this study, we require you to complete the WUCQ and the WUOQ. The WUCQ evaluates the work units' performance on the following seven latent behavioural competencies of effort, core people processes, citizenship behaviour, counter-productive work behaviours, innovation, employee green behaviour and task performance. Further you would be required to assess the following six latent work unit outcomes through the completion of the WUOQ; production, climate, satisfaction, market standing, future growth and high performance culture.

The once-off online questionnaire will require 30 minutes of your time for completion and can be completed at a time and place that is convenient to you.

POTENTIAL RISKS AND DISCOMFORTS

There are no potential risks or discomforts foreseen if you agree to participation of this research other than the time that you will need to complete the questionnaire. Any concerns regarding the negative consequences of providing sensitive information in the evaluation of the work unit are reduced through the confidential use of results. The information obtained in the research will not be used to determine the performance levels of work units or calculate an average but rather test the hypothesised relationships between the behaviours and the outcomes of work unit performance.

All questionnaires are answered anonymously and the names and identities of branches/franchises assessed will not be disclosed. Participants will not be exposed to any risk or discomfort due to the short nature of the questionnaire and the convenience of completing it at a time and place of choice.

POTENTIAL BENEFITS TO SUBJECTS AND/OR TO SOCIETY

Participation in this study will provide the opportunity for you to assess the behaviours and outcomes of the work unit. Once completed, general feedback from the survey will be provided to you on the results of the research study. Using these results, the need for interventions on certain constructs can be identified and designed to improve the level on these constructs. We are also willing to make the WUCQ and the WUOQ available to you for future use.

The use of teams or units is a widely occurring phenomenon in society. Although this research is aimed at the work unit, it is suggested that the findings and increased knowledge from the research will contribute to the understanding of performance in the many different manifestations of teams. Further, as previously stated, the field of industrial psychology does not have a comprehensive understanding on work unit performance. It is hoped that by using this research on the behaviours and outcomes of the work unit, further research will be conducted on the potentials necessary for work unit performance.

PAYMENT FOR PARTICIPATION

No payment will be provided to you for participating of the study. You can, however, choose to anonymously enter for a competition in which you can stand a chance to win a Takealot voucher to the value of R2500.00. You can enter for the competition by clicking on a link, once you reach the end of the electronic questionnaire, which will take you to a second, independent electronic questionnaire in which will only ask for your cell phone number. The winner will be selected randomly and contacted via the cell phone number provided.

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 means of coding procedures and the safeguarding of the data will be ensured through the use of a password secure private network. Only the researchers will have access to the information provided.

The results of this study will be published in the form of an open source electronic thesis on Sun Scholar and in the form of an article in an accredited scholarly journal. The confidentiality of the participants will be maintained in the publication through not mentioning their identity. Further, the identity of the participating orgainisation will also not be revealed in the publications.

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 though closing the window in the browser. You may also refuse to answer any questions you don't want to through the not applicable (N/A) option and still remain in the study. The investigator may withdraw you from this research if circumstances arise which warrant doing so.

IDENTIFICATION OF INVESTIGATORS

If you have any questions or concerns about the research, please feel free to contact Jonathan Mark Seland (jonathanseland@gmail.com/ 0767837082) or Prof. C.C Theron (ccth@sun.ac.za/ 0842734139).

RIGHTS OF RESEARCH SUBJECTS

You may withdraw your consent at any time and discontinue participation without penalty. You are not waiving any legal claims, rights or remedies because of your participation in this research study. If you have questions regarding your rights as a research subject, contact Ms Maléne Fouché [mfouche@sun.ac.za; 021 808 4622] at the Division for Research Development at Stellenbosch University

***I have read and understand the information provided and voluntarily consent to participate in the research under the stipulated conditions.**

- Yes
- No

Biographical information

Thank you for agreeing to participate.
The work unit is defined as a temporary or permanent organisational entity that operates in a private, state-owned or not-for-profit organisation. The size of these work units varies from a small team consisting of a leader and three subordinates to a department within a company that is comprised of a large number of individuals. In other words, the work unit is the unit (branch/franchise/department) that you are responsible for.

Please select the appropriate response to describe the work unit.

***Industry**

- Retail
- Financial services
- Banking
- Communication
- Education
- Information technology
- Food and beverage
- Non-profit
- Consulting
- Other:

***Province**

- Gauteng
- Western Cape
- Eastern Cape
- KwaZulu-Natal
- Northern Cape
- Limpopo
- Mpumalanga
- North West
- Free State

***Number of members in the work unit**

- Less than 10
- 10-30
- 30-50
- 50+

***Are you a manager or subordinate?**

- Manager
- Subordinate

Procedure

The questionnaire consists of 13 sections and each question is written in the format of a rating scale. It is estimated that it will require 30 minutes of your time and you can track your progress on the progress bar. Please answer the questions honestly and select the not applicable option (N/A) as seldom as possible. If required, the questionnaire can be saved and completed at a later stage.

Work Unit Competency Questionnaire (WUCQ)

Organisational work units exist to achieve specific results or outcomes. To achieve these results the work unit needs to act in specific ways. The organisational work unit can be thought of as an organism that, similar to an individual, displays specific behaviours that allows it to achieve specific results. Please rate your organisational work unit in terms of the extent to which it displayed the following behaviours [or competencies] over the past six months by choosing the most appropriate response option.

Innovating

The extent to which the work unit displays creativity, not only in the prescribed job but also on behalf of the whole organisation, shows openness to new ideas and experiences, handles novel situations and problems with innovation and creativity, thinks broadly and strategically in order to support and drive desired organisational change.

*Creativity

The work unit consistently displays a lack of imagination, originality and inventiveness, not only on the team job, but also on behalf of the whole organisation.		The work unit displays some originality, inventiveness and creativeness, not only in the job but also on behalf of the whole organisation.		The work unit consistently displays exceptional originality, inventiveness, and creativeness, not only on the teams job but also on behalf of the whole organisation.	
1	2	3	4	5	N/A

*Oppeness

The work unit consistently resists and attempt to avoid new ideas and experiences.		The work unit is open to ideas and experiences.		The work unit consistently search for, investigate and explore new ideas and experiences.	
1	2	3	4	5	N/A

***New problems**

The work unit consistently tries to fix inappropriate existing solutions to new problems.		The work unit sometimes finds innovative and creative solutions to new problems.		The work unit consistently find innovative and creative solutions to new problems.	
1	2	3	4	5	N/A

***Change**

The work unit almost never suggests ways of improving the way work is done; the team is content with the way work is done.		The work unit regularly suggests ways of improving.		The work unit continuously suggests innovative and creative ways of improving the way work is done.	
1	2	3	4	5	N/A

***Open-mindedness**

The work unit consistently thinks narrowly, short-term and operationally.		The work unit sometimes thinks broadly, long term and strategically.		The work unit consistently thinks broadly, long-term and strategically.	
1	2	3	4	5	N/A

***Brainstorming**

The work unit consistently comes up with only a limited range of obvious and unimaginative alternatives.		The work unit sometimes comes up with some unusual but thought-provoking alternatives.		The work unit consistently comes up with a broad range of unusual but thought-provoking alternatives.	
1	2	3	4	5	N/A

***Exploration**

The work unit almost never explores unfamiliar terrain to identify "white space/ blue ocean" business opportunities.		The work unit occasionally explores unfamiliar terrain to identify "white space/ blue ocean" business opportunities.		The work unit consistently explores unfamiliar terrain to identify "white space/ blue ocean" business opportunities.	
1	2	3	4	5	N/A

***Improvement**

The work unit almost never reflects on possible ways of improving the way work is done.		The work unit sometimes reflects on possible ways of improving the way work is done.		The work unit continuously reflects on possible ways of improving the way work is done.	
1	2	3	4	5	N/A

Effort

The extent to which the work unit devotes constant attention towards work, uses resources like time and care in order to be effective on the job, shows willingness to keep working under detrimental conditions and spends the extra effort required for the task.

*Time

1	2	3	4	5	N/A
The work unit regularly works less hours than required.		The work unit regularly works the required hours, rarely less, seldom more.		The work unit regularly works longer hours than required.	

*Care

1	2	3	4	5	N/A
The work unit tends to be negligent; the work needs a lot of correction.		The work unit gives reasonable attention to detail but the work often still needs some correction.		The work unit gives a lot of attention to detail; the work needs almost no correction.	

*Perserverance

1	2	3	4	5	N/A
When circumstances gets tough the work unit gives up.		The work unit keeps going as long as the circumstances are reasonably good.		When the circumstances are tough, the work unit keeps going.	

*Effort

1	2	3	4	5	N/A
The work unit can be counted on not to exercise extra effort if the task would need it.		The work unit sometimes would exercise extra effort if the task would need it but not always.		The team can be counted on to exercise extra effort if the task would need it.	

*Commitment

1	2	3	4	5	N/A
The work unit shows a lack of commitment to the work.		The work unit are neither uncommitted nor really committed.		The work unit shows passionate commitment to the work.	

*Energy investment

1	2	3	4	5	N/A
The work unit invests very little energy into the work.		The work unit invests only the energy that is necessary to get the job done.		The work unit invests more energy than is necessary in the work.	

*Dedication

The work unit demonstrates no dedication to work.		The work unit demonstrates some dedication to work.		The work unit demonstrates high dedication to work.	

Counterproductive Workplace behaviour

The extent to which the members in the work unit display behaviour that threatens the wellbeing of an organisation, shows unwillingness to comply with organisational rules, interprets organisational expectations incorrectly, fails to maintain personal discipline, is absent from work, not punctual, steals, misuses drugs, displays confrontational attitudes towards co-workers, supervisors, and work itself, his/her behaviour hinders the accomplishment of organisational goals.

*Organisational wellbeing

1	2	3	4	5	N/A
The work unit displays behaviour that threatens the well-being of the organisation.		The work unit occasionally displays behaviour that promotes the well-being of the organisation.		The work unit frequently displays behaviour that promotes the well-being of the organisation.	

*Organisational rules

1	2	3	4	5	N/A
The work unit tends to disobey organisational rules and ignore procedure.		The work unit generally obeys organisational rules and procedures.		The work unit diligently submits to organisational rules and procedures.	

*Personal discipline

1	2	3	4	5	N/A
The work unit shows poor personal discipline.		The work unit shows reasonably good personal development.		The work unit shows excellent personal discipline.	

*Confrontation

1	2	3	4	5	N/A
The work unit is difficult to get along with: they tend to be involved in destructive interpersonal conflict with other members and superiors.		The work unit gets along with most: they are seldom involved in destructive interpersonal conflict with other members and superiors.		The work unit gets along well with almost everybody: they succeed in keeping out of-destructuve inter-personal conflict with colleagues and superiors.	

*Trouble

1	2	3	4	5	N/A
The work unit tends to be in trouble for disobeying the disciplinary code of the organisation.		The work unit generally avoids disobeying the disciplinary code of the organisation.		The work unit diligently avoids disobeying the disciplinary code of the organisation.	

*Instructions

1	2	3	4	5	N/A
The work unit intentionally or through carelessness fail to execute lawful instructions.		The work unit generally executes lawful instructions.		The work unit diligently executes lawful instructions.	

*Sexual harassment

The work unit tends to treat members of the opposite sex with disrespect: they tend to abuse

The work unit generally treats members of the opposite sex with respect: they generally

At all times the work unit treats members of the opposite sex with respect: they do not abuse

relationships.		do not abuse relationships.		relationships with colleagues.	
1	2	3	4	5	N/A

***Theft**

The work unit tends to inappropriately use and/or take organisational property for themselves.		The work unit generally avoids the inappropriate use and theft of organisation property.		The work unit carefully avoids the inappropriate use and theft of organisation property.	
1	2	3	4	5	N/A

***Substance abuse**

Substance abuse tends to interfere with the work units performance at work.		The work unit generally avoids substance abuse at work.		The work unit is never guilty of substance abuse at work.	
1	2	3	4	5	N/A

***Bullying**

The work unit tends to bully colleagues.		The work unit generally avoids bullying colleagues at work.		The work unit never bullies colleagues at work.	
1	2	3	4	5	N/A

Organisational Citizenship Behaviour

The extent to which the members of the work unit display voluntary behaviour contributing towards the overall effectiveness of the organisation, volunteers to carry out task activities that are not formally part of the job description, follows organisational rules and procedures, endorses, supports, and defends organisational objectives, shows willingness to go the extra mile, voluntary helps colleagues with work, shows willingness to tolerate inconveniences and impositions of work without complaining, is actively and constructively involved in organisational affairs.

***Helping behaviour**

The work unit very seldom helps colleagues with work problems unless explicitly instructed to do so.		The work unit sometimes helps colleagues with work problems without being instructed to do so.		The work unit regularly helps colleagues with work problems without being instructed to do so.	
1	2	3	4	5	N/A

***Sportsmanship**

The work unit tends to complain and become negative when faced by an unavoidable inconveniences and burdens arising from work.		The work unit tolerates unavoidable inconveniences and burdens arising from work.		The work unit maintains a positive attitude despite unavoidable inconveniences and burdens arising from work.	
1	2	3	4	5	N/A

***Organisational loyalty**

The work unit criticises, opposes		The work unit refrains from		The work unit passionately	

and attacks the organisation in front of outsiders.		criticising, opposing and attacking the organisation in front of outsiders.		endorses, supports and defends the organisation outsiders.	
1	2	3	4	5	N/A

*Civic duty

The work unit shows an unwillingness to actively participate in organisational governance and to look out for the organisations' best interests.		The work unit is willing but not really keen to participate in organisational governance and to look out for the organisation's best interests.		The work unit shows a keen willingness to actively participate in organisational governance and to look out for the organisations best interests.	
1	2	3	4	5	N/A

*Organisational compliance

The work unit regularly fails to submit to organisational rules and procedures.		The work unit generally follows organisational rules and procedures.		The work unit follows organisational rules and procedures to the letter at all times.	
1	2	3	4	5	N/A

*Beyond call of duty

The work unit does only what is expected. It refuses to go the extra mile.		The work unit is willing but not really keen to go beyond the call of duty and to go the extra mile.		The work unit always shows a willingness to go beyond the call of duty and to go the extra mile.	
1	2	3	4	5	N/A

*General organisational citizenship behaviour

The work unit almost never displays voluntary behaviour that is not formally part of the job description that contributes to the overall effectiveness of the organisation.		The work unit sometimes displays voluntary behaviour that is not formally part of the job description that contributes towards the overall effectiveness of the organisation.		The work unit regularly displays voluntary behaviour that is not formally part of the job description that contributes towards the overall effectiveness of the organisation.	
1	2	3	4	5	N/A

Employee Green Behaviour

Scalable actions and behaviours that the work unit engages in that are linked with and contribute to or detract from environmental sustainability.

*Conserving

The work unit does not do earth-conscious behaviours such as reducing the use of resources, reusing, re-purposing and recycling.		The work unit sometimes does earth-conscious behaviours such as reducing the use of resources, reusing, re-purposing and recycling.		The work unit always does earth-conscious behaviours such as reducing the use of resources, reusing, re-purposing and recycling.	
1	2	3	4	5	N/A

*Working sustainability

The work unit does not adapt work products and processes to minimise the negative impact on the environment.		The work unit sometimes adapts work products and processes to minimise the negative impact on the environment.		The work unit continuously adapts work products and processes to minimise the negative impact on the environment.	
1	2	3	4	5	N/A

*Avoiding harm

The work unit does not avoid harming the environment through consciously reducing pollution, monitoring environmental impact and strengthening ecosystems.		The work unit occasionally avoids harming the environment through consciously reducing pollution, monitoring environmental impact and strengthening ecosystems.		The work unit consistently avoids harming the environment through consciously reducing pollution, monitoring environmental impact and strengthening ecosystems.	
1	2	3	4	5	N/A

*Influencing others

The work unit does not educate and encourage others to adopt more sustainable behaviour.		The work unit occasionally educates and encourages others to adopt more sustainable behaviour.		The work unit consistently educates and encourages others to adopt more sustainable behaviour.	
1	2	3	4	5	N/A

*Taking initiative

The work unit is not proactive in starting programs and policies that protect the environment, does not lobby for environmental issues in the organisation and does not place environmental concerns first.		The work unit is occasionally proactive in starting programs and policies that protect the environment, occasionally lobbies for environmental issues in the organisation and sometimes places environmental concerns first.		The work unit is always proactive in starting programs and policies that protect the environment, lobbies for environmental issues in the organisation and places environmental concerns first.	
1	2	3	4	5	N/A

Task Performance

The extent to which the work unit effectively performs the foundational, substantive or technical tasks that is essential for a specific job effectively, successfully completes role activities prescribed in the job description and achieves personal work objectives.

*Production or service goals

The work unit seldom meets production goals or service goals, finds excuses for not meeting goals.		The work unit normally meets production or service goals, but does not exceed goals.		The work unit exceeds production or service goals every time.	
1	2	3	4	5	N/A

*Quantity of work output

The amount of work that the work unit delivers is below the required output.		The work unit normally delivers the amount of work required, but no more.		The work unit consistently exceeds the amount of work required; it always does more than is expected.	
1	2	3	4	5	N/A

*Quality of work output

The quality of work that the work unit delivers is substantially below the required standards.		The work unit normally delivers products or services of the required quality.		The work unit consistently exceeds the quality of work required; consistently exceeds quality standards.	
1	2	3	4	5	N/A

*Task effectiveness

The work unit performs the core tasks that are essential for the job very ineffectively, the unit uses significantly more resources than typically required.		The work unit performs the core tasks that are essential for the specific job effectively. The work unit uses the amount of resources typically required.		The work unit performs the core task that are essential for the specific job highly effectively; the work unit uses significantly less resources than typically required.	
1	2	3	4	5	N/A

*Task performance reputation for adding value

The work unit has a task performance reputation for undermining the success of the organisation.		The work unit generally has a satisfactory task performance reputation for contributing to the success of the organisation.		The work unit has an excellent task performance reputation for contributing to the success of the organisation.	
1	2	3	4	5	N/A

*Stick to the task role instructions

The members of the work unit fail to stick to the task roles prescribed by the job description.	The members of the work unit generally stick to the task roles prescribed by the	The members of the work unit fully stick to the task roles prescribed by the job description.

made by management, irrespective of where the most reliable information is located.		by people close to the source of the information. However, decisions are often made by management.		people close to the sources of the information, irrespective of where these people are situated.	
1	2	3	4	5	N/A

*Organisational interaction

The organisation or work unit functions as separate entities and there is very little interaction. The organisation has little contact with the environment.		The organisation or the work unit and its parts interact reasonably well with each other and with the broader environment.		The organisation or work unit and its parts interact with one another and with the broader environment almost all of the time.	
1	2	3	4	5	N/A

*Conflict management

There is considerable internal conflict, and inappropriate win/lose activities occur regularly. No attempts are made to resolve conflict by using problem solving methods.		There is a measure of internal conflict, and inappropriate win/lose activities occur at times. Attempts are sometimes made to resolve conflicts by using problem solving methods.		There is very little internal conflict and few inappropriate win/lose activities occur. Ongoing attempts are made to resolve conflict by using problem-solving methods.	
1	2	3	4	5	N/A

*Productive clashing of ideas

There is very little 'productive clashing' of ideas concerning tasks and projects. Time is wasted with clashes that are related to interpersonal friction.		There is a measure of 'productive clashing' of ideas concerning tasks and projects. However, energy is spent on clashes that are related to interpersonal friction.		There is a great deal of 'productive clashing' of ideas concerning tasks and projects and little energy is spent on clashes that are related to interpersonal friction.	
1	2	3	4	5	N/A

*Integrity and uniqueness of the work unit

No value is attached to maintaining the integrity and uniqueness of the work unit.		A certain degree of value is attached to maintaining the integrity and uniqueness of the work unit.		There is a shared value to enable the work unit in the organisation to maintain the integrity and uniqueness.	
1	2	3	4	5	N/A

*Learning through feedback

An action-learning process is not followed. Feedback mechanisms do not allow the work unit to learn from their own experience.		Work unit members apply action learning in their work on occasion. Sometimes feedback enables the work unit to learn from experience.		Work unit members mostly work in an action-learning manner. Feedback enables individuals and groups to learn from experience.	
1	2	3	4	5	N/A

*Applying reward systems

Managers and supervisors are not rewarded and punished according to profit or		Managers and supervisors are rewarded and punished inconsistently		Managers and supervisors are rewarded and punished according to profit or	

of subordinates and for creating a variable working group.		performance, growth of subordinates and for creating a viable working group.		of subordinates and for creating a viable working group.	
1	2	3	4	5	N/A

Work Unit Outcome Questionnaire (WUOQ)

Organisational work units exist to achieve specific results or outcomes. Please rate the extent to which your work unit has achieved the following outcomes over the past six months by marking the response option that best describes the achievements of your unit.

Production and Efficiency

The extent the work unit reaches quantitative outputs such as meeting goals, quantity, quality and cost-effectiveness, and task performance.

*Production or service goals

The work unit seldom reaches production or service goals, seeks excuses for non-achievement of goals.		The work unit normally reaches production or service goals, but does not exceed the goals.		The work unit exceeds production or service goals in time every time.	
1	2	3	4	5	N/A

*Quality of product or service

The work units quality of product or service seldom reaches the required standard.		The work unit normally produces product and service of the required quality.		The work unit consistently exceeds quality standards.	
1	2	3	4	5	N/A

*Amount of work output

The amount of work that is produced by the work unit is far below the required output.		The work unit produces the amount of work that is required, but no more.		The work unit always exceeds the amount of work that is required, consistently does more than expected.	
1	2	3	4	5	N/A

*Cost-effectiveness of unit core processes

The cost-effectiveness of the work units core processes is well below budget.		The cost-effectiveness of the work unit core processes is normally within budget.		The cost-effectiveness of the work units core processes is significantly better than what was budgeted for.	
1	2	3	4	5	N/A

*Work performance

The work performance of the work unit is considerably below the required standard.		The work unit normally produces satisfactory work performance.		The work unit produces high work performance.	
1	2	3	4	5	N/A

Work unit Climate

The psychological environment of the unit, and gives an overall assessment of the integration, commitment and cohesion of the unit. It includes working atmosphere, teamwork, work group cohesion, agreement on core values and consensus regarding the vision, achievement-related attitudes and behaviours and commitment to the unit.

*Warmth and friendliness of the work atmosphere

1	2	3	4	5	N/A
Relationships between staff members are strained and the atmosphere in the workplace is cold and hostile.		The atmosphere in the workplace is normally warm and friendly and people generally get on well.		Relationships between staff members are very warm and friendly; a pleasant productive atmosphere prevails in the workplace.	

*Harmony, integration and teamwork

1	2	3	4	5	N/A
The different parts of the work unit are poorly integrated and there is very little harmony and teamwork.		Satisfactory integration exists between parts of the work unit and there is normally harmony and teamwork.		There is a high degree of integration between parts of the work unit, as well as considerable harmony and teamwork.	

*Cohesion in the work uint

1	2	3	4	5	N/A
There is practically no cohesion in the work unit in terms of focus, alignment and interpersonal relationships.		There is normally sufficient cohesion in the work unit in terms of focus, alignment and interpersonal relationships.		There is great cohesion in the work unit in terms of focus, alignment and interpersonal relationships.	

*Agreement on core values

1	2	3	4	5	6 N/A
There is no clear understanding of core values. Even senior management do not apply these values consistently.		A fair degree of understanding of core values exists, but these values are not applied consistently.		There is a high degree of agreement and application of core values by individuals, work units or organisation.	

*Consensus on the vision and its achievement

1	2	3	4	5	N/A
The vision and implementation of strategies is unclear and is not communicated properly to the employees.		Consensus normally exists on the vision. Strategies and plans are not always implemented.		There is considerable consensus on the vision, as well as on the means and strategies to achieve it.	

*Performance orientated attitudes and behaviour

The attitude and behaviour of employees regarding the achievement of the work unit goals are negative.	The attitude and behaviour of employees regarding the achievement of the work unit goals are normally positive.	The attitude and behaviour of employees regarding the achievement of unit or group goals are very positive.

1	2	3	4	5	N/A

***Employee commitment to the unit**

Employees are not committed to the unit at all and they are not concerned about the vision.		Employees are normally reasonably committed to the work unit and its vision.		Employees are highly committed to the unit and its vision.	
1	2	3	4	5	N/A

Employee Satisfaction

The satisfaction with the task and work context, empowerment, and career progress, as well as with outcomes of leadership.

***Satisfaction with the work and the work context**

The work unit is not at all satisfied with their work and work context.		The work unit is generally satisfied with their work and work context.		The work unit is very satisfied with their work and work context.	
1	2	3	4	5	N/A

***Satisfaction with the quality of supervision**

The work unit is not at all satisfied with the quality of supervision.		The work unit is normally satisfied with the quality of supervision.		The work unit is very satisfied with the quality of supervision.	
1	2	3	4	5	N/A

***Satisfaction with the salary and fringe benefits**

The work unit is not at all satisfied with the salaries and fringe benefits		The work unit is generally satisfied with the salary and fringe benefits		The work unit is very satisfied with the salaries and fringe benefits	
1	2	3	4	5	N/A

***Satisfaction with career development**

The work unit The work unit The work unit

is not all satisfied with career progress and growth.		is generally satisfied with career progress and growth.		is very satisfied with career progress and growth.	
1	2	3	4	5	N/A

***Work unit empowerment**

The work unit does not feel at all sufficiently empowered to carry out tasks and to perform satisfactorily.		The work unit feels sufficiently empowered to carry out tasks and to perform satisfactorily.		The work unit feels highly empowered to carry out tasks to perform satisfactorily.	
1	2	3	4	5	N/A

***Respect for the leader**

The work unit does not at all show the expected respect for the leader.	The work unit normally shows the expected respect for the leader.	The work unit shows much respect for the leader.			
1	2	3	4	5	6 N/A

***Confidence in the leader**

The work unit does not at all show confidence in the leader.		The work unit normally shows confidence in the leader.		The work unit shows much confidence in the leader.	
1	2	3	4	5	N/A

***Satisfaction in the leader**

The work unit is not at all satisfied with the leader.		The work unit is normally satisfied with the leader.		The work unit is very satisfied with the leader.	
1	2	3	4	5	N/A

***Acceptance of the leaders influence**

The work unit does not accept the leaders influence at all in terms of their commitment to his/her values and conforming to his/her requirements.		The work unit normally accepts the leaders influence in terms of commitment to his/her values and conforming to his/her requirements.		The work unit readily accepts the leaders influence in terms of commitment to his/her values and conforming to his/her requirements.	
1	2	3	4	5	N/A

High Performance Culture

The shared perception amongst members of a unit that high and exceptional performance in everything that the unit does is the norm or expectation in the organisational unit.

***Risk taking**

1	2	3	4	5	N/A
Experimentation and risk taking is not permitted in the work unit. Mistakes are highly frowned upon.		Experimentation and risk taking are allowed, although not supported. Mistakes in the work unit are seen as failures.		Experimentation is encouraged. The work unit is supported in risk taking and mistakes are seen as an opportunity to learn.	

***Accountability**

1	2	3	4	5	N/A
The work unit has no responsibility of the results. The focus is not on achievements and there is no accountability for performance.		The work unit has some form of responsibility for results. The focus is not entirely on results and accountability is not completely clear.		The work unit is responsible for results. The focus is on the achievement of results and maintaining clear accountability for performance.	

***Ability**

1	2	3	4	5	N/A
The work unit has members with below average ability who doubt their capacity. This attitude is encouraged by the work unit and the members are kept under strict instructions.		The work unit consists of members that have ordinary ability and are skeptical of their capability. This mediocrity is cultivated and space is provided to improve although not greatly supported.		The work unit has exceptional members that have a can-do attitude. These highly talented are nurtured and encouraged to use the space to change and excel.	

***Performance-driven**

1	2	3	4	5	N/A
The work unit is not performance driven. Inertia and a mindset against winning is encouraged. The focus is not high on performance.		The work unit is partly performance driven. Inertia and members challenging the winning mindset are discouraged but not challenged. The focus is not solely on high performance but the environment allows it.		The work unit has developed and maintained a high performance culture. Inertia and members who do not have this winning mindset are challenged. High excellence is the focus and members are stimulated to achieve high performance.	

***Community**

The work unit consists of a bunch of individuals. Each member has an egotistic mentality.

The work unit has a togetherness but members are still individualistic. Members work co-cooperatively but

The work unit has a shared sense of identity and community. There is a feeling of 'corporateness' and an attitude of 'all for one

		maintain an egocentric motive.		and one for all'.	
1	2	3	4	5	N/A

***Customer orientation**

The work unit keeps customer satisfaction at a constant level. The work unit looks inward and is not responsive to customers.		The work unit has an interest in customer value. The work unit is not entirely focused on customers and is not rapidly responsive.		The work unit strives to enhance customer value creation. The focus is on what customers want and being responsive to them.	
1	2	3	4	5	N/A

***Competition**

The work unit does not compare externally. There is no interest in becoming the market leader.		The work unit has an external orientation. Although choosing to compare with the best in the market, it is often not possible to compete.		The work unit chooses to compete and compare with the best in the marketplace by always striving for relative success compared to competitors and maintaining a leading market position.	
1	2	3	4	5	N/A

Market Standing

The market share, competitiveness and market-directed diversity of products or services, customer satisfaction and reputation for adding value to the organisation.

***Market share**

The work unit is steadily losing market share against its major competitors.		The work unit maintains its market share against its major competitors.		The work unit is rapidly but steadily winning market share against its major competitors.	
1	2	3	4	5	N/A

***Competitiveness in markets**

The work unit is not at all competitive and its marketing strategies are ineffective.		The work unit is sufficiently competitive and is visibly marketing its products and services.		The work unit is highly competitive and markets its products and services in a competitive way.	
1	2	3	4	5	N/A

***Diversity of markets**

There is no diversity in the markets served by the work unit and it sticks to traditional markets.		There is some diversity in the markets that are served by the work unit.		The unit is exploiting a range of highly diverse markets.	

1	2	3	4	5	N/A

***Competitiveness of products or services**

1	2	3	4	5	N/A
The work units products or services compare poorly with those of its competitors or comparable units.		The work units products or services normally compare satisfactorily with those of its competitors or comparable units.		The work units products or services are regarded as highly competitive in comparison with those of its competitors or comparable units.	

***Diversity of products or services**

1	2	3	4	5	N/A
The work unit offers a limited range of products or services.		There is some diversity in the range of products or services offered by the unit.		The work unit offers a highly diverse range of client-directed products or services.	

***Customer satisfaction**

1	2	3	4	5	N/A
Satisfaction of internal and/or external customers is considerably below expected levels.		Satisfaction of internal and/or external customers is usually satisfactory, although complaints occur.		Satisfaction of internal and/or external customers is always excellent.	

***Reputation for adding value**

1	2	3	4	5	N/A
The work unit has a reputation for not contributing to the success of the unit or the greater organisation.		The work unit generally has a satisfactory reputation for its contribution to the success of the unit or greater organisation.		The work unit has an excellent reputation for its contribution to the success of the unit or organisation.	

Future Growth

An index of projected future performance and includes profits and market share, capital investment, staff levels and expansion of the unit.

***Profit**

1	2	3	4	5	N/A
Profit projections for the next five years are far below the present figures.		Profit projections for the next five years are in line with the present figures.		Profit projections for the next five years are considerably higher than the present figures.	

***Market share**

1	2	3	4	5	N/A
Market share projections for the next five years are far below the present figures.		Market share projections for the next five years are in line with the present figures.		Market share projections for the next five years are significantly higher than the present figures.	

***Capital investment**

1	2	3	4	5	N/A
Projected future capital investments provides for a sharp decline in growth.		Projected future capital investments provides for marginal growth.		Projected future capital investments provides for considerable growth in the course of time.	

***Staff levels**

1	2	3	4	5	N/A
No attempts are made to keep staff levels in line with the market share goals.		Ad hoc attempts are made to keep staff levels roughly in line with profit and market share goals.		Based on careful analyses, staff levels are adapted to profit and market share goals.	

***Expansion of unit**

1	2	3	4	5	N/A
No future expansion of the work unit is planned in terms if markets, products, and human and capital resources.		Slight future expansion of the work unit is planned in terms of markets, products and human and capital resources.		Large-scale future expansion of the work unit is planned in terms of markets, products and human and capital resources.	

***Would you like to participate in the lucky draw?**

- Yes
- No

Thank you for taking the survey.

APPENDIX B: ETHICAL CLEARANCE

UNIVERSITEIT
STELLENBOSCH
UNIVERSITY

NOTICE OF APPROVAL

REC Humanities Amendment Form

8 May 2018

Project number: 1208

Project Title: THE DEVELOPMENT AND EMPIRICAL TESTING OF A REVISED PERFORMANCE INDEX

Dear Mr Jonathan Seland

Your REC Humanities Amendment Form submitted on 16 April 2018 was reviewed and approved by the REC: Humanities.

Please note the following for your approved submission:

Ethics approval period:

Protocol approval date (Humanities)	Protocol expiration date (Humanities)
20 November 2017	19 November 2020

GENERAL COMMENTS:

Please take note of the General Investigator Responsibilities attached to this letter. You may commence with your research after complying fully with these guidelines.

If the researcher deviates in any way from the proposal approved by the REC: Humanities, the researcher must notify the REC of these changes.

Please use your SU project number (1208) on any documents or correspondence with the REC concerning your project.

Please note that the REC has the prerogative and authority to ask further questions, seek additional information, require further modifications, or monitor the conduct of your research and the consent process.

FOR CONTINUATION OF PROJECTS AFTER REC APPROVAL PERIOD

Please note that a progress report should be submitted to the Research Ethics Committee: Humanities before the approval period has expired if a continuation of ethics approval is required. The Committee will then consider the continuation of the project for a further year (if necessary)

Included Documents:

Document Type	File Name	Date	Version
Default	Facebook request_thesis GG_JS v2 (1)	15/04/2018	1
Default	JONATHAN SELAND RESEARCH PROPOSAL EDIT	15/04/2018	1

If you have any questions or need further help, please contact the REC office at cgraham@sun.ac.za.

Sincerely,

Clarissa Graham

REC Coordinator: Research Ethics Committee: Human Research (Humanities)

National Health Research Ethics Committee (NHREC) registration number: REC-050411-032.
The Research Ethics Committee: Humanities complies with the SA National Health Act No.61 2003 as it pertains to health research. In addition, this committee abides by the ethical norms and principles for research established by the Declaration of Helsinki (2013) and the Department of Health Guidelines for Ethical Research: Principles Structures and Processes (2nd Ed.) 2015. Annually a number of projects may be selected randomly for an external audit.

Investigator Responsibilities

Protection of Human Research Participants

Some of the general responsibilities investigators have when conducting research involving human participants are listed below:

1.Conducting the Research. You are responsible for making sure that the research is conducted according to the REC approved research protocol. You are also responsible for the actions of all your co-investigators and research staff involved with this research. You must also ensure that the research is conducted within the standards of your field of research.

2.Participant Enrollment. You may not recruit or enroll participants prior to the REC approval date or after the expiration date of REC approval. All recruitment materials for any form of media must be approved by the REC prior to their use.

3.Informed Consent. You are responsible for obtaining and documenting effective informed consent using **only** the REC-approved consent documents/process, and for ensuring that no human participants are involved in research prior to obtaining their informed consent. Please give all participants copies of the signed informed consent documents. Keep the originals in your secured research files for at least five (5) years.

4.Continuing Review. The REC must review and approve all REC-approved research proposals at intervals appropriate to the degree of risk but not less than once per year. There is **no grace period.** Prior to the date on which the REC approval of the research expires, **it is your responsibility to submit the progress report in a timely fashion to ensure a lapse in REC approval does not occur.** If REC approval of your research lapses, you must stop new participant enrollment, and contact the REC office immediately.

5.Amendments and Changes. If you wish to amend or change any aspect of your research (such as research design, interventions or procedures, participant population, informed consent document, instruments, surveys or recruiting material), you must submit the amendment to the REC for review using the current Amendment Form. You **may not initiate** any amendments or changes to your research without first obtaining written REC review and approval. The **only exception** is when it is necessary to eliminate apparent immediate hazards to participants and the REC should be immediately informed of this necessity.

6.Adverse or Unanticipated Events. Any serious adverse events, participant complaints, and all unanticipated problems that involve risks to participants or others, as well as any research related injuries, occurring at this institution or at other performance sites must be reported to Malene Fouche within **five (5) days** of discovery of the incident. You must also report any instances of serious or continuing problems, or non-compliance with the RECs requirements for protecting human research participants. The only exception to this policy is that the death of a research participant must be reported in accordance with the Stellenbosch University Research Ethics Committee Standard Operating Procedures. All reportable events should be submitted to the REC using the Serious Adverse Event Report Form.

7.Research Record Keeping. You must keep the following research related records, at a minimum, in a secure location for a minimum of five years: the REC approved research proposal and all amendments; all informed consent documents; recruiting materials; continuing review reports; adverse or unanticipated events; and all correspondence from the REC

8.Provision of Counselling or emergency support. When a dedicated counsellor or psychologist provides support to a participant without prior REC review and approval, to the extent permitted by law, such activities will not be recognised as research nor the data used in support of research. Such cases should be indicated in the progress report or final report.

9.Final reports. When you have completed (no further participant enrollment, interactions or interventions) or stopped work on your research, you must submit a Final Report to the REC.

10.On-Site Evaluations, Inspections, or Audits. If you are notified that your research will be reviewed or audited by the sponsor or any other external agency or any internal group, you must inform the REC immediately of the impending audit/evaluation.