THE DEVELOPMENT AND EVALUATION OF A GENERIC INDIVIDUAL NON-MANAGERIAL PERFORMANCE MEASURE

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

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March 2013

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DECLARATION

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ABSTRACT

The human resource function attempts to proactively and reactively affect the work performance of employees through advice, diagnosis and interventions in a manner that will benefit the quality of the product and service an organisation provides to the market. In this study a generic performance construct (that can be applied to non-managerial, individual positions), was defined based on previous studies in the area of generic performance. A South African performance measure was designed accordingly that can be used to obtain multi-rater assessments of the generic, non-managerial, individual performance construct. This questionnaire was validated by evaluating the fit of the measurement model, using confirmatory factor analysis.

Most of the data for this study was obtained from OK Furniture. A few questionnaires were completed by a non-probability sample of non-managerial personnel from a variety of organisations. The total sample size comprised of 205 respondents. Item and dimensionality analysis was performed on the 12 subscales to assess the success with which they represented the underlying performance constructs. In the item analysis two items were identified as somewhat problematic but both were judged not to be sufficiently problematic to delete them from the GPQ. Results from the dimensionality analysis showed satisfactory evidence that the items of each subscale reflect a common underlying factor. A spectrum of goodness-of-fit statistics was used to assess the measurement model fit. The hypothesis of exact fit was rejected but the hypothesis of close fit could not be rejected ($p > .05$). The position that the measurement model fits the data closely in the population was found to be a tenable position. The fit indices reflected good model fit in the sample. The measurement model parameter estimates indicated that the indicator variables represented the latent performance dimensions satisfactorily. Discriminant validity was investigated. Mixed evidence on discriminant validity was obtained.

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The sample size of this study was satisfactory when viewed from the perspective of statistical power given the method of item parcelling that was used, but a larger and more representative sample would have been preferable in that it would have allowed the GPQ measurement model to be fitted with individual items as indicator variables. Another limitation seemed to have been the language of the questionnaire. Informal feedback suggested that some respondents, especially those that are not fluent in English, struggled to fully understand all the questions.

Recommendations for future research are made.

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OPSOMMING

Die menslike hulpbronfunksie in organisasies poog om die kwaliteit van die produk of diens wat die organisasie aan die mark lewer te verbeter deur werknemers se werksprestasie proaktief en reaktief te beïnvloed deur middel van menslike hulpbronbestuursadvies, -diagnose en -intervensies. In hierdie studie is 'n generiese prestasiekonstruk gedefinieer (gerig op individuele nie-bestuursposte) gebaseer op vorige studies van generiese prestasie. Dit is hoofsaaklik gemik op individuele nie-bestuursvlak poste. 'n Suid Afrikaanse prestasiemeetinstrument is ontwikkel wat gebruik kan word om multi-beoordelaar assesserings van die generiese nie-bestuursprestasiekonstruk te verkry. Die vraelys is gevalideer deur, met behulp van bevestigende faktorontleding, die pasgehalte van die metingsmodel te ondersoek.

Die meerderheid data vir hierdie studie is verkry vanaf die OK Furniture-kettingwinkelgroep. Enkele vraelyste is ook voltooi deur 'n nie-waarskynlikheid steekproef van nie-bestuurspersoneel van ander organisasies. Die totale steekproefgrootte het bestaan uit 205 respondente. Item- en dimensionaliteit-analise is uitgevoer op die 12 subskale om die sukses waarmee hulle die onderliggende prestasiekonstrukte verteenwoordig te evalueer.

In die item-analise is twee items geïdentifiseer wat moontlik problematies kan wees maar nie sodanig problematies dat dit hul verwydering uit die GPQ regverdig het nie. Die resultate van die dimensionaliteit-analise het aangetoon dat die items van elke subskaal inderdaad redelik bevredigend 'n gemeenskaplike onderliggende faktor reflekteer. 'n Spektrum van pasgehaltestatistiek is gebruik om die pasgehalte van die metingsmodel te beoordeel. Die hipotese dat die model die data perfek pas is verwerp, maar die hipotese van benaderde passing kon nie verwerp word nie ($p > .05$). Die pasgehalte maatstawwe dui op goeie modelpassing in die steekproef. Die skattings van die metingsmodelparameters dui daarop dat die aanwyserveranderlikes die prestasie-dimensies bevredigend verteenwoordig.

Diskriminantgeldigheid is ondersoek. Gemengde bewyse van diskriminantgeldigheid is verkry.

Beskou vanuit die perspektief van statistiese krag was die steekproefgrootte van hierdie studie bevredigende (gegewe die gebruik van item pakkies) 'n Groter en meer verteenwoordigende steekproef sou egter wenslik gewees het insoverre dit die passing van die GPQ metingsmodel met individuele items sou toelaat. 'n Verdere oënskynlike beperking was die vraelys se taalgebruik. Informele terugvoer dui daarop dat sommige respondente, veral dié wat nie vlot Engels praat nie, gesukkel het om sommige vrae te verstaan.

Aanbevelings vir verdere navorsing word gemaak.

ACKNOWLEDGEMENTS

This project would not have been possible without the guidance, support and patience of Prof. CC Theron. Thank you for persevering with me! A big thank you to Jannie Horn from OK Furniture for availing your time and resources to ensure the completion of the questionnaires. I am forever grateful for the data.

I would like to thank the NRF for their financial support and their contribution towards research.

To all my friends and family who supported me in various ways, I love and appreciate you. You made this journey a lot more enjoyable. Last but not the least, this project is worship unto my Heavenly Father, and best friend. Thank you for giving me life in abundance, I'm excited for the adventures ahead.

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CHAPTER 1

INTRODUCTION, RESEARCH OBJECTIVE AND OVERVIEW OF THE STUDY

1.1   INTRODUCTION

Organisations are man-made phenomena and exist to combine and transform scarce factors of production into products and services (or components thereof) with economic utility. In performing this task the organisation is confronted with a choice of different possibilities on how to use the limited factors of production it has access to.   The organisation is guided in this choice by the economic principle, which commands, on behalf of society, that the organisation should strive to attain the highest possible output of need satisfying products and services with the lowest possible input of production factors.

The organisation is managed, operated and ran by people.   Labour is the life giving production factor through which the other factors of production are mobilised.   People are the carriers of labour as a production factor.   An organisation's human resources therefore represent a critical factor in as far as it determines the effectiveness and efficiency with which the other factors of production are utilised and managed.   This in turn, implies that the effectiveness and efficiency with which the human resources of an organisation are utilised and managed will determine the quality of the product and service an organisation provides to the market.

The human resource function attempts to proactively and reactively affect the work performance of employees through advice, diagnosis and interventions in a manner that will benefit the quality of the product and service an organisation provides to the market. Two types of interventions can be distinguished, namely human resource interventions aimed at affecting the flow of employees into, through and out of the organisation, and interventions aimed at affecting the nature/composition of the work force in their current positions. Interventions designed to affecting the nature/composition of the work force in their current positions attempt to alter the characteristics of the existing work force in their current positions or to change the characteristics of their work situation (e.g. through

training, feedback, job redesign or remuneration) with the expectation that such changes will result in increased employee performance. Interventions designed to affect the flow of employees attempt to change the quality/nature of the work force by regulating the nature of employees that are added to, removed from or reallocated in the organisation (e.g. through recruitment, selection and down-sizing). Again the expectation is that such changes in person characteristics will manifest in increased work performance.

1.1.1 PERSONNEL SELECTION

One important human resource intervention, relating to the flow of workers, is personnel selection. Assuming that only a limited number of vacancies exist, the task of the selection decision maker is in essence to identify that subgroup from the total group of applicants that would perform optimally on a valid measure of job performance (Cronbach & Gleser, 1965). In personnel selection decisions, future job performance forms the basis (i.e., the criterion) on which applicants should be evaluated so as to determine whether they should be accepted for appointment or rejected (Cronbach & Gleser, 1965). Bartram, Robertson and Callinen (2002) comments as follows in this regard:

> For too long we have been pre-occupied with the wonderful personality questionnaires
> and ability tests we have constructed to measure all sorts of aspects of human potential.
> In so doing, we have at times lost sight of why this is important. As a consequence we
> have often been puzzled by our clients' inability to see the value in what we have to
> offer. We need to realize that this inability may be due in no small part to our failure to
> address the issues that actually concern clients: performance at work and the outcomes
> of that performance. (Bartram et al., 2002, p. 17)

Information on actual job performance is, however, never available at the time of the selection decision. Performance levels will only reveal themselves once applicants have been appointed. The only alternative to random decision making (other than not to take any decision at all), would be to predict expected criterion performance from relevant, though limited, information available at the time of the selection decision and to base the selection decision on these criterion-referenced inferences. Even though it is logically impossible to directly measure the performance construct at the time of the selection decision, it can nonetheless be predicted at the time of the selection decision if: (a) variance

in the performance construct can be explained in terms of one or more predictors (b) the nature of the relationship between these predictors and the performance construct has been made explicit; and (c) predictor information can be obtained prior to the selection decision in a psychometrically acceptable format. The only information available at the time of the selection decision that could serve as such a substitute would be psychological, physical, demographic or behavioural information on the applicants[1]. Such substitute information would be considered relevant to the extent that the regression of the (composite) criterion on a weighted (probably, but not necessarily, linear) combination of information explains variance in the criterion. Thus the existence of a relationship, preferably one that could be articulated in statistical terms, between the outcomes considered relevant by the decision maker and the information actually used by the decision maker, constitutes a fundamental and necessary, but not sufficient, prerequisite for effective and equitable selection decisions.

1.1.2   COMPETENCY MODELLING

In terms of the foregoing argument personnel selection is possible because the level of performance delivered by any job incumbent is not a random event. Rather it is an expression of the lawful working of a complex nomological network of latent variables characterising the individual and his/her work environment. The fundamental question, underlying a construct orientated selection procedure (Binning & Barrett, 1989) is the deceptively simple question why differences in performance levels exist. A valid and credible explanation for the performance of a working person constitutes a fundamental and necessary but not sufficient prerequisite for an efficient and equitable personnel selection procedure. Developing and validating a construct orientated selection procedure (Binning & Barrett, 1989) thus requires the development and testing of a performance hypothesis (Ellis & Blustein, 1991; Landy, 1986) or competency model (Saville & Holdsworth, 2000; 2001).

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[1] Strictly speaking this is not true. The level of job performance achieved by specific individuals also depend on situational or environmental variables acting as main effects to explain variance in performance across positions and organizations and interacting with personal characteristics of applicants to explain variance in performance within a specific position within a specific organization. The exploitation of such interaction effects in personnel selection has seemingly not been widely considered.

Competency modelling is a rather contentious topic in Industrial Psychology (Schippmann, Ash, Battista, Carr, Eyde, Hesketh, Kehoe, Pearman, Prien & Sanchez, 2000). Moreover competency modelling is characterised by quite a bit of conceptual confusion. Competency modelling nonetheless holds the key to successful personnel selection. Competency modelling refers to the explication of a competency model. A competency model in essence is a three-domain structural model that maps a network of causally inter-related person characteristics onto a network of causally inter-related key performance areas and that maps the latter onto a network of causally inter-related outcome variables. The effect of the person characteristics on the performance dimensions and the effect of the latter on the outcome variables are in turn moderated by environmental variables. In the United Kingdom competency modelling tradition (in contrast to the United States tradition) the person characteristics would be referred to as competency potential latent variables and the key performances dimensions as competencies (Bartram, 2005). The essential components of a competency model are depicted in Figure 1.1.
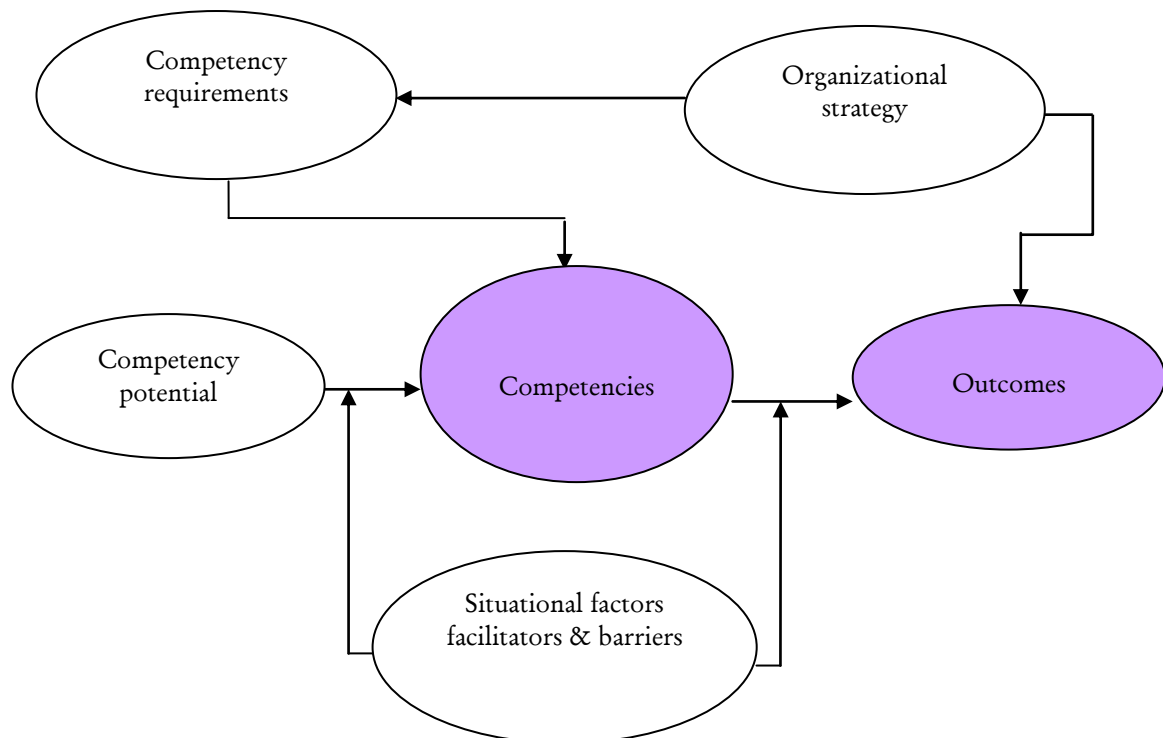
Figure 1.1   Essential components and structure of a competency model: Competency design; towards an integrated human resource management system by Saville and Holdsworth, 2000. *SHL Newsline*, March, 7-8

The performance construct forms the pivot around which all human resource management actions, and therefore also personnel selection, revolves. In its broadest sense the performance construct encompasses both competencies and outcomes (Binning & Barrett, 1989). Whether an employee is successful in his/her job could be judged in terms of the employee's behavioural actions as well as in terms of that which the employee achieves through these actions. In a narrower, more restricted sense, however, the performance construct would typically be interpreted to refer to competencies only. Competencies (in the UK tradition) are defined as: "sets of behaviours that are instrumental in the delivery of desired results or outcomes" (Bartram; 2005, p. 1187). Competencies are "individual performance behaviours that are observable, measureable and critical to successful individual or corporate performance" (Cooper, Lawrence, Kiertead, Lynch & Luce, 1998, p. 4). Competency potential in turn refers to the characteristics or abilities that enable an employee to perform effectively in the job situation.

According to Bartram (2005) competencies are what Campbell (1990) defined as performance or the actual behaviour of employees. Job performance in the more restricted Campbell (1990) sense of the term is defined as "actions or behaviours relevant to the organization's goals" (Hunt, 1996, p. 52). This definition includes both productive and counterproductive behaviours that impact the fulfilment of organisation's goals. Campbell (1990) thus explicitly differentiates between performance and the outcomes of performance. Outcomes refer to the results that the employee achieves through his/her behaviour actions and can include factors like customer satisfaction, generated profit or wastage levels. Bartram et al. (2002) distinguishes between four categories of outcomes namely economic, technological, commercial and social outcomes. Jobs are created to achieve specific outcomes. Organisational strategy will determine the specific nature of these outcomes. Competency requirements are derived from the outcomes for which the job exists. Since specific structural relationships are assumed between the job competencies and the outcomes, the competency-outcome structural model could be used as a basis to investigate the construct validity of an operational competency/criterion measure.

It is typically assumed that what constitutes performance differs from job to job. This assumption would firstly imply the need to develop specific, tailor-made competency models for each specific position. It would moreover imply the need to develop a specific performance appraisal measure for each specific position to test the merits of the competency model. This assumption consequently resulted in the development of a broad range of (criterion) measures that could serve as indicators of performance in specific job (Tubre, Arthur, Bennett, & Paul, 1996). Behavioural Observation Scales (BOS), Behaviourally Anchored Rating Scales (BARS) and Mixed Standard Rating Scales (Wexley & Yukl, 1984) are examples of these. These measures are normally developed in-house for specific positions. The assumption would thirdly imply the need to derive separate selection procedures from each job specific competency model.

Empirically testing comprehensive competency models for specific jobs would best be achieved via structural equation modelling (Diamantapoulos & Siguaw, 2000). Structural equation modelling is, however a large sample statistical technique (Kelloway, 1998). Quite often, however, the number of jobs of any specific kind that exists in any given organisation does not meet the sample size requirements set by the statistical technique to be used to evaluate the proposed model. This would therefore in the case of many jobs effectively prevent the empirical testing of comprehensive job-specific competency models. The inability to empirically evaluate job-specific competency models in turn would seriously erode the scientific credibility of human resource management actions aimed at improving employee job performance.

Inter-organisational cooperation offers a possible but somewhat impractical solution to this dilemma. An alternative solution, however, would be to argue that although performance differs from job to job on a detailed level of analysis, there does exist a sufficient correspondence between jobs on a higher level of aggregation to assume the existence of a generic non-managerial performance construct. It could be argued that globalisation and the velocity of change in the workplace necessitate the selection of personnel that can perform a diverse array of applications rather than one specialised field of expertise. Organisations need multi-skilled employees to work flexibly and adaptively in response to environmental change. As a result organisations are forced to define jobs more

broadly in order to capture broad fields of competencies rather than very specific and narrow approaches. If it would be possible to constitutively define a generic non-managerial performance construct and it would be possible to operationalise the multi-dimensional construct in terms of a generic non-managerial performance questionnaire it would facilitate meaningful progress towards an integrated comprehensive individual@work structural model[2].

A more detailed, in-depth understanding of the manner in which competency potential latent variables produce variance in employee performance will contribute towards more effective selection decisions. "There is evidence that different facets of job performance have different antecedents. That is, the attributes that lead some applicants to excel in specific aspects of performance (e.g., performing individual job tasks) appear to be different from those that lead some applicants to excel in other aspects of job performance (e.g., teamwork)" (Murphy & Shiarella, 1997, p. 852). Bartram (2004, p. 247) agrees with this statement in turn postulating "a better understanding of the factorial structure of the domain of criterion behaviours will help us to better design predictors both in terms of coverage and validity."

A valid and credible explanation for the performance of an employee constitutes a necessary but not sufficient prerequisite for an effective personnel selection procedure. A directive on how to combine information on the determinants of performance to arrive at an estimate of the performance level that could be expected from an applicant is also required.

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[2] Essentially the same argument applies with regards to managerial performance. More extensive work seems to have been done on the conceptualization and operationalization of a generic managerial performance construct though (SHL, 2000; 2001; Spangenberg, 1990). The use of a generic managerial performance construct also seems to be a more accepted idea than the use of a generic non-managerial performance construct. Essential the same argument also applies to the performance of organizational units. Although the conceptualization of a generic managerial performance construct or the conceptualization of the organizational unit performance construct, and the development and validation of generic South African performance measures to measure these constructs, could have been fruitful research avenues to pursue, this research study nonetheless chooses to focus on conceptualization and operationalization of a generic non-managerial performance construct for the reasons presented in the argument leading up to the formulation of research objective in paragraph 1.2.

1.1.3   SELECTION DECISION RULES

Criterion inferences are derived from the measurement data via a decision rule. A selection decision rule describes how predictions on criterion performance should be derived from the available test and non-test information on applicants and how these expected criterion estimates relate to accepting/rejecting the applicant. The decision whether to accept an applicant is based on the mechanically or judgementally derived expected criterion performance conditional on the available test and non-test information on applicants. Given the objective of human resource management in general and personnel selection in particular to add value, a strict top-down selection decision-rule is furthermore assumed, based on expected criterion performance.

Two types of data combination rules can be distinguished (Grove & Meehl, 1996; Kleinmuntz, 1990; Gatewood & Feild, 1994; Murphy & Davidshofer, 1988). Clinical prediction involves combining information from test scores and measures obtained from interviews and observations covertly in terms of an implicit combination rule imbedded in the mind of a clinician to arrive at a judgment about the expected criterion performance of the individual being assessed (Grove & Meehl, 1996; Gatewood & Feild, 1994; Murphy & Davidshofer, 1988). Mechanical prediction involves using the information overtly in terms of an explicit combination rule to arrive at a judgment about the expected criterion performance of the individual being assessed (Gatewood & Feild, 1994; Murphy & Davidshofer, 1988). An actuarial system of prediction represents a mechanical method of combining information, derived via statistical or mathematical analysis from actual criterion and predictor data sets, to arrive at an overall inference about the expected criterion performance of an individual (Meehl, 1957; Murphy & Davidshofer, 1988). Both clinical and mechanical combination of data requires that the nature of the relationship between the criterion and the substitute information be understood. They, however, differ in the way they develop an understanding of the criterion-information relationship and how they express this understanding. Because an actuarially derived decision rule is distilled from actual historical predictor and criterion data it should more accurately reflect the nature of the relationship that exists between the various latent predictor variables and the criterion construct than a clinically derived selection decision rule. An actuarially

derived decision rule should therefore result in more accurate selection decision making. Moreover, due to its explicit nature, a mechanical, and specifically then an actuarially derived mechanical decision rule, should also be more consistently applied than the latter.

Reviews of studies on the accuracy of clinical and actuarial prediction support the foregoing conclusions and suggest that clinicians very rarely make better predictions in comparison with actuarially derived prediction methods, that statistical methods are in many cases more accurate in predicting relevant criteria than highly trained clinicians, and that clinical judgement should be replaced, wherever possible, by mechanical methods of integrating the information used in forming predictions (Dawes & Corrigan, 1974; Dawes, 1971; Goldberg, 1970; Grove & Meehl, 1996; Kleinmutz, 1990; Meehl, 1954; 1957; Murphy & Davidshofer, 1988).

1.1.4   JUSTIFYING THE SELECTION DECISION RULE

It is this (clinical or mechanical) selection decision rule that should be evaluated psychometrically and not in the final analysis the individual instruments that supply the selection rule with information. The permissibility of the criterion inferences derived via the selection decision rule should firstly be evaluated in terms of its predictive validity - in other words in terms of the correspondence that exists between the criterion inferences made via the decision rule from the available predictor information and the actual criterion performance achieved.

Demonstrating that the criterion inferences made via the (clinical or mechanical) decision rule from the available predictor information correlate significantly with the actual criterion performance achieved, however, constitutes insufficient evidence to justify a selection procedure. If the selection decision rule demonstrates predictive validity the question arises whether the selection decision rule under investigation is worth implementing in comparison to an alternative (possibly currently existing) rule. Utility analysis (Boudreau, 1989; 1991; Brogden, 1949; Cascio, 1991(b); Cronbach & Gleser, 1965; Naylor & Shine, 1965; Taylor & Russell, 1939) aims to provide an answer to this question in terms of various indices for judging worth. The final question is whether the manner in

which applicants will be assigned to a specific treatment (accept or reject) based on criterion inferences derived from available predictor information, can be considered fair. Stated differently, the question is whether the decision strategy will directly or indirectly put members of specific applicant groups at an unfair, unjustifiable disadvantage.

1.1.5   PREREQUISITES FOR JUSTIFYING THE SELECTION DECISION RULE

To empirically examine the permissibility of the criterion inferences derived via the selection decision rule, to examine the fairness of the decision rule and to examine the utility of the decision rule requires that the selection decision rule be applied in dummy selection under conditions where the actual criterion performance is known. Under these conditions the permissibility of the criterion inferences the fairness of the inferences and the utility of the decision rule can be determined because $E[Y|X_i]$, the treatment allocation and the actual criterion state Y are all known. The verdict on the validity, fairness and the utility of the selection decision rule based on the results of the dummy selection trial run will, however, only be statistically credible if the criterion and predictor measures can be obtained for a sufficiently large sample of cases. Statistical power is a matter of particular concern for the statistical analyses required to ensure valid, fair, utility maximising selection. Typically the Cleary interpretation (Cleary, 1968) would underpin the evaluation of selection fairness and consequently moderated regression (Bartlett, Bobko, Mosier & Hannan, 1978; Berenson, Levine & Goldstein, 1983; Lautenschlager & Mendoza, 1986) would be used to establish whether the group variable significantly explains variance in the criterion when included in a regression model (as a group main effect and/or as a group*predictor interaction effect) that already includes the predictor. The evaluation of predictive bias by means of moderated multiple regression analysis is, however, plagued by statistical power problems (Aguinis, 1995; Aguinis & Stone-Romero, 1997; Aguinis, Beaty, Boik & Pierce, 2005) that increases the risk of Type II errors. Ensuring an adequate sample size thereby becomes that more important.

Normally it would be assumed that the constitutive definition of the criterion construct is unique for each specific job. It would be typically assumed that what constitutes performance differs from job to job. This assumption resulted into a broad range of

specific measures in the field that serve as specific indicators of performance (Tubre, Arthur, Bennett, & Paul, 1996). If the constitutive definition of the criterion construct is unique for each specific job, separate validation studies has to be performed for each job utilising a job specific performance measure as the criterion.

If a limited number of positions for a specific job exists in any given organisation, such an empirical validation study then becomes technically unfeasible because of the small sample size. At the same time it would imply the inability to develop an actuarial decision rule to start with. The inability to actuarially derive and to empirically evaluate the psychometric credentials of the decision rule has serious practical consequences that extend beyond the risk of not being able to justify a selection procedure should it be challenged in terms of employment equity legislation (Republic of South Africa, 1998). The inability to actuarially derive and to empirically evaluate the selection decision rule negatively affects the validity, fairness and utility of the performance inferences the rule uses as the basis for its decisions. Theron (2007, pp. 107-108) argues as follows in this regard:

> ... the ability of a clinical selection strategy to adapt itself in a manner that would eliminate systematic prediction errors, should they be identified, seems doubtful. Given that selection decisions are based on (clinically or mechanically derived) estimates of criterion performance, a critical requirement for effective selection is that the nature of the predictor-criterion relationship should be accurately understood. The literature (Dawes & Corrigan, 1974; Goldberg, 1970; Grove & Meehl, 1996; Kleinmutz, 1990; Meehl, 1954; 1957; 1956; Dawes, 1971; Murphy & Davidshofer, 1988; Wiggins, 1973) rather unequivocally considers the mechanical methods of integrating the information used in forming predictions as superior to clinical methods. Actuarially derived mechanical decision rules probably derive their superior performance record through their ability to capture the nature of the relationship that exists between the various latent predictor variables and the criterion construct with greater accuracy and the greater consistency with which the rule is applied (Gatewood & Feild, 1994). The problem thus seems that in some cases an already complex job performance structural model that needs to be understood is made even more complex by the fact that a group membership variable not only affects the latent variables that determine job performance, but also affects job performance directly and possibly moderates the effect of one or more latent variables on performance. The likelihood that the clinical mind will be able to accurately understand the manner in which even a small subset of these latent variables combine to determine criterion performance and be able to consistently

apply this understanding, therefore seems even smaller than in cases where group membership need not be considered to accurately estimate job performance. In too many cases where it is feasible to conduct the rigorous validation research required to develop proper actuarial decision rules, it is sadly enough not been performed. In many cases where selection decisions are currently being made, however, it will (seemingly) not be feasible to do so. Unless ingenious ways can be found to circumvent the practical obstacles at present preventing these studies (e.g. synthetic validation inter-organizational cooperation, bootstrapping), the harsh reality will be that in many cases selection fairness will remain an unattainable ideal. Simply because a need for equitable selection exists does not mean that it will necessarily be easily attainable in each and every case; it might even be unattainable in some cases irrespective of how strong the desire for a fair selection procedure might be.

The situation could, however, be salvaged if it could be argued that the constitutive definition of the criterion construct is not unique to each and every job. Significant and important differences probably exist between the connotative meaning of work success in managerial positions in comparison to non-managerial positions. The differences in the connotative meaning of work success between non-managerial jobs however are probably sufficiently less pronounced to allow for the creation of a generic non-managerial performance construct. Although detail differences undoubtedly exist between specific non-managerial jobs, these differences can still be accommodated within a single generic non-manageria1 performance construct.

It thus follows that it in principle would be possible to derive an actuarial decision rule for all the jobs comprising a family of non-managerial jobs and to psychometrically evaluate the resultant decision rule in terms of fairness and utility if:
   a) such a generic performance construct could be constitutively defined;
   b) a valid and reliable measure of this non-managerial performance construct could be developed that
   c) would be applicable to the family of non-managerial jobs in a given organisation, and that is
   d) populated by a sufficiently large number of incumbents to justify a validation study in terms of statistical power (Cohen,1988)

Moreover the development of a measure of generic non-managerial performance will allow the development and empirical testing of generic performance structural models. The performance construct could be interpreted as a behavioural domain as well as an outcome domain. Moreover it could be argued that the latent variables comprising each domain are structurally inter-related within each domain as well as between domains. Very few if any comprehensive performance structural models[3] exist that attempt to model the full complexity of the performance construct. To increase the effectiveness of Industrial Psychologists in practice, valid (or close fitting) performance theory should be available to guide the development of human resource interventions. Developing and empirically testing comprehensive generic performance structural models (alternatively termed competency models) will provide practitioners with credible information on the determinants of performance and the manner in which they combine to base decisions on and will provide a sound foundation to build future performance theory. The lack of comprehensive performance structural models inhibits the development of generic explanatory structural competency models of the type referred to above. Instead the responsibility is placed on individual practitioners to conceptualise the job performance construct as it applies to specific jobs. A job-specific performance hypothesis then typically has to be developed as to which latent variables explain variance in performance to guide human resource management actions aimed at improving performance in the specific job. Such job-specific performance hypotheses, however, more often than not exist only implicitly in the mind of the practitioner. Very seldom if ever, is explicit structural competency models developed and tested that relates latent behavioural performance dimensions to latent outcome variables. One of a broad range of performance measures available in the field would typically serve to provide job-specific behavioural indicators of performance (Tubre, Arthur, Bennett& Paul, 1996) to formatively and/or summatively evaluate the performance of employees and/or human resource interventions aimed at improving employee performance.

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[3] The terms *performance structural model* is here specifically used to only refer to the pattern of structural relations hypothesized (or proven) to exist between the latent competency variables, between the latent outcome variables and between the latent competency variables and the latent outcome variables. The term *generic explanatory structural competency model* will be used to refer to a structural model that in addition to the performance structural model also includes the manner in which competency potential latent variables map onto the competency latent variables.

It could be argued that in their failure to develop and test comprehensive generic managerial and non-managerial structural competency models the discipline has in effect let industrial psychological practice down. Practitioners should not have to develop job-specific performance hypotheses to guide human resource management actions aimed at improving performance. The discipline should provide practitioners with comprehensive structural competency models that depict the latent behavioural dimensions and the latent outcome variables relevant to a family of jobs, the manner in which the former affect the latter, the most influential latent person and environmental characteristics that affect performance and the manner in which these variables affect the latent behavioural dimensions.

A number of such generic non-managerial performance models do exist each with their associated performance measures (Borman & Motowidlo, 1993; Campbell, 1990; Campbell, McCloy, Oppler, Sager, 1993; Hunt, 1996, Murphy, 1990; Viswesvaran, 1993). Until recently, however, no generic non-managerial South African performance measures were available. Schepers (2003) recently addressed this limitation by developing a generic South African non-managerial performance measure, the *Work Performance Questionnaire* (WPQ). Highly satisfying psychometric results were obtained for the WPQ (Schepers, 2003). A serious shortcoming of the WPQ, however, is that it was not developed to measure a specific, *a priori* defined set of generic performance competencies by means of a specific operational architecture in the Campbell *et al.* (1993) tradition. A specific, detailed stance on the factor structure of the performance construct is not taken. A structure generating, unrestricted, exploratory approach in the evaluation of the WPQ is rather followed. This approach detracts from the value the WPQ could have had as a generic criterion measure given the fact that in real-life decision-making information is desired on a performance construct which carries a specific constitutive definition determined upfront by the decision problem. More specifically, in the development and evaluation of a selection decision rule the aim is to predict success on a specific criterion. What should be measured should not be decided by the measuring instrument. The measuring instrument should therefore not be psychometrically interrogated to determine what exactly it is measuring and how well, but rather to determine how well the instrument is measuring that which the decision-maker requires information on.

A need thus still exists to develop and psychometrically evaluate a generic South African non-managerial performance measure of an *a priori* defined generic individual, non-managerial performance construct.

1.2   OBJECTIVE OF THE STUDY

The objectives of the study consequently are:

a)   to constitutively define a generic performance construct that would be applicable to non-managerial, individual positions;

b)   to develop a South Africa performance measure that could be used to obtain multi-rater assessments of the generic, non-managerial, individual performance construct;

c)   to validate the performance measure by evaluating the fit of the measurement model implied by the architecture of the instrument and the constitutive definition of the generic performance construct.

The study will build on previous local and international research done in the field of generic performance models.

1.3   STRUCTURAL OUTLINE OF THE THESIS

The objective of the study is to constitutively define a generic performance construct that would be applicable to non-managerial, individual positions, to construct an instrument to measure the construct as constitutively defined and to validate the inferences made about the construct from the measures of the instrument. Chapter 2 reviews the different methods used in the conceptualisation of job performance and the various generic non-managerial performance models and their associated performance measures (Borman & Motowidlo, 1993; Campbell, 1990; Campbell, McCloy, Oppler & Sager, 1993; Hunt, 1996; Murphy, 1990; Schepers, 2003; Viswesvaran, 1993) that have been proposed in the literature. A critical evaluation of the theoretical validity (Mouton & Marais, 1985) of the various constitutive performance definitions is used to derive the constitutive definition of the generic non-managerial performance construct that will underpin the South African generic performance measure.   This baseline structure of generic non-managerial performance is used to develop the questionnaire that measures these latent performance

dimensions. The aim is to obtain a generic South African measure of non-managerial performance. Chapter 3 describes the methodology used in the construction of the South African performance measure and will outline the research methodology used to empirically investigate the construct validity of the proposed instrument. Chapter 4 presents the results of psychometric evaluation of the generic non-managerial performance measure through confirmatory factor analysis utilising the statistical analysis procedure of structural equation modelling. This process will indicate how well the measurement model fits the data. Chapter 5 discusses the findings and proposes further fruitful areas of further research.

This study focuses on a generic set of performance dimensions that can be applied across non-managerial jobs. The performance measure is developed for individual employees and will not be applicable to the performance measurement of collectives or groups.

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CHAPTER 2
REVIEW OF GENERIC MODELS OF NON-MANAGERIAL JOB PERFORMANCE

2.1   INTRODUCTION

Attempts to develop actuarial selection decision rules to select employees for specific positions and attempts to validate clinical or subjectively developed mechanical selection procedures are frequently thwarted because of the inability to obtain predictor and criterion data for a sufficiently large sample. The root of the problem lies in the assumption that the constitutive definition of the criterion construct is unique for each specific job. If the constitutive definition of the criterion construct is unique for each specific job separate validation studies have to be performed for each job utilising a job specific performance measure as the criterion. The problem, however, is that quite often the number of employees that hold the specific position is too small to technically develop and justify a selection decision rule in a validation study. The situation could, however, be salvaged if the constitutive definition of the criterion construct is not unique to each and every job. If a family of jobs would share a common constitutive definition of performance it would then become possible to derive an actuarial decision rule for all the jobs that are part of the family and to psychometrically evaluate the resultant decision rule in terms of fairness and utility if a valid and reliable measure of the generic performance construct could be developed.

To achieve the objectives outlined in Chapter 1, a critical review of previous research completed on generic performance models is used to define a generic performance construct that represents the performance dimensions of non-managerial individuals in the work place. This research is used to compile a baseline structure of performance. In order to reach the stated research objectives, a clear, unambigious definition of performance is required.

2.2   DEFINING THE PERFORMANCE CONSTRUCT

Job performance is an abstract construct. A construct is an abstract representation that only exists in the mind of man (Kerlinger, 1986), an intellectual construction of the mind (Guion, 1991; Margenau, 1950), a cognitive building block created by man via his abstract reasoning capacity to enable him to intellectually organise/categorise the sensory confusion, to obtain an intellectual grip on that which he observes around him and to communicate such an understanding to his fellow man (Mouton & Marais, 1985). Constructs or latent variables[4] cannot be directly observed but rather are abstract ideas constructed by man to be used to understand and explain phenomena in nature. In the absence of constructs man would have experienced the world around him as a cacophonous, bombardment of specific sensations. Thinking about his experiences, making sense of his environment and communicating this understanding to others would have been almost impossible. A construct is a deliberately and consciously invented abstraction formed by generalising a common theme contained in observable particulars to explain and predict empirical phenomena (Kerlinger, 1986). The primary objective of science is to develop valid theory. Scientific theory represents a set of interrelated constructs, their definitions and statements on the nature of the relationship between constructs with the purpose of explaining and predicting empirical phenomena in Nature (Kerlinger, 1986, p. 9). Constructs form the primary structural components from which science constructs explanatory structural models. A theory could be considered valid if it can satisfactorily account for observations.

The meaning of constructs is explicated through the processes of conceptualisation and operationalisation. Two dimensions of meaning are thereby implied, namely (Kerlinger & Lee, 2000) a connotative dimension and a denotative dimension.   The connotative dimension refers to the internal structure of the construct and it is inferred from the manner in which the constructs links up to other constructs in a nomological network of constructs. The connotative meaning of a construct is explicated through a process of conceptualisation whereby a constitutive, literary or theoretical definition (Kerlinger, 1986; Lord & Novick, 1968; Marais & Mouton, 1985) is established to describe the nature

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[4] The term latent variable will be used as a synonym for the term construct throughout this thesis.

or structure of the abstract idea that constitutes the construct. Constructs are constitutively defined in terms of other constructs contained in the structural model (Kerlinger & Lee, 2000; Margenau, 1950). Conceptualisation therefore provides an intellectual grasp on the construct. According to Mouton and Marais (1985) the conceptualisation of a construct could be considered theoretically valid if all dimensions of meaning, implied by the way the construct is used, are identified; and these dimensions of meaning are mutually exclusive.

To be regarded as a scientific theory a sufficient number of its constructs must be connected directly to empirical phenomena in Nature by rules of correspondence (Margenau, 1950; Torgerson, 1958) so as to permit empirical testing of the theory. The denotative dimension refers to the array of empirical events (i.e. objects, events, behavioural acts) indicated by the construct as constitutively defined. The explication of the denotative meaning of a construct is therefore contingent on the explication of the connotative meaning. Viswesvaran and Ones (2000, p. 222) warn in this regard:

> An abstract construct implies two characteristics. First, one cannot point to something physical and concrete and state that 'it" is job performance. One can only point out the manifestations of this construct. Second, there are many manifestations that could indicate job performance. Thus, the specific manifestations may change from job to job, but the dimension of the construct may generalize across jobs (Viswesvaran & Ones, 2000, p. 222).

The denotative meaning of a construct is explicated through a process of operationalisation whereby an operational definition (Kerlinger & Lee, 2000) is established. The operational definition describes the observable expressions of the abstract idea represented by the construct or describes the actions through which the construct could be manipulated to different conditions so as to obtain an empirical grasp on the construct. Two types of operational definitions can be distinguished (Kerlinger & Lee, 2000), namely measured operational definitions and experimental operational definitions. The latter type of operational definition spells out the operations or actions required to alter, through manipulation or force, the condition or level of the construct. The first type of operational definition, in contrast, specifies the operations or actions required to elicit observable behavioural denotations in which the construct manifests itself.

Despite the pivotal role that the performance construct plays in Industrial Psychology surprisingly little research attention has been devoted to this construct (Campbell, 1991). Our understanding of the latent structure of performance therefore is still relatively limited (Campbell. 1991).

Definitions of performance in the literature generally do not stress the view that it is important to interpret performance as a construct that encompasses both a behavioural domain as well as an outcome domain and that the content of these two domains are structurally inter-related. Definitions tend to rather focus on one domain or the other. They do however quite often indirectly hint at the other neglected domain. Hunt (1996) for example defines job performance as "actions or behaviours relevant to the organization's goals" (Hunt, 1996; p. 52). This definition includes both productive and counterproductive behaviours that impact on the fulfilment of organisation's goals. Bartram (2005) likewise interprets performance behaviourally but nonetheless implies that incumbents are hired to do specific things well because they are instrumental in achieving specific, desired outcomes and not because these actions have intrinsic value.

> Performance is something that people actually do and can be observed. By definition, it includes only those actions or behaviours that are relevant to the organization's goals and that can be scaled (measured) in terms of each person's proficiency. Performance is what the organization hires one to do, and do well. Performance is not the consequence or result of action, it is the action itself. Performance consists of goal-relevant actions that are under the control of the individual, regardless of whether they are cognitive, motor, psychomotor, or interpersonal (Bartram, 2005, p. 1186).

Campbell (1991, p. 704), in similar vein, stresses that performance should be interpreted behaviourally but nonetheless acknowledges that what constitutes relevant behaviour depends on the outcomes that the organisation identifies as important.

> Performance is behaviour. It is something that people do and it is reflected in the actions that people take. Further, it includes only those actions or behaviours relevant to the organization's goals. The choice of goals is a value judgment on the part of those empowered to make such judgments. Performance is not the consequence(s) or result(s) of actions; it is the action itself.

Viswesvaran and Ones (2000) in their definition of performance acknowledge, albeit still subtly, that the performance construct should be interpreted in a manner that includes both behaviours and the outcomes that those behaviours result in:

> Job performance refers to scalable actions, behaviour and outcomes that employees engage in or bring about, that are linked with and contribute to organizational goals (Viswesvaran & Ones, 2000, p. .216).

Employees are, in terms of the job description, expected to perform well on specific latent behavioural performance dimensions because these are assumed to be instrumental in the achievement of specific desirable latent outcome variables. In the final analysis the job exists to achieve these latent outcome variables. The performance of employees could therefore be evaluated in terms of the success with which they achieve the outcomes for which the job exists. It should, however, be acknowledged that the success with which the outcomes for which the job exists are achieved also depend on factors beyond the control of the employee. Outcome measures of job performance can therefore be quite heavily contaminated. Campbell (1990) points out that for the latter reason rewarding and punishing individuals based on the outcomes they achieve might be unfair. Nonetheless a more penetrating understanding of what success in a specific job (or a family of related jobs) means would be achieved if the manner in which the latent behavioural performance dimensions affects each other and how they affect the latent outcome variables could be formally modelled as a performance structural model. In the final analysis latent behavioural performance dimensions and latent outcome variables should simultaneously be considered to pronounce a verdict on whether an employee is succeeding at the task he/she had been assigned.

In contrast to the foregoing interpretations of performance that place the emphasis on behaviour, Bernardin and Beatty (1984) hold a view of performance that is interpreted by Visveswaran and Ones (2000, p. 222) as follows:

> Bernardin and Beatty (1984), define performance as the record of outcomes produced on a specific job function or activity during a specified time period.

Bernardin and Beatty (1984) do not, however, completely ignore or deny the behavioural aspect of performance. In fact Bernardin and Beatty (1984, p. 12) in terms of their own definition define performance in terms of both outcomes and behaviours although they place the emphasis on the former.

> Performance: those outcomes that are produced or behaviours that are exhibited in order to perform certain job activities over a specified period of time.

For the purpose of this research performance is defined in a manner that acknowledges that job performance encompasses both behaviours and outcomes.

> 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 organization and that contribute to organizational goals.

To comprehensively appraise performance in terms of this definition both the latent behavioural performance dimensions and the latent outcome variables have to be measured. Understanding of any specific employee's performance does not lie in the individual performance dimension values alone but rather in the structurally inter-related network of specific values that the whole network of performance latent variables carries. The meaning of performance is spread over the whole of the performance structural model. Dissection of the structural model invariably will result in a loss of meaning.

This research study has as its objective the development and (partial) validation of a behavioural measure of performance in the behavioural observation scale tradition. This interpretation of performance implies that, in addition to a behavioural measure of performance an outcome measure of performance would also be required. This interpretation of performance implies that a structural model would have to be proposed that explicates the structural relations existing between the behavioural and outcome dimensions and this model would have to be tested empirically. Subsequent research studies will have to attend to the development and validation of an outcome measure of performance and to propose and fit a performance structural model. This would then pave the way for the development of a comprehensive generic competency model by

mapping inter-related person characteristics (or competency potential latent variables] on to the performance structural model. Performance is a complex and abstract construct and is influenced by a combination of factors like ability, motivation and situational constraints, (Viswesvaran & Ones, 2000). According to Campbell (1990) three latent variables mediate the effect of more specific person characteristics on the latent behavioural performance dimensions.

> Individual differences on a specific performance component are viewed as a function of three, major determinants – declarative knowledge, procedural knowledge, skill and motivation (Campbell, 1990, p. 705).

Campbell (1990) describes declarative knowledge as knowledge about facts and things like principles, goals and self knowledge. Declarative knowledge in turn is shaped by latent variables like ability, personality, interests, education, training, experience and aptitude. Procedural knowledge is when the "what to do" is effectively combined with "how to do it". Procedural knowledge and skill are cognitive skill, psychomotor skill, physical skill, self-management skill and interpersonal skill. Procedural knowledge likewise is shaped by latent variables like ability, personality, interests, education, training, experience and aptitude[5]. The last determinant motivation is the choice to perform, the level of effort and the persistence of effort (Campbell, 1990). Motivation in turn could be explained in terms of the latent variables comprising the expectancy theory of motivation (Landy & Trumbo, 1980).

2.3   PROCEDURES USED TO CONCEPTUALISE THE PERFORMANCE CONSTRUCT

The need for the conceptualisation and operationalisation of a generic non-managerial performance construct has been argued in Chapter 1. A critical question is which procedure should be used to explicate the connotative meaning of the generic performance construct? The connotative dimension refers to the internal structure of the construct and it is inferred from the manner in which it links up to other constructs in a nomological network of constructs. What one has in mind when one refers to a construct can be

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[5] A skill refers to a proficiency in some task (Gouws, Meyer, Louw & Plug, 1979). In essence it is therefore argued that competency potential latent variables need not necessarily determine the generic job competencies directly. The impact of critical person characteristics on the generic competencies could in some instances be mediated by specific generic, non-job-related competencies.

inferred from the manner in which the construct is used in relation to other constructs (Kerlinger & Lee, 2000). Viswesvaran and Ones (2000) suggest that researchers have used some combination of four approaches to develop a constitutive definition of a generic work performance construct:

- Researchers have reviewed an array of existing job performance measures developed for specific jobs and used in different contexts and domains. This is done in an attempt to isolate the performance dimensions that are shared across the various specific performance measures to combine them into a construct of generic job performance. In considering these different measures they attempted to find common themes shared by specific performance dimensions measured by specific instruments that constitute the construct of job performance. This approach however is heavily dependent on the rigour with which the original performance measures were developed. Of critical importance is the question whether a content valid measure had been achieved with low criterion deficiency and low criterion contamination (Kerlinger & Lee, 2000). The critical concern is that the specific measures might be deficient. This happens when it fails to reflect relevant performance dimensions. Viswesvaran and Ones (2000) seem to point to this danger when they warn that since this method takes specific interpretations of performance as a basic point of departure it is prone to be influenced by the original researchers' individual biases, focus and interests. Very few job specific performance appraisal instruments in the form of behavioural observation scales or behaviourally anchored rating scales for example probably formally acknowledge the relevance of contextual performance and counterproductive behaviour in addition to task performance.

- To isolate the performance dimensions that are shared across the various specific jobs researchers have also used standard job analytic techniques (like the critical incident technique, functional task analysis (Gatewood & Feild, 1994) to conceptualise the performance construct as it applies to specific jobs. These techniques are used to describe the behaviour that constitute the job and to cluster these behaviours so as to isolate the structure that underlies the behaviour (Viswesvaran & Ones, 2000). The dimensions obtained through job analysis, however, quite often differ when compared with dimensions obtained through

other empirical methods (Visweswaran & Ones, 2000). Job analysis techniques tend to isolate specific functional competencies that represent the abstract themes in the behaviour that should be displayed on the job (van der Bank, 2007). Factor analysis of the importance of key behavioural tasks comprising a job will typically not result in a factor structure that mirrors the functional competency structure as a more direct summary of the actual behaviour on the job. When conceptualising and operationalising a generic performance construct the focus is on estimated, scalable behaviours that describe individual variance, a factor that the job analytic technique does not clearly reveal.

- To isolate the performance dimensions that are shared across the various specific jobs "researchers have developed measures of hypothesised dimensions, collected data on these measures, and factor analysed the data (Viswesvaran & Ones, 2000, p. 216). This method is the most direct way of empirically assessing the dimensionality of the performance domain. A factor that limits this method is the number and type of measures used in the data collection phase. The study of Viswesvaran, Ones and Schmidt (1996), although not formally aimed at developing a comprehensive conceptualisation of a generic performance construct as such, could nonetheless be seen as an attempt to implement this approach. They argued that the dimensions that should be included in a generic performance construct would be indicated if the measures of job performance that were reported in fifteen journals of work psychology over the past 80 years would be pooled. Since this approach essentially represents a more sophisticated version of the first approach discussed above the shortcomings associated with this procedure also are relevant here. This limitation could be addressed by applying the lexical hypothesis used in the construction of personality measures to the development of a generic performance measure. The lexical hypothesis reflects the assumption that individual differences in performance should be encoded in the language that people use when communicating about differences in performance. Practically this would then mean that assessments of performance of individuals in a representative sample of specific jobs would have to be obtained on all adjectives harvested from the dictionary of the English language that characterise the quality of behaviour. Visweswaran and Ones (2000) somewhat unconvincingly present the Visweswaran

et al. (1996) study as an extension of the lexical hypothesis to the conceptualisation and assessment of performance.

- Finally researchers have attempted to isolate the performance dimensions that are shared across various specific jobs by using organisational theories. Welbourne, Johnson and Erez (1998) use role theory and identity theory to isolate specific dimensions of work performance. Borman and Motowidlo (1993) rely on the socio-technical systems approach to organisational design to explicate generic performance dimensions.

A critical question is which procedure the current research study should use to explicate the connotative meaning of the generic non-managerial performance construct. The current research firstly relies on a review of existing generic first-order performance models. A set of latent behavioural performance dimensions was harvested from these models so that that all dimensions are mutually exclusive but cover the array of performance dimensions proposed in the models.

The question is whether the latent performance dimensions that were identified in this manner should be included in the constitutive definition of a generic non-managerial performance construct. Constructs are abstract thought objects intellectually created by man to serve the objective of explaining observed phenomena. They do not exist as such and therefore have no absolute, verifiable meaning. Constructs are assigned a specific connotative meaning. The connotative meaning assigned to a construct is indicated by the manner in which the construct is used in theoretical arguments. The connotative meaning assigned to a construct could therefore be considered valid if it acknowledges all the dimensions implied by the manner in which the construct is used in relation to other constructs (Kerlinger, 1986; Mouton & Marais, 1985).

The set of latent behavioural dimensions identified for inclusion in the generic performance model was therefore critically evaluated as to whether a theoretical rationale can be established to justify the inclusion of the dimension in the model. Why should an employee's work behaviour be evaluated in terms of the proposed dimensions? The instrumentality of the behavioural performance dimension in achieving desired outcomes

was considered in the development of such a theoretical rational. In principle it also has to be conceded that latent behavioural dimensions could have intrinsic value in terms of which its inclusion in the performance construct could be justified without necessarily resulting in any high-valence outcome. If this would be claimed for specific latent behavioural dimensions a convincing argument would then have to be presented as to why such a latent behavioural dimension has intrinsic value.

Conversely the question should, however, also be asked whether significant proportions of variance would be explained in all desired latent outcomes variables by the competency-outcome structural model implicitly referred to in the previous paragraph. The question therefore is whether the proposed performance model suffers from criterion deficiency in as far it fails to reflect work behaviours that are instrumental in achieving desired outcomes.

2.4 HIGHER-ORDER GENERIC NON-MANAGERIAL PERFORMANCE FACTORS

Three broad dimensions of performance have been identified that can generally be applied across jobs as stand-alone performance dimensions. These dimensions are task performance, organisational citizenship behaviour and counterproductive behaviours (Viswesvaran & Ones, 2000). Although not presented as such by Viswesvaran and Ones (2000) these three broad performance dimensions could also be interpreted as three higher-order generic non-managerial performance factors. These three higher-order generic performance factors in turn split into specific lower-order task, organisational citizenship behaviour and counterproductive behaviour factors. These higher-order performance factors could moreover be interpreted to load on an overall performance factor.

2.4.1 TASK PERFORMANCE

Jobs exist to combine and transform scarce factors of production into a specific product or service or components thereof. Specific tasks need to be performed to produce the output for which the job exists. A task represents the series of behavioural actions required to

produce an identifiable part of the output (Bernardin & Beatty, 1984). The job in essence comprises a set of inter-related prescribed tasks. Task performance is defined as: "the proficiency with which incumbents perform activities that are formally recognised as part of their jobs; activities that contribute to the organisation's technical core either directly by implementing a part of its technological process, or indirectly by providing it with needed materials or services" (Borman & Motowidlo, 1993, p. 73). Task performance refers to the extent to which the behavioural duties and responsibilities as stipulated in the job description are adhered to (Viswesvaran & Ones, 2000).

Job analysis is used to explicate sets of tasks that constitutes a job and how these relate to the output for the job and other outcomes that the organisation values. This information is captured in a job description. The job description, however, does not provide a complete script of the behaviour that employees display towards the organisation and its members. Both organisational citizenship behaviour and counterproductive behaviour constitute job behaviours that are not formally stipulated in the job description but that nonetheless impact on organisational effectiveness and should therefore be considered when conceptualising work performance. Organisational citizenship behaviour describes positive behaviour that promotes organisational effectiveness that goes beyond just accomplishing task performance while counterproductive behaviour refers to negative behaviour that undermine organisational effectiveness (Marcus & Schuler, 2004; Viswesvaran & Ones, 2000). Even though organisational citizenship behaviour and counterproductive behaviour proves to be negatively correlated, they nonetheless are separate, unique constructs and not merely opposites on a continuum as one might assume (Kelloway, Loughlin, Barling & Nault; 2002).

2.4.2   ORGANISATIONAL CITIZENSHIP BEHAVIOUR

Organisational citizenship behaviour (OCB) is defined as: "individual behaviour that is discretionary/extra-role, not directly or explicitly recognised by the formal reward system and that in the aggregate promotes the effective functioning of the organisation" (Viswesvaran & Ones, 2000, p. 218). Emphasis is placed on the extra-role nature of OCB and the fact that this behaviour is not directly rewarded. The only requirement is that this

behaviour should contribute towards the organisations' effectiveness. Organ (1988) identified the following six first-order factors loading on the second-order OCB factor: sportsmanship, altruism, civic virtue, courtesy, cheerleading, and conscientiousness.

Organisational spontaneity is a closely related term proposed by George and Brief (1992) also explaining constructive extra-role behaviour that is performed voluntarily by the employee. Dimensions comprising organisational spontaneity are: helping co-workers, protecting the organisation, making constructive suggestions, self development and spreading goodwill. The distinction between OCB and organisational spontaneity is that the latter behaviour is recognised and remunerated by the reward system of the organisation despite the fact that the job description does not explicitly and formally specify these behaviours (Viswesvaran & Ones, 2000). Organ (1997) has, however, conceded that the requirement of the behaviour not being directly rewarded is not a critical component of the conceptualisation of OCB.

Borman and Motowidlo (1993) propose a performance factor that closely resembles organisational citizenship behaviour that they term contextual performance and that they contrast to task performance. Contextual performance refers to all constructive non-prescribed activities that benefit the organisation and its members. According to Borman and Motowidlo (1993, p. 82) the following five first-order contextual performance factors can be distinguished:

> [1] persisting with enthusiasm and extra effort as necessary to complete own task activities successfully, [2] volunteering to carry out task activities that are not formally part of own job, [3] helping and cooperating with others, [4] following organizational rules and procedures, [5] endorsing, supporting, and defending organizational objectives.

2.4.3   COUNTERPRODUCTIVE BEHAVIOUR

Counterproductive behaviour is voluntary behaviour that transgresses generally accepted organisational norms of acceptable conduct and thereby threatens the wellbeing of an organisation and its members (Viswesvaran & Ones, 2000, p. 218). Forms of

counterproductive behaviours were identified by Gruys and Sackett (2003) and include behaviours such as property damage, substance abuse, violence on the job and withdrawal behaviours like tardiness and absenteeism. According to Robinson and Bennett (1995) deviant behaviour in organisations is either directed at the organisation or at fellow employee and the deviant behaviour can be either serious or minor (two continua are therefore implied: organisational/interpersonal and serious/minor). Four categories of counterproductive behaviour are identified in terms of these two criteria, namely (Viswesvaran & Ones, 2000):

- Property deviance (serious deviance directed at the organisation)
- Production deviance (minor deviance directed at the organisation)
- Personal aggression (serious deviance directed at other individuals)
- Political deviance (minor deviance directed at other individuals)

Martinko, Gundlach and Douglas (2002) distinguish between counterproductive behaviour that is internally directed and self-destructive and counterproductive behaviour that is externally directed and retaliatory. These two factors could constitute fruitful second-order counterproductive behaviour factors on which a multitude of specific first-order deviance factors load. Martinko et al. (2002) argues that different causal processes underlie the two second-order counterproductive behaviour factors.

2.5   FIRST-ORDER GENERIC NON-MANAGERIAL PERFORMANCE FACTORS

"Generic work behaviour is defined as behaviour that contributes to the performance of virtually any job independent of technical job roles" (Hunt, 1996, p. 51). Generic work behaviour is general behaviours and skills that are important for any occupation or work situation. This study focuses on the development of a model that defines performance across a variety of non-managerial jobs.

2.5.1   GENERIC FIRST-ORDER PERFORMANCE MODELS

Research in the field of generic performance has grown tremendously. Various studies focussed on managerial performance models like research done by Schepers (2003), the great eight competency model of Bartram, Robertson and Calinen (2002), Borman and Brush (1993) and Tett, Guterman, Bleier and Murphy (2000). This study however focuses on individual non-managerial job performance. To compile a baseline structure of generic non-managerial job performance, previous research on generic performance models for non-managerial administrative and technical jobs was reviewed.

2.5.1.1 VISWESVARAN

Viswesvaran (in Visweswaran & Ones, 2000) listed 486 job performance measures that were published in articles over the years. Two raters working independently strived to group the job performance measures with the same conceptual meaning together. They derived the following ten dimensions of job performance:

- overall job performance

- job performance or productivity

- effort

- job knowledge

- interpersonal competence

- administrative competence

- quality

- communication competence

- leadership

- compliance with rules (Viswesvaran & Ones, 2000, p. 216).

In defining these different dimensions, Viswesvaren (in Visweswaran & Ones, 2000) describes overall job performance as the overall work effectiveness of the individual. According to Visweswaran and Ones (2000) this includes the work reputation of the employee. In as far as work reputation develops in the minds of others as a function of overall job performance this seems a somewhat questionable stance. Work reputation

should rather be treated as an important outcome latent variable analogous to the market standing dimension proposed by Spangenberg and Theron (2004) as a measure of organisational unit performance. Overall job performance could be seen to serve as a second-order performance factor in a hierarchical latent structure with nine first-order performance factors. Neither Visweswaran (1993) nor Visweswaran and Ones (2000), however, explicitly describe overall job performance as such. Productivity is defined as the quantity or volume of work produced. Normally this is related to the ratio of the inputs in relation to the outcomes achieved. Effort refers to the resources like time and care spend in order to be effective on the job. The dimension of job knowledge refers to the employee's insight and knowledge in terms of the task that he/she has to perform. The dimension of interpersonal competence refers to the degree to which the employee gets along with other employees and thus his ability to interact on a social level. This is a very important dimension because the nature of the workplace demands from an employee to fulfil certain roles. To be effective in the workplace one therefore should have the capacity to interact with other employees. The administration dimension describes the effectiveness with which the employee is able to coordinate these different roles. Quality is the indication of how well the job is done and job knowledge is the demonstrated expertise of the employee. Communication competence is the skill with which an employee communicates in a written and oral manner, regardless of the content. The leadership dimension describes the individual's ability to empower and bring out extra performance from other employees. This dimension does not necessarily assume a formal leadership position. Compliance with rules refers to the degree to which the employee obeys organisational rules and regulations as well as the correct interpretation of these rules and expectations (Viswesvaran & Ones, 2000).

Viswesvaren (in Visweswaran & Ones, 2000) showed positive correlations across the different dimensions of job performance. Viswesvaren (in Visweswaran & Ones, 2000) gathered results across 300 studies and concluded that over 50% of the variance is shared across the different dimensions. Inter-rater correlations and non-ratings-based measures were analysed. These positive correlations suggest the existence of a general factor across the different dimensions of job performance (Viswesvaran & Ones, 2000). The inclusion of the overall performance factor in these correlation analyses, however, seems somewhat

questionable in as far as it could be interpreted to be the general factor that the positive correlations between the other nine factors point to.

2.5.1.2 CAMPBELL

Campbell's (1990) eight factor hierarchical performance model was strongly influenced by the long-term Selection and Classification Project (Project A) of the U.S. Army. The latter is a five factor model that was used to capture the latent performance structure in a population of 275 entry-level skilled jobs in the United States Army and includes the following dimensions:

- Core technical proficiency
- General soldiering proficiency
- Effort and leadership
- Personal discipline
- Physical fitness and military bearing

Campbell's (1990) decision to expand the five factor model of Project A was based on a review study of performance using the BARS technique as well as a PhD research study by Hedberg (in Campbell, 1990) that used extensive interviews and critical incident methodology to identify the factors on which performance feedback is given in actual feedback sessions (Campbell 1990).

Campbell conceptualises job performance in terms of the following eight dimensions:

- job specific task proficiency
- non-job-specific task proficiency
- written and oral communication
- demonstrating effort
- maintaining personal discipline
- facilitating peer and team performance
- supervision/leadership
- management or administration

(Campbell, 1990, pp. 708-710; Viswesvaran & Ones, 2000, p. 216).

Campbell (1990) explains that the importance of these dimensions would differ across different occupational groups. Campbell (1990) assumes no higher-order general performance factor on which the foregoing eight performance factors load. Campbell (1990) does, however, regard the proposed model as hierarchical in as far as lower-order factors load on each of the proposed eight factors. Moreover Campbell (1990) concedes that the number of factor levels that would have to be assumed under each of the eight factors could vary.

Job-specific task proficiency is defined as the degree of success with which incumbents perform the core substantive or technical tasks that are essential to a specific job. Non-job-specific task proficiency refers to behaviour that is not specific to a certain job but is nonetheless expected of all members of the organisation (Visweswaran & Ones, 2000). Individuals are required to do certain tasks that do not include core tasks of a specific job. For a military official this might include first aid or basic navigation (Campbell, 1990). Written and oral communication tasks refer to the ability of an employee to communicate in the written or spoken word irrespective of the merits of the content of the communicated message. Factor four refers to the intensity and consistency (or perseverance) of an employee's effort to succeed in the core tasks of the job. It includes the willingness to keep working under detrimental conditions and to spend the extra effort required for the task. Maintaining personal discipline refers to the success with which the employee succeeds in staying out of trouble and refrains from displaying work behaviours that negatively impact on the organisation and its employees. This dimension essentially seems to refer to the extent to which counterproductive behaviour is displayed. Facilitating peer and team performance refers to the way that the employee supports peers and helps them with certain job problems. This dimension along with the demonstrating effort dimension partially corresponds to the display of organisational citizenship behaviours. OCB, however, includes behaviours not acknowledged by Campbell's proposed latent performance structure. Supervision includes goal setting, teaching effective methods to supervisees and the modelling of appropriate behaviour. Management/administration, the last dimension includes the articulation of goals for the unit, organising people and resources, monitoring progress, helping to solve problems and

overcoming crises that might hinder goal accomplishment (Campbell, 1990; Visweswaran & Ones, 2000).

2.5.1.3 HUNT

Hunt (1996) focuses on the explication of generic, non-job specific, non-ability dependent job performance dimensions rather than the core technical or substantive performance dimension. Hunt (1996) specifically wanted to isolate those dimensions of performance that are primarily dependent on differences in motivation rather than on differences in ability. The taxonomy suggested by Hunt (1996) could be interpreted as lower-order factors that load on the two higher-order factors of organisational citizenship behaviour and counterproductive behaviour. To develop his generic work behaviour model, Hunt (1996) factor analysed supervisor ratings for 18,146 employees in 52 different job settings at 36 different companies.

Hunt (1996) proposed a nine-factor model of entry-level job performance. The nine dimensions are:

- adherence to confrontational rules
- industriousness
- thoroughness
- schedule flexibility
- attendance
- off-task behaviour
- unruliness
- theft
- drug misuse.

Adherence to confrontational rules refers to the willingness of the employee to follow certain rules even if it means a confrontation with a co-worker, client or manager. This dimension includes the ability to fulfil minimum job requirements and organisational rule following (Hunt, 1996). The dimension of industriousness is explained as the constant attention and effort that the employee devotes to his work. Industriousness may also be

similar to the theoretical construct initiative (Hunt, 1996). The quality of an employee's work is the core of the thoroughness dimension. Schedule flexibility is described as the willingness of the employee to change his schedules in order to accommodate demands at work (Hunt, 1996). The dimension of attendance is related to absenteeism and punctuality. Components associated with attendance include withdrawal, maintaining personal discipline and behavioural job withdrawal (Campbell, McCloy, Oppler & Sager, 1993). Off-task behaviour is when the employee uses company time for non-job activities and includes constructs like social loafing, free riding and tendency to withhold effort (Hunt, 1996). The dimension of unruliness explains minor deviant tendencies and provocative attitudes towards co-workers, supervisors, and the job itself. Taking money or commodities from organisation is associated with the dimension of theft and the last dimension of drug abuse refers to the illegal use of drugs and alcohol. The latter dimension is closely related to components of withdrawal and psychological job withdrawal (Hunt, 1996). A fundamental assumption of the Hunt- model is that the nine dimensions of performance are interrelated to some degree. This would suggest the presence of higher-order factors. Hunt (1996) proposed five higher-order factors to account for the correlations observed between the nine dimensions of performance. These higher-order factors are shown in the hierarchical latent performance structure depicted in Figure 2.1.
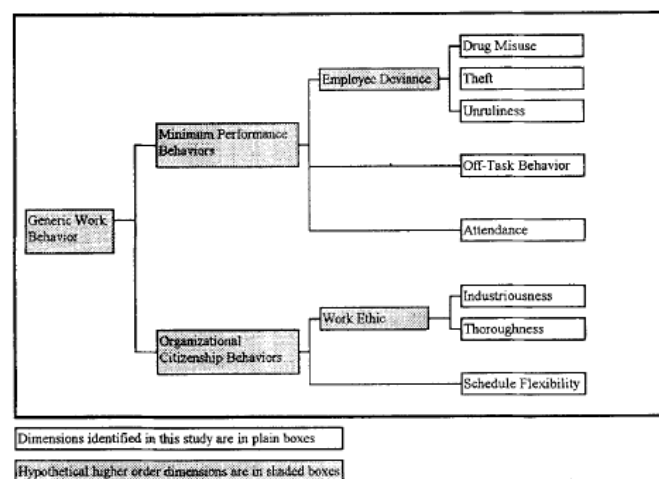
Figure 2.1 Hierarchical latent performance structure proposed for the hunt model: Generic work behaviour: An investigation into the dimensions of entry-level, hourly job performance by Hunt, S. 1996. *Personnel Psychology* 49(1). Copyright 1996 by Personnel Psychology Inc.

In evaluating the content validity of the proposed model (Hunt, 1996) felt that the adherence to confrontational rules dimension should be omitted from model because it only applied to specific jobs. Hunt (1996) moreover felt that the original model excluded four performance factors that the literature dealing with empirical and theoretical studies performance dimensions and taxonomies would suggest are important. These additional performance dimensions are teamwork, problem solving, safety and personal appearance.

According to Hunt (1996) *teamwork* includes the elements of interpersonal proficiency, engaging others, employee relations, social intelligence, relations with co-workers, social relations, courtesy and helping co-workers. Teamwork is defined as the way employees work together in the workplace to reach and achieve a common organisational goal. In the proposed performance model of Hunt, the dimension of unruliness is partially related to this dimension of teamwork.

Problem solving describes the ability of an employee to utilise information in such a manner to solve or adapt to problems in the workplace. Problem solving is related to the concepts of open-mindedness and making constructive suggestions. This dimension clearly influences overall performance and plays an important role in the workplace that is growing into a more continuous learning environment (Hunt, 1996).

A failure to comply with *safety* regulations will affect job performance in terms of injuries to workers or damage to company property. This dimension of safety includes the components of accidents, safe worker and the theoretical component of protecting the organisation (Hunt, 1996).

Personal appearance may have a negative impact on performance in the way that it influences the nature and quality of interpersonal communication. This will happen when the employee's appearance deviates from the normal societal norms. The dimension of personal appearance is related to the concepts of physical fitness and military bearing as previously defined by Campbell (1990) as well as meticulousness (Hunt, 1996).

2.5.1.4 BORMAN AND MOTOWIDLO

Borman and Motowidlo defined job performance at a higher level in terms of two components namely task performance and contextual performance (Borman & Motowidlo, 1993). Confirmatory factor analyses provided evidence for the distinction between task and citizenship performance (Johnson; 2003). Supervisors tend to ascribe the same importance to contextual and task performance when making judgements about overall performance (Borman & Motowidlo, 1997). Research by Werner (1994) and Van Scotter and Motowidlo (1996) confirm this model. Task performance is described as: "the effectiveness with which job incumbents perform activities that contribute to the organisation's technical core either directly by implementing a part of its technological process, or indirectly by providing it with needed materials or services" (Borman & Motowidlo, 1997, p. 99). The specific first-order task performance dimensions that load on the higher-order task performance factor as defined above differ between different jobs.

Contextual performance on the other hand is defined as: "activities that contribute to organisational effectiveness in ways that shape the organisational, social, and psychological context and serves as the catalyst for task activities and processes" (Borman & Motowidlo, 1997, p. 100). In a practical sense contextual performance can be explained as similar to organisational citizenship behaviour (OCB). A similar concept is pro-social organisational behaviour (POB). This is behaviour that is intended to uphold and promote the interests of individuals or groups irrespective of whether it promotes the interest of the organisation. An additional difference between OCB and POB is that POB can be role-prescribed or extra-role behaviours, while OCB refers to extra-role behaviours. This means that POB may have a negative effect on the organisation in an effort to promote the wellbeing of others (Borman & Motowidlo, 1997, p. 100). An example of POB is when an employee assists another employee in his tasks and duties and fails to reach his own deadlines.

A taxonomy of citizenship performance makes provision for the following dimensions:
- Personal support
- Organisational support

- Conscientious initiative

(Johnson, 2003).

Personal support includes behaviour directed towards benefiting individuals within the organisation like helping, motivating, cooperating with and showing consideration of others. Organisational support is explained as behaviours intended to benefit the organisation like loyalty towards the organisation, being a good ambassador and complying with organisational rules and norms. Conscientious initiative includes behaviours intended to profit the task or job like taking initiative, persevering with extra effort to complete tasks and engaging in self-development initiatives (Johnson, 2003). Conscientious initiative, however, appears to be a complex first-order factor in as far as it also seems to load on the task performance second-order factor. A factor model with conscientious initiative loading on both the task factor and the citizenship factor, demonstrates a significantly better fit compared to models in which it loaded on just one or the other (Johnson, 2003). Conscientious initiative therefore reflects an element of both task and citizenship performance.

The distinction between task and contextual performance seems to hold great promise for the development of a generic performance@work structural model. Correlations between personality scales and contextual performance tend to be higher than the correlations with task performance. This means that certain personality factors like conscientiousness tend to play a stronger role in the contextual performance like organisational citizenship behaviour while task performance tends to be influenced more strongly by knowledge and abilities (Borman & Motowidlo, 1997; Visweswaran & Ones, 2000).

2.5.1.5 MURPHY

Job performance consists of four dimensions according to Murphy (1990) namely:
- Downtime behaviours
- Task performance
- Interpersonal performance

- Destructive behaviours

(Viswesvaran & Ones, 2000).

Task performance is explained by Murphy (1990) as the completion of role activities prescribed in the job description. Downtime behaviours are related to all the negative aspects in the area of time spent on the job like lateness, tardiness and absenteeism. Behaviours related to assisting others, teamwork and pro-social behaviours are categorised under the interpersonal performance dimension. Destructive behaviour is the failure of the employee to comply with certain work related rules. This behaviour includes violence, theft and other negative behaviours counterproductive to the reaching organisational goals (Viswesvaran & Ones, 2000). Downtime behaviours and destructive behaviours can both be regarded as forms of counterproductive behaviours. Murphy (1990) in effect defines performance in terms of task performance, organisational citizenship behaviour aimed at colleagues and counterproductive behaviours.

2.5.1.6 BERNARDIN AND BEATTY

Bernardin and Beatty (1984) identified six dimensions of performance, they are:

- "Quality: The degree to which the process or result of carrying out an activity approaches perfection, in terms of either conforming to some ideal way of performing the activity or fulfilling the activity's intended purpose.
- Quantity: The amount produced, expressed in such terms as dollar value, number of units, or number of completed activity cycles.
- Timeliness: The degree to which an activity is completed, or a result produced, at the earliest time desirable from the standpoints of both coordinating with the outputs of others and maximising the time available for other activities.
- Cost-effectiveness: The degree to which the use of the organisation's resources (e.g., human, monetary, technological, material) is maximised in the sense of getting the highest gain or reduction in loss from each unit or instance of use of a resource.

- Need for supervision: The degree to which a performer can carry out a job function without either having to request supervisory assistance or requiring supervisory intervention to prevent an adverse outcome.

- Interpersonal impact: The degree to which a performer promotes feelings of self-esteem, goodwill, and cooperativeness among co-workers and subordinates"

  (Bernardin & Russell, 1998, p. 243)

Their definition of performance is more focused on the outcomes reached. This definition contrasts with the definition of Campbell (1990) that stresses that performance should be defined in terms of behaviour rather than outcomes reached (Viswesvaran & Ones, 2000). The causal interrelationships between the six dimensions are important and need to be thoroughly understood. Specific structural relations therefore exist between the outcome variables. Performance of employees should individually and collectively serve organisational strategy. Organisational strategy imposes specific standards on each outcome latent variable. Strategy is served only if all outcome standards are met. A task performed in accordance with the quality and quantity standards but not performed in accordance with the required time frame may not contribute towards reaching the organisation's strategic objective if prompt, high-quality mass production is the strategic intent of the organisation. In setting the latent outcome variable standards the structural relationships existing between the outcomes need to be understood. In this situation the interrelationships between the various dimensions are important as they influence the combinations of performance standards that can be set.

Whether the strategically important outcome standards will be achieved depend at least in part on the performance level achieved in the latent behavioural performance dimensions that are instrumental in achieving the desired outcomes. Job performance encompasses both behaviours and outcomes. Performance refers to the values/states of an interrelated network of latent behavioural performance dimensions as well as an interrelated set of latent outcome variables structurally linked to the latent behavioural performance dimensions. To comprehensively appraise performance both the latent behavioural performance dimensions and the latent outcome variables therefore have to be measured. An understanding of any specific employee's performance is not found in the separate,

individual performance dimension values but rather lies in the structurally inter-related network of specific values that the whole network of performance latent variables carries.

A critical question is whether the six outcome latent variables identified by Bernardin and Beatty (1984) provide a comprehensive coverage of the performance outcome domain. Additional latent outcome variables that seem to be implied by the argument presented by Welbourne et al. (1998) (see paragraph 2.5.1.9 below) are career growth/human capital, innovations, customer satisfaction/market reputation. Psychological empowerment (Spreitzer, 1995), engagement (Macey & Schneider, 2008) organisational commitment (Knippenberg & Sleebos, 2006) and intention to quit (Sturges, Conway, Guest & Liefooghe, 2005) represent addition latent outcome variables that might be valued by organisations.

In considering the need to expand the performance outcome domain, the fact that employees do not display specific work related behaviours solely to achieve strategically important institutional outcomes should be considered. These work behaviours also serve individual outcomes that are valued by the employee. Employee satisfaction and some of the latent outcome variables listed above as relevant to the organisation (psychological empowerment, engagement organisational commitment) are examples of individual criteria.

The individual criteria used to evaluate employee satisfaction with performance (Lofquist & Dawis, 1978) are very important because it is structurally related to the institutional outcome criteria with which the organisation evaluates the employee's work behaviour.

2.5.1.7   SCHEPERS

Schepers (2003) postulated that his Work Performance Questionnaire (WPQ) would measure three components associated with generic performance.

- Quantity and quality of work produced by the workers (Task-orientation)
- Initiative and creativity of the workers manifested in the work situation

- Managerial qualities of workers exhibited in the work situation (leadership, motivation of subordinates, good interpersonal skills, and good communication skills.)

(Schepers, 2003, p. 13)

Schepers (2003) used the Work Performance Questionnaire on a sample of 278 administrative and operational staff at an Afrikaans-medium university. The measuring instrument used was a questionnaire consisting of 38 items that each fall into one of the categories listed above (quantity and quality of work produced, initiative and creativity, and managerial qualities). The questionnaire was completed by the superiors of the administrative and operational staff. Superiors used a nine point scale to rate employees.

This study used two separate scales, one for managerial staff and one for non-managerial staff. Six items were not applicable to non-managerial personnel. The full scale (managerial scale) consists of 38 items measuring four factors namely:

- Task-orientation
- Managerial ability
- Analytical ability
- Creative thinking and resourcefulness

Task-orientation speaks about the volume and quality of work completed by the employee. This factor includes work-tempo, energy level, punctuality, initiative, purposefulness and independence.

Managerial ability includes behaviour like communication, ability to motivate others, leadership, adaptability and interpersonal skills. This factor explains a high person-orientation, ability to inspire subordinates, high productivity and the ability to communicate goals and objectives effectively. Managerial ability also speaks of the ability to command respect from followers.

Analytical ability explains the ability to get to the bottom of problems and challenges in the workplace and to resolve problems in a logical and systematic way. This factor includes behaviour that speaks of intelligence and making decisions through the deduction of the correct and accurate facts. Performance in this dimension shows evidence of study and insight.

Creative thinking and resourcefulness describes the quality of decisions made when employees complete their tasks.

These four factors correlate highly with one another and define a second-order general performance factor (Schepers, 2003)

The shorter form of the WPQ defines work performance in three factors namely:

- Creativity

- Task-orientation

- Interpersonal relationships

The shorter scale yielded a high Cronbach alpha reliability coefficient of 0,978 (Schepers, 2003).

Schepers (2003, p. 10) defines the objective of his study the "construction and evaluation of a work performance questionnaire for use with administrative and operational staff." Schepers (2003) includes in his interpretation of administrative and operational staff people who perform managerial functions. He however excluded items with a managerial content from the WPQ administered to employees in non-managerial positions. This raises the important question whether it could be expected of employees occupying non-managerial position to spontaneously display specific managerial competencies. Leadership and managerial behaviours that individuals have to display when occupying leadership positions to achieve success (defined in terms of leadership outcomes) are not solely the prerogative of leaders. Individuals occupying non-leadership positions in which they have no followers through which they have to achieve specific outcomes can spontaneously/naturally display behaviours that, if they would have been displayed when occupying a leadership position, would have been regarded as leadership success (interpreted behaviourally). Although an individual might not be formally responsible to achieve specific results through followers such an individual can nonetheless

spontaneously/naturally act towards himself, his co-workers (including his superior/leader) and the goals of the unit and organisation he is part of in a manner that serves the objectives of the unit and organisation. But for the self-directed action (self-exploration, self-discovery, self-development and growth), these behaviours really constitute organisational citizenship behaviour (OCB) directed at followers, the leader and the unit/organisation. In terms of this argument OCB could therefore be conceptualised as a form of spontaneous leadership in a non-leadership position. Most generic performance models (Borman & Motowidlo, 1997; Campbell, 1990, Visweswaran & Ones, 2000) acknowledge OCB as an important latent behavioural performance dimension. The question is whether in addition to OCB another managerial or leadership dimension should be included in a generic non-managerial performance model. House's (1995) interpretation of leadership encompasses three leadership dimensions, namely *general leadership,* which entails giving purpose and meaning to followers, and articulating and implementing a compelling vision (these leader behaviours are largely *interactive*); *management,* which implies a position of formal authority and entails *rational-analytical* behaviours involved in development and implementation of strategies, policies and procedures; and *supervisory leadership* that provides guidance, support, and corrective feedback to followers on a day-to-day basis (these leader behaviours are again largely *interactive*). It could be argued that OCB as a form of spontaneous leadership in a non-leadership position adequately acknowledges and reflects spontaneous interactive leadership behaviours but that it does not adequately acknowledge spontaneous rational-analytical leadership behaviours. These would for example refer to behaviours like environmental scanning, planning, organising, establishing (or improving) administrative systems, the development and implementation of strategies, tactics and policies, acting entrepreneurially (House, 1995; Spangenberg & Theron, 2004).

2.5.1.8 WELBOURNE, JOHNSON AND EREZ

Welbourne et al. (1998) argue that employees have to enact numerous organisationally salient roles while at work and they identified the following five roles:

- Job role;
- Organisational role;

- Career role;

- Team role;

- Innovator role

Traditionally *job role* represents employee performance in the light of the employee completing assigned tasks to contribute towards organisational goals. *Organisational role* is behaviour that influences the overall organisational success in terms of organisational citizenship behaviour elicited. *Job role* is clearly influenced by compensation systems like merit pay, sales commission and piece rate plans. *Organisational role* is influenced by group-based compensation systems like profit sharing, gain sharing and stock options or grants. It is therefore evident that different reward- and compensation systems will influence different role behaviour in the organisation (Welbourne et al., 1998).

The *Career role* requires the employee to take responsibility for his/her career development and encompasses those employee behaviours that are aimed at the development of job relevant competency potential and competencies (Welbourne et al., 1998). Inclusion of the career role in the list of areas in which employees' performance should be assessed is justified by arguing that career planning and growth forms an integral part of the new psychological contract. The new psychological contract is based on the employer's inability to provide job security in light of the economical situation and challenges. The employer will therefore provide a career program in exchange for the employee's commitment to increase his/her value to the organisation by taking responsibility for their own career planning (Welbourne et al., 1998).

The *team role* requires employees to be committed, cooperating, contributing team members. Inclusion of the career role in the list of areas in which employees' performance should be assessed is justified by arguing that teamwork is increasingly becoming a significant component of organisational performance and that the modern workplace requires team members to utilise their diverse skills and knowledge to reach organisational goals. Synergy is created when members work together and the team is able to achieve greater results than what the individual would have accomplished on his/her own (Welbourne et al., 1998).

Finally the *innovator role* is included in the Welbourne et al. (1998) model of performance and describes the organisational expectation that individual employees should be creative not only in their own individual jobs but also on behalf of the whole organisation, contributing towards the competitive advantage of their firm. This entrepreneurial role is motivated in that it will contribute to overall organisational effectiveness and adaptability in a changing environment.

These roles were identified through the evaluation of compensation systems. Organisations have specific behavioural expectations of their employees. The roles that organisations consider salient will be measured during performance appraisal. Organisations use compensation systems to communicate their intentions and reward behaviour that will contribute towards organisational success. Welbourne et al. (1998) argue that the roles mentioned, identify dimensions of job performance that are typically neglected by the other traditional performance appraisal measures.

2.5.1.9 BARTRAM

The Great Eight competency model was developed through factor analysis and multidimensional scaling analysis of employee self-assessment and management assessment of workplace performance (Bartram, 2005). The Great Eight competency model was developed across various industry sectors and jobs, but was primarily focused on supervisory and managerial positions (Bartram, Robertson & Callinen; 2002). Even though Bartram's model is mainly aimed at explaining behaviour in managerial positions, it still has relevance for the current study because most of the job dimensions are generic enough to also be descriptive of non-managerial job performance. The leading and supervising sub-dimension of the leading and deciding competency seems to be the only competency that has questionable relevance for non-managerial positions.

The work of Bartram was based on a hierarchical competency framework. The framework distinguishes between 112 component competencies of related workplace behaviour at the finest level of detail. These competency components are not further differentiated. Bartram (2005) regards these components as the basic building blocks in the

development of competency models. Components can be combined to form competencies and the combined competencies will form competency models. Bartram developed a hierarchical competency model where the 112 components were aggregated under twenty second-order competency factors and these in turn were collapsed into eight third-order competency factors. The third-order competency factors were termed the Great Eight because it is believed that they hold a similar position in the performance domain as the Big Five do in the personality predictor domain (Bartram, 2005). The hierarchical nature of the SHL universal competency framework holds the advantage over the other performance models discussed thus far. According to this model, it is possible to drill down into any of the broad performance dimensions and to elaborate on the performance description. Bartram (2005, p. 1188) motivates the need for a generic performance model at the lower level of elaboration as follows:

> The choice of the Great Eight as the level of analysis (rather than either higher level constructs or more detailed competency models) was driven by the need to provide a degree of differentiation of the criterion space that reflected the range of attributes that managers and practitioners distinguish in practice, while retaining sufficient generality to enable the same model to be applied across a wide range of studies involving diverse competency models and predictor instruments.

The eight generic performance dimensions proposed by Bartram et al. (2002) and Bartram (2005) and their definitions are shown in Table 1. The nature of the competency domain definitions reflects the earlier claim that the Big Eight competency model has relevance for the assessment of performance in non-managerial positions.

Table 2.1

The big eight competency model

Competency domain title	Competency Domain Definition
Leading and deciding	Takes control and exercises leadership. Initiates action, gives direction and takes responsibility.
Supporting and Co-operation	Supports others and shows respect and positive regard for them in social situations. Puts people first, working effectively with individuals and teams, clients and staff. Behaves consistently with clear personal values that compliment those of the

	organisation.
Interacting and Presenting	Communicates and networks effectively. Successfully persuades and influences others. Relates to others in a confident and relaxed manner.
Analysing and interpreting	Shows evidence of clear analytical thinking. Gets to the heart of complex problems and issues. Applies own expertise effectively. Quickly takes on new technology. Communicates well in writing.
Creating and conceptualising	Works well in situations requiring openness to new ideas and experiences. Seeks out learning opportunities. Handles situations and problems with innovation and creativity. Thinks broadly and strategically. Supports and drives organisational change.
Organising and Executing	Plans ahead and works in a systematic and organised way. Follows directions and procedures. Focuses on customer satisfaction and delivers a quality service or product to the agreed standards.
Adapting and Coping	Adapts and responds well to change. Manages pressure effectively and copes well with setbacks
Enterprising and performing	Focuses on results and achieving personal work objectives. Works best when work is related closely to results and the impact of personal efforts is obvious. Shows an understanding of business, commerce and finance. Seeks opportunities for self-development and career advancement.

(Bartram et al., 2002; Bartram, 2005)

Bartram et al. (2002) and Bartram (2005) hypothesise that specific competency potential latent variables can be mapped unto the eight performance dimensions. "The main advantage of the Great Eight is that it provides a framework for integrating other measures, such as ability and motivation, and it provides a clear set of one-to-one predictor-to-criterion a priori hypotheses" (Bartram et al., 2002, p. 17). They did,

however, not propose a fully fledged structural model. Such a model could, however, be derived from the currently available published research (Bartram, 2005; Bartram et al., 2002; Baron, Bartram & Rainer, 2003). Moreover, in future (assuming reasonable model fit) this model could be expanded to also include generic latent outcome variables. In such a model the structural relationships existing between the latent outcome variables could be modelled as well as the manner in which the Great Eight competencies affect the latent outcome variables.

Compared to the model of Campbell (1991), the Great Eight competency model shows some overlap (Bartram, 2005):

- Job-specific task proficiency (ratings of overall job performance)
- Non-job-specific task proficiency (Great Eight factors 4 and 5)
- Written and oral communication (Great Eight factor 3)
- Demonstrating effort (Great Eight factor 8)
- Maintaining personal discipline (Great Eight factor 7)
- Facilitating team and peer performance (Great Eight factor 2)
- Supervision and leadership (Great Eight factor 1)
- Management and administration (Great Eight factor 6)

2.6 COMPARISON OF PERFORMANCE MODELS AND DEVELOPMENT OF A BASELINE STRUCTURE FOR GENERIC PERFORMANCE MEASURE

In order to compile a baseline structure of generic performance a comparison was made between the different models described in the literature review. A set of latent behavioural performance dimensions was harvested from these models so that that all dimensions are mutually exclusive but cover the array of performance dimensions proposed in the models.

Table 2.1 provides a summary of the latent behavioural performance dimensions proposed by the various researchers reviewed in paragraph 2.5.1. The Bernardin and Beatty (1984) model is not included in the comparison because of its focus on latent outcome variables

rather than on latent behavioural performance variables. The latent outcome variables were used in the subsequent evaluation of the justifiability of including these specific latent behavioural performance dimensions in the generic performance model. Where different terms were used to refer to essentially the same performance dimension in different performance models these terms were treated as synonyms and the dimension was entered in column 1 of Table 2.1 under an appropriate name.

Table 2.2

Comparison of generic non-managerial performance models

Performance Dimension number and name	Behavioural performance dimension	Models listing dimension
1 Effort	Effort Demonstrating Effort (OCB) Industriousness (OCB)	Viswesvaran Campbell Hunt
2 Job Knowledge	Job knowledge	Viswesvaran
3 Interpersonal Performance	Interpersonal Competence Interpersonal Performance Team Role Supporting and Co-operating Facilitating Peer and Team Performance (OCB) Interpersonal impact	Viswesvaran Murphy Welbourne, Johnson and Erez Bartram Campbell Bernadin and Beatty
4 Management and Administration	Administrative Competence Management/Administration Organising and Executing Managerial ability	Viswesvaran Campbell Bartram Schepers
5 Communication	Communication Competence Written and Oral Communication Interacting and Presenting	Viswesvaran Campbell Bartram
6 Leadership	Leadership Supervision Leading and deciding	Viswesvaran Campbell Bartram

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7 Counter Productive Work Behaviour	Compliance with Rules	Viswesvaran
	Maintaining Personal Discipline	Campbell
	Adherence to Confrontational Rules	Hunt
	Destructive Behaviours	Murphy
	Attendance (CPB)	Hunt
	Downtime Behaviour	Murphy
	Unruliness (CPB)	Hunt
	Theft (CPB)	Hunt
	Drug Misuse (CPB)	Hunt
	Off-Task Behaviour	Borman and Motowidlo
8 Organisational Citizenship Behaviour	Organisational Role	Welbourne, Johnson and Erez
	Contextual Performance	Borman and Motowidlo
9 Task Performance	Task Performance	Borman and Motowidlo
	Task Performance	Murphy
	Task Orientation (quality & quantity)	Schepers
	Job Role	Welbourne, Johnson and Erez
		Campbell
	Job specific task proficiency	Campbell
	Non-job specific task proficiency	Viswesvaran
	Productivity	Bartram
	Enterprising and Performing	Viswesvaran
	Quality of Work	Hunt
	Thoroughness	
10 Innovating	Creative Thinking	Schepers
	Innovator Role	Welbourne, Johnson and Erez
		Bartram
	Creating and Conceptualising	
11 Career Growth	Career Role	Welbourne, Johnson and Erez
		Bartram
	Enterprising and Performing	
12 Problem-solving and Analysing	Analysing and Interpreting	Bartram
	Analytical Ability	Schepers
13 Adapting	Adapting and Coping	Bartram
	Schedule Flexibility	Hunt

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2.7 PROPOSED PERFORMANCE MODEL

2.7.1 EFFORT

Effort is included in the models of Campbell (1990) (demonstrating effort) and Viswesvaran (Viswesvaran & Ones, 2000) (effort). Hunt (1996) uses a dimension of industriousness that he explains as constant attention and effort that the employee elicits towards his work. Industriousness may also be similar to the theoretical construct of initiative.

The competence of effort is using resources like time and care spent in order to be effective on the job. This competence speaks of the consistency of an employee's effort. It includes the willingness to keep working under detrimental conditions and to spend the extra effort required for the task. This dimension describes constant attention and effort that the employee elicits towards his/her work and the initiative to seek opportunities for self-development and career advancement.

2.7.2 JOB KNOWLEDGE

Viswesvaran explains the importance of job knowledge as a dimension of work performance. This dimension refers to all the insight and knowledge concerning the task that the employee has to perform (Viswesvaran, 1993). Job related knowledge and expertise is the degree to which an employee masters concepts to perform a specific task. It is an intricate concept that includes ability or capacity to learn, and seniority (opportunity to learn). The concept of job knowledge is generally measured with a paper-and – pencil test.

2.7.3 INTERPERSONAL PERFORMANCE

The competence of relating well with others is included in most of the models. Welbourne et al. (1998) (Team role), Campbell (1990) (Facilitating Peer and Team Performance), Bernadin and Beatty (1993) (interpersonal impact), Murphy (1990)

(interpersonal performance), Bartram (2005) (interacting and presenting) and Viswesvaran (1993) (interpersonal competence) all includes components of interpersonal competence.

Interpersonal competence is the degree to which the employee gets along with other employees, the ability to interact on a social level. This dimension includes teamwork and pro-social behaviours. To work effectively in a team situation requires employees to be committed, cooperating and contributing team members. It describes the ability of an employee to relate to others in a confident and relaxed manner, to act with sensitivity and to consider their opinions and suggestions. This dimension explains how the employee respects others and considers their problems and shortcomings. Interpersonal performance is the ability to support others and to show respect and positive regard for them in social situations. It describes how an employee behaves consistently with clear personal values that complement those of the organisation.

2.7.4 MANAGEMENT AND ADMINISTRATION

Bartram includes the dimension of organising and executing. Similar dimension are present in the models of Campbell (1990) (management/administration), Viswesvaran (1993) (administrative competence) and Schepers (2008) (Managerial ability).

This dimension describes how an employee plans ahead and works in a systematic and organised way. It is the ability to follow directions and procedures. It includes the articulation of goals for the unit, organising people and resources, monitoring progress, helping to solve problems and overcoming crises that might hinder goal accomplishment. The dimension speaks of administration ability and the effectiveness with which the employee coordinate his/her different work roles. This factor explains a high person-orientation, ability to inspire subordinates, high productivity and the ability to communicate goals and objectives effectively. Managerial ability also speaks of the ability to command respect from followers.

2.7.5 COMMUNICATION

Communication plays a very important role in workplace interaction and will therefore have an impact on job performance. This dimension is included in the models of Viswesvaran (1993) (Communication competence), Campbell (1990) (Written and oral communication) and Bartram (2005) (Interacting and Presenting).

Written and oral communication tasks refer to the ability of an employee to communicate in the written or spoken word irrespective of the merits of the content of the communicated message. This dimension describes the ability of the employee to communicate and network effectively, their ability to successfully persuade and influence others and the way that the employee relates to others in a confident and relaxed manner.

2.7.6 LEADERSHIP

The dimension of leadership is included in the models of Campbell (1990) (supervision), Viswesvaran (1993) (leadership) and lastly Bartram (2005) (leading and deciding).

Leadership in the proposed model does not refer to a formal leadership position. The competence of leadership describes the ability of an employee to empower and bring out extra performance in other employees. It describes the way that the employee supports peers and helps them with certain challenges. It describes the leadership qualities of the employee and how he/she works dynamically to motivate and inspire other employees. Leadership also entails the modelling of appropriate behaviour. It is the way that an employee initiates action, gives direction and takes responsibility.

2.7.7 COUNTERPRODUCTIVE WORK BEHAVIOUR

Counterproductive work behaviour or the behaviour of an employee that threatens the wellbeing of an organisation and its members are included in the following generic performance models: Viswesvaran (1993) (Compliance with rules), Campbell (1990) (Maintaining personal discipline), Hunt (1996) (Adherence to confrontational rules,

Attendance, Unruliness, Theft, Drug Misuse), Borman and Motowidlo (1993) (Off-Task behaviour) and Murphy (1990) (Destructive behaviours, Downtime behaviour).

The employee's unwillingness to comply with organisational rules and regulations and an incorrect interpretation of these expectations will result into counter productive work behaviour. The employee's ability to maintain personal discipline will avoid the display of work behaviours that has a negative impact on the organisation. In essence the employee has to comply with minimum job requirements and organisational rule following. The dimension of attendance is related to absenteeism and punctuality. Components associated with attendance include withdrawal and inability to maintain personal discipline. Counterproductive behaviour includes minor deviant behaviours like theft and drug misuse in the work situation as well as provocative attitudes towards co-workers, supervisors, and work itself. This behaviour includes violence, theft and other negative behaviours hindering the accomplishment of organisational goals.

2.7.8 ORGANISATIONAL CITIZENSHIP BEHAVIOUR

Organisational Citizenship Behaviour contributes towards the overall effectiveness of the organisation. This behaviour is extra-role and not formally defined in the specific job description. Conclusively organisational citizenship behaviour is not explicitly recognised by the formal reward system.

Welbourne et al. (1998) include this behaviour in their model (Organisational Role) as well as Borman and Motowidlo (1993) (Contextual Performance). Contextual performance refers to all constructive non-prescribed activities that benefit the organisation and its members. According to Borman and Motowidlo (1993, p. 82) the following five first-order contextual performance factors can be distinguished:

> [1] persisting with enthusiasm and extra effort as necessary to complete own task activities successfully, [2] volunteering to carry out task activities that are not formally part of own job, [3] helping and cooperating with others, [4] following organisational rules and procedures, [5] endorsing, supporting, and defending organisational objectives.

Organisational Citizenship Behaviour is defined as a higher order factor in the performance model of Hunt. This behaviour is defined in terms of Work Ethic (Industriousness and Thoroughness) as well as Schedule flexibility. The dimension of industriousness is explained as the constant attention and effort that the employee devotes to his work. Industriousness may also be similar to the theoretical construct initiative (Hunt, 1996). The quality of an employee's work is the core of the thoroughness dimension. Schedule flexibility is described as the willingness of the employee to change his schedules in order to accommodate demands at work (Hunt, 1996).

2.7.9   TASK PERFORMANCE

The performance of a task is clearly very important and this dimension is described in the models of Viswesvaran (1993) (Productivity, Quality of Work), Campbell (1990) (job specific task proficiency and non-job specific task proficiency), Borman and Motowidlo (1993) (Task Performance), Murphy (1990) (task performance), Schepers (2008) (Task Orientation – quality and quantity), Bartram (2005) (Enterprising and performing), Welbourne et al. (1998) (Job Role) and lastly Hunt (1996) (Thoroughness).

Task performance is described as: "the effectiveness with which job incumbents perform activities that contribute to the organisation's technical core either directly by implementing a part of its technological process, or indirectly by providing it with needed materials or services" (Borman & Motowidlo, 1997, p. 99). This dimension describes the effectiveness with which an employee performs the foundational, substantive or technical tasks that is essential for a specific job. It includes productivity that is defined as the quantity or volume of work produced and describes the ratio inputs in relation to the outcomes achieved. Quality is the indication of how well the job is done. Job-specific task proficiency is defined as the degree of success with which incumbents perform the core substantive or technical tasks that are essential to a specific job. According to Murphy task performance is described as the completion of role activities prescribed in the job description. Task-orientation speaks about the volume and quality of work completed by the employee. This factor includes work-tempo, energy level, punctuality, initiative, purposefulness and independence. Job role represents employee performance in the light

of the employee completing assigned tasks to contribute towards organisational goals. Enterprising and performing focuses on results and achieving personal work objectives. This is evident when work is related closely to results and the impact of personal efforts is obvious.

2.7.10 INNOVATING

The dimension of Innovation is included in the performance models of Schepers (2008) (Creative Thinking), Welbourne et al. (1998) (Innovator Role), Bartram (2005) (Creating and Conceptualising).

The innovating dimension describes the creativity of employees, not only in their individual jobs but also on behalf of the whole organisation, contributing towards the competitive advantage of their firm. This entrepreneurial role is motivated in that it will contribute to overall organisational effectiveness and adaptability in a changing environment. Creating and Conceptualising requires openness to new ideas and experiences and describes the ability to seek out new learning opportunities. It describes the ability of the employee to handle situations and problems with innovation and creativity and the ability to think broadly and strategically. Lastly Creating and Conceptualising describes the ability to support and drive organisational change. Creative thinking and resourcefulness describes the quality of decisions made when employees complete their tasks.

2.7.11 CAREER GROWTH

Career Growth is described in the models of Welbourne et al. (1998) (Career Role) as well as Bartram (2005) (Enterprising and Performing).

The *Career role* requires the employee to take responsibility for his/her career development and encompasses those employee behaviours that are aimed at the development of job relevant competency potential and competencies (Welbourne et al., 1998). Inclusion of the career role in the list of areas in which employees' performance

should be assessed is justified by arguing that career planning and growth forms an integral part of the new psychological contract. The new psychological contract is based on the employer's inability to provide job security in light of the economical situation and challenges. The employer will therefore provide a career program in exchange for the employee's commitment to increase his/her value to the organisation by taking responsibility for their own career planning (Welbourne et al., 1998). Enterprising and performing describes the ability of an employee to seek opportunities for self-development and career advancement.

2.7.12 PROBLEM-SOLVING AND ANALYSING

The dimension of problem-solving and analysing is included in the models of Bartram (2005) (Analysing and Interpreting) as well as Schepers (2008) (Analytical Ability).

Analysing and Interpreting describes the ability of an employee to apply analytical thinking in the job situation. An employee with this ability will be capable to identify the core issues in complex situations and problems. It is the ability to apply expertise effectively and communicate solutions effectively in writing. Analysing and interpreting also describes the ability to learn and utilise technology. Analytical ability explains the ability to get to the bottom of problems and challenges in the workplace and to resolve problems in a logical and systematic way. This factor includes behaviour that speaks of intelligence and making decisions through the deduction of the correct and accurate facts. Performance in this dimension shows evidence of study and insight.

2.7.13 ADAPTING

Adapting is described in the performance models of Bartram (2005) (Adapting and Coping) and Hunt (1996) (Schedule Flexibility). This dimension describes the ability of an employee to adapt and respond effectively in situations where change is inevitable. It describes how the employee manages pressure effectively and the ability to cope well with setbacks. Schedule flexibility is described as the willingness of the employee to change his schedules in order to accommodate demands at work (Hunt, 1996)

2.8   VALIDATING THE BASELINE STRUCTURE

The second step that Spangenberg and Theron (2004) used to develop their generic organisational unit performance model was to verify the appropriateness of the proposed performance dimensions. The inclusion of the proposed latent behavioural dimension in the generic model of individual performance therefore needed to be justified.   The appropriateness of each of the latent performance dimensions listed in Table 2.1 was considered. Some of the dimensions listed in table 2.1 seemed to be more contentious than others.   Does the level of effort elicited by employees influence their performance? Keeping in mind that this performance measure is focussed on entry level non-managerial jobs, what would the relevance of a dimension of leadership be? Should job knowledge be treated as a behavioural dimension of job performance or rather as job competency potential latent variable?   The set of latent behavioural dimensions identified in Table 2.2 for possible inclusion in the generic performance model was critically evaluated in order to prove that a theoretical rationale can be established to justify the inclusion of the dimension in the model. Why should an employee's work behaviour be evaluated in terms of the proposed dimensions? A convincing theoretical rationale should exist to warrant the inclusion of a dimension in the model.   The instrumentality of the behavioural performance dimension in achieving desired outcomes was considered in the development of such a theoretical rational. In principle it should be acknowledged that latent behavioural dimensions could have intrinsic value in terms of its inclusion in the performance construct without necessarily resulting in any high-valence outcome.

The question also considered was whether significant proportions of variance would be explained in all desired latent outcomes variables by the latent performance dimensions listed in Table 2.2. The question therefore is whether the proposed performance model suffers from criterion deficiency in as far it fails to reflect work behaviours that are instrumental in achieving desired outcomes.

Jobs, like organisations, are not natural phenomena, but rather man-made phenomena, designed and created by man to serve a specific purpose. Jobs exist to accomplish some objective - to produce a product or a service or some component thereof for a specific

market of consumers or clients. The market of consumers or clients could be external to the organisation or could exist internal to the organisation. Every job has specific tasks as described by the job description of that occupation. A job is a defined set of inter-related behavioural tasks, constraints and opportunities in the deliverance of a product or service. Some of these behavioural tasks are unique to the specific position and some of these behavioural tasks apply more generally across numerous positions (e.g., using a PC and word processing software to prepare written manuscripts). The performance of a job incumbent should therefore first and foremost be evaluated in terms of the level of competence with which both the job-specific and non-job-specific behavioural tasks are completed[6]. This generic performance measure therefore has to contain a measure of **task performance** as this is the main focus of any job. Task Performance is included in the models of Visweswaran (Visweswaran & Ones, 2000) (Productivity and Quality of work), Borman & Motowidlo (1997) (Task Performance), Murphy (1990) (Task Performance), Schepers (2008) Task Orientation (quality & quantity), Welbourne et al. (1998) (Job Role), Campbell (1990) (Job specific task proficiency), Bartram (2005) (Enterprising and Performing) and Hunt (1996) (Thoroughness). Organisations compensate employees mainly for their contribution towards completing specific tasks. The level of competence with which these behavioural tasks are completed could in turn be expected to positively influence both the quality of the product or service (or component thereof) delivered to the market and the quantity of output. These two latent output variables could be expected to be negatively correlated. The quality and quantity output variables could, moreover, be expected to positively influence the level of customer satisfaction.

The quality and quantity of the output would, however, not solely be an expression of the job-specific and non-job-specific task proficiency of the job incumbent. The definition used to describe the dimension of effort speaks of resources like care and time that the employee uses to effectively complete the required tasks. The amount of resources (e.g., attention, time, care) the employee commits to the task could also be hypothesised to affect the quality and quantity of the output. The intensity and perseverance with which employees attempt to succeed in the both the job-specific and non-job-specific behavioural

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[6] The distinction between job-specific and non-job-specific task performance is, however, not regarded as critical here.

tasks (i.e., the effort they devote to their work) could be expected to affect the quality and quantity of their output. The effect of effort on the quantity and quality of output would, however, not be expected to be direct but rather be mediated by the level of task performance. The way that the employee uses his time as well as the level of care with which the employee approaches his/her tasks will have an influence on the performance outcome. Effort speaks of initiative that will also lead to a positive performance outcome. **Effort** was therefore included in the baseline structure of this generic performance measure. This dimension is defined in the performance models of: Visweswaran (Visweswaran & Ones, 2000) (Effort), Campbell (1990) (Demonstrating Effort) and Hunt (1996) (Industriousness). The latent effort dimension could therefore be expected to be related to the latent task dimension.

Events in the internal and external environment that affect employee task performance are not fully predictable. More so the more dynamic and complex the environment becomes. Short term adaptation to unforeseen events is therefore important. At the same time longer term systemic change in the external and internal organisational environment is also inevitable. For organisations to succeed they have to anticipate and appropriately adapt to long term systemic change. On both fronts, however, individual employees are required to demonstrate behavioural flexibility and behavioural adaptability to change. **Adaptability** as defined in the models of Bartram (2005) (Adapting and Coping) and Hunt (1996) (Schedule Flexibility), was therefore included in the baseline structure of this generic performance measure. This latent performance dimension could be expected to be positively related to the latent task performance dimension especially if the environment in which the organisation operates could be characterised as complex and dynamic.

To remain competitive within a dynamic, perpetually changing market environment organisations have to continually reinvent the way they do business and the products and services they offer to the market. Ideally the source of creative, innovative change should not be centralised at one point at the top of the organisational hierarchy but rather decentralised throughout the organisation. Difficult to imitate and causally obscure competitive advantage lies in the innovative behaviour displayed by individual employees. Employees are therefore required to act entrepreneurially, to come up with creative and

novel ways of doing things that will contribute towards organisational success. The dimension of Innovation is included in the models of: Schepers (2003) (Creative Thinking), Welbourne et al. (1998) (Innovator Role) and Bartram (2005) (Creating and Conceptualising). **Innovating** was therefore included in the baseline structure of this generic performance measure. This latent performance dimension could be expected to be positively related to the latent outcome variables organisational capacity[7] and customer satisfaction.

Development of personnel is an important human resource intervention aimed at improving employee task performance. Ideal, however, would be that the organisation does not take sole responsibility for employee development. Individual employees should take responsibility for their own development. This includes the initiative to seek opportunities for growth and improvement in performance. **Self-development** as defined in the performance models of: Welbourne et al. (1998) (Career Role) and Bartram (2005) (Enterprising and Performing), was therefore included in the baseline structure of this generic performance measure. This latent performance dimension is expected to be positively related to the latent task performance dimension and the need for supervision latent outcome variable. The latent self-development dimension could moreover be expected to positively impact on the latent OCB dimension of performance.

A contentious question was whether leadership should be included in a generic performance model of non-managerial individual job performance. Moreover, if it was to be included as a performance dimension how should it be defined? Human capital is of utmost importance in a world marked by globalisation. Employees need to be empowered and inspired to reach their potential. For this reason the dimension of leadership can not be left out of the equation. Even in a performance measure aimed at entry level jobs, employees with the potential to inspire others, model the appropriate behaviour and the ability to take ownership of their tasks will perform better than other employees that does not elicit such behaviour. Keeping the significance of human capital in mind, progression to the next level is always important and leadership therefore needs to be developed.

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[7] Organizational capacity refers to the wealth of resources available to the organization.

Leadership will not only influence individual performance, but will influence the performance of co-workers as well. This latent performance dimension is expected to positively impact task performance and organisational citizenship behaviour. For the purpose of this study, the dimension is named "leadership potential". **Leadership potential** was therefore included in the baseline structure of this generic performance measure. Components of leadership are defined in the models of: Visweswaran (Visweswaran & Ones, 2000) (Leadership), Campbell (1990) (Supervision) and Bartram (2005) (Leading and deciding).

Organisations are by definition inter-dependent collections of people working towards a common objective. No employee can successfully achieve the outcome for which he/she is responsible by operating in independent isolation. Vertical and horizontal communication between employees therefore becomes very important. Communication competence is described in four different models namely those of Viswesvaran (Viswesvaran & Ones, 2000) (communication competence), Campbell (1990) (written and oral communication) and Bartram (2005) (Interacting and Presenting). Communications becomes more important the more organic and less mechanistic the organisation structure becomes. This in turn depends on the complexity and dynamism of the external environment in which the organisation operates. Competence in both verbal and written communication is important. **Communication** is therefore included in the baseline structure of this generic performance measure. The latent communication performance dimension firstly refers to proficiency at verbal and formal written communication regardless of the content. This competence describes the ability to communicate simply and comprehensibly. It, however, also refers to maintaining open, effective communication channels. The latent communication performance dimension is expected to positively influence the latent task dimension.

Because organisations are by definition inter-dependent collections of people working towards a common objective in which no employee can successfully achieve the outcome for which he/she is responsible by operating in independent isolation, the quality of inter-personal interaction has a significant impact on organisational functioning. To be considered successful employees have to get along with other employees, show

consideration for colleagues and be competent at social interaction. **Interpersonal relations** is included in the baseline structure of this generic performance measure. The latent variable of interpersonal relations is included in the models of: Visweswaran (Visweswaran & Ones, 2000) (Interpersonal Competence), Murphy (1990) (Interpersonal Performance), Welbourne et al. (1998) (Team Role), Bartram (2005) (Supporting and Co-operating), Campbell (1990) (Facilitating Peer and Team Performance), Bernardin and Beatty (1984) (Interpersonal impact). Performance on this latent performance dimension could be expected to positively affect the latent task dimension mediated by the latent communication dimension and to positively affect the latent inter-personal outcome variable. A reciprocal relationship could be hypothesised to exist between the latent communication dimension and the latent inter-personal relations dimension of performance.

Most, if not all, non-managerial jobs require some degree of planning, organising coordinating and monitoring of one's own activities and resources. Although superiors of non-managerial personnel are held accountable for these functions, an employee would be considered successful to the degree to which he/she is more than a passive pawn in the hands of a manager but rather eases the managerial burden placed on the superior by taking some initiative and responding proactively. **Management** as defined in the models of Visweswaran (Visweswaran & Ones, 2000) (Administrative Competence), Campbell (1990) (Management/Administration), Bartram (2005) (Organising and Executing) and Schepers (2008) (Managerial ability) was therefore included in the baseline structure of this generic performance measure. Performance on this dimension is expected to positively affect task performance.

Most, if not all, non-managerial jobs require some degree of problem solving. Problem solving should become more prevalent as one move up the organisational hierarchy. Performing a job is more than executing a limited set of routines in response to given cues. Employees are frequently confronted with novel, previously not encountered, problems. To solve these problems crystallised knowledge should be transferred on the novel problem. This dimension is defined in the following models: Bartram (2005) (Analysing and Interpreting) and Schepers (2003) (Analytical Ability). **Analysing and problem-**

solving is included in the baseline structure of this generic performance measure. Performance on this dimension could be expected to positively affect task performance.

The job comprising a set of inter-related behavioural tasks, constraints and opportunities in service of a product or service is imbedded in a larger organisation which poses specific contextual behavioural expectations. The employee is firstly expected to comply with work-related organisational rules and refrain from displaying behaviour that negatively impacts on the organisation and its employees. Counterproductive work behaviour refers to a wide spectrum of employee behaviours that have a negative effect on organisational functioning and success. These include but are not limited to theft, unruliness, drug misuse, non-compliance with organisational rules, personal indiscipline, unauthorised absenteeism and social loafing. The latent variable of Counterproductive work behavior is included in the models of: Visweswaran (Visweswaran & Ones, 2000) (Compliance with Rules), Campbell (1990) (Maintaining Personal Discipline), Hunt (1996) (Adherence to Confrontational Rules, Attendance, Unruliness, Theft, Drug Misuse), Murphy (1990) (Destructive Behaviours, Downtime Behaviours) and Borman and Motowidlo (1997) (Off-Task Behaviour). **Counterproductive work behaviour** is therefore included in the baseline structure of this generic performance measure. Performance on this dimension could be expected to negatively affect task performance, to positively affect the latent need for supervision and to negatively affect the timeliness outcome variables.

The organisation, however, values more than simply staying out of trouble. The employee is secondly expected to display organisational citizenship behaviour that facilitates the task performance of co-workers, facilitates the task of the leader and benefits the organisation. The role the employee is meant to play in the organisation cannot be completely scripted. Organisational citizenship behaviour refers to all constructive non-prescribed activities that benefit the organisation and its members. **Organisational citizenship behaviour** as defined in the models of Welbourne et al. (1998) (Organisational Role) and Borman and Motowidlo (1997) (Contextual Performance), is therefore included in the baseline structure of this generic performance measure. Organisational citizenship behaviour could be expected to negatively affect the latent need for supervision outcome variable.

Demonstrating job knowledge is suggested by Viswesvaran (Viswesvaran & Ones, 2000) as a separate generic performance dimension. It, however, seems doubtful that expert job knowledge would express itself in unique job behaviour as yet not captured by the foregoing performance dimensions. Exert job knowledge will probably express itself in task performance, and analysing and problem-solving and Job knowledge is therefore not included as a latent performance in its own right in the proposed generic performance model. Rather it is proposed that job knowledge should be treated as a job competency potential (Saville & Holdsworth, 2000) latent variable that positively influences task performance and analysing and problem-solving.

Three broad dimensions of performance have been identified that can generally be applied across jobs as stand-alone performance dimensions. These dimensions are task performance, organisational citizenship behaviour and counterproductive behaviours (Viswesvaran & Ones, 2000). Although not presented as such by Viswesvaran and Ones (2000) these three broad performance dimensions could also be interpreted as three higher-order generic non-managerial performance factors. Both organisational citizenship behaviour and counterproductive behaviour constitute broad categories of job behaviours that are not formally stipulated in the job description but that nonetheless impact on organisational effectiveness and should therefore be considered in addition to task performance when conceptualising work performance. The question arises whether self development should be interpreted as a specific first-order performance dimension that loads on one (or more) of the second-order performance factors or whether it should be interpreted as a fourth second-order factor. If numerous self development related behaviours would have existed (analogous to the first-order organisational citizenship dimensions), treating it as a second-order performance factor would have made sense. This does not seem to be the case though. The most prudent option at this stage therefore seems to be to regard it as a first-order factor that loads on the task performance and the organisational citizenship behaviour second-order factors.

Bernardin and Beatty (1984) identify six outcome latent variables in terms of which the performance of employees should be evaluated. Whether employees are considered successful is judged according to their approach not in terms of what the employer does

but rather by what the employer achieves. The latent outcome variables they suggest are: Quality of output, quantity of output, timeliness, cost-effectiveness, need for supervision, and interpersonal impact. Specific structural relations are assumed to exist between the outcome variables. Performance of employees should individually and collectively serve organisational strategy. Organisational strategy imposes specific standards on each outcome latent variable. Strategy is served only if <u>all</u> outcome standards are met. Whether the strategically important outcome standards will be achieved depend at least in part on the performance level achieved in the latent behavioural performance dimensions that are instrumental in achieving the desired outcomes. The twelve latent performance dimensions discussed thus far were argued to be influential behavioural determinants driving the performance levels achieved on the outcome latent variables. An additional question to concern is whether the level of performance on any of the six latent outcome variables is significantly influenced by a latent behavioural performance dimension not listed in Table 2.2. No glaring omission seems to be indicated.

A further, related question is whether the six outcome latent variables identified by Bernardin and Beatty (1984) provide a sufficiently comprehensive coverage of the performance outcome domain. The argument presented earlier (see paragraph 2.5.1.6) suggests that additional latent outcome variables should be considered. The need to expand the domain of latent outcome variables seems especially pressing with regards to individual criteria mobilised by individual employees to assess the satisfactoriness of their work performance. Extending the domain of latent outcome variables will not be attempted in this study. It should, however, be attempted in subsequent research. Doing so should unlikely result in a need to expand the domain of latent behavioural performance dimensions. Subsequent research could, however, prove this assumption wrong.

2.9 PROPOSED CONSTITUTIVE DEFINITION OF THE GENERIC NON-MANAGERIAL INDIVIDUAL PERFORMANCE CONSTRUCT

The baseline structure for this generic performance measure contains the 12 dimensions listed and defined in Table 2.3.

Table 2.3

Summary of the proposed 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/her 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	**Innovating**	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. Supports and drives

		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 through 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.
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 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.

2.10 PROPOSED GENERIC NON-MANAGERIAL INDIVIDUAL PERFORMANCE STRUCTURAL MODEL.

The argument presented in paragraph 2.8 aimed at validating the proposed non-managerial individual performance model suggests that specific structural relations exist between the twelve latent behavioural performance dimensions and the six latent outcome variables identified by Bernardin and Beatty (1984). These structural relations are schematically depicted as a non-managerial individual performance structural model in Figure 2.2.
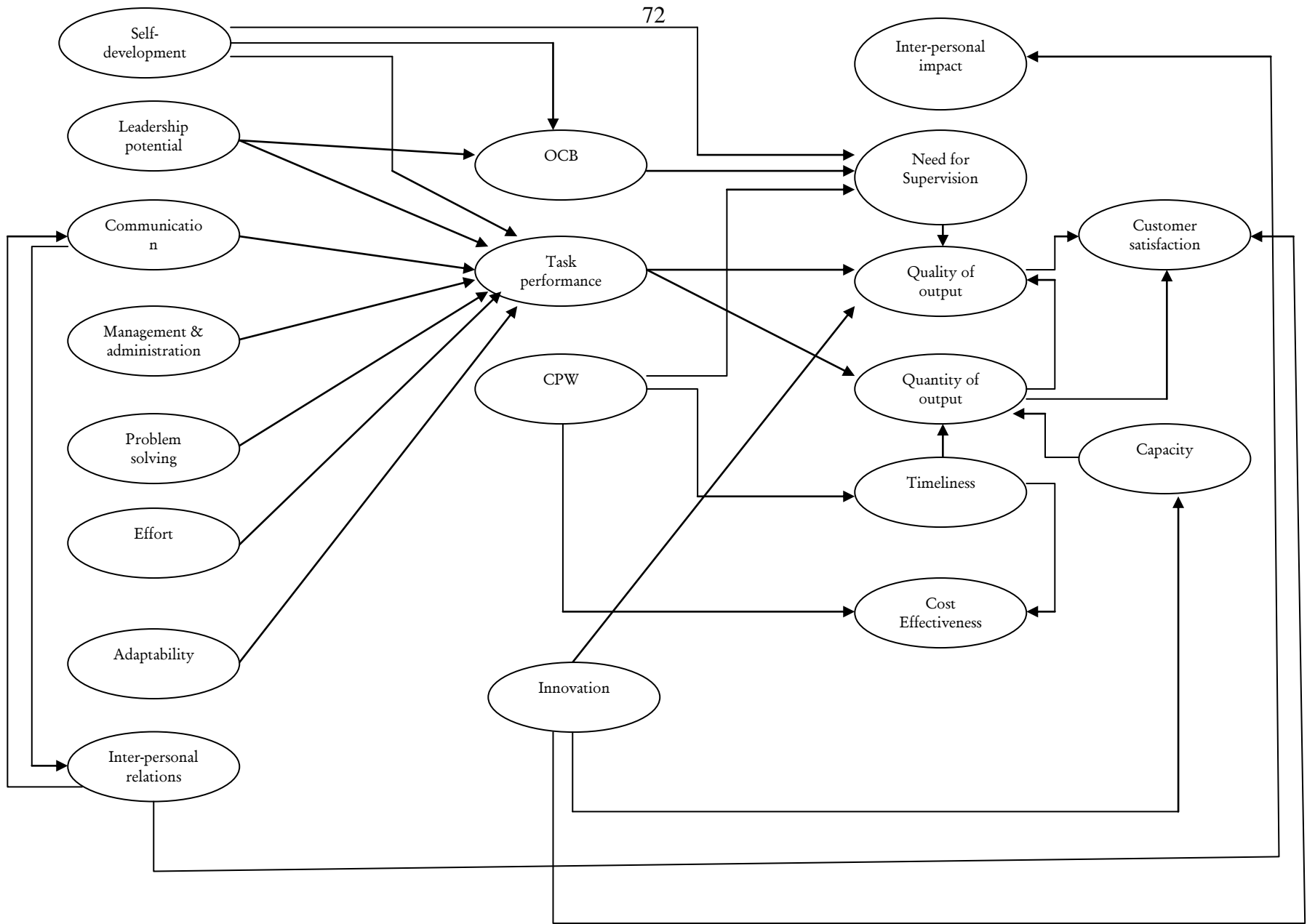
Figure 2.2   Proposed generic non-managerial individual performance structural model

CHAPTER 3
RESEARCH METHODOLOGY

3.1   INTRODUCTION

In Chapter 1 the need was argued for the development and validation of a generic, non-managerial performance measure. In Chapter 2 the performance construct was conceptualised in terms of twelve inter-related latent behavioural performance dimensions. The primary objective of the research is to develop a multi-rater measuring instrument that will provide a measure of the performance construct as constitutively defined in Chapter 2 and to evaluate the reliability and construct validity of the instrument.

The objective of Chapter 3 is to describe how the performance measure, termed the Generic Performance Questionnaire (GPQ) was developed and evaluated psychometrically. The architecture of the GPQ reflects a specific definition of performance and the design intention[8] to have specific items reflect specific performance dimensions. The design of the GPQ in conjunction with its scoring key implies a specific measurement model which formally expresses the belief that the behavioural responses to specific items of the GPQ are a function of certain underlying performance dimensions. The measurement model thus maps specific items onto specific first-order performance factors thereby claiming that responses to these items reflect the state of the underlying first-order factor to which it is linked. To ascertain the validity of these claims made by the GPQ requires a confirmatory factor analysis in which the fit of the implied measurement model is evaluated. The credibility of the verdict on the validity of these claims depends on the methodology used to arrive at the verdict. The methodology is therefore meant to serve the epistemic ideal of science (Babbie & Mouton, 2001). Should the methodology used be flawed or unclear, this may jeopardise the chances of arriving at a valid conclusion on the merit of the measurement model as a hypothesis on the nature of the construct the GPQ is measuring and how it is measuring the specific construct. As a

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[8] The term "design intention" is interpreted to refer to the intention of the developers of the instrument during the design of the instrument that specific items should reflect specific dimensions of the to-be-measured construct.

result, the conclusions derived on the ability of the GPQ to measure the performance construct amongst South African employees in non-managerial positions via its premeditated design could be fundamentally flawed. This would seriously impair the credibility of the verdict on the merits of the GPQ as a generic measure of job performance and erode confidence in the use of the instrument as a criterion measure.

Because scientific methodology is meant to serve the epistemic ideal of science, a scientific inquiry should subject its method of inquiry to critical inspection by knowledgeable members of the scientific community in which the research is being performed (via publication and conference presentations). In this sense, science could be said to be rational (Babbie & Mouton, 2001). Scientific rationality can, however, only serve the epistemic ideal of science if the method used in the scientific inquiry is comprehensively described and if the methodological choices that have been made are thoroughly motivated. Chapter 3 consequently provides a thorough description and motivation of the research methodology used to develop the GPQ and to evaluate the ability of the GPQ to measure the generic job construct as it defines it via its premeditated design in a sample of South African non-managerial employees.

3.2 DEVELOPMENT OF THE GENERIC PERFORMANCE QUESTIONNAIRE (GPQ)

The definition of each performance dimension was used to generate items for the GPQ. The number of items per dimension ranges from six to ten and is intended to be a clear representation of the underlying performance dimension. The instrument measures performance in the workplace, it is a generic measure (the instrument is not job specific) and can be used to measure performance for all entry-level non-managerial positions.

Items were generated by the researcher by identifying critical behavioural incidents associated with a high and a low standing on the latent performance dimension. The constitutive definition of each latent performance dimension was used to evaluate the content validity of each critical behavioural incident. The critical incidents were written as short, specific statements to which respondents have to respond by indicating on a 5

point rating scale the relative frequency with which the behaviour described in the incident had been displayed by the focal employee during the indicated rating period.

The GPQ was used to obtain multi-rater assessments of the job performance of a focal employee. Since the GPQ is aimed at assessing the performance of non-managerial personnel the intention is to use the instrument for 180° (rather than 360°) performance evaluations. The instrument is therefore available in two forms, namely in a self-assessment form and other-assessment form. The latter form is used to obtain assessments of the focal employee from peers and from a superior. Each latent performance dimension is measured by an essentially unidimensional set of items. The same set of items is used in both forms. The description of the behavioural denotations is provided in the first person in the self-assessment form whereas the same behavioural denotation is described in the third person in the other-assessment form. The measuring instrument uses a 5-point Likert type scale to record the responses of respondents to the items. This scale is used to measures the relative frequency with which the focal employee displayed the behaviour described in the item during the assessment period.

The items comprising each subscale describe behavioural denotations of the various latent behavioural performance dimensions. The objective was to obtain a set of items for each subscale that provides a relatively uncontaminated expression (via the respondent's behavioural response to it) of the latent performance dimension it was earmarked to reflect. No behaviour will, however, ever reflect only a single underlying latent variable. Human behaviour is complexly determined by numerous latent variables. The best possible situation would be if the items in each subscale would each relatively purely reflect the common latent performance dimension of interest but the systematic measurement error influences would share very little common variance. The item set written to serve as a subscale for each latent performance dimension was therefore considered essentially unidimensional if the inter-item partial correlations between items, controlling for the common underlying factor, approaches zero.

Copies of the two forms of the experimental GPQ are shown in Appendix A.

3.3   RESEARCH PROBLEM AND RESEARCH HYPOTHESES

The GPQ was developed to measure generic non-managerial performance so as to enable the eventual development and empirical testing of a comprehensive generic performance structural model. The GPQ can, however, only be used with confidence to operationalise the twelve latent behavioural performance dimensions in the model if credible evidence on the reliability and construct validity of the instrument exists.

The substantive hypothesis tested in this study is that the GPQ provides a construct valid and reliable measure of job performance as defined by the instrument, amongst South African non-managerial personnel.

The substantive hypothesis translates into the following specific operational hypotheses:

- The measurement model implied by the scoring key and the design intention of the GPQ can closely reproduce the covariances observed between the items comprising each of the sub-scales,
- The factor loadings of the items on their designated latent behavioural performance dimensions are significant ($p < .05$) and large[9] ($\lambda_{ij} \geq .50$),
- The measurement error variance associated with each item is small
- The latent performance dimensions explain large proportions of the variance in the items that represent them, and
- The latent performance dimensions correlate low to moderate with each other.

3.4   VALIDATION SAMPLE

This study makes use of structural equation modeling (SEM) which is very much a large sample technique. The measuring instrument measured performance across various occupations in non-managerial positions. The target population at which the GPQ was aimed at consists of South African employees in non-managerial positions in which they are not formally responsible for the management of one or more followers. That forces

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[9] The magnitude of the factor loadings is interpreted in the completely standardized solution. A factor loading will be considered sufficient large if the latent variable explains at least 50% of the variance in the item.

the question what exactly is a non-managerial position. Strictly speaking a non-managerial position is a position in which one is not formally held accountable for the management of anything. Such a position, however, probably does not exist. Even the foregoing analysis of the content of non-managerial positions pointed to the need to include a performance dimension Management and Administration in the generic performance model. For the purpose of this study management was interpreted narrowly as the accomplishment of organisational unit objectives through the direction of other people. The critical question was therefore whether employees have subordinates reporting to them over which they have a managerial prerogative and through which they accomplish specific objectives set for an organisational unit. A non-managerial position can therefore be defined as a position in which the incumbent independently pursues an objective for which he/she is individually accountable. To obtain valid and credible validation results for the generic performance measure, a representative probability sample should ideally be selected from the target population. This clearly is not practically feasible in a study of this nature.

A non-probability sample of non-managerial employees from OK Furniture as well as a small sample of various non-managerial employees from various other organisations was used for this study. A sizable, non-ignorable gap exists between the target population and the sampling population. Using a non-probability sample always leaves the risk of a self-selection error. These two errors make it unlikely that the sample accurately represented the target population. Inferences with regards to the target population were therefore made with extreme caution.

Structural equation modeling was used as statistical analysis technique (see paragraph 3.5). The process of SEM requires a large sample because the process is based on covariances that are less stable when estimated from small samples. Sample size under 200 normally means that parameter estimates are unstable and that the analysis will lack statistical power. Sample size also influences parameter estimates and chi-square tests of fit (Ullman, 2006). The twelve latent behavioural performance dimensions are measured by 96 items. If the model is fitted with individual items then it would imply that 258 freed parameters would have to be estimated in the measurement model (assuming the latent variables are correlated but that the latent variances are not estimated). The degrees of freedom of the

model would then be 4398. Syntax developed by Preacher and Coffman (2006) in R and available at http://www.quantpsy.org/rmsea/rmsea.htm indicates that a sample size of 15.38 participants would then be adequate to ensure a .80 probability that an incorrect model with 4398 degrees of freedom is correctly rejected. This is applicable when the probability of a Type 1 error in testing the null hypothesis of close fit is fixed at .05 (i.e., P(reject H_0: RMSEA $\leq$ .05|RMSEA =.08)). Required sample size, viewed from the perspective of statistical power, reduces as the degrees of freedom increases.

A further consideration is, however, that the number of observations should exceed the number of freed parameters to be estimated (258 in the case of the GPQ measurement model). Hair, Black, Babin and Anderson (2010) suggest the rather stringent guideline that at least 15 observations are required for each parameter estimated in the model. In the case of the GPQ measurement model this would imply a sample of 3870 cases. In their summary of guidelines available in the literature on the required sample size for SEM Hair et al. (2010, p. 662) provide the following guidelines:

> Based on the discussion of sample size, the following suggestions for minimum sample sizes are offered based on the model complexity and basic measurement characteristics:
>
> - Minimum sample size-100: Models containing five or fewer constructs, each with more than three items (observed variables), and with high item communalities (.6 or higher).
> - Minimum sample size-150: Models with seven or fewer constructs, modest communalities (.5), and no underidentified constructs.
> - Minimum sample size-300: Models with seven or fewer constructs, lower communalities (below.45), and/or multiple underidentified (fewer than three items) constructs.
> - Minimum sample size-500: Models with large numbers of constructs, some with lower communalities, and/or having fewer than three measured items.
>
> In addition to these characteristics of the model being estimated, sample size should be increased in the following circumstances: (1) data deviates from multivariate normality, (2) sample-intensive estimation techniques (e.g., ADF) are used, or (3) missing data exceeds 10 percent.

The sample that was eventually selected failed to fully meet the sample size requirements as set out above. The sample consisted of all races (Black, Indian, Coloured and White), both genders and various different languages were represented. The assessments were completed between February 2012 and July 2012 under standardized circumstances. One hundred and fifty-nine (159) responses were gathered from OK Furniture and a further forty-six (46) from other employees in different settings within the South African context. The total sample therefore consisted of 205 observations. This falls somewhat short of the number of respondents that are required to fit the measurement model with individual items as indicator variables as originally intended. Access to data seems to be the Achilles' heel of the applied Industrial Psychology researcher in South Africa.

3.5   RESEARCH DESIGN

In a typical explanatory research study the operational research hypothesis would exist as a tentative relational statement hypothesising a specific relationship between at least one independent observed variable (X) and at least one dependent observed variable (Y). In its simplest form the operational hypothesis therefore takes on the form: "If X changes in a specific way then Y will change along with it in a specific way." It is against this background that Kerlinger (1973) and Kerlinger and Lee (2000) argue that the aim of the research design is to provide empirical evidence that can be interpreted unambiguously for or against the operational hypothesis in an attempt to answer the research question. The research design achieves this by controlling (dependent variable) variance (Kerlinger, 1973; Kerlinger & Lee, 2000). The degree to which the research design maximizes systematic variance, minimizes error variance and controls extraneous variance determines the credibility of the study and the interpretation of the results (Kerlinger, 1973; Kerlinger & Lee, 2000). The research design constitutes a plan that is applied to test the operational hypothesis.

The substantive and operational research hypotheses in this study do not have the traditional relational structure typical of the hypotheses formulated in explanatory research in which it would be meaningful to refer to a dependent/endogenous variable and an independent/exogenous variable in the normal sense of the terms. This particular study

focuses on a single multidimensional latent variable "job performance" without embedding it in specific structural relationships with other latent variables[10]. This leads to the question whether the concept of a research design still has relevance for this study.

Although the measurement model implied by the scoring key of the GPQ does not hypothesise any structural relations between latent variables, it does nonetheless hypothesise specific measurement relations between the items comprising the instrument and the latent performance dimensions they were earmarked to represent. More specifically the measurement model assumes that the slope of the regression of specific indicator variables (X) on the specific latent variable (ξ) the indicator variable is meant to represent, is positive and significantly greater than zero (or in the case of unreflected negatively keyed items, negative and significantly smaller than zero). In addition the measurement model makes assumptions about the covariance between the latent variables and the covariance between the measurement error terms. To empirically test the merits of the measurement relation assumptions made by the measurement model still requires some plan or strategy. The concept of a research design is therefore still relevant to this research study even though the traditional way of thinking about research designs might not be relevant.

In this study an *ex post facto* correlational design was used. In this form of systematic empirical enquiry the researcher does not have direct control over the various independent variables (Kerlinger & Lee, 2000). This is because their manifestation(s) would have already occurred or they are not inherently manipulable (Kerlinger & Lee, 2000). Three major limitations with regards to *ex post facto* research are:

- The inability to manipulate independent variables;
- The lack of power to randomise; and
- The risk of improper interpretation.

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[10] If a comprehensive investigation into the construct validity of the GPQ would have been the objective of the research it would have been necessary to explicate this nomological network in which the job performance construct is imbedded by specifying the structural relations that exist between the latent behavioural performance dimensions and between the latent behavioural performance dimensions and the latent outcome variables.

When experimental designs are compared with *ex post facto* designs, the latter lacks control and the possibility for incorrect interpretations may occur. These erroneous interpretations may occur in light of various possible explanations for the obtained correlations (Kerlinger & Lee, 2000). The results and interpretations of an *ex post facto* correlational design should therefore be treated with caution.

To empirically test the merits of the measurement relation assumptions made by the measurement model, using the logic of the *ex post facto* correlational design, the researcher observes the observed variables (i.e., the items comprising the GPQ or item parcels formed from these) and calculates the observed inter-item covariance matrix. Estimates of the freed measurement model parameters are obtained in an iterative fashion with the purpose of reproducing the observed covariance matrix as accurately as possible (Diamantopoulos & Siguaw, 2000). If the fitted model fails to accurately reproduce the observed covariance matrix (Byrne, 1989; Kelloway, 1998) the conclusion would unavoidably follow that the measurement model implied by the design intention does not provide an acceptable explanation for the observed covariance matrix. Such an outcome would invariably mean that the GPQ does not measure the job performance construct as intended. The converse, however, is not true. If the covariance matrix derived from the estimated model parameters closely corresponds to the observed covariance matrix it does not necessarily mean that the processes postulated by the measurement model must have produced the observed covariance matrix. It only means it could have. Such an outcome would therefore not warrant the conclusion that the GPQ definitely measures the job performance construct as intended. A high degree of fit between the observed and estimated covariance matrices would only mean that the processes portrayed in the measurement model provide one plausible explanation for the observed covariance matrix.

3.6   STATISTICAL ANALYSIS
3.6.1   ITEM AND DIMENSIONALITY ANALYSIS

Prior to fitting the measurement model underlying the GPQ, item analysis was used to examine the assumption that the items comprising each of the twelve subscales of the GPQ do in fact reflect a common underlying latent variable. In the design of the

questionnaire the intention was to construct essentially one-dimensional sets of items to reflect variance in each of the twelve latent performance dimensions collectively comprising the generic performance domain. The items were meant to function as relatively homogenous stimulus sets to which respondents react with behaviour that is a relatively uncontaminated expression primarily of the performance construct as it applies to the focal employee. In the statistical analysis process, item analysis was used to distinguish items that do not convey a clear representation of the sub-scale in question. Item analysis can therefore be used to create high validity and reliability in tests. On this basis, tests can be approved through the selection, substitution and the revision of items (Anastasi & Urbina, 1997).

The intention of item analysis is to create one-dimensional sets of items that explain variance in each one of the latent variables comprising performance. High internal consistency reliability for each sub-scale (i.e., high Cronbach alpha values), high item-sub-scale total correlations, high squared multiple correlations when regressing items on linear composites of the remaining items comprising the sub-scale and other favourable item statistics will, however, not provide sufficient evidence that the common underlying latent variable is in fact a unidimensional latent variable. In the conceptualisation of the performance construct and in the design of the GPQ the fundamental assumption was that each of the twelve first-order performance factors is in fact a unidimensional latent variable. It is thereby, however, not implied that each of the twelve performance dimensions is a narrow, very specific construct. Rather each performance dimension should be interpreted as a reasonably broad facet of non-managerial performance that expresses itself in a wide array of specific behaviours. Nonetheless each of the items comprising each of the twelve subscales of the GPQ is expected to load (albeit rather modestly) on a single factor. These items in the measurement model idealistically should function as homogenous stimuli to which raters would respond in a manner that is a true expression of that specific single underlying latent variable. The purpose of dimensionality analysis was to verify the unidimensionality of each subscale. Dimensionality analysis enables the researcher to remove items with insufficient factor loadings. If necessary, heterogeneous subscales can be divided into two or more homogeneous subscales.

3.6.2   TREATMENT OF MISSING VALUES

Before analysing data for this study, the issue of missing values had to be addressed. Normally missing values are the result of non-responses from participants.

According to Mels (2003) the traditional way of dealing with missing values is to apply list wise deletion. This process creates a data set that incorporates only complete data cases. The down side of using list wise deletion is the danger that the researcher is left with a very small data set.

Other methods have been developed to deal with this problem of being left with small data sets. Multiple Imputation (MI) and Full Information Maximum Likelihood estimation (FIML) are two methods available in LISREL 8.88 (Jöreskog & Sörbom, 2003). In both these methods no cases with missing values are deleted. Values for missing values are derived for all instances from the original sample. The multiple imputation procedures assume that the values are missing at random and that the observed variables are continuous and follow a multivariate normal distribution (Du Toit and Mels, 2002). The method of Full Information Maximum Likelihood can be used to substitute missing values when the variables follow a multivariate normal distribution.

If the data set does not conform to the assumption of multivariate normality, imputation by matching can be used to solve the problem of missing values. This process of imputation is when real values are substituted for missing values. In the process of substitution, missing values are replaced with values derived from other cases with a similar response pattern (Jöreskog & Sörbom, 2003).

The item and dimensionality analyses, originally performed on the data set with missing values were repeated on the imputed data set to evaluate the impact of the imputation.

3.6.3   STRUCTURAL EQUATION MODELLING

Structural equation modeling, using robust maximum likelihood estimation, was used to perform a confirmatory factor analysis on the observed inter-item covariance matrix.

Structural equation modeling (SEM) according to Hoyle is "a comprehensive statistical approach to testing hypotheses about relations among observed and latent variables" (Hoyle, 1995, p. 4). This process of analysis is based on the basic linear model (Ullman, 2006). Theory is used to specify and develop a model consisting of various latent variables that is measured by multiple indicators. When the model is sufficiently defined and structured according to theory, SEM can be used to evaluate the relations between the different latent variables and between the latent variables and their designated indicator variables.

SEM is a statistical analysis technique that is used to test the proposed research model's fit. According to Kelloway (1998) constructs in the social sciences are represented by different measures. Researchers can use SEM to determine the effectiveness with which these measures reflect the proposed constructs. "Confirmatory factor analysis and an application of structural equation modeling, are both more rigorous and more parsimonious than the 'more traditional' techniques of exploratory factor analysis" (Kelloway, 1998, p. 2).

Within the social sciences, researchers are primarily concerned with the questions of explanation and prediction. Models of prediction however have become very complex. SEM is very beneficial in the testing and specification of these complex models (Kelloway, 1998). In the evaluation of the predictive relationships between the different latent variables, SEM is a powerful method that can be used to determine the quality of the measurement. In relation to other traditional analysis techniques, SEM is beneficial in the sense that this method can estimate the strength of the relationships between the latent variables. SEM incorporates and integrates path analysis and factor analysis. The process of structural equation modeling revolves around two steps namely the validation of the measurement model followed by the process of fitting the structural model. Validating the

measurement model is done through confirmatory factor analysis while the fitting of the structural model involves path analysis with the various latent variables. Although structural relations between latent variables will not be examined in this specific study, the structural model depicted in Figure 2.1 will eventually have to be fitted (assuming at least reasonable measurement model fit) to more thoroughly investigate the construct validity of the GPQ.

Confirmatory factor analysis is based on the testing of specific hypotheses on the number of factors/latent variables underlying the observed inter-item covariance matrix, the nature of the relationship between the factors and the nature of the loading pattern of the items on the factors. SEM is used to test the ability of the factor structure hypothesised in the model to reproduce the observed inter-item covariance matrix, to test the strength and significance of the correlations between the factors (assuming that an oblique factor structure was specified) and to evaluate the strength and significance of the factor loadings (Kelloway, 1998).

Validating the measurement model is therefore done by confirming that the different indicators hypothesised to measure the latent variables do in fact successfully do so. Fitting the model means to evaluate the extent to which the covariances predicted by the model parameter estimates match the observed covariance matrix that was derived from the data of the study. With this analysis the researcher can use the modification indices and other coefficients to improve the fit of the model.

These arguments presented in favour of SEM as a statistical analysis technique was the motivation for using this technique in this study.

Evaluating the fit of the measurement model by means of confirmatory factor analysis involves a five phase process. The five steps through which the SEM analysis proceeds are as follows (Hair, Black, Babin, Anderson & Tatham, 2010; Kelloway, 1998):

- Model specification
- Evaluation of model identification
- Estimation of model parameters

- Testing model fit
- Model re-specification

3.6.3.1 MODEL SPECIFICATION

The design and architecture of the GPQ implies a hypothesis on the manner in which the individual test item scores are expected to be influenced by the dimensions of the generic performance construct as constitutively defined in paragraph 2.7. The manner in which the responses of respondents to the GPQ items are hypothesised to be related to the twelve underlying latent behavioural performance dimensions is graphically depicted as a specific measurement model. Sample size limitations, however, prevented the fitting of the measurement model in which the individual items serve as the indicator variables. Although fitting the measurement model in which the individual items serve as the indicator variables undeniably remains the methodological ideal, sample size considerations forced the calculation of item parcels (see paragraph 3.6.3.3.1). Either three or four item parcels were calculated per subscale. A total of 46 item parcels were calculated. The manner in which the responses of respondents to the GPQ items parcels are hypothesised to be related to the twelve underlying latent behavioural performance dimensions is graphically depicted as a specific measurement model (see Figure 3.1). Whether it is justified to make inferences about the twelve performance dimensions in the manner dictated by the scoring key depends on the fit of this measurement model and the strength of the loading of the items on the underlying latent variables. The substantive hypothesis, that the GPQ provides a construct valid measure of job performance as defined by the instrument amongst South African non-managerial personnel, was tested by testing the subsequent statistical hypotheses.

Figure.3.1 below portrays the graphical representation of the measurement model implied by the design and architecture of the GPQ when item parcels are calculated from the items comprising each of the twelve sub-scales and the parcels are used to represent the latent performance dimensions.

The GPQ measurement model as depicted in Figure 3.1 can be defined in terms of a measurement matrix equations expressed as equation 1.

$$X = \Lambda x\xi + \delta \tag{1}$$

Where:

- **X** is 46x1 column vector of item parcel scores;
- Λx is a 46x12 matrix of factor loadings;
- ξ is a 1x12 column vector of latent behavioural performance dimensions, and
- δ is a 46x1 column vector of unique or measurement error components consisting of the combined effect on X of systematic non-relevant influences and random measurement error (Jöreskog & Sörbom, 1993).

3.6.3.2 EVALUATION OF MODEL IDENTIFICATION

"The problem of identification revolves around the question of whether one has sufficient information to obtain a unique solution for the parameters to be estimated in the model. If a model is not identified, it is not possible to determine unique values for the model coefficients" (Diamantopoulos & Siguaw, 2000, p. 48). In LISREL the problem of model identification can occur when the information provided by the variances and covariances of the different variables does not adequately allow for a unique solution of the model parameters set free to be estimated. In an unidentified model the number of independent parameters being estimated is more than the number of non-redundant elements of "S" (Diamantopoulos & Siguaw, 2000). When this happens, LISREL will not be able to generate a solution to the unknown parameters in the measurement equations. In order to solve a system of equations the number of unknown elements in the equations has to be at least equal to the number of unique pieces of information available. This will result into a unique solution of the parameters in the LISREL model. A unique set of estimates for the parameters set free in the model can only be found if the number of independent parameters being estimated is less than or equal to the number of non-redundant elements of "S" (Diamantopoulos & Siguaw, 2000, p. 48).

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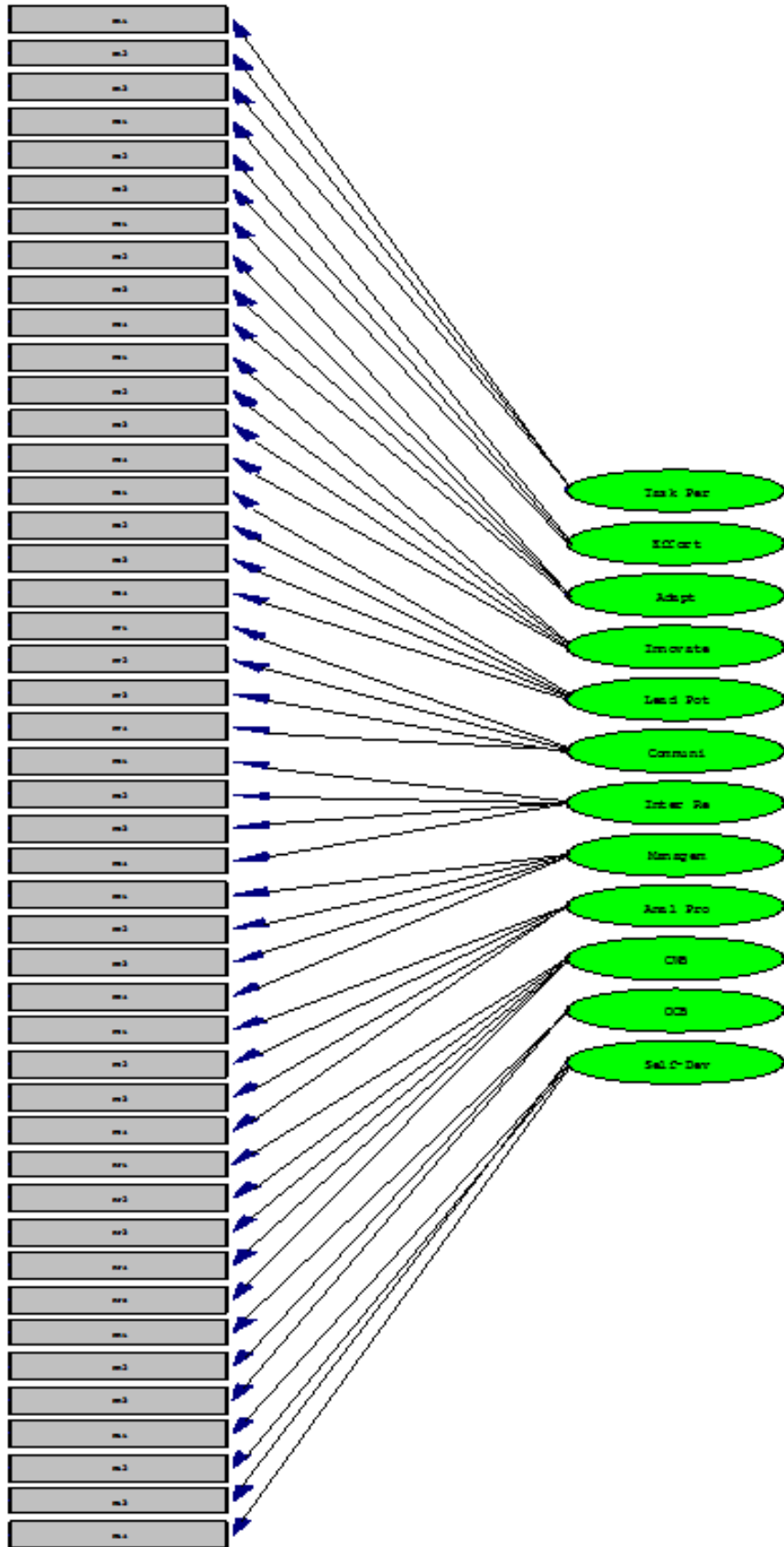
Figure 3.1   GPQ measurement model

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The following formula can be used to determine whether a specified model meets the minimum requirement for identification

$$t \leq s/2$$

where t = the number of parameters to be estimated

s = the number of variances and covarinaces amongst the manifest (observable) variables, calculated as $(p)(p + 1)$

p = the number of observed variables (i.e., items in this case).

If $t > s/2$ the model is unidentified. If a model is unidentified "it is the failure of the combined model and data constraints to identify (locate or determine) unique estimates that results in the identification problem" (Diamantopoulos & Siguaw, 2000, p. 48). If $t = s/2$ the model is just-identified. This means that a single unique solution can be obtained for the parameter estimates. A just-identified model, however, has zero degrees of freedom and therefore no variance-covariance information remains to test the derived model solution (Diamantopoulos & Siguaw, 2000).

If $t < s/2$ the model is over-identified. In this regard, it means that more than one estimate of each parameter can be obtained. In a model that is over-identified, the equations available outnumber the number of parameters to be estimated (Diamantopoulos & Siguaw, 2000).

A just-identified model has positive degrees of freedom and therefore variance-covariance information remains to test the derived model solution (Diamantopoulos & Siguaw, 2000).

The measurement model shown in Figure 3.1 has 158 freed model parameters[11] that have to be estimated. There are 1081 unique variance and covariance terms in the observed covariance matrix. The degrees of freedom of the model is therefore 923. The model is therefore over-identified with positive degrees of freedom.

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[11] 46 factor loadings, 46 measurement error variances and 66 inter-latent variables have to be estimated. The intercept of the regression of X_{ij} on ξ_j is constrained to be zero because the means of X_{ij} on ξ_j are of not interest when evaluating the construct validity of the GPQ in a single group..

3.6.3.3 ESTIMATION OF MODEL PARAMETERS

3.6.3.3.1 Variable Type

An important factor that had to be considered in this study was whether to fit the measurement model by representing the twelve latent performance dimensions with single items or to create item parcels. Various considerations related to the difference in psychometric characteristics, factor-solution and model-fit were taken into consideration to make this decision of whether item parcels should be used instead of single items.

Item parceling serves as a data analysis solution for a variety of data problems, namely non-normality, small sample sizes and unstable parameter estimates. To produce valid results, the process of SEM requires normally distributed continuous observed variables. Compared to single items, item parcels better approximate normally distributed continuous variables when they are used as indicators of latent constructs. By using item parcels in the study new variables can be created that will be a better estimation of normally distributed continuous variables that will reduce the distortion of model parameter estimates. Compared to single items, item parcels are more likely to meet the assumptions underlying maximum likelihood estimation. The use of item parcels presents itself as an approach to convert ordered-categorical data into continuous data. This is done in the light of minimising the attenuation caused by using ordered-categorical variables (Dunbar-Isaacson, 2006).

The interest in applying parcels within SEM is therefore largely based on its proposed advantages compared to single items. The composite score of an item parcel reveals more reliable results compared to single item scores. Lower skewness and kurtosis and a higher validity occur for item parcels (Dunbar-Isaacson, 2006). Model-fit indices like the Root Mean Square Error of Approximation (RMSEA), Comparative Fit Index (CFI), as well as the Chi-Square Test, improves as the number of items in a parcel increases. Model-fit indices however only increases with items that have a unidimensional structure.

Item parcels however are not without disadvantages. Item parcels are only effective within unidimensional structures. Difficulties in interpretation may occur when item parcels measures a multi-dimensional construct. Another disadvantage is the fact that item parceling might lead to an improved fit for all models. The reason for this improved fit is because parcel-based models cancel out random and systematic error by combining these errors and thereby improving model fit. When item parceling is used, the probability of identifying miss specified models is reduced, increasing the probability of Type II errors and therefore a failure to correctly reject a wrong model (Little, Cunningham, Shahar & Widaman, 2002).

Item parceling would have been the preferred methodological option if the purpose of the research was to test a complex hypothesis by fitting a structural model. The aim of the study is, however, not to evaluate the fit of a structural model. The question therefore is not whether the GPQ can be used to provide valid and reliable item parcel indicator variable measures for latent behavioural performance variables in a structural model. The aim of the study is rather to evaluate the GPQ psychometrically as a freestanding generic measure of non-managerial job performance. The aim is to evaluate whether the design intentions of the GPQ succeeded and whether each item would provide a valid and reliable measure of a specific latent performance dimension. The ideal approach therefore has to be to fit a measurement model in which the individual items serve as indicator variables of the latent generic performance dimensions. Fitting a measurement model in which each individual item serves as an indicator variable of the latent performance dimension would require the estimation of 258 model parameters 96 factor loadings, 96 measurement error variances and 66 covariance terms.

The available sample, however, only consists of 205 observations. The most basic requirement is that the number of observations should at least have to exceed the number of parameters to be estimated (Jöreskog & Sörbom, 1996a; 1996b). Since this requirement has not been met that left little choice but to temporarily postpone the ideal of fitting the GPQ measurement model with individual items and to in the current study use the option of item parcelling.

Taken the abovementioned advantages and limitations into consideration between three and four item parcels were calculated to represent each of the twelve latent performance dimensions to fit the measurement model in this study. The SPSS syntax that was used to calculate the item parcels are shown in Appendix B.

3.6.3.3.2   Univariate and multivariate normality

When fitting the measurement model to continuous data, the method of maximum likelihood estimation is used to derive estimates for the freed measurement model parameters. This method of estimation assumes multivariate normality. Alternative estimation methods used in structural equation modeling are true generalised least squares (GLS) and full information maximum likelihood (FIML) (Mels, 2003).

Methods used to fit structural equation models when the data does not have a normal distribution are the methods of robust maximum likelihood (RML), weighted least squares (WLS) and diagonally weighted least squares (DWLS) (Mels, 2003).

Robust maximum likelihood is recommended in cases where the assumption of a multivariate normal distribution does not hold (Mels, 2003).

3.6.3.4 TESTING MODEL FIT

Model fit refers to how well the proposed model reflecting the underlying theory is able to account for the observations made on the latent variables comprising the model (Hooper, Coughlan & Mullen, 2008). The aim of structural equation modeling is to determine how well the model "fits" the data of the underlying theory. More specifically the question is how well the model can account for the observed covariance matrix. If observed covariance matrix can be closely reproduced from the estimates obtained for the freed model parameters, the model fits the data. The model can then be regarded as providing a plausible account of the process that generated the observed covariance matrix. If the model fits the data it can, however, never be concluded that the process depicted in the model is necessarily the one that underpins the phenomenon of interest.

A wide variety fit indices are available to guide the researcher in this process of model fit. Various cut-off values for these indices as well as the lack of agreement on which indices to report on might lead to conflicting information. Statisticians have ever since developed new and improved indices in order to improve model fit. Researchers should therefore use information with caution as model fit is one of the most important steps in the process of structural equation modeling (Diamantopoulos & Siguaw, 2000; Hooper et al., 2008).

For this reason, conclusions with regards to model fit were not derived based on a single statistical index. The full spectrum of fit indices available in LISREL was utilised to determine how well the model fits the underlying data and theory. This includes the modification indices.

3.6.3.4.1 LISREL fit indices

ABSOLUTE FIT INDICES

Model chi-square

For the purpose of evaluating overall model fit, the minimum fit function chi-square value is traditionally used to determine the incongruity between the observed and reproduced sample covariance matrices. The chi-square statistic is used to test the exact fit null hypothesis. This means that the model fits the data in the population perfectly and that the model can reproduce the observed covariance matrix in the population. Any discrepancy between the observed and reproduced covariance matrices in the sample is due to sampling error under the exact fit null hypothesis. An non-significant chi-square value (assuming a .05 significance level) will therefore indicate a good model fit. The normal theory chi-square statistic assumes multivariate normality and is very sensitive to sample size. Using large sample sizes might result in model rejections and in the case of small sample sizes, chi-square lacks the power to discriminate between a good fit and a poor fit (Hooper et al., 2008). The Satorra Bentler chi square that results from the use of robust maximum likelihood parameter estimation is better suited to multivariate non-normal data (Mels, 2003).

Root mean square error of approximation (RMSEA)

"The RMSEA tells us how well the model, with unknown but optimally chosen parameter estimates would fit the population covariance matrix. In recent years it has become regarded as one of the most informative fit indices due to its sensitivity to the number of estimated parameters in the model" (Hooper et al., 2008, p. 54). The RMSEA focuses on the discrepancy between the observed and reproduced covariance matrices in the population but expresses the population discrepancy function value in terms of the degrees of freedom of the model (Diamantopoulos & Siguaw, 2000). A value close to .05 and an upper limit of .08 seems to be an indication of good model fit (Browne & Cudeck, 1993). LISREL provides for a test of the closeness of model fit by formally calculating the probability of the sample RMSEA value being observed in the sample under H_0: RMSEA $\leq$ .05 (Du Toit & Du Toit, 2001).

Goodness-of-fit statistic (GFI) and the adjusted goodness-of-fit statistic (AGFI)

The Goodness-of Fit statistic was created by Jöreskog and Sorböm (2003) to serve as an alternative to the Chi-square. A cut-off value of .90 is recommended for the GFI and .95 in the case of low factor loadings and small sample sizes.

As the name indicates, adjusted goodness-of-fit statistic (AGFI) adjusts the GFI based on degrees of freedom and also increases with sample size. Like the GFI, an indication of good model fit is confirmed by values between 0 and 1 with a generally accepted value of .90 (Hooper et al., 2008).

Root mean square residual (RMR) and standardised root mean square residual (SRMR)

"The root mean square residual (RMR) and standardized root mean square residual (SRMR) are the square root of the discrepancy between the sample covariance matrix and the model covariance matrix" (Hooper et al., 2008; p. 54). The scale of each indicator item is used to determine the range of the RMR. This will lead to complications in the

interpretation of RMR values when a questionnaire contains items with varying scales. In this case items may be measured on a scale ranging from 1-5 in comparison to other items where responses are recorded on a scale ranging from 1-7). This problem is counteracted by the standardised RMR (SRMR) that proves to be more helpful in interpretation. Values for the SRMR range from 0 to 1.0. Models with a good fit reflect values less than .05 while models reflecting values of .08 are still considered acceptable. "A SRMR of 0 indicates perfect fit but it must be noted that SRMR will be lower when there is a high number of parameters in the model and in models based on large sample sizes (Hooper et al., 2008, p. 55).

INCREMENTAL FIT INDICES

Also known as comparative or relative fit indices, incremental fit indices do not use the chi-square in isolation to determine the goodness of fit of a model, but rather compares the chi-square value to a baseline model (Hooper et al., 2008).

Normed-fit index (NFI)

The normed-fit index evaluates model fit by comparing the χ^2 value of the model to the χ^2 of the null model. The null/independence model is a model where all the variables are structurally unrelated and therefore represents the worst case scenario. Values for this index ranges from 0 – 1 with values greater than .90 reflecting a good model fit. This index is very sensitive to sample size. In interpretation of this index an acceptable cut-off of $NNFI \geq .95$ as the threshold is suggested (Hooper et al., 2008).

Comparative fit index (CFI)

The CFI is a revised form of the NFI but takes sample size into consideration. Similar to the NFI, this index also assumes a base-line model in which all latent variables are structurally unrelated. Values for this statistic ranges between 0 and 1.0 with values closer to 1.0 indicating good fit. An acceptable cut-off value according to research is $CFI \geq .95$ (Hooper et al., 2008).

PARSIMONY FIT INDICES

Parsimony fit indices are used to overcome the problem of complex models where the degree of model fit is dependent on the number of parameters that have to be estimated. The Parsimony Goodness-of-Fit Index (PGFI) and the Parsimonious Normed Fit Index (PNFI) are the two indices developed to aid in the process of determining model fit. The PGFI is derived from the GFI by adjusting for loss of degrees of freedom. The PNFI is based on the NFI and also adjusts for degrees of freedom. The values associated with parsimony fit indices are considerably lower than other goodness of fit indices because of the way that they penalise for model complexity. Values of .5 seem to be a good indication of model fit (Hooper et al., 2008).

Information criteria indices namely: Akaike Information Criterion (AIC) and Consistent Version of AIC (CAIC) are a second form of parsimony fit indices that are used to compare non-nested or non-hierarchical models. Small values suggest a good fit, but because of an absence of a 0-1 scale it is difficult to suggest a cut-off value (Hooper et al., 2008).

3.6.3.4.2   Statistical hypotheses

Two overarching model fit hypotheses were tested. The exact fit null hypothesis (H_{01}) represents the rather ambitious stance that the hypothesised measurement model accurately reflects the measurement model in the parameter.

H_{01}: RMSEA = 0

H_{a1}: RMSEA > 0

Under the exact fit hypothesis the measurement model should therefore be able to reproduce the observed covariance matrix to a degree of accuracy that could be explained in terms of sampling error only. This represents a somewhat unrealistic although not altogether impossible situation. Browne and Cudeck (1993, p. 137) consequently argue:

> In applications of the analysis of covariance structures in the social sciences it is implausible that any model that we use is anything more than an approximation to

reality. Since a null hypothesis that a model fits exactly in some population is known a priori to be false, it seems pointless even to try to test whether it is true.

Assuming that the measurement model underlying the GPQ only approximates the processes that operated in reality to create the observed inter-item covariance matrix, the following close fit null hypothesis (H_{02}) was also tested (Browne & Cudeck, 1993):

H_{02}: RMSEA = .05

H_{a2}: RMSEA > .05

If the close fit null hypothesis would not be rejected, or alternatively if the measurement model would at least demonstrate reasonable model fit, the following factor loading null hypotheses would be tested:

H_{0j}: $\lambda_{ik} = 0$; $j = 1, 2, 3, ..., t^{12}$; $i = 1, 2, 3, ..., t$; $k = 1, 2, 3, ..., 12$

H_{aj}: $\lambda_{ik} > 0$; $j = 1, 2, 3, ..., t$; $i = 1, 2, 3, ..., t$; $k = 1, 2, 3, ..., 12$

If the close fit null hypothesis would not be rejected, or alternatively if the measurement model would at least demonstrate reasonable model fit, the measurement error variance matrix $\Theta\delta$ would be evaluated as well as the latent variable covariance matrix Φ. The discriminant validity of the latent performance dimension inferences derived from each set of indicator variables will also be evaluated.

3.6.3.5 MODEL RE-SPECIFICATION

In evaluating model fit, it is not uncommon to find a poor fit of an anticipated model. This could be the result of the complexity associated with structural equation modeling. Some modifications could be applied to improve these results of model fit. This however should be done with caution and the researcher should ensure that the changes still align with the underlying theory. A good starting point is to assess the fit of each construct and its item parcels individually in order to identify weak items (Hooper et al., 2008). Item parcels reflecting a low multiple R^2 (less than .2) generally reflects high levels of error, therefore they should be removed. Following this process, each construct in the model

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[12] t represents the total number of items parcels in the GPQ measurement model, namely 46.

should be evaluated in order to determine the strength of discriminant validity achieved (Hooper et al., 2008). "The phi (ϕ) value between two constructs is similar to their covariance, therefore a phi of 1.0 indicates that the two constructs are measuring the same thing (Hooper et al., 2008; p. 56). Bagozzi, Yi, and Phillips (1991) suggest that the evaluation of discriminant validity presents another test that could be used to determine whether the constructs in the proposed model are significantly different from one another. This is calculated as follows:

$$\text{parameter estimate (phi value)} \pm 1.96 * \text{standard error.}$$

If the calculated confidence interval includes the value 1.0, discriminant validity is not sufficient and further evaluation in terms item cross-loadings should be made. Items with high Lambda-X modification indices are likely to contribute towards the discriminant problem and researchers could therefore consider these items for deletion (Hooper et al., 2008).

Model fit can also be improved through the process of correlating the different measurement error terms. In order to correlate error terms, a strong theoretical justification should also be presented. Correlating error terms means that shared sources of systematic but non-relevant variance are affecting items parcel scores thereby causing covariance between the measurement error terms of those item parcels. Researchers should therefore discuss the statistical and substantive impact of this practice in order to justify the decision (Hooper et al., 2008).

3.7   SUMMARY

Chapter 3 outlined the research methodology as well as the hypothesis tested in this study. In this chapter, the statistical procedures for analysing the data were also explained. Chapter 4 will discuss the results of the data analysis.

CHAPTER 4
RESEARCH RESULTS

4.1   INTRODUCTION

This chapter outlines the results of the data analysis described in Chapter 3.   The measurement model (Figure3.1) hypothesised relationships between specific indicator variables and specific first-order performance variables. These hypotheses assume that the items in each subscale (and combined in the three item parcels serving as indicator variables) reflect only the underlying performance dimension that it intends to measure. From these defined relationships the statistical hypotheses were formulated.   Two overarching statistical hypotheses were formulated on overall model fit and 36 specific statistical hypotheses on the significance of the freed factor loadings in the factor loading matrix. Results of the statistical analysis aimed at testing these stated null hypotheses are presented in this chapter.

4.2   MISSING VALUES

Treating missing values is the process of dealing with data sets with incomplete responses. Table 4.1 indicates the number of missing values per item per dimension.

Table 4.1

Number of missing values per subscale item

		Item number									
		1	2	3	4	5	6	7	8	9	10
	A	2	1	3	7	3	3	10			
	B	3	2	1	1	5	4	2			
	C	4	4	0	2	8	6	4	2		
Number of	D	1	4	1	3	2	3	5	4		
missing	E	1	2	1	3	2	2	2	3		
values per	F	9	10	2	3	5	4	1	2		
Dimension	G	3	2	1	1	2	3	1	1		
	H	11	3	1	3	1	12	7	4		
	I	3	1	2	3	1	3	1	1		
	J	1	2	4	3	5	1	1	2	4	2
	K	3	3	2	3	2	2	3			
	L	3	3	3	14	6	14	4	4	4	

Different options are available to address this issue in research (Du Toit & Du Toit, 2001; Mels, 2003):

- List-wise deletion of cases;
- Pair-wise deletion of cases;
- Imputation by matching;
- Multiple imputation (MI); and
- Full information Maximum likelihood estimation (FIML)

As a default treatment of missing values, list-wise deletion is used in most research cases. This process however can result into a dramatic reduction of sample size. Because of the initial small sample size, this option was rejected to solve the problem of missing values in the current study.

Pair-wise deletion offers another possibility in dealing with missing values. This process is not a viable solution to the problem when the research makes use of item parcels. The problem would only be repeated on item parcel level as well. A more satisfactory solution to the missing values problem would be to use the multiple imputation procedure (Du Toit & Du Toit, 2001; Mels, 2003). Both multiple imputation procedures available in LISREL 8.88 derive missing values for all the cases in the original sample. This implies that no observations are deleted and that the imputed data set is afterwards available for the calculation of item parcels (Du Toit & Du Toit, 2001; Mels, 2003). No separate imputed data set is created in the process of Full Information Maximum Likelihood (FIML). This process therefore prevents the calculation of item parcels and hinders item and dimensionality analyses.

Imputation by matching involves a process of substituting real values for missing values. The substituted values are derived from one or more complete observations with a similar response pattern. Cases with missing values after imputation are subsequently deleted (Jöreskog & Sörbom, 1996b). Imputation by matching was utilised in this study. The decision to use imputation by matching rather than the more sophisticated and more precise multiple imputation procedure was motivated by the concern that more would be

lost by the failure to fully satisfy the assumptions of multivariate normality and continuous variables underlying this procedure than would be gained by the sophistication of the procedure. The conservative decision was therefore taken to use the less elegant but more robust workhorse of imputation procedures to treat the missing values problem. The twenty-two (22) items with less than 1 missing values were used as matching variables. The imputation by matching procedure resulted into the deletion of 6 cases. The sample size was therefore reduced to 199.

4.3   ITEM ANALYSIS

The intention of the GPQ is to reflect one dimensional sets of items that would explain variance in each of the 12 latent variables of the performance domain. In essence respondents should respond to the items with behaviour that is primarily an expression of the underlying performance dimension that the item intends to measure. In a unidimensional performance domain it is expected that moderate inter-item correlation should occur in each sub-scale. Descriptive item statistics were calculated to identify how well the items reflect the content of the underlying performance dimension. Item statistics were used to identify and delete poor items. Poor items are items that fail to discriminate between different states of the latent variable as well as items that do not reflect a common latent variable.

Item statistics include the item-total correlation, the squared multiple correlation, difference in scale reliability when the item is deleted, difference in scale variance when the item is deleted, the inter-item correlations, the item mean and the item standard deviation (Murphy & Davidshofer; 2005).

According to Taylor (2005), the corrected item-total correlation is the correlation of the item with the sum on all the items in a specific scale excluding the item itself. A low item-total correlation implies that the item is not related to the construct being measured by the majority of the other items comprising the scale. A high item-total correlation does not necessarily imply the opposite. High item-total correlation could imply that all items in a

sub-scale measure the same construct. This construct however is not necessarily unidimensional or the intended construct.

The squared multiple correlation is another item statistic that describes the psychometric qualities of an item. This statistic refers to the squared multiple correlation when regressing each item on a weighted linear composite of the remainder of the items of the specific sub-scale. A low squared multiple correlation would suggest that variance in the item is not adequately explained by the common latent variable underlying the majority of the items (Murphy & Davidshofer; 2005). A weighted composite of subscale items that explains a substantial amount of variance in the item is indicated by high squared multiple correlations. This high correlation suggests that that specific item successfully reflects a common underlying latent variable.

The reliability coefficient of the sub-scale when an item is removed can be used to evaluate whether an item has the same underlying meaning as the rest of the scale (Taylor; 2005). When the reliability of the scale improves as an item is removed, it is an indication that the item lowers the overall reliability of the scale and is therefore not a good indicator of the construct being measured by the scale.

The extent to which the sub-scale variance changes, is another item statistic that reflects whether an item succeeds in measuring the underlying performance domain. When the sub-scale variance increases or when the subscale variance decreases only marginally at the removal of an item, it is an indication of a poor item. The variance of a p-component linear composite (X_t) can be expressed as equation 2:

$$S^2_t = S^2_1 + S^2_2 + ... + S^2_p + 2S_1S_2r_{12} + 2S_1S_3r_{13} + ... + 2S_{(p-1)}S_pr_{p(p-1)} \qquad (2)$$

If S^2_i is low and/or item i correlate low with the rest of the items of the sub-scale, the variance of the linear composite would drop relatively little when item i is deleted. Items that do not reflect a common latent variable will correlate low the other items comprised in the sub-scale. Insensitive items will have low variances. Poor items will therefore, when

removed from a subscale, lower the subscale variance only marginally, or, if the item correlates negatively with the remainder of the items, even increase the variance.

When an item has a small item variance, it indicates that the item fails to reflect differences in the latent variable. Items with small item variances would not co-vary with the other items in the sub-scale. Items with extreme high (or low) means, implies a negatively (or [positively) skewed item score distribution. This means the distribution is curtailed at the upper or lower end of the distribution.

In deciding on the psychometric credentials of an item, a basket of item statistic evidence should be taken into consideration and not just a single item statistic (Theron, 2002b).

4.3.1   ITEM ANALYSIS RESULTS AND DISCUSSION OF THE INDIVIDUAL GPQ SCALES

The above-mentioned item statistics were calculated for each of the sub-scales of the GPQ prior to implementing the imputation by matching procedure. Evaluation of these results would determine whether to delete any poor items prior to calculating item parcels and fitting the measurement model. A summary of the initial item analysis results is presented in Table 4.2.

Table 4.2

Subscale statistics; a summary of results of the item analysis

Subscale	Sample Size	Mean	Number of items	Variance	Standard Deviation	Cronbach Alpha
A	205	27.9	7	19.553	4.422	.775
B	205	28.92	7	23.477	4.845	.847
C	205	29.47	8	36.361	6.030	.823
D	205	30.96	8	32.967	5.742	.839
E	205	31.18	8	38.089	6.172	.851
F	205	30.91	8	37.460	6.120	.859
G	205	33.32	8	30.448	5.518	.875
H	205	31.86	8	35.799	5.983	.882
I	205	31.74	8	35.654	5.971	.845
J	205	43.92	10	49.189	7.013	.882
K	205	29.17	7	26.975	5.194	.867
L	205	39.46	9	52.668	7.257	.916

The results of the item analyses for each subscale are presented separately below. Results on the item means, standard deviations and subscale total score descriptive statistics are presented in Appendix B1 for each subscale on the enclosed CD.

4.3.1.1 Item Analysis: Subscale A (Task performance)

None of the items in the Task performance subscale had extreme low or extreme high means. None of the items displayed small standard deviations that set them apart from the typical distributions observed for the majority of the items. It can therefore be concluded that all the items were sufficiently sensitive. The inter-item correlation matrix for the Task performance subscale is shown in Table 4.3. Item A5 seems to be a questionable item in Table 4.3 in the way that it correlates low with the majority of the other items in the subscale ($r_{ij} < .30$).

Table 4.3

Inter-item correlation matrix: factor A (Task Performance)

	A1	A2	A3	A4	A5	A6	A7
A1	1.000	.545	.421	.375	**.226**	.342	.360
A2	.545	1.000	.519	.339	**.087**	.329	.317
A3	.421	.519	1.000	.363	**.256**	.274	.317
A4	.375	.339	.363	1.000	**.278**	.348	.316
A5	.226	.087	.256	.278	1.000	.367	.222
A6	.342	.329	.274	.348	.367	1.000	.338
A7	.360	.317	.317	.316	**.222**	.338	1.000

Item A5's questionable status is confirmed in Table 4.4 in that the scale variance decreases less markedly when A5 is deleted from the scale compared to the effect of the removal of the other items on the scale variance. The lower item-total correlation and the lower squared multiple correlation also point to the problem status of A5.

The Cronbach alpha for the current subscale is .775. This falls below the critical cut-off value of .80 set for this study[13]. Item A5 again is the only item that shows itself to be

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[13] Setting a definite and single cut-off value in terms of which the adequacy of the reliability of a set of measures is evaluated is at best debatable and contentious. Various contextual factors like scale length, sample homogeneity and the purpose of the assessment need to be taken into account. Despite these

marginally problematic on the Cronbach alpha if item deleted statistic. The Cronbach alpha remains unchanged when this item is deleted, indicating that although this item is slightly out of step with the remainder of the items in the subscale it does not seriously disturb the internal consistency of this subscale. Based on the basket of available evidence it was decided to retain A5 in the Task performance subscale.

Table 4.4

Reliability analysis of the factor A sub-scale

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
A1	23.19	14.573	.581	.384	.730
A2	23.20	14.536	.539	.434	.738
A3	23.22	14.691	.545	.351	.737
A4	23.37	14.652	.507	.259	.745
A5	23.33	16.015	.347	.206	.775
A6	23.08	15.027	.502	.280	.746
A7	23.13	14.836	.465	.222	.754

4.3.1.2 Item Analysis: Subscale B (Exerting effort)

None of the items in the Exerting effort subscale had extreme low or extreme high means. None of the items displayed small standard deviations that set them apart from the typical distributions observed for the majority of the items. It can therefore be concluded that all the items were sufficiently sensitive. The inter-item correlation matrix for the Exerting effort subscale is shown in Table 4.5. No items in this subscale show themselves as questionable items in Table 4.5 in that they all tends to correlate moderately ($r_{ij} > .30$) with each other.

The absence of problem items in the Exerting effort subscale is confirmed in Table 4.6 in that the scale variance reduces less markedly when each item is deleted from the scale. The moderate-high item-total correlation and the moderate squared multiple correlations also point to the absence of problem items in this subscale.

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reservations the internal consistency reliability of the measures of a subscale will be considered acceptable if the Cronbach alpha value exceeds .80.

Table 4.5

Inter-item correlation matrix: factor B (Exerting Effort)

	B1	B2	B3	B4	B5	B6	B7
B1	1.000	.362	.449	.386	.331	.486	.386
B2	.362	1.000	.401	.412	.484	.350	.454
B3	.449	.401	1.000	.453	.496	.442	.494
B4	.386	.412	.453	1.000	.471	.402	.401
B5	.331	.484	.496	.471	1.000	.464	.586
B6	.486	.350	.442	.402	.464	1.000	.568
B7	.386	.454	.494	.401	.586	.568	1.000

Table 4.6

Reliability analysis of the factor B sub-scale

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
B1	24.93	18.085	.539	.334	.836
B2	24.79	18.075	.557	.329	.833
B3	24.73	17.283	.626	.399	.822
B4	24.82	17.908	.572	.338	.831
B5	24.66	17.434	.652	.467	.819
B6	24.88	17.902	.620	.431	.824
B7	24.69	17.132	.665	.491	.816

The Cronbach alpha for the current subscale is .847. This falls above the critical cut-off value of .80 set for this study. The Cronbach alpha decreases when each item is deleted from the scale, indicating that the items tend to respond in unison to changes in the level of the latent variable being measured and the deletion of any item will negatively affect the internal consistency of this subscale. Based on the basket of available evidence it was decided to retain all the items in the Exerting effort subscale.

4.3.1.3 Item Analysis: Subscale C (Adaptability)

None of the items in the Adaptability subscale had extreme low or extreme high means. None of the items displayed small standard deviations that set them apart from the typical distributions observed for the majority of the items. It can therefore be concluded that all the items were sufficiently sensitive. The inter-item correlation matrix for the Adaptability subscale is shown in Table 4.7. Quite a number of items in this subscale show themselves as questionable items in Table 4.7 in that they fail to correlate even moderately ($r_{ij} > .30$) with other items in the subscale.

Table 4.7

Inter-item correlation matrix: factor C (Adaptability)

	C1	C2	C3	C4	C5	C6	C7	C8
C1	1.000	.602	.404	.517	.416	.467	**.288**	.309
C2	.602	1.000	.473	.520	.425	.472	.345	.343
C3	.404	.473	1.000	**.278**	**.261**	.311	**.185**	**.208**
C4	.517	.520	**.278**	1.000	.486	.527	.316	**.241**
C5	.416	.425	**.261**	.486	1.000	.559	.369	**.264**
C6	.467	.472	.311	.527	.559	1.000	.325	**.292**
C7	**.288**	.345	**.185**	.316	.369	.325	1.000	.395
C8	.309	.343	**.208**	**.241**	**.264**	**.292**	.395	1.000

The presence of problem items in the Adapting subscale is, however, not really corroborated in Table 4.8. Although the items C3, C7 and C8 do have somewhat lower item-total and squared multiple correlations the Cronbach alpha of the scale is nonetheless not positively affected when these three items are deleted. The Cronbach Alpha for this scale is satisfactorily high (0.823). Based on the basket of available evidence it was decided to retain all the items in the subscale. The results in the inter-item correlation matrix might point towards factor fission.

Table 4.8

Reliability analysis of the factor C sub-scale

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
C1	25.60	28.584	.627	.456	.793
C2	25.74	28.228	.670	.504	.788
C3	25.64	30.641	.423	.251	.818
C4	25.80	27.905	.603	.429	.795
C5	25.70	27.671	.585	.399	.797
C6	25.74	28.082	.624	.440	.792
C7	26.41	27.879	.462	.255	.818
C8	25.68	29.345	.425	.220	.820

4.3.1.4 Item Analysis: Subscale D (Innovating)

None of the items in the Innovation subscale had extreme low or extreme high means. None of the items displayed small standard deviations that set them apart from the typical distributions observed for the majority of the items. It can therefore be concluded that all the items were sufficiently sensitive. The inter-item correlation matrix for the Innovation

subscale is shown in Table 4.9. Some items in this subscale seem questionable. They tend to correlate not even moderately ($r_{ij} > .30$) with the other items in the subscale.

Table 4.9

Inter-item correlation matrix: factor D (Innovating)

	D1	D2	D3	D4	D5	D6	D7	D8
D1	1.000	.397	.432	.457	.461	.408	.464	.402
D2	.397	1.000	.371	.355	.290	.430	.311	**.250**
D3	.432	.371	1.000	.396	.412	.429	.374	.460
D4	.457	.355	.396	1.000	.423	.437	.422	.401
D5	.461	**.290**	.412	.423	1.000	.473	.354	.394
D6	.408	.430	.429	.437	.473	1.000	**.289**	.333
D7	.464	.311	.374	.422	.354	**.289**	1.000	.459
D8	.402	**.250**	.460	.401	.394	.333	.459	1.000

The presence of problem items in the Adapting subscale is, however, not really corroborated in Table 4.810. Although the item D2 does have somewhat lower item-total and squared multiple correlations the Cronbach alpha of the scale is nonetheless not positively affected when this item is deleted. The Cronbach Alpha for this scale is satisfactorily high (0.839). Based on the basket of available evidence it was decided to retain all the items in the Innovation subscale. The results in the inter-item correlation matrix again might point towards factor fission.

Table 4.10

Reliability analysis of the factor D sub-scale

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
D1	27.13	24.905	.629	.403	.812
D2	27.20	26.838	.489	.276	.830
D3	27.11	25.771	.592	.364	.817
D4	27.26	25.782	.599	.362	.816
D5	27.06	26.002	.578	.361	.819
D6	27.14	25.593	.573	.376	.819
D7	26.99	25.042	.546	.342	.824
D8	26.85	26.638	.556	.348	.822

4.3.1.5 Item Analysis: Subscale E (Leadership potential)

None of the items in the Leadership potential subscale had extreme low or extreme high means. None of the items displayed small standard deviations that set them apart from the typical distributions observed for the majority of the items. It can therefore be concluded that all the items were sufficiently sensitive. The inter-item correlation matrix for the Leadership potential subscale is shown in Table 4.11. No items in this subscale seems to be problematic, they all tend to correlate at least moderately ($r_{ij} > .30$) with each other.

Table 4.11

Inter-item correlation matrix: factor E (Leadership potential)

	E1	E2	E3	E4	E5	E6	E7	E8
E1	1.000	.430	.450	.413	.418	.436	.414	.560
E2	.430	1.000	.450	.417	.453	.372	.324	.415
E3	.450	.450	1.000	.479	.415	.374	.354	.397
E4	.413	.417	.479	1.000	.477	.361	.380	.359
E5	.418	.453	.415	.477	1.000	.422	.509	.441
E6	.436	.372	.374	.361	.422	1.000	.420	.395
E7	.414	.324	.354	.380	.509	.420	1.000	.390
E8	.560	.415	.397	.359	.441	.395	.390	1.000

The absence of problem items in the Leadership potential subscale is confirmed in Table 4.12 in that the scale variance reduces substantially when any particular item is deleted from the scale. The moderate-high item-total correlation and the moderate squared multiple correlations also point to the absence of problem items in this subscale.

Table 4.12

Reliability analysis of the factor E sub-scale

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
E1	27.21	29.492	.636	.436	.827
E2	27.14	31.063	.573	.347	.835
E3	27.33	30.315	.585	.366	.833
E4	27.21	30.149	.577	.362	.834
E5	27.22	29.437	.638	.430	.827
E6	27.26	29.576	.558	.317	.837
E7	27.40	29.298	.562	.347	.837
E8	27.51	28.949	.596	.397	.832

The Cronbach Alpha for this scale is satisfactorily high (0.851). The items seem to contribute to the internal consistency of the scale. The Cronbach alpha values never increases when an item is deleted. Based on the basket of available evidence it was decided to retain all the items in the Leadership potential subscale.

4.3.1.6 Item Analysis: Subscale F (Communication)

None of the items in the Communication subscale had extreme low or extreme high item means. None of the items displayed small standard deviations that set them apart from the typical distributions observed for the majority of the items. It can therefore be concluded that all the items were sufficiently sensitive. The inter-item correlation matrix for the Communication subscale is shown in Table 4.13 A few items in this subscale seems to be questionable items in Table 4.13, they fail to correlate even moderately ($r_{ij} > .30$) with other items in the subscale.

Table 4.13

Inter-item correlation matrix: factor F (Communication)

	F1	F2	F3	F4	F5	F6	F7	F8
F1	1.000	.700	.400	.385	**.273**	**.287**	**.284**	.399
F2	.700	1.000	.444	.459	**.258**	**.288**	.307	.338
F3	.400	.444	1.000	.696	.502	.475	.455	.469
F4	.385	.459	.696	1.000	.502	.376	.457	.389
F5	**.273**	**.258**	.502	.502	1.000	.772	.429	.462
F6	**.287**	**.288**	.475	.376	.772	1.000	.332	.395
F7	**.284**	.307	.455	.457	.429	.332	1.000	.562
F8	.399	.338	.469	.389	.462	.395	.562	1.000

The presence of problem items in the Communication subscale is, however, not really corroborated in Table 4.14. Although the items F7 and F8 and to a somewhat lesser degree F1 and F2 do have somewhat lower item-total and squared multiple correlations the Cronbach alpha of the scale is nonetheless not positively affected when these items are deleted from the scale. The Cronbach Alpha for this scale is satisfactorily high (0.859). Based on the basket of available evidence it was decided to retain all the items in the subscale. The results in the inter-item correlation matrix might point towards factor fission.

Table 4.14

Reliability analysis of the factor F sub-scale

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
F1	26.97	29.630	.536	.522	.850
F2	27.03	29.938	.555	.542	.847
F3	27.13	28.440	.697	.571	.831
F4	27.11	28.698	.656	.564	.835
F5	27.08	28.635	.640	.670	.837
F6	27.04	29.702	.583	.622	.844
F7	27.09	29.807	.560	.399	.847
F8	26.89	29.228	.601	.434	.842

4.3.1.7 Item Analysis: Subscale G (Interpersonal relations)

None of the items in the Interpersonal relations subscale had extreme low or extreme high means. None of the items displayed small standard deviations that set them apart from the typical distributions observed for the majority of the items. It can therefore be concluded that all the items were sufficiently sensitive. The inter-item correlation matrix for the Interpersonal relations subscale is shown in Table 4.15. None of the items in this subscale therefore seems to be questionable items in Table 4.15, they all tends to correlate at least moderately ($r_{ij} > .30$) with each other.

Table 4.15

Inter-item correlation matrix: factor G (Interpersonal relations)

	G1	G2	G3	G4	G5	G6	G7	G8
G1	1.000	.562	.430	.509	.526	.475	.507	.444
G2	.562	1.000	.515	.392	.328	.478	.403	.364
G3	.430	.515	1.000	.419	.424	.489	.316	.350
G4	.509	.392	.419	1.000	.549	.562	.486	.526
G5	.526	.328	.424	.549	1.000	.526	.520	.397
G6	.475	.478	.489	.562	.526	1.000	.601	.533
G7	.507	.403	.316	.486	.520	.601	1.000	.513
G8	.444	.364	.350	.526	.397	.533	.513	1.000

The absence of problem items in the Interpersonal relations subscale also is apparent from the item statistics showed in Table 4.16 in that the scale variance reduces substantially when any particular item is deleted from the scale. The moderate-high item-total correlation and the moderate squared multiple correlations also point to the absence

of problem items in this subscale. The Cronbach alpha for the current subscale is a satisfactory .875. This comfortably falls above the critical cut-off value of .80 set for this study. The Cronbach alpha decreases when an item is deleted from the scale, indicating that the items tend to respond in unison to changes in the level of the latent variable being measured and the deletion of any item will negatively affect the internal consistency of this subscale. Based on the basket of available evidence it was decided to retain all the items in the subscale.

Table 4.16

Reliability analysis of the factor G sub-scale

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
G1	29.13	23.551	.673	.495	.856
G2	29.30	23.548	.584	.439	.866
G3	29.28	24.220	.565	.384	.867
G4	29.19	23.924	.669	.476	.856
G5	28.96	24.039	.628	.460	.860
G6	29.20	22.945	.718	.544	.850
G7	29.01	23.869	.648	.483	.858
G8	29.14	23.729	.599	.403	.863

4.3.1.8 Item Analysis: Subscale H (Management)

All the items in the Management subscale had means towards the middle range of the scale. None of the items had small standard deviations that set them apart from the typical distributions observed for the majority of the items. It can therefore be concluded that all the items were sufficiently sensitive. The inter-item correlation matrix for the Management subscale is shown in Table 4.17. None of the items in this subscale show seems to be questionable items they all tend to correlate at least moderately ($r_{ij} > .30$) with each other.

The absence of problem items in the Management subscale also is apparent from the item statistics should in Table 4.18 in that the scale variance reduces substantially when an item is deleted from the scale. The moderate-high item-total correlation and the moderate squared multiple correlations also point to the absence of problem items in this subscale.

Table 4.17

Inter-item correlation matrix: factor H (Management)

	H1	H2	H3	H4	H5	H6	H7	H8
H1	1.000	.493	.438	.382	.535	.435	.522	.502
H2	.493	1.000	.628	.476	.508	.351	.484	.562
H3	.438	.628	1.000	.475	.442	.426	.557	.505
H4	.382	.476	.475	1.000	.445	.392	.417	.381
H5	.535	.508	.442	.445	1.000	.682	.515	.528
H6	.435	.351	.426	.392	.682	1.000	.487	.401
H7	.522	.484	.557	.417	.515	.487	1.000	.554
H8	.502	.562	.505	.381	.528	.401	.554	1.000

H4 could possibly be flagged based on the somewhat lower squared multiple correlation. The response of the subscale Cronbach alpha does, however, not warrant deleting the item from the subscale. The Cronbach alpha for the current subscale is a satisfactory .882. This comfortably falls above the critical cut-off value of .80 set for this study. The Cronbach alpha of the subscale decreases when an item is deleted from the scale, indicating that the items tend to respond in unison to changes in the level of the latent variable being measured and the deletion of any item will negatively affect the internal consistency of this subscale. Based on the basket of available evidence it was decided to retain all the items in the subscale.

Table 4.18

Reliability analysis of the factor H sub-scale

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
H1	27.91	27.378	.633	.416	.869
H2	27.90	27.442	.672	.531	.865
H3	27.95	28.273	.665	.511	.866
H4	27.85	29.214	.559	.330	.876
H5	27.80	26.848	.708	.596	.861
H6	27.78	28.382	.605	.510	.871
H7	27.87	27.890	.681	.485	.864
H8	27.99	27.541	.659	.466	.866

4.3.1.9 Item Analysis: Subscale I (Analysing and problem-solving)

None of the items in the Analysing and problem-solving subscale had extreme low or extreme high item means. None of the items displayed small standard deviations that set

them apart from the typical distributions observed for the majority of the items. It can therefore be concluded that all the items were sufficiently sensitive. The inter-item correlation matrix for the Analysing and problem-solving subscale is shown in Table 4.19. I7 and I8 seem to be questionable items in Table 4.19. These items fail to correlate moderately ($r_{ij} > .30$) with the remainder of the items in the subscale.

Table 4.19

Inter-item correlation matrix: factor I (Analysing and problem-solving)

	I1	I2	I3	I4	I5	I6	I7	I8
I1	1.000	.612	.542	.429	.380	.442	.300	**.285**
I2	.612	1.000	.589	.477	.448	.386	**.249**	**.227**
I3	.542	.589	1.000	.526	.610	.497	.340	.337
I4	.429	.477	.526	1.000	.429	.397	**.235**	.270
I5	.380	.448	.610	.429	1.000	.351	.327	.400
I6	.442	.386	.497	.397	.351	1.000	.384	.339
I7	.300	**.249**	.340	**.235**	.327	.384	1.000	.463
I8	**.285**	**.227**	.337	**.270**	.400	.339	.463	1.000

The presence of problem items in the Analysing and problem-solving subscale is, however, not really corroborated in Table 4.20. Although the items I7 and I8 do have somewhat lower item-total and squared multiple correlations the Cronbach alpha of the scale is nonetheless not positively affected when these two items are deleted from the scale. The Cronbach Alpha for this scale is satisfactorily high (0.845). Based on the basket of available evidence it was decided to retain all the items in the subscale. The results in the inter-item correlation matrix might point towards factor fission.

Table 4.20

Reliability analysis of the factor I sub-scale

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
I1	27.87	27.126	.621	.457	.822
I2	27.79	27.292	.624	.492	.821
I3	27.85	25.821	.726	.574	.807
I4	27.75	27.822	.568	.352	.829
I5	27.76	27.992	.606	.435	.824
I6	27.75	27.631	.572	.349	.828
I7	27.65	29.692	.455	.289	.841
I8	27.77	29.831	.460	.301	.841

4.3.1.10   Item Analysis: Subscale J (Counterproductive work behaviour)

All the items in the Counterproductive work behaviour subscale had means towards the middle range of the scale. None of the items had small standard deviations that set them apart from the typical distributions observed for the majority of the items. It can therefore be concluded that all the items were sufficiently sensitive. The inter-item correlation matrix for the Counterproductive work behaviour subscale is shown in Table 4.21. Three of the items in this subscale prove to be questionable items as shown in Table 4.21. These items fail to correlate moderately ($r_{ij} > .30$) with some of the other items in the subscale. Especially item J1 presents itself as a problematic item.

Table 4.21

Inter-item correlation matrix: factor J (Counterproductive work behaviour)

	J1	J2	J3	J4	J5	J6	J7	J8	J9	J10
J1	1.000	.354	**.261**	.379	.331	.441	.374	**.120**	.310	**.206**
J2	.354	1.000	.633	.533	.563	.607	.376	.390	.322	.389
J3	**.261**	.633	1.000	.506	.457	.576	.366	.441	.465	.478
J4	.379	.533	.506	1.000	.547	.572	.409	.412	.344	.443
J5	.331	.563	.457	.547	1.000	.616	.414	.446	**.268**	.457
J6	.441	.607	.576	.572	.616	1.000	.403	**.251**	**.298**	.391
J7	.374	.376	.366	.409	.414	.403	1.000	.537	.539	.503
J8	**.120**	.390	.441	.412	.446	**.251**	.537	1.000	.596	.582
J9	.310	.322	.465	.344	**.268**	**.298**	.539	.596	1.000	.468
J10	**.206**	.389	.478	.443	.457	.391	.503	.582	.468	1.000

The Cronbach Alpha for this scale is quite substantial (0.882). The problematic nature of item J1 is corroborated in Table 4.22. J1 does have somewhat lower item-total and squared multiple correlations and the Cronbach alpha of the scale is positively affected when these J1 is deleted from the scale. When J1 is deleted the Cronbach Alpha for this scale increases to .884. Due to the small increase in Alpha value (0.002) it was decided not to delete this item. Based on the basket of available evidence it was decided to retain all the items in the subscale.

Table 4.22

Reliability analysis of the factor J sub-scale

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
J1	39.66	**41.919**	**.434**	**.313**	**.884**
J2	39.85	39.474	.669	.542	.866
J3	39.72	40.522	.667	.550	.867
J4	39.73	39.078	.665	.468	.866
J5	39.79	38.619	.657	.529	.867
J6	39.67	38.932	.673	.594	.865
J7	39.20	40.912	.616	.464	.870
J8	39.23	41.502	.584	.577	.872
J9	39.13	41.469	.554	.499	.874
J10	39.27	41.234	.612	.457	.870

4.3.1.11 Item Analysis: Subscale K (Organisational citizenship behaviour)

All the items in the Organisational citizenship behaviour subscale had means towards the middle range of the scale. None of the items had small standard deviations that set them apart from the typical distributions observed for the majority of the items. It can therefore be concluded that all the items were sufficiently sensitive. The inter-item correlation matrix for the Organisational citizenship behaviour subscale is shown in Table 4.23. None of the items in this subscale show themselves as questionable items, they all tend to correlate at least moderately ($r_{ij} > .30$) with each other.

Table 4.23

Inter-item correlation matrix: factor K (Organisational citizenship behaviour)

	K1	K2	K3	K4	K5	K6	K7
K1	1.000	.547	.422	.406	.410	.472	.465
K2	.547	1.000	.669	.492	.481	.530	.496
K3	.422	.669	1.000	.478	.497	.410	.378
K4	.406	.492	.478	1.000	.530	.413	.427
K5	.410	.481	.497	.530	1.000	.455	.438
K6	.472	.530	.410	.413	.455	1.000	.744
K7	.465	.496	.378	.427	.438	.744	1.000

The absence of problem items in the Organisational citizenship behaviour subscale also is apparent from the item statistics shown in Table 4.24. The scale variance reduces substantially when any particular item is deleted from the scale. The moderate-high item-

total correlation and the moderate squared multiple correlations also point to the absence of problem items in this subscale. K1 and K4 could possibly be flagged based on their somewhat lower squared multiple correlations. The response of the subscale Cronbach alpha does, however, not warrant deleting these items from the subscale. The Cronbach alpha for the current subscale is a satisfactory .867. This comfortably falls above the critical cut-off value of .80 set for this study. The Cronbach alpha decreases of the subscale when each item is deleted from the scale, indicating that the items tend to respond in unison to changes in the level of the latent variable being measured and the deletion of any item will negatively affect the internal consistency of this subscale. Based on the basket of available evidence it was decided to retain all the items in the Organisational citizenship behaviour subscale.

Table 4.24

Reliability analysis of the factor K sub-scale

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
K1	25.04	20.024	.596	.373	.855
K2	24.99	19.878	.722	.579	.837
K3	24.94	20.433	.625	.498	.850
K4	24.95	20.891	.600	.388	.853
K5	24.99	20.584	.616	.406	.851
K6	25.01	19.959	.674	.599	.843
K7	25.11	20.038	.654	.585	.846

4.3.1.12 Item Analysis: Subscale L (Self-development)

All the items in the Self-development subscale had means towards the middle range of the scale. None of the items had small standard deviations that set them apart from the typical distributions observed for the majority of the items. It can therefore be concluded that all the items were sufficiently sensitive. The inter-item correlation matrix for the Self-development subscale is shown in Table 4.25. None of the items in this subscale show themselves as questionable items in Table 4.25 in that they all tend to correlate moderately ($r_{ij} > .30$) with each other.

Table 4.25

Inter-item correlation matrix: factor L (Self-development)

	L1	L2	L3	L4	L5	L6	L7	L8	L9
L1	1.000	.434	.457	.384	.443	.380	.489	.380	.432
L2	.434	1.000	.545	.587	.535	.617	.573	.675	.652
L3	.457	.545	1.000	.529	.562	.529	.575	.669	.502
L4	.384	.587	.529	1.000	.746	.601	.511	.577	.618
L5	.443	.535	.562	.746	1.000	.615	.411	.531	.544
L6	.380	.617	.529	.601	.615	1.000	.509	.577	.604
L7	.489	.573	.575	.511	.411	.509	1.000	.691	.672
L8	.380	.675	.669	.577	.531	.577	.691	1.000	.605
L9	.432	.652	.502	.618	.544	.604	.672	.605	1.000

Table 4.26 does, however point to item L1 as a problematic item in that the scale variance reduces substantially less when this item is deleted from the scale. The item-total correlation and the squared multiple correlation also fall outside the range of values associated with these two item statistics, pointing to the problem status of this item in this subscale. The response of the subscale Cronbach alpha also points the problem status of L1. The Cronbach alpha for the current subscale is a highly satisfactory .916. This comfortably falls above the critical cut-off value of .80 set for this study. Deleting L1 would increase the scale reliability to .964. Due to the small increase in Alpha value (0.001) it was decided not to delete this item. Based on the basket of available evidence it was decided to retain all the items in the Self-development subscale.

Table 4.26

Reliability analysis of the factor L sub-scale

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
L1	34.85	45.419	.531	.344	**.917**
L2	35.09	41.294	.746	.594	.904
L3	35.20	42.465	.699	.543	.907
L4	35.23	40.318	.741	.643	.905
L5	35.14	40.783	.711	.643	.907
L6	35.09	41.643	.717	.539	.906
L7	34.94	43.037	.706	.626	.907
L8	35.09	41.829	.761	.664	.903
L9	35.02	41.657	.748	.615	.904

4.3   SUMMARY OF ITEM ANALYSIS RESULTS

This part of the research chapter reported on the results obtained from the item analysis. The purpose was to evaluate the success with which these items represent the various performance dimensions measured by the GPQ instrument.   In the design and development of the questionnaire the intention was to construct essentially one-dimensional sets of items to reflect variance in each of the twelve latent performance dimensions collectively comprising the generic performance domain.   The items were meant to function as relatively homogenous stimulus sets to which respondents react with behaviour that is a relatively uncontaminated expression primarily of the performance construct as it applies to the focal employee.   The purpose with the item analysis was to gather evidence on the extent to which this intention succeeded.   Item statistics were calculated for the items in each sub-scale.   These statistics included the item-total correlations, the squared multiple correlations, the inter item correlations and the Cronbach alpha coefficients.   To the extent that the intention succeeded the item-total correlations, the squared multiple correlations, the inter item correlations should be moderately high and the Cronbach alpha coefficients should exceed .80.   In evaluating these item statistics, the GPQ items survived the opportunity to be discredited and to be shown not to measure the underlying latent performance dimensions satisfactorily.   Two items were identified as somewhat problematic but both were judged not to be sufficiently problematic to delete them from the GPQ.   Therefore no items were deleted from the instrument.

Item analysis was also completed after the imputation of missing values.   No drastic improvement was obtained from these results except a slight improvement in the Cronbach Alpha statistics.

4.4   DIMENSIONALITY ANALYSIS

The intention of the GPQ was to construct effectively one-dimensional sets of items that would reflect variance in the 12 latent dimensions of the performance construct.   The design intention was that a response to an indicator variable should be an expression of a

specific underlying performance variable. The latent first-order performance dimension that is reflected in the indicator variables is assumed to be unidimensional. To evaluate the assumption that variance in the responses to the set of items comprising each subscale was to a sufficient degree brought about by a single underlying factor, principal axis factoring analyses with oblique rotation were performed on each of the 12 subscales. This process allows the evaluation of the success with which each indicator variable along with the rest of the items in the subscale measures the performance dimension it professes to measure. Again a similar logic than that underpinning the item analysis applies here. If the design intention succeeded to develop set of items that successfully reflect a specific latent performance dimension and this latent performance dimension is a unidimensional construct, the extraction of a single factor and having each item load reasonably high on the single factor should allow the accurate reproduction of the observed inter-item correlation matrix. The extraction of a single factor and having each item load reasonably high on the single factor that allows the accurate reproduction of the observed inter-item correlation matrix does not, however, necessarily mean that the target latent performance dimension carrying a specific constitutive definition has been successfully measured. The extraction of a single factor, along with adequate loadings on the factor will, however, mean that the hypothesis that items in the specific subscale all successfully measure the target latent performance dimension as constitutively defined has survived the opportunity to be falsified.

In the design and development of the GPQ the fundamental assumption was that each of the twelve first-order performance factors is in fact a unidimensional latent variable. That, however, does not mean that each of the twelve performance dimensions is interpreted as a narrow, very specific construct. Each performance dimension should rather be interpreted as a reasonably broad facet of non-managerial performance that expresses itself in a wide array of specific behaviours. Still it is expected that each of the items comprising each of the twelve subscales of the GPQ should load (albeit rather modestly because of the broad nature of most of the latent performance dimensions) on a single factor. In cases where more than one factor is extracted the question arises whether the factor fission makes conceptual sense. Specifically the question is whether the extracted factors can be considered meaningful sub-dimensions of the latent performance dimension as

constitutively defined. If so further questions are whether both sub-dimensions are adequately represented by items in the subscale and whether all items adequately reflect the second-order factor that the GPQ originally intended to measure.

Factor analysis performed on a correlation or covariance matrix might not be the most effective procedure for determining the dimensionality of a subscale (Spangenberg & Theron, 2004). There is a possible danger in extracting artefact factors reflecting differences in item difficulty value, kurtosis or variance only. Schepers (1992) stresses the need to calculate the descriptive statistics for the items of each sub-scale to determine the possibility of multiple factors appearing as an artefact of differential item characteristics like skewness. The typical array of descriptive statistics was consequently calculated for the items of each sub-scale to examine the possibility that the failure to corroborate the unidimensionality assumption, where it occurred, was due to differential item characteristics.

The Statistical Package for the Social Sciences (SPSS) 19.0 was used to perform a series of 12 exploratory factor analyses on the items comprising the subscales of the GPQ. Table 4.27 is a summary of the results of the factor analyses.

Table 4.27

Summary of the results of the principal axis factor analyses

Subscale	Determinant	KMO	Bartlett X^2	% Variance explained	No. of factors extracted
A	.199	.804	289.064*	35.269	2
B	.090	.875	449.580*	44.517	1
C	.081	.868	446.183*	39.316	1
D	.093	.889	440.963*	39.801	1
E	.075	.897	496.124*	41.993	1
F	.021	.782	679.349*	45.078	2
G	.034	.883	660.004*	47.280	1
H	.027	.882	639.735*	48.566	1
I	.059	.864	546.635*	42.112	2
J	.009	.872	867.349*	44.676	2
K	.043	.849	608.725*	48.639	1
L	.004	.900	936.925*	55.442	1

*p<0.01

Below follows the process of the factor analysis as well as a more detailed account for the results of each subscale.

4.4.1 EVALUATING THE FACTOR ANALYZABILITY OF THE INTER-ITEM CORRELATION MATRIX

The Kaiser-Meyer-Olkin (KMO) measure and Bartlett's test were used to examine the factor analysability of the observed inter-item correlation matrices. The KMO measure of sampling adequacy is an index that represents the ratio of the sum of the squared inter-item correlations and the squared inter-item correlations plus the sum of the squared partial inter-item correlation coefficients (Sricharoena & Buchenrieder, 2005). The measure varies between 0 and 1 with values closer to 1.00 considered to be better. A value of 1 will be the result when items reflect a single common underlying factor so that when this factor is statistically controlled, the correlations between items will approach zero. The correlation matrix is considered factor analysable when KMO approaches unity (but at least $> .6$). In the case of the GPQ, KMO values ranges between .9 and .782. This indicates that all the correlation matrices are factor analysable.

To test the null hypothesis that the inter-item correlation matrix is an identity matrix[14] in the parameter, the Bartlett test of sphericity was used. With the GPQ, the stated null hypothesis could be rejected for all of the 12 subscales. This implies that the correlation matrices are all factor analysable.

The observed inter-item correlation matrix contains various sizeable ($r_{ij} > .30$) and significant ($p < .05$) correlations (see Appendix B2 on the enclosed CD) for all of the 12 subscales. This further confirms the factor analysability of the subscale correlation matrices.

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[14] An identity matrix is a matrix in which all the items in a subscale only correlate with themselves and not with each other (i.e., all the diagonal elements in the correlation matrix are 1's and all the off diagonal elements are 0's).

Although the abovementioned results (KMO, Bartlett's test of sphericity and the significance of the inter-item correlations) are not altogether surprising given the design intention with the GPQ, it implies that factor analysis on all 12 inter-item correlation matrices would be meaningful.

4.4.2   FACTOR EXTRACTION METHOD

Factor analysis was completed for each of the 12 subscales using principal axis factor analysis. Various extractions methods are available to extract factors from an inter-item correlation matrix. Methods includes: unweighted least squares, generalized least squares, maximum likelihood, principal axis factoring, principal component analysis and image factoring – all compatible with SPSS. Comprehensive descriptions of the various possible extraction methods are available in Nunnally (1978), Tabachnick and Fidell (2001). In factor extraction, the important decision lies between principal component analysis and factor analysis. Factor analysis was chosen for this research because it seeks the least number of factors which can account for the common variance shared by the observed variables. In dimensionality analysis, the purpose is to evaluate the assumption that a single underlying performance factor can account for the variance shared by the specific items in the subscale. Another alternative method is principal component analysis. This method however does not differentiate between common and unique variance as it aims to extract factors which account for total (unique and common) variance in a subset of variables (Fabrigar, Wegener, MacCallum & Strahan, 1999). Compared to principle component analysis, factor analysis better serves the objectives of this study (evaluating whether items in each subscale only reflect one underlying performance factor). Principal axis factor method was used in this study as the specific factor analytic extraction method as it proved as factor decomposition that is easily interpretable (Costello & Osborne, 2005; Fabrigar et al., 1999).

4.4.3   DECISION ON THE NUMBERS OF FACTORS TO EXTRACT

A general assumption in the analysis of the observed inter-item correlation matrix would be that observed correlation matrix can be perfectly explained by extracting as many

factors as there are variables being analyzed. The more factors that are extracted, the better the fit between the observed and reproduced correlation matrices, but the less parsimonious the factor structure becomes (Tabachnick & Fidell, 2001). Therefore an important question to decide on is the number of factors to extract that will be meaningful for interpretation. The retained factors should therefore account for the covariance between the items in any particular scale. Decision on the number of factors to be extracted should be guided by theory (Fabrigar et al., 1999). The eigenvalue-greater-than-one criterion and the scree test were used in this study to determine the number of factors to extract (Fabrigar et al., 1999).

4.4.3.1 Eigenvalue-greater-than-one criterion

This method is also known as the Kaiser criterion (Kaiser; 1960). Eigenvalue or latent root is the amount of variance accounted for by a factor; it is the sum of the squared factor loadings of the observed variables in a column, in other words, the sum of the variances explained in the items by each factor (Hardy & Bryman, 2004). According to Taylor (2005), the criterion of eigenvalues-greater-than-one can be attributed to Guttman (1954), adapted by Kaiser in 1960. In order to determine the number of factors to extract, eigenvalues are computed for the correlation matrix. In this process eigenvalues less than 1.00 are ignored, implying that they don't contribute as much to the variance of all the variables. Eigenvalues greater than 1.00 are retained, but Taylor (2005) cautions that factors can fall close to this value on either side of the 1.00 cut-off value. For example, a factor with an eigenvalue of 1.01 would be retained but a value of .99 would be rejected. The insignificant difference between these values entails that both would account for almost exactly the same amount of variance, but in this example, the value of .99 would be rejected. Hardy and Bryman (2004) suggest overcoming this shortcoming by extracting both more and fewer factors than the number suggested by the eigenvalue-greater-than-one rule to assess whether these factors, when rotated, are meaningful.

4.4.3.2 Scree test

The scree test is the graph of the eigenvalues of the extracted factors plotted against the number of factors extracted. In the scree plot, researchers are looking for a "break" between the factors with large eigenvalues and factors with relatively small eigenvalues (Cattell, 1966). The meaning of the word scree, comes from the explanation of rubble at the bottom of a cliff (Taylor, 2005). Scree in this context of research refers to the factors that could be ignored after a substantial drop in the eigenvalues. The number of factors to be extracted is shown by the number of factors before the drop or break in the scree plot (Taylor, 2005). Therefore all the factors that appear before the break (or elbow), are believed to be important and therefore extracted. Limitations of this method are the perspective of subjectivity and ambiguity (Hayton, Allen & Scarpello, 2004). This is evident in cases with smaller sample sizes when the ratio of variables to factors is low. Subjectivity also creeps in where there are no clear breaks or where two or more apparent breaks are noticeable.

4.4.4. ROTATION OF EXTRACTED FACTORS

Rotation is the process of re-orientating factors in order to make factor loadings more interpretable (Powell & Peng, 1989). Varimax, quartimax and aquamax are some options to choose from. Varimax, quartimax and aquamax are orthogonal methods of rotation while oblique methods of rotation consist of direct oblimin, quartimin and promax (Costello & Osborne, 2005; Tabachnick & Fidell, 2001). In this study, it was expected that exploratory factor analysis performed on each subscale of the GPQ would result in the extraction of one factor underlying each performance subscale. Under these expectations, the rotation of the extracted factor structure would not be required or meaningful. Nonetheless in the event of factor fission, even though such an event may be considered unlikely, it makes sense to make provision for the possibility that the extracted factors might be correlated. For the purpose of this study an oblique rotation method was therefore utilised to aid in interpretation and reporting in the case of factor fission.

4.4.5 DIFFERENTIAL SKEWNESS

The extraction of artefact factors reflecting differences in skewness or other statistical characteristics could be the result of differential item skewness or other statistical characteristics (Schepers, 1992). The need to calculate descriptive statistics for each item was therefore highlighted. Most items reflected a significantly ($p < 0.05$) negatively skewed and leptokurtic distribution. The likelihood that differential item characteristics can account for the factor fission observed on four of the subscales therefore seems low.

4.4.6 DISCUSSION OF THE DIMENSIONALITY OF THE INDIVIDUAL SCALES OF THE GPQ

Principal axis factor analysis with oblique rotation was used on the subscales of the GPQ to determine unidimensionality. The eigenvalue-greater-than-one rule combined with the scree plot was used to determine the number of factors to be extracted. A summary of results obtained for each subscale is presented below.

4.4.6.1 Dimensionality Analysis: Factor A (Task performance)

The design intention was that the 7 items written for the Task performance subscale should all successfully reflect a single underlying performance dimension. Evaluation of the exploratory factor analysis output for subscale A indicates that two factors are required to satisfactorily explain the observed correlations between the 7 items of subscale A. Two factors have eigenvalues greater than one. This is also illustrated in the scree plot.

The question arises whether this outcome points to a meaningful fission of the Task performance latent performance dimension. From the pattern matrix shown in Table 4.28, a reasonably clear pattern of loadings emerge. The factor loadings in Table 4.28 can be interpreted as partial regression coefficients reflecting the relationship between the items and the underlying factor with the other (correlated) factor held constant. In the rotated factor matrix, it is clear that items A1-A3 have larger loadings on the first factor

(> .5) while items A5 and A 6 have larger loadings on factor two (> .5). A4 loads on both factors (> .3) and item A7 loads on factor two (> .3)

Table 4.28

Pattern matrix factor A

	Factor	
	1	2
A1	**.587**	.161
A2	**.953**	-.198
A3	**.539**	.159
A4	.301	.369
A5	-.100	**.657**
A6	.183	**.508**
A7	.298	**.312**

Meaningful underlying themes could be found in the wording of the items loading on each of the two factors. Items A1, A2 and A3 all seem to refer to the extent to which quantity and quality output standards have been reached or exceeded. The items loading on factor 2 in contrast seem to weigh what is achieved against what has been invested to achieve the output. In terms of this reasoning one, however, would have expected A4 to have shown a more pronounced loading on factor 2. Moreover, in terms of this reasoning task expectations (A7) should then be expressed in terms of what needs to be achieved against what may be invested to achieve the required output. These two factors can be seen as meaningful subdimensions of the Task performance latent performance dimension.

Residuals were computed between observed and reproduced correlations. There was only 1 (4.0%) non-redundant residual with an absolute value greater than .05. The extracted two-factor solution therefore provides a credible explanation for the observed inter-item correlation matrix. The unidimensionality assumption is therefore not corroborated for subscale A. 35.269% of the variance is explained by factor 1 compared to the 7.613% of the variance that is explained by factor 2.

To examine how well the items reflect the single underlying performance dimension, SPSS was forced to extract a single factor to determine the loadings of the items on the single factor. The results are shown in Table 4.29.

Table 4.29

Forcing a single factor A

	Factor
	1
A1	.687
A2	.661
A3	.637
A4	.576
A5	**.384**
A6	.553
A7	.530

All items except A5 (>.3) have loadings greater than .50 on the single factor. In the residual correlation matrix 28% of the residual correlations are large suggesting that the single factor solution still manages to adequately explain the observed correlation matrix. This evidence shows that all items excluding A5 satisfactorily reflect a single second-order underlying factor. Item A5 has a borderline loading approaching .40. Item A5 also came to the fore as a borderline problematic item in the item analysis. Based on the combined evidence generated by the item analysis and the factor analysis it was decided to flag item A5 as a borderline, questionable item for future analysis on the GPQ but to retain item A5 in subscale for the current analysis.

4.4.6.2 Dimensionality Analysis: Factor B (Exerting effort)

Investigating the unidimensionality assumption that the 7 items comprising the Exerting Effort subscale all reflect a single underlying performance factor suggests that a single factor is required to satisfactorily explain the observed correlations between the 7 items of subscale B and that all items have satisfactorily loadings on the extracted factor (>.50). Only one factor has an eigenvalue greater than one. The scree plot also suggests the extraction of a single factor.

There are 5 (23.0%) non-redundant residuals with absolute values greater than .05 implying that the solution provides a credible explanation for the observed inter-item correlation

matrix. The unidimensionality assumption is therefore corroborated for subscale B. 44.517% of the total subscale variance can be explained by the extracted factor.

Table 4.30

Factor matrix factor B

	Factor
	1
B1	.587
B2	.609
B3	.687
B4	.624
B5	.723
B6	.683
B7	.742

4.4.6.3 Dimensionality Analysis: Factor C (Adaptability)

In the case of Factor C, the unidimensionality assumption that the 8 items comprising the Adaptability subscale of the GPQ all reflect a single underlying performance factor was tested. One factor was extracted with an eigenvalue greater than one. This suggests that one factor explains the observed correlations between the 8 items of the subscale. Items C1, C2, C4-C6 have satisfactory loadings on the single factor (> .5) while items C3 and C7 and C8 do not meet the stated loading criterion of .50. The loadings for C3, C7 and C8 do, however, approximate .50. The same three items were also flagged in the item analysis of this subscale. Insufficient evidence was, however, found to warrant the deletion of these three items.

Table 4.31

Factor matrix factor C

	Factor
	1
C1	.715
C2	.756
C3	**.484**
C4	.691
C5	.650
C6	.700
C7	**.488**
C8	**.447**

The residuals computed for this subscale resulted into 13 (46.0%) non-redundant residuals with absolute values greater than 0.05. The one extracted factor accounted for 39.316 % variance in the subscale.

This finding points to the need to extract a second factor. When a second factor is extracted C1, C2 and C3 load onto the second factor with moderately high but negative factor loadings ($-.78 < \lambda_{ij} < -.59$). Items C7 and C8 still load on factor one with moderate-low loadings ($\lambda_{71} = .484$ and $\lambda_{81} = .309$). Given the border-line loadings of these three items C3, C7 and C8 are nonetheless retained until further research confirms their problem status.

4.4.6.4 Dimensionality Analysis: Factor D (Innovating)

The unidimensionality assumption that the 8 items included in the Innovating subscale all reflect a single underlying performance factor was confirmed. Only one factor was extracted with an eigenvalue greater than one. The scree plot also indicates the extraction of a single factor. All items in this subscale shows strong loading on the singe extracted factor ($>.5$)

Table 4.32

Factor matrix factor D

	Factor
	1
D1	.694
D2	.535
D3	.654
D4	.660
D5	.641
D6	.634
D7	.604
D8	.612

Residuals are computed between observed and reproduced correlations. There are 8 (28.0%) non-redundant residuals with absolute values greater than .05, suggesting that the factor solution does provide a sufficient explanation for the observed inter-item correlation

matrix. The one extracted factor explains 39.801% of the sub-scale variance in the item data.

4.4.6.5 Dimensionality Analysis: Factor E (Leadership potential)

The unidimensionality assumption that the 8 items comprising the Leadership Potential subscale all reflect a single underlying performance factor was confirmed with the extraction of a single factor with an eigenvalue greater than one. All items has satisfactory loadings on the single factor (>0.5)

Table 4.33

Factor matrix factor E

	Factor
	1
E1	.695
E2	.630
E3	.643
E4	.636
E5	.697
E6	.608
E7	.612
E8	.656

Residuals are computed between observed and reproduced correlations. There are 6 (21.0%) non-redundant residuals with absolute values greater than .05. This is an indication that the factor solution provides a satisfactory explanation for the observed inter-item correlation matrix. The extracted factor explains 41.993% of the sub-scale variance.

4.4.6.6 Dimensionality Analysis: Factor F (Communication)

In evaluating the unidimensionality assumption that the 8 items comprising the Communication sub-scale all reflect a single underlying performance factor, the SPSS exploratory factor analysis suggests that one would need two factors to explain the observed correlations of the item sub-scale. Two factors with eigenvalues greater than one were extracted. Items F1 and F2 load on factor two ($>.5$). Items F3, F5 and F6 have load

on factor one (>.5), while items F4, F7 and F8 all have loadings on factor one greater than .4. Both F1 and F2 are more specified to measure written communication compared to the other items that is more focussed on oral communication. For the purpose of this study however, written and oral communication can be seen under a single dimension of communication.

Table 4.34

Rotated factor matrix factor F

	Factor	
	1	2
F1	.034	**.749**
F2	-.003	**.836**
F3	**.549**	.307
F4	**.487**	.328
F5	**.978**	-.202
F6	**.787**	-.097
F7	**.486**	.184
F8	**.490**	.229

SPSS was forced to extract a single factor to determine how well the items represent a single underlying factor. All items have satisfactorily high loadings on the single factor (>.5).

Table 4.35

Forcing a single factor F

	Factor
	1
F1	.571
F2	.587
F3	.770
F4	.725
F5	.706
F6	.641
F7	.611
F8	.648

45.078% of the variance in the subscale items is explained by factor one compared to the 10.723% of factor two. There are 13 (46.0%) non-redundant residuals with absolute values greater than .05, suggesting that the forced factor solution does in fact not provide an adequate explanation for the observed inter-item correlation matrix.

4.4.6.7 Dimensionality Analysis: Factor G (Interpersonal relations)

The unidimensionality assumption that the 8 items comprising the Interpersonal Relations sub-scale all reflect a single underlying performance factor is confirmed by the extraction of a single factor with an eigenvalue greater than one. The scree plot also indicates the extraction of a single factor to the left of elbow in the scree plot. All items have satisfactorily large loadings on the single factor ($>.50$).

Table 4.36

Factor matrix factor G

	Factor
	1
G1	.721
G2	.623
G3	.600
G4	.724
G5	.684
G6	.777
G7	.704
G8	.651

Residuals are computed between observed and reproduced correlations. There are 10 (35.0%) non-redundant residuals with absolute values greater than .05. The single extracted factor explains 47.280% of the variance in the subscale items. This outcome indicates that the factor solution is a relatively credible explanation for the observed correlation matrix.

4.4.6.8 Dimensionality Analysis: Factor H (Management)

In evaluating the unidimensionality assumption that the 8 items comprising the Management sub-scale all reflect a single underlying performance factor; the extraction of a single factor confirms this hypothesis. Only one factor was extracted with an eigenvalue greater than one. In the scree plot this is demonstrated by the fact that only one factor lies to the left of the elbow in the scree plot. All items have satisfactorily large loadings on the single factor ($>.5$).

Table 4.37

Factor matrix factor H

	Factor
	1
H1	.678
H2	.724
H3	.715
H4	.598
H5	.757
H6	.648
H7	.731
H8	.710

The residual correlations were computed for the extracted factor solution. There are 5 (17.0%) non-redundant residuals with absolute values greater than .05, suggesting that the factor solution provides a satisfactory explanation of the inter-item correlation matrix. The single extracted factor explains 48.566% of the sub-scale variance.

4.4.6.9 Dimensionality Analysis: Factor I (Analysing and problem-solving)

In evaluating the unidimensionality assumption that the 8 items comprising the Analysing and Problem-solving sub-scale all reflect a single underlying performance factor, the SPSS results suggests that two factors have to be extracted to explain the observed correlations between the items of this sub-scale. Two factors had eigenvalues greater than one.

Items I1, I2, I3, I4 load on factor one (>.6). Item I5 and I6 load on factor one with a value greater than 0.4 while factors I7 and I8 have stronger loadings on factor two (>.6).

Table 4.38

Rotated factor matrix factor I

	Factor	
	1	2
I1	**.710**	-.004
I2	**.867**	-.166
I3	**.763**	.089
I4	**.619**	.032
I5	**.488**	.248
I6	**.418**	.279
I7	.039	**.630**
I8	-.007	**.710**

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Items I1, I2, I3, I4, I5 and I6 loading on factor 1 seem to all relate to the manner in which the employee goes about attempting to solve problems. In contrast items I7 and I8 loading on factor 2 seem to both refer to the extent to which problems are successfully solved. Both forms of behaviour represent facets of the analysing and problem-solving performance dimension as defined by the GPQ. The results shown in Table 4.40 therefore represent a meaningful fission of the analysing and problem-solving latent performance dimension.

In order to identify how successful the items of this sub-scale represent a single underlying factor the researcher forced SPSS to extract a single factor.

Table 4.39

Forcing a single factor I

	Factor
	1
I1	.686
I2	.697
I3	.814
I4	.628
I5	.666
I6	.619
I7	**.483**
I8	**.487**

The results of the single factor extraction indicates adequate factor loadings of items I1 – I6 (>.50) but the loadings of items I7 and I8 fall marginally below the stated loading criterion. I7 and I8 are nonetheless retained until further research confirms their problem status. Residuals are computed between observed and reproduced correlations. There are 4 (14.0%) non-redundant residuals with absolute values greater than .05 this is indicative of a credible explanation for the observed inter-item correlation matrix. 42.112% variance is explained by factor one compared to the 7.107% of factor two.

In considering the definition of the performance dimension measured by the sub-scale, the assumption is made that the items do in fact reflect one underlying second-order theme.

4.4.6.10   Dimensionality Analysis: Factor J (Counterproductive work behaviour)

The uni-dimensionality assumption that the 10 items comprising the Counterproductive work behaviour sub-scale reflect a single underlying performance factor is rejected. Two factors are necessary to explain the observed correlations between the items of this sub-scale and have eigenvalues greater than one. The scree plot also indicates the extraction of two factors when evaluating the number of factors appearing to the left of the elbow in the scree plot. Items J1- J6 all load on factor one. The loadings of all the items on factor one are quite substantial but for J1 that has a loading smaller than .50. Items J7 – J10 all load on factor 2 (>0.5).

Table 4.40

Rotated factor matrix factor J

	Factor	
	1	2
J6	.960	-.179
J2	.737	.038
J5	.657	.104
J4	.631	.135
J3	.548	.236
J1	.488	-.002
J8	-.100	.902
J9	-.004	.722
J10	.177	.588
J7	.182	.567

Items J1- J6 loading on factor one all seem to share the theme of transgressing organisational rules that as such do not constitute criminal acts but that nonetheless are prohibited by organisational rules. Items J7 – J10 loading on factor 2 in contrast all seem to refer to behaviour that would be considered criminal and that can result in prosecutions in court as transgressions of specific legal acts. Both forms of behaviour affect the organisation negatively and can legitimately considered forms of counterproductive work behaviour. The results shown in Table 4.40 therefore represent a meaningful fission of the counterproductive work behaviour latent performance dimension.

SPSS was forced to extract a single factor to determine how well a single underlying factor is represented in this sub-scale.

Table 4.41

Forcing a single factor J

	Factor
	1
J1	**.456**
J2	.717
J3	.721
J4	.708
J5	.704
J6	.712
J7	.651
J8	.638
J9	.596
J10	.664

All items except J1 have loadings greater than .5. Therefore it could be assumed that all the items but for J1 satisfactorily reflect a second-order counterproductive latent variable underlying this sub-scale. J1 is nonetheless retained until further research confirms its problem status.

Residuals are computed between observed and reproduced correlations for the two-factor solution. There are 12 (26.0%) non-redundant residuals with absolute values greater than .05, indicating a satisfactory explanation for the observed inter-item correlation matrix. 44.676% variance is explained by factor one compared to the 8.647% variance of factor two.

In considering the definition of the performance dimension measured by the sub-scale, the assumption is made that the items do in fact reflect one underlying second-order theme.

4.4.6.11 Dimensionality Analysis: Factor K (Organisational citizenship behaviour)

The unidimensionality assumption that the 7 items comprising the Organisational citizenship behaviour sub-scale all reflect a single underlying performance factor is confirmed with the extraction of a single factor with an eigenvalue greater than one. All items have satisfactorily high loadings on the single factor (>.50).

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Table 4.42

Factor matrix factor K

	Factor
	1
K1	.646
K2	.786
K3	.683
K4	.648
K5	.665
K6	.732
K7	.711

The residuals were computed between observed and reproduced correlations. There are 7 (33.0%) non-redundant residuals with absolute values greater than .05. The single extracted factor explains 48.639% of the variance in the item data.

4.4.6.12   Dimensionality Analysis: Factor L (Self-development)

Evaluating the unidimensionality assumption that the 9 items comprising the Self-development sub-scale all reflect a single underlying performance factor, the SPSS results confirm that one factor explains the observed correlations of this sub-scale. All factors have satisfactory loadings on this single factor ($>$.50).

Table 4.43

Factor matrix factor L

	Factor
	1
L1	.554
L2	.786
L3	.733
L4	.773
L5	.737
L6	.750
L7	.746
L8	.805
L9	.787

Residuals are computed between observed and reproduced correlations. There are 13 (36.0%) non-redundant residuals with absolute values greater than .05. The single extracted factor explains 55.442% of the variance in the item data of the sub-scale.

4.4.7   SUMMARY OF THE DIMENSIONALITY RESULTS

The GPQ consists of 12 latent variables intended to reflect essentially one dimensional sets of items that measures the performance domain. Employees should respond to items with behaviour that is primarily expressed by a specific performance variable. Results from the dimensionality analysis show satisfactory proof that the items indeed correspond with a single underlying factor.

4.5   EVALUATION OF THE PRIMARY MEASUREMENT MODEL

The GPQ was designed to measure the generic performance construct. Operational denotations are used to determine the employees' position on each of the performance dimensions. Items in the GPQ are assumed to elicit responses in the employee that agree with behaviour that denote the measured performance dimension. This study aims to prove the extent to which this premeditated operational design succeeds in providing a valid measure of the defined performance construct.

4.5.1   VARIABLE TYPE

The objective of the research was to develop and validate a South Africa performance measure that could be used to obtain assessments of the generic, non-managerial, individual performance construct. The GPQ was developed by purposefully generating items to reflect each of the 12 latent performance dimensions comprising the generic non-managerial performance domain. The aim is to evaluate whether this design intentions of the GPQ succeeded. The ideal approach therefore would have been to fit a measurement model in which the individual items serve as indicator variables of the latent generic performance dimensions. Due to the relatively small sample in relation to the number of items involved in the GPQ, fitting the measurement GPQ model with individual items would have meant estimating more parameters (258) than there are observations in the data set (199). Taking the above mentioned into consideration, item parcels (containing between 2 and 3 items in each sub-scale) were created. Utilising item parcels simplifies the logistics of fitting the measurement model and, as linear composites of items, also results in

more reliable indicator variables (Nunnally; 1978). The item parcels were interpreted as continuous variables. The analysis of the covariance matrix via maximum likelihood (or robust maximum likelihood) estimation was consequently considered permissible (Jöreskog & Sörbom 1996a; 1996b; Mels, 2003).

4.5.2   UNIVARIATE AND MULTIVARIATE NORMALITY

Maximum likelihood estimation is the default procedure used to estimate model parameters in the process of fitting a measurement model to continuous data. This method of estimation assumes that data follows a multivariate normal distribution. This is also the case for generalized least squares (GLS) and full information maximum likelihood (FIML) as other estimation methods in structural equation modelling when dealing with continuous data (Mels, 2003). Incorrect standard errors and chi-square estimates can be the result of the inappropriate analysis of continuous non-normal variables in structural equation models. PRELIS was used to evaluate the univariate (Table 4.44) and multivariate normality (Table 4.45) of the indicator variables (Jöreskog & Sörbom, 1996b). The null hypothesis of univariate normality had to be rejected ($p < .05$) in the case of 16 of the 46 indicator variables.

Table 4.44

Tests of univariate normality for item parcels

Variable	Skewness		Kurtosis		Skewness & Kurtosis	
	z-Score	P-Value	Z-Score	P-Value	Chi-Square	P-Value
PA1	-1.428	.153	0.724	.469	2.564	.278
PA2	-3.812	.000	1.913	.056	18.189	.000
PA3	-0.318	.751	0.728	.467	0.630	.730
PB1	-2.356	.018	-3.346	.001	16.750	.000
PB2	-3.559	.000	0.272	.786	12.739	.002
PB3	-3.159	.002	-0.536	.592	10.268	.006
PC1	-1.199	.230	-0.160	.873	1.464	.481
PC2	0.810	.418	-2.300	.021	5.946	.051
PC3	-0.151	.880	1.107	.268	1.249	.536
PC4	-1.830	.067	0.172	.863	3.380	.185
PD1	-1.563	.118	-1.246	.213	3.995	.136
PD2	0.766	.444	-0.284	.776	0.668	.716
PD3	-0.903	.367	-0.956	.339	1.729	.421
PD4	-0.860	.390	-0.142	.887	0.760	.684
PE1	-0.356	.722	-1.762	.078	3.230	.199
PE2	-1.342	.179	-4.610	.000	23.055	.000
PE3	-1.518	.129	-2.447	.014	8.292	.016
PE4	-1.281	.200	-1.217	.224	3.121	.210
PF1	-4.020	.000	1.620	.105	18.789	.000
PF2	-1.728	.084	0.531	.595	3.267	.195
PF3	-1.499	.134	-1.411	.158	4.235	.120
PF4	-1.930	.054	-0.295	.768	3.811	.149
PG1	-2.545	.011	-4.552	.000	27.200	.000
PG2	-1.951	.051	-6.773	.000	49.684	.000
PG3	-1.711	.087	-3.313	.001	13.902	.001
PG4	-2.499	.012	-1.897	.058	9.843	.007
PH1	-2.470	.014	1.301	.193	7.794	.020
PH2	0.679	.497	-3.120	.002	10.192	.006
PH3	0.196	.845	-1.274	.203	1.661	.436
PH4	-0.944	.345	-0.755	.450	1.461	.482
PI1	0.701	.483	-4.250	.000	18.551	.000
PI2	0.232	.816	-3.302	.001	10.960	.004
PI3	0.182	.856	-0.359	.719	0.162	.922
PI4	-1.637	.102	0.029	.977	2.681	.262
PJ1	-4.112	.000	1.578	.114	19.402	.000
PJ2	-2.908	.004	-0.628	.530	8.853	.012
PJ3	-4.865	.000	2.007	.045	27.700	.000
PJ4	-5.243	.000	2.138	.033	32.057	.000
PJ5	-2.712	.007	2.939	.003	15.994	.000
PK1	-2.467	.014	-1.799	.072	9.321	.009
PK2	-2.639	.008	-2.887	.004	15.300	.000
PK3	-2.389	.017	-2.867	.004	13.927	.001
PL1	-3.845	.000	1.242	.214	16.327	.000
PL2	-2.070	.038	-0.907	.364	5.107	.078
PL3	-2.993	.003	0.386	.700	9.105	.011
PL4	-1.771	.077	-0.281	.779	3.216	.200

The null hypothesis of multivariate normality was also rejected (p > .05)

Table 4.45

Test of multivariate normality for item parcels

Skewness			Kurtosis			Skewness & Kurtosis	
Value	Z-Score	P-Value	Value	Z-Score	P-Value	Chi-Square	P-Value
881.018	53.291	.000	2618.016	18.341	.000	3176.338	.000

PRELIS was consequently used to attempt to normalise the indicator variable distribution. Although the attempt at normalisation had the effect of achieving univariate normality in each of the individual indicator variable distributions, the null hypothesis of multivariate normality still had to be rejected for the multivariate indicator variable distribution (Table 4.46). Robust maximum likelihood estimation was consequently used to estimate the freed measurement model parameters. Since the attempt at normalisation marginally improved the deviation of the observed multivariate distribution from the theoretical multivariate normal distribution as reflected in the chi-square statistics, the normalised data was used to fit the measurement model.

Table 4.46

Test of multivariate normality (after normalisation)

Skewness			Kurtosis			Skewness & Kurtosis	
Value	Z-Score	P-Value	Value	Z-Score	P-Value	Chi-Square	P-Value
879.453	53.094	.000	2615.003	18.284	.000	3153.283	.000

4.5.3 ASSESSING OVERALL GOODNESS-OF-FIT OF THE FIRST-ORDER MEASUREMENT MODEL

In Chapter 3, the measurement model was presented that illustrates the design of the GPQ. This model illustrates how item parcels of sub-scales should load on their underlying performance dimension. The confirmatory factor model was fitted by analyzing the covariance matrix calculated from the GPQ item parcel data set containing 199 observations. Structural equation modeling (LISREL 8.8) was used to test the hypothesis that the measurement model explains the observed covariance matrix. The output of the confirmatory factor analysis is shown in Appendix B3 on the enclosed CD.

The exact fit null hypothesis was tested that the measurement model is able to reproduce the observed covariance matrix to an extent of accuracy that could be explained in terms of sampling error only:

H_{01}: RMSEA = 0

H_{a1}: RMSEA > 0

The following close fit null hypothesis was also tested (Browne & Cudeck, 1993):

H_{02}: RMSEA ≤ .05

H_{a2}: RMSEA > .05

PRELIS was used to fit the model by analyzing the covariance matrix calculated from the item parcel data set. Item parcels were treated as continuous variables. A final solution of parameter estimates for the GPQ measurement model was produced through robust maximum likelihood estimation after seventeen iterations.

The following table (Table 4.47) represents the full array of fit statistics calculated by LISREL to assess the absolute and comparative fit of the measurement model. The purpose of this section is to assess the goodness of fit of the measurement model. According to Bollen and Long (1993), Schumacker and Lomax (1996), Diamantopoulos and Siguaw (2000), Thompson and Daniel (1996) and Thompson (1997) a final decision should not be based on any single indicator of fit. Rather it is proposed that an integrated judgment on the model fit should be made by taking all the fit indices into consideration.

In evaluating model fit, the above mentioned fit indices were combined with an evaluation of the magnitude and distribution of the standardized residuals and an evaluation of the number of large modification indices calculated for the factor loading matrix.

If adequate model fit is obtained the interpretation of the measurement model parameter estimates will be permissible. Specifically the magnitude and significance of the lambda factor loading estimates will be interpreted, the magnitude and significance of the theta-delta error variance estimates and the proportion of variance explained in the indicator variables by the latent variable(s) they represent.

Table 4.47

Goodness-of-fit statistics

Degrees of Freedom	923
Minimum Fit Function Chi-Square	1554.172 (P = .0)
Normal Theory Weighted Least Squares Chi-Square	1432.858 (P = .0)
Satorra-Bentler Scaled Chi-Square	1070.862 (P = .000504)
Estimated Non-centrality Parameter (NCP)	147.862
90 Percent Confidence Interval for NCP	(70.768 ; 233.222)
Minimum Fit Function Value	7.849
Population Discrepancy Function Value (F0)	.747
90 Percent Confidence Interval for F0	(.357 ; 1.178)
Root Mean Square Error of Approximation (RMSEA)	.0284
90 Percent Confidence Interval for RMSEA	(.0197 ; .0357)
P-Value for Test of Close Fit (RMSEA < 0.05)	1.00
Expected Cross-Validation Index (ECVI)	7.004
90 Percent Confidence Interval for ECVI	(6.615 ; 7.435)
ECVI for Saturated Model	10.919
ECVI for Independence Model	193.753
Chi-Square for Independence Model with 1035 Degrees of Freedom	38271.191
Independence AIC	38363.191
Model AIC	1386.862
Saturated AIC	2162.000
Independence CAIC	38560.683
Model CAIC	2065.204
Saturated CAIC	6803.063
Normed Fit Index (NFI)	.972
Parsimony Normed Fit Index (PNFI)	.867
Comparative Fit Index (CFI)	.996
Incremental Fit Index (IFI)	.996
Relative Fit Index (RFI)	.969
Critical N (CN)	190.687
Root Mean Square Residual (RMR)	.0364
Standardized RMR	.0487
Goodness of Fit Index (GFI)	.761
Adjusted Goodness of Fit Index (AGFI)	.720
Parsimony Goodness of Fit Index (PGFI)	.649

To determine the adequacy of the model and thereby the success with which the GPQ measures the 12 latent performance dimensions in the manner it was designed to do, multiple criteria (theoretical, statistical and practical criteria) should be taken into account (Byrne, 1989). Failure to take these criteria into consideration could result into:

- deficient representation of goodness of fit
- selection of indices based on value rather than theory
- Inability to cross-validate results as a result of undesirable characteristics of the reported fit indices.

Taken these considerations into account, a basket of multiple criteria was used to evaluate the measurement model.

4.5.3.1 Model fit indices interpretation

The Satorra-Bentler chi-square value comes to 1070.862 with 923 degrees of freedom (calculated as ½k(k + 1)-t, where k is the number of observed variables and t is the number of parameters to be estimated) reflecting a significant result (p < .01), indicating that the model is not adequate (Kaplan, 2000).

The hypothesis of exact model fit is therefore rejected (H_{01}: RMSEA = 0). The rejected null hypothesis indicates that the first-order measurement model is unable to reproduce the observed covariance matrix in the sample to such a degree of accuracy that the difference between the observed sample covariance matrix and the reproduced sample covariance matrix can be explained in terms of sampling error only. Due to the chi-square statistic's sensitivity to sample size and to deviations from multivariate normality as well as the somewhat idealistic nature of the hypothesis that the model fits the population perfectly, the chi-square statistic should rather be interpreted as a goodness (or badness) of fit measure (Kaplan, 2000). Large χ^2-values correspond to bad fit and small values to good fit.

Diamantopoulos and Siguaw (2000) recommend assessing the degree of lack of fit of the model through the estimation of the non-centrality parameter. Treating the chi-square statistic as a badness-of-fit measure by expressing the minimum fit function chi-square estimate in terms of the degrees of freedom (χ^2/df = 1.68), indicates that the measurement model reflect acceptable fit (Theron & Spangenberg, 2004). Values for the normed chi-square statistic between 2 and 5 are regarded as indicative of good fit (Kelloway, 1998).

Values less than 2 have been interpreted as indicating over-fitting. When viewed from these perspectives the model can be seen to fit the data well, or, when viewed somewhat negatively, be seen to have been over-fitted. Guidelines indicating good fit should be interpreted with caution as the researcher's personal modeling experience play a role. Relying on normed chi-square should also be done with caution (Kelloway, 1998).

If it were assumed that the first- order measurement model only approximates the processes that operated in reality to create the observed covariance matrix, the χ^2 test statistic would follow a non-central χ^2 distribution with a non-centrality parameter, λ. The estimated λ value (147.862) reflects the estimated discrepancy between the observed (Σ) and the estimated population covariance ($\hat{\Sigma}$) matrices (Diamantopoulos and Siguaw, 2000).

The first order measurement model was fitted by minimizing a fit function that compares the observed sample covariance matrix (S) to the reproduced sample covariance matrix ($\hat{S}$) derived from the model parameter estimates (Jöreskog & Sörbom, 1996a; Spangenberg & Theron, 2004). Model fit is reflected by the extent to which the minimum fit function value (7.849) approaches zero. The estimated population discrepancy function value (F_0) reflects the extent to which the observed population covariance matrix (Σ) is estimated to differ from the reproduced population covariance ($\hat{\Sigma}$) resulting from the parameters minimizing the selected discrepancy function fitting the model on Σ (Browne & Cudeck, 1993). F_0 -value for this model is a low .747 with confidence interval limits of .357 and 1.178. Exact model fit would reflect a F_0 –value of zero because the observed population covariance matrix Σ would then have been equal to the estimated population covariance matrix ($\hat{\Sigma}$).

The discrepancy between the observed population covariance matrix and the estimated population covariance matrix implied by the model per degree of freedom is indicated by the root mean square error of approximation (RMSEA). Values under .05 are indications of good model fit, values above .05 but less than .08 indicate a reasonable fit. Values greater than .08 but smaller than .1 indicate a mediocre model fit, where values greater

than .1 indicate a poor fit (Browne & Cudeck, 1993; Diamantopoulos & Siguaw, 2000). According to Diamantopoulos and Siguaw (2000) RMSEA is one of the most informative fit indices. It is calculated as follows: $(F_0/df)^{1/2}$, where F_0 is the population discrepancy function value and df represents the degrees of freedom. A value of zero in this case would indicate the absence of discrepancy and would entail a perfect model fit (Mulaik & Millsap, 2000). In the case of the GPQ results, the RMSEA value of .0284 signifies a very good fit of the measurement model. The 90 percent confidence interval for RMSEA (.0197 - .0357) also indicates a good fit in that the upper limit of the confidence interval does not include the critical cutoff value of .05. The fact that the confidence interval falls below the critical cut off value of .05 implies that the null hypothesis of close fit will not be rejected. LISREL explicitly tests close fit in the population by testing H_{02}: RMSEA $\leq$ .05 against H_{a2}: RMSEA > .05. The probability of observing a sample RMSEA value of .0284 under H_{02} is sufficiently larger (1.00) than the critical p-value of .05. This means that H_{02} is not rejected (p > .05).

The non-centrality parameter (λ) and the RMSEA focuses on error as a result of approximation (difference between Σ and $\hat{\Sigma}$). The expected cross-validation index (ECVI) focuses on overall error (discrepancy between the reproduced sample covariance matrix (Ŝ) and the expected covariance matrix obtained in the independent sample) (Byrne, 1989; Spangenberg & Theron, 2004). According to Diamantopoulos and Siguaw (2000) ECVI is a very good indicator of overall model fit. In this study, the ECVI (7.004) is smaller than the value for the independence or null model (193.753) as well as the value related to the saturated model (10.919). These values indicate a positive model fit, indicating that the fitted model would have a better chance of being replicated in a cross-validation sample than the saturated model or the independence model. These assumptions are made according to the statement that smaller values on this index indicates a more parsimonious fit (Kelloway, 1998).

Model fit can be improved by adding more paths to the model and estimating more parameters until a perfect fit is attained in the form of a saturated or just-identified model with no degrees of freedom (Spangenberg & Theron, 2004). Davidson (2000) also explains

that increasing the parameters in a model will lead to a better fit. The purpose of this study is however to achieve satisfactory fit with the least amount of model parameters.

Evaluating the values of the Akaike information criterion (AIC = 38363.191) indicates a more parsimonious model fit than the independent/null model (1386.862) and the saturated model (2162.000) as smaller values on these indices reflects a more parsimonious model (Kelloway, 1998; Spangenberg & Theron, 2004). The values for consistent Akaike information criterion (CAIC = 38560.683) in the same way indicates a more parsimonious fit due to smaller values in the independent/null model (2065.204) and the saturated model (6803.063). Small values indicates a parsimonious fit, a clear definition of "small" in this case however is not available.

Comparative fit statistics in LISREL shows good model fit relative to that of the independence model. The normed fit index (NFI = .972), the non-normed fit index (NNFI = .996), the comparative fit index (CFI = .996), the incremental fit index (IFI = .996) all indicates good fit (Bentler, 1990; Bentler & Bonnett, 1980; Kelloway, 1998; Spangenberg & Theron, 2004). Values exceeding .90 are considered indicative of good fit (Diamantopoulos & Sigauw, 2000).

The critical sample size statistic (CN) reflects the size of the sample that would have made the minimum fit function χ^2 statistic just significant at the .05 significance level. The estimated CN value (190.687) is close to the recommended value of 200 that serves as an indication of a satisfactory representation of the data (Diamantopoulos & Siguaw, 2000). This proposed threshold should be used with caution (Spangenberg & Theron, 2004).

The root mean square residual (RMR = .0364) signifies the average value of the residual matrix (S-Ŝ), and the standardized RMR (.0487) represents the fitted residual divided by their estimated standard errors. These values also signify good model fit. A value under .05 for the standardized RMR indicates good model fit. Complexities in interpretation of fitted residual (RMR statistic) could occur due to the fact that their magnitude varies with the unit of measurement. This can be avoided by concentrating on the standardized residuals. Each standardized residual could then be interpreted as standard normal deviate

and considered "large" if it is greater than 2.58 in absolute value (Diamantopoulos & Siguaw, 2000).

The goodness-of-fit index (GFI) is an indication of the relative amount of variances and covariances explained by the model (Diamantopoulos & Siguaw, 2000). The adjusted goodness-of-fit index (AGFI) and the parsimony goodness-of-fit index (PGFI) illustrate the degree to which the reproduced sample covariance matrix recovered the observed sample covariance matrix (Diamantopoulos & Siguaw, 2000). The AGFI adjusts the GFI for the degrees of freedom in the model while the PGFI uses model complexity to make adjustments (Diamantopoulos & Siguaw, 2000; Jöreskog & Sörbom, 1996a; Kelloway, 1998). These two measures should be between 1 and 0. Values greater than .90, indicate that the model fits the data well. These two values (.720 and .649) portray satisfactory model fit. Guidelines for the interpretation of GFI and AGFI are based on experience and should therefore be done with caution (Kelloway, 1998). Values for the PGFI tends to be conservative, therefore the GFI is generally considered the most reliable measure of absolute fit (Diamantopoulos & Siguaw, 2000).

The results obtained for the abovementioned statistics seems to reflect a good fitting measurement model that clearly outperforms the independence model and the saturated model.

4.5.3.2 Examination of residuals

The shape and distribution of the standardized residuals are shown in Figure 4.1. Standardized residuals can be interpreted as standard normal deviates. A standardized residual with an absolute value greater than 2.58 would be interpreted as large at a 1% significance level (Diamantopoulos & Siguaw, 2000). Large standardized residuals are an indication of covariance (or the lack of covariance) between indicator variables that the model fails to explain. Large positive residuals reflect a model that underestimates the covariance terms between specific observed variables. The model can therefore be improved by adding paths to the model. Large negative residuals are an indication that the model over-estimates the covariance between specific observed variables. To rectify this

problem, paths associated with the indicator variables can be removed (Diamantapoulos & Siguaw, 2000; Kelloway, 1998). The stem-and-leaf plot in Figure 4.1 seems to be slightly positively skewed.

```
-16|7
-14|
-12|
-10|6
- 8|31
- 6|575
- 4|543100
- 2|99887755433332100999999988766655555554444333333222222222111111100000000
- 0|999999999888888888877777777776666666666665555555555555555555555444444444+96
  0|111111111111111111111111111111122222222222222222222222222222333333333333333+94
  2|00001111111111111111222223333333334444455556677788889999990112223348999
  4|0112237022279
  6|9
  8|82
 10|
 12|
 14|
 16|1
```

Figure 4.1. Stem and leaf plot of the standardized residuals

Figure 4.1 shows the smallest (-16.701) and the largest (17.113) standardized residual with 42 large negative standardized residuals and 43 large positive standardized residuals. The total number of large residuals expressed as a percentage of the total number of unique elements in the observed variance-covariance matrix is 7.9% ((85/1081)*100) which can be considered small. The small percentage of unique variance and covariance terms that are poorly estimated by the fitted measurement model implies good model fit.

The slight deviation from the 45˚-reference line in the Q-plot reflected in Figure 4.2 provides an alternative picture of the same trend shown in Figure 4.1 and again points to good model fit.

4.5.3.3 Model modification indices

Breckler (1990) indicates that theoretical models often do not provide an adequate fit to the data. He suggests modifications to model that can be used to improve fit. The following options are available:
- Changing factor loadings (λ) from fixed to free or vice versa,
- Allowing for or constraining correlations among measurement errors (δ), and

- Allowing for or constraining correlations among the exogenous latent variables (ξ)

```
          3.5..............................................................
             .                                                        ..
             .                                                       . .
             .                                                   .   .
             .                                              .       x
             .                                            .        x
             .                                          .         *
             .                                        .          x
             .                                                  *
             .                                      .        xxx*
             .                                    .        xx**  .
             .                                          x***x   .
             .                                        ****     .
             .                                  .   xx*x       .
        N    .                                .    *x**        .
        o    .                              .    *x**          .
        r    .                            . xx*                .
        m    .                            . x**                .
        a    .                          .x***                 .
        l    .                        ***                     .
             .                      xxx                       .
        Q    .                     *xx                        .
        u    .                    xxx*                        .
        a    .                   x**                          .
        n    .                  ***                           .
        t    .                x***.                           .
        i    .               **x .                            .
        l    .              xx* .                             .
        e    .            x*    .                             .
        s    .          x*x*x  .                              .
             .         *xxx   .                               .
             .       x**x      .                              .
             .     xxx*x       .                              .
             .   xx*xx        .                               .
           *x*              .                                 .
             *            .                                   .
           x            .                                     .
           *           .                                      .
           x         .                                        .
           x        .                                         .
             .    .                                           .
             ..  .                                            .
          -3.5...........................................................
          -3.5                                               3.5
                         Standardized Residuals
```
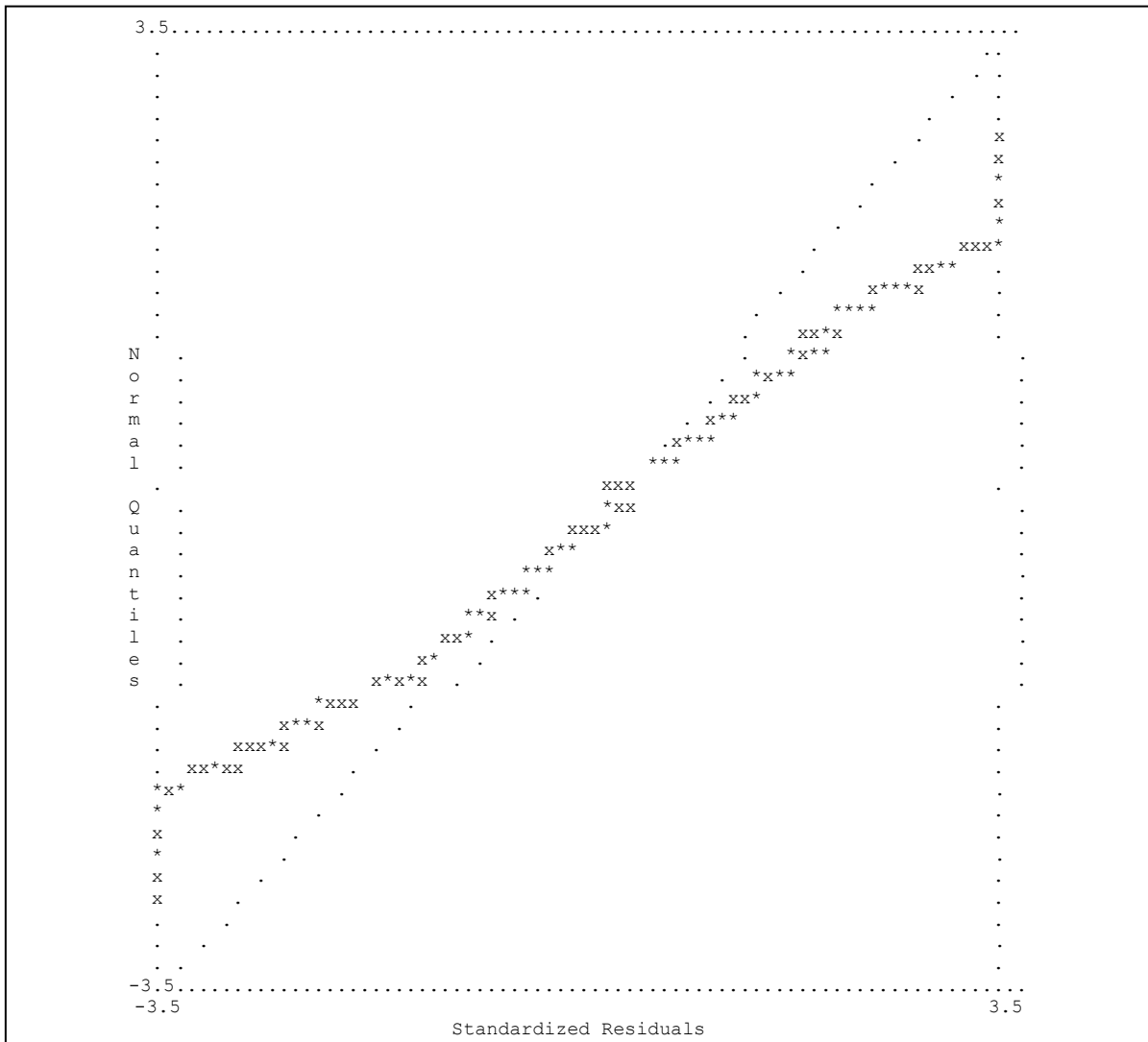
Figure 4.2. Q-plot of standardized residuals

In using these measures to improve model fit, Breckler (1990) cautions that there is no guarantee that this process will lead to the population model. It is also not clear which paths improves parsimonious fit of the model. The results of the modification model should be interpreted with caution and in conjunction with cross-validation (Breckler, 1990; Browne & Cudeck, 1993).

LISREL calculates the modification indices and estimates the decrease that should be found in the (normal theory) χ^2 statistic when the current fixed parameters are set free and the

model is re-estimated. Chi-square values exceeding 6.6349 indicate parameters that would statistically significantly improve the fit of the model when they are freed (p < .01). Modification indices calculated for the factor loading matrix (Λ_x) identify 33 additional paths that will have a significant positive impact on model fit. Therefore only 33 out of 506 (6.5%) possible additions to Λ_x will result into an improved model fit (p < .01). The small percentage of large modification index values obtained for Λ_x comments favourably on the fit of the model. Modification indices calculated for the theta-delta matrix (Θ_δ) reveal 47 covariance terms that will have a significant positive impact on model fit. Therefore allowing for 47 out of 1035 possible covariance terms in Θ_δ to be freed (4.5%) will result into an improved model fit (p < .01). The small percentage of large modification index values obtained for Θ_δ also comments favourably on the fit of the model.

4.5.4   EVALUATION OF THE FIRST-ORDER FACTOR MODEL

The unstandardised factor loading matrix (Λ_x) reflects the slope of the regression of the unstandardised item parcels X_j on the unstandardised latent performance dimensions ξ. The unstandardised factor loading matrix (Table 4.48) was used to determine the statistical significance of the first-order factor loadings hypothesized by the proposed measurement model represented by Equation 1. Inspection of Table 4.48 indicates that all the freed first-order factor loadings are significant (p < .05). All 46 null hypotheses H_{0i}: $\lambda_{jk} = 0$; i = 3,4,..., 45; j = 1,2....46; k = 1,2.....12 can therefore be rejected in favour of H_{a1}: $\lambda_{jk} \neq 0$; i = 3,4,..., 45; j = 1,2....46; k = 1,2.....12. All item parcels therefore reflect the performance dimension they were intended to measure.

Table 4.48

Unstandardized factor loading matrix

	Task Perfor	Effort	Adapt	Innovate	Lead Pot	Communi
PA1	.598[*]	-	-	-	-	-
	(.050)	-	-	-	-	-
	12.049	-	-	-	-	-
PA2	.501	-	-	-	-	-
	(.051)	-	-	-	-	-
	9.736	-	-	-	-	-

153

PA3	.492	-	-	-	-	-
	(.054)	-	-	-	-	-
	9.127	-	-	-	-	-
PB1	-	.622	-	-	-	-
	-	(.051)	-	-	-	-
	-	12.182	-	-	-	-
PB2	-	.637	-	-	-	-
	-	(.041)	-	-	-	-
	-	15.468	-	-	-	-
PB3	-	.622	-	-	-	-
	-	(.049)	-	-	-	-
	-	12.696	-	-	-	-
PC1	-	-	.635	-	-	-
	-	-	(.061)	-	-	-
	-	-	10.360	-	-	-
PC2	-	-	.735	-	-	-
	-	-	(.063)	-	-	-
	-	-	11.579	-	-	-
PC3	-	-	.597	-	-	-
	-	-	(.058)	-	-	-
	-	-	10.359	-	-	-
PC4	-	-	.740	-	-	-
	-	-	(.058)	-	-	-
	-	-	12.741	-	-	-
PD1	-	-	-	650	-	-
	-	-	-	(.050)	-	-
	-	-	-	13.122	-	-
PD2	-	-	-	.664	-	-
	-	-	-	(.055)	-	-
	-	-	-	12.102	-	-
PD3	-	-	-	.654	-	-
	-	-	-	(.053)	-	-
	-	-	-	12.421	-	-
PD4	-	-	-	.660	-	-
	-	-	-	(.051)	-	-
	-	-	-	12.871	-	-
PE1	-	-	-	-	.714	-
	-	-	-	-	(.049)	-
	-	-	-	-	14.694	-
PE2	-	-	-	-	.702	-
	-	-	-	-	(.052)	-
	-	-	-	-	13.493	-
PE3	-	-	-	-	.684	-
	-	-	-	-	(.053)	-
	-	-	-	-	12.849	-
PE4	-	-	-	-	.724	-
	-	-	-	-	(.052)	-
	-	-	-	-	14.037	-
PF1	-	-	-	-	-	.613
	-	-	-	-	-	(.060)
	-	-	-	-	-	10.148
PF2	-	-	-	-	-	.628
	-	-	-	-	-	(.061)
	-	-	-	-	-	10.296

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PF3	-	-	-	-	-	.781
	-	-	-	-	-	(.051)
	-	-	-	-	-	15.179
PF4	-	-	-	-	-	.844
	-	-	-	-	-	(.047)
	-	-	-	-	-	18.047
PG1	-	-	-	-	-	-
PG2	-	-	-	-	-	-
PG3	-	-	-	-	-	-
PG4	-	-	-	-	-	-
PH1	-	-	-	-	-	-
PH2	-	-	-	-	-	-
PH3	-	-	-	-	-	-
PH4	-	-	-	-	-	-
PI1	-	-	-	-	-	-
PI2	-	-	-	-	-	-
PI3	-	-	-	-	-	-
PI4	-	-	-	-	-	-
PJ1	-	-	-	-	-	-
PJ2	-	-	-	-	-	-
PJ3	-	-	-	-	-	-
PJ4	-	-	-	-	-	-
PJ5	-	-	-	-	-	-
PK1	-	-	-	-	-	-
PK2	-	-	-	-	-	-
PK3	-	-	-	-	-	-
PL1	-	-	-	-	-	-
PL2	-	-	-	-	-	-
PL3	-	-	-	-	-	-
PL4	-	-	-	-	-	-
	Inter Re	Managem	Anal Pro	CWB	OCB	Self-Dev
PA1	-	-	-	-	-	-
PA2	-	-	-	-	-	-
PA3	-	-	-	-	-	-
PB1	-	-	-	-	-	-
PB2	-	-	-	-	-	-
PB3	-	-	-	-	-	-
PC1	-	-	-	-	-	-
PC2	-	-	-	-	-	-
PC3	-	-	-	-	-	-
PC4	-	-	-	-	-	-
PD1	-	-	-	-	-	-
PD2	-	-	-	-	-	-

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PD3	-	-	-	-	-	-
PD4	-	-	-	-	-	-
PE1	-	-	-	-	-	-
PE2	-	-	-	-	-	-
PE3	-	-	-	-	-	-
PE4	-	-	-	-	-	-
PF1	-	-	-	-	-	-
PF2	-	-	-	-	-	-
PF3	-	-	-	-	-	-
PF4	-	-	-	-	-	-
PG1	.703 (.041) 17.313	- - -	- - -	- - -	- - -	- - -
PG2	.590 (.044) 13.472	- - -	- - -	- - -	- - -	- - -
PG3	.594 (.045) 13.060	- - -	- - -	- - -	- - -	- - -
PG4	.575 (.050) 11.611	- - -	- - -	- - -	- - -	- - -
PH1	- - -	.763 (.054) 14.094	- - -	- - -	- - -	- - -
PH2	- - -	.712 (.042) 17.050	- - -	- - -	- - -	- - -
PH3	- - -	.662 (0.049) 13.587	- - -	- - -	- - -	- - -
PH4	- - -	.629 (0.054) 11.610	- - -	- - -	- - -	- - -
PI1	- - -	- - -	.627 (.053) 11.808	- - -	- - -	- - -
PI2	- - -	- - -	.619 (.049) 12.525	- - -	- - -	- - -
PI3	- - -	- - -	.781 (.057) 13.728	- - -	- - -	- - -
PI4	- - -	- - -	.701 (.058) 12.114	- - -	- - -	- - -
PJ1	- - -	- - -	- - -	.589 (.057) 10.381	- - -	- - -

PJ2	-	-	-	.648	-	-
	-	-	-	(.045)	-	-
	-	-	-	14.454	-	-
PJ3	-	-	-	.591	-	-
	-	-	-	(.047)	-	-
	-	-	-	12.513	-	-
PJ4	-	-	-	.698	-	-
	-	-	-	(.056)	-	-
	-	-	-	12.570	-	-
PJ5	-	-	-	.767	-	-
	-	-	-	(.059)	-	-
	-	-	-	12.972	-	-
PK1	-	-	-	-	.703	-
	-	-	-	-	(.056)	-
	-	-	-	-	12.625	-
PK2	-	-	-	-	.673	-
	-	-	-	-	(.047)	-
	-	-	-	-	14.267	-
PK3	-	-	-	-	.619	-
	-	-	-	-	(.050)	-
	-	-	-	-	12.429	-
PL1	-	-	-	-	-	.668
	-	-	-	-	-	(.050)
	-	-	-	-	-	13.284
PL2	-	-	-	-	-	.829
	-	-	-	-	-	(.050)
	-	-	-	-	-	16.487
PL3	-	-	-	-	-	.725
	-	-	-	-	-	(.050)
	-	-	-	-	-	14.385
PL4	-	-	-	-	-	.769
	-	-	-	-	-	(.055)
	-	-	-	-	-	13.968

[*] The top value represents the unstandardised λ_{ij} estimate, the second value in brackets the standard error of λ_{ij} and the third value the test statistic z.

The completely standardized factor loading matrix (Λ_x) reflects the slope of the regression of the standardised item parcels X_j on the standardised latent performance dimensions ξ_i. The completely standardised factor loading matrix (Table 4.49) was used to determine the magnitude of the first-order factor loadings hypothesized by the proposed measurement model represented by Equation 1.

Table 4.49

Completely standardized factor loading matrix

	Task Perfor	Effort	Adapt	Innovate	Lead Pot	Communi
PA1	.744	-	-	-	-	-
PA2	.683	-	-	-	-	-

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PA3	.624	-	-	-	-	-
PB1	-	.770	-	-	-	-
PB2	-	.871	-	-	-	-
PB3	-	.762	-	-	-	-
PC1	-	-	.698	-	-	-
PC2	-	-	.755	-	-	-
PC3	-	-	.725	-	-	-
PC4	-	-	.739	-	-	-
PD1	-	-	-	.767	-	-
PD2	-	-	-	.740	-	-
PD3	-	-	-	.731	-	-
PD4	-	-	-	.787	-	-
PE1	-	-	-	-	.712	-
PE2	-	-	-	-	.793	-
PE3	-	-	-	-	.744	-
PE4	-	-	-	-	.781	-
PF1	-	-	-	-	-	.661
PF2	-	-	-	-	-	.731
PF3	-	-	-	-	-	.838
PF4	-	-	-	-	-	.874
PG1	-	-	-	-	-	-
PG2	-	-	-	-	-	-
PG3	-	-	-	-	-	-
PG4	-	-	-	-	-	-
PH1	-	-	-	-	-	-
PH2	-	-	-	-	-	-
PH3	-	-	-	-	-	-
PH4	-	-	-	-	-	-
PI1	-	-	-	-	-	-
PI2	-	-	-	-	-	-
PI3	-	-	-	-	-	-
PI4	-	-	-	-	-	-
PJ1	-	-	-	-	-	-
PJ2	-	-	-	-	-	-
PJ3	-	-	-	-	-	-
PJ4	-	-	-	-	-	-
PJ5	-	-	-	-	-	-
PK1	-	-	-	-	-	-
PK2	-	-	-	-	-	-
PK3	-	-	-	-	-	-
PL1	-	-	-	-	-	-
PL2	-	-	-	-	-	-
PL3	-	-	-	-	-	-
PL4	-	-	-	-	-	-
	Inter Re	Managem	Anal Pro	CWB	OCB	Self-Dev
PA1	-	-	-	-	-	-
PA2	-	-	-	-	-	-
PA3	-	-	-	-	-	-
PB1	-	-	-	-	-	-
PB2	-	-	-	-	-	-
PB3	-	-	-	-	-	-
PC1	-	-	-	-	-	-
PC2	-	-	-	-	-	-
PC3	-	-	-	-	-	-

PC4	-	-	-	-	-	-
PD1	-	-	-	-	-	-
PD2	-	-	-	-	-	-
PD3	-	-	-	-	-	-
PD4	-	-	-	-	-	-
PE1	-	-	-	-	-	-
PE2	-	-	-	-	-	-
PE3	-	-	-	-	-	-
PE4	-	-	-	-	-	-
PF1	-	-	-	-	-	
PF2	-	-	-	-	-	
PF3	-	-	-	-	-	-
PF4	-	-	-	-	-	-
PG1	.864	-	-	-	-	-
PG2	.730	-	-	-	-	-
PG3	.727	-	-	-	-	-
PG4	.742	-	-	-	-	-
PH1	-	.818	-	-	-	-
PH2	-	.831	-	-	-	-
PH3	-	.795	-	-	-	-
PH4	-	.752	-	-	-	-
PI1	-	-	.748	-	-	-
PI2	-	-	.745	-	-	-
PI3	-	-	.800	-	-	-
PI4	-	-	.775	-	-	-
PJ1	-	-	-	.745	-	-
PJ2	-	-	-	.813	-	-
PJ3	-	-	-	.769	-	-
PJ4	-	-	-	.807	-	-
PJ5	-	-	-	.764	-	-
PK1	-	-	-	-	.796	-
PK2	-	-	-	-	.836	-
PK3	-	-	-	-	.744	-
PL1	-	-	-	-	-	.813
PL2	-	-	-	-	-	.880
PL3						.854
PL4	-	-	-	-	-	.797

Most of the loadings in the factor loading matrix exceed the critical value of 0.71 suggested by Hair et al. (2006). Four item parcels have loadings lower than this cut-off value but still higher than .60. The item parcels therefore generally do represent the latent performance dimension that they were designed to reflect acceptably well. The fact that the item parcels all load well to reasonably well on each of the latent performance dimensions they were tasked to represent does not, however, necessarily mean that all the items comprising the parcel also represent the latent variable well. Poor items could be hiding in the item parcel. Although this effect is minimised in this study through the small number of items included in each item this fact nonetheless precludes a really confident verdict on the

success with which the individual items comprising the GPQ performed the task that was assigned to them during the design and development of the instrument.

The squared completely standardised factor loadings indicate the squared multiple regression when regressing the standardised item parcel on the standardised latent variable it was earmarked to represent. The R^2 values for the item parcels are shown in table 4.50.

Table 4.50

Squared multiple correlations for item parcels

PA1	PA2	PA3	PB1	PB2	PB3
.554	.467	.389	.593	.759	.581
PC1	PC2	PC3	PC4	PD1	PD2
.488	.570	.526	.546	.588	.547
PD3	PD4	PE1	PE2	PE3	PE4
.534	.620	.506	.628	.554	.609
PF1	PF2	PF3	PF4	PG1	PG2
.436	.535	.703	.764	.747	.532
PG3	PG4	PH1	PH2	PH3	PH4
.529	.551	.670	.690	.632	.566
PI1	PI2	PI3	PI4	PJ1	PJ2
.559	.555	.640	.601	.555	.661
PJ3	PJ4	PJ5	PK1	PK2	PK3
.591	.651	.583	.634	.699	.553
PL1	PL2	PL3	PL4		
.661	.774	.730	.635		

Spangenberg and Theron (2004) explain the total variance in the ith item parcel (X_i) could be the result of the following:

- Variance in the latent variable the item set was meant to reflect (ξ_i)
- Variance due to variance in the other systematic latent effects the item parcel was not designed to reflect, and
- Variance due to random measurement error.

The R² values shown in Table 4.50 reflect the proportion of variance in the item parcel that can be explained in terms of the variance in the latent variable it was tasked to reflect. Hair et al.'s (2006) critical factor loading of .71 implies a critical R² value of .50. In the case of only four item parcels the latent variable of interest explain less than 50% of the variance in the item parcel.

The unstandardised measurement error variances for the item parcels are reflected in Table 4.51 and the completely standardised measurement error variances in Table 4.52

Table 4.51

Unstandardized measurement error variances

PA1	PA2	PA3	PB1	PB2	PB3
.288[*]	.286	.379	.266	.129	.279
(.048)	(.046)	(.047)	(.032)	(.023)	(.036)
6.031	6.167	8.103	8.426	5.711	7.709
PC1	PC2	PC3	PC4	PD1	PD2
0.423	.408	.321	.456	.296	.365
(.052)	(.041)	(.040)	(.056)	(.035)	(.050)
8.101	9.860	7.992	8.182	8.362	7.358
PD3	PD4	PE1	PE2	PE3	PE4
.373	.267	.497	.291	0377	.336
(.058)	(.035)	(.073)	(.039)	(.061)	(.057)
6.400	7.546	6.834	7.568	6.215	5.860
PF1	PF2	PF3	PF4	PG1	PG2
.485	.342	.258	.220	.168	.306
(.079)	(.051)	(.045)	(.052)	(.036)	(.063)
6.148	6.682	5.774	4.206	4.714	4.872
PG3	PG4	PH1	PH2	PH3	PH4
.314	.270	.287	.228	.255	.304
(.043)	(.055)	(.037)	(.036)	(.052)	(.044)
7.258	4.942	7.707	6.405	4.892	6.923
PI1	PI2	PI3	PI4	PJ1	PJ2
.310	.308	.342	.326	.279	.215
(.050)	(.054)	(.044)	(.052)	(.049)	(.044)
6.163	5.711	7.843	6.239	5.653	4.940
PJ3	PJ4	PJ5	PK1	PK2	PK3
.241	.262	.420	.286	.195	.309
(.036)	(.041)	(.070)	(.057)	(.035)	(.052)
6.654	6.415	5.976	5.039	5.518	5.954
PL1	PL2	PL3	PL4		
.228	.201	.194	.340		
(.029)	(.039)	(.030)	(.054)		
7.898	5.144	6.579	6.290		

[*] The top value represents the unstandardised $\theta_{\delta j}$ estimate, the second value in brackets the standard error of $\theta_{\delta j}$ and the third value the test statistic z.

The 12 latent performance dimensions constituting the generic non-managerial performance domain as defined by the GPQ are expected to correlate. Since the 12 latent performance dimensions are seen as 12 qualitatively distinct although related dimensions of performance they should, however, not correlate excessively high with each other. The latent variable inter-correlations are shown in the phi matrix in Table 4.53.

Table 4.52

Completely standardised measurement error variances

PA1	PA2	PA3	PB1	PB2	PB3
.446	.533	.611	.407	.241	.419
PC1	PC2	PC3	PC4	PD1	PD2
.512	.430	.474	.454	.412	.453
PD3	PD4	PE1	PE2	PE3	PE4
.466	.380	.494	.372	.446	.391
PF1	PF2	PF3	PF4	PG1	PG2
.564	.465	.297	.236	.253	.468
PG3	PG4	PH1	PH2	PH3	PH4
.471	.449	.330	.310	.368	.434
PI1	PI2	PI3	PI4	PJ1	PJ2
.441	.445	.360	.399	.445	.339
PJ3	PJ4	PJ5	PK1	PK2	PK3
.409	.349	.417	.366	.301	.447
PL1	PL2	PL3	PL4		
.339	.226	.270	.365		

All the inter-latent variables are statistically significant ($p < .05$). Correlations are considered excessively high in this study if they exceed a value of .90. Judged by this criterion none of the correlations in the phi matrix are excessively high. Seven of the 66 inter-latent variable correlations exceed .80 but fall below .88.

Table 4.53

Phi matrix

	Task Per	Effort	Adapt	Innovate	Lead Pot	Communi
Task Per	1.000					
Effort	.832* (.049) 17.063	1.000				
Adapt	.792 .056) 14.041	.688 (.059) 11.714	1.000			
Innovate	.785 (.056) 13.924	.682 (.054) 12.676	.837 (.035) 23.754	1.000		

Lead Pot	.742 (.055) 13.394	.714 (.048) 14.814	.662 (.060) 11.093	.804 (.048) 16.588	1.000	
Communi	.728 (.049) 14.708	.656 (.057) 11.552	.690 (.053) 13.111	.743 (.053) 13.922	.712 (.058) 12.357	1.000
Inter Re	.765 (.053) 14.463	.786 (.042) 18.857	.585 (.059) 9.900	.654 (.055) 11.906	.810 (.040) 20.396	.686 (.050) 13.774
Managem	.749 (.057) 13.177	.738 (.047) 15.841	.793 (.040) 19.832	.749 (.046) 16.294	.797 (.051) 15.776	.736 (.044) 16.742
Anal Pro	.746 (.053) 14.048	.673 (.056) 12.029	.736 (.048) 15.450	.791 (.051) 15.434	.766 (.057) 13.363	.822 (.040) 20.413
CWB	.629 (.064) 9.762	.618 (.064) 9.591	.526 (.070) 7.545	.508 (.069) 7.316	.604 (.066) 9.099	.510 (.070) 7.272
OCB	.692 (.060) 11.515	.675 (.058) 11.608	.590 (.062) 9.504	.581 (.067) 8.690	.731 (.060) 12.155	.616 (.060) 10.321
Self-Dev	.546 (.075) 7.302	.550 (.072) 7.667	.475 (.077) 6.146	.542 (.065) 8.379	.597 (.064) 9.363	.586 (.069) 8.464
	Inter Re	Managem	Anal Pro	CWB	OCB	Self-Dev
Inter Re	1.000					
Managem	.783 (.041) 18.956	1.000				
Anal Pro	.683 (.056) 12.142	.877 (0.034) 25.656	1.000			
CWB	.739 (.071) 10.397	.705 (0.063) 11.199	.686 (.062) 11.098	1.000		
OCB	.752 (.063) 11.906	.730 (.055) 13.199	.757 (.054) 13.931	.832 (.040) 20.674	1.000	
Self-Dev	.544 (.072) 7.608	.656 (.063) 10.468	.650 (0.061) 10.653	.657 (.060) 10.993	.648 (.074) 8.769	1.000

[*] The top value represents the unstandardised φ_{ij} estimate, the second value in brackets the standard error of φ_{ij} and the third value the test statistic z.

4.5.5 DISCRIMINANT VALIDITY

The absence of excessively high correlations between the latent variables in the phi matrix is, however, not very strong evidence of discriminant validity. The possibility that latent performance dimensions might correlate unity in the parameter but correlate less than unity in the statistic because of sampling error still exists. To examine this possibility a

95% confidence interval was calculated for each sample estimate in Φ utilising an Excel macro developed by Scientific Software International (Mels, 2010). If any confidence interval includes the value 1 it would imply that the null hypothesis $H_{0i}: \rho = 1$ cannot be rejected. Confidence in the claim that the two latent performance dimensions are unique, qualitatively distinct dimensions of the performance construct would thereby be seriously eroded.

The 95% confidence intervals for the 66 inter-latent variable correlations are shown in Table 4.54. None of the 66 confidence intervals include unity although 2 intervals include the value (.90) earlier considered to be a critical value for excessively large correlations. The discriminant validity of the GPQ dimension measures is thereby indicated.

The 12 latent performance dimensions correlate to some degree as indicated in Table 4.53. None of these correlations are considered excessively large. It can moreover with 95% confidence be concluded that none of the correlations in the parameter are equal to 1. Each latent performance dimension is represented by 2 - 4 item parcels. The average variance extracted (AVE[15]) reflects the average proportion of variance in the indicator variables that is accounted for by the latent variable that the indicator variables were tasked to represent (Diamantopoulos & Sigauw, 2000). Farrell (2010) argues that the average variance extracted should be greater than .50 and should be greater than the squared correlation between the latent variables. His argument is that the latent variable should account for more variance in the indicators that were tasked to represent the latent variable than measurement variance. Secondly the argument is that the latent variable should account for more variance in the indicator variables that it was tasked to reflect.

The squared correlations between the latent performance dimensions as well as the average variance extracted for each latent performance dimension are shown in Table 4.55. Table 4.55 shows that the AVE values for *Task performance* and *Effort exerted* are problematic in that the two constructs explain less variance in the item parcels representing them than

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[15] The AVE is defined as the average proportion of the variance that a latent variable is able to explain in the indicator variables that were tasked to represent it (Farrell, 2008). The AVE is calculated as $\rho_v = (\Sigma\lambda^2{}_{ij})/(\Sigma\lambda^2{}_{ij} + \Sigma\theta_{\delta i})$ (Diamantopoulos & Sigauw, 2000, p. 91)

measurement error does. The remaining 10 latent performance dimensions meet the criterion that the AVE should exceed .50.

Table 4.54

95% confidence interval for sample phi estimates

	Task Per	Effort	Adapt	Innovate	Lead Pot	Communi	Inter Re	Managem	Anal Pro	CWB	OCB	Self-Dev
Task Per	-											
Effort	.708-.906	-										
Adapt	.654-.879	.554-.787	-									
Innovate	.648-.873	.561-.774	.754-.894	-								
Lead Pot	.614-.832	.607-.796	.528-.764	.688-.880	-							
Communi	.617-.811	.530-.754	.571-.780	.620-.830	.579-.808	-						
Inter Re	.640-.851	.689-.855	.458-.689	.533-.749	.716-.875	.575-.772	-					
Managem	.615-.841	.631-.817	.700-.859	.644-.826	.673-.877	.637-.811	.689-.851	-				
Anal Pro	.623-.833	.548-.769	.627-.817	.668-.872	.629-.857	.726-.886	.557-.778	.791-.929	-			
CWB	.487-.739	.477-.728	.376-.649	.361-.631	.459-.718	.360-.634	.566-.850	.559-.808	.545-.789	-		
OCB	.555-.792	.545-.773	.455-.698	.435-.697	.590-.829	.485-.720	.600-.852	.603-.821	.630-.845	.735-.896	-	
Self-Dev	.383-.676	.394-.675	.311-.612	.402-.657	.457-.708	.435-.705	.388-.670	.515-.763	.514-.754	.523-.759	.479-.771	-

Table 4.55

Squared sample phi estimates and average variance extracted per latent variable

	Task Per	Effort	Adapt	Innovate	Lead Pot	Communi	Inter Re	Managem	Anal Pro	CWB	OCB	Self-Dev	AVE
Task Per	-												.469894
Effort	.692	-											0.644237
Adapt	.627	.473	-										0.488927
Innovate	.616	.465	.701	-									0.514699
Lead Pot	.551	510	.438	.646	-								0.519634
Communi	.530	.430	.476	.552	.507	-							0.525404
Inter Re	.585	.618	.342	.428	.656	.471	-						0.550476
Managem	.561	.545	.629	.561	.635	.542	.613	-					0.601885
Anal Pro	.557	.453	.542	.626	.587	.676	.466	.769	-				0.537756
CWB	.396	.382	.277	.258	.365	.260	.546	.497	.471	-			0.517731
OCB	.479	.456	.348	.338	.534	.379	.566	.533	.573	.692	-		0.628673
Self-Dev	.298	.303	.226	.294	.356	.343	.296	.430	.423	.432	.420	-	0.656938
AVE	0.469894	0.644237	0.488927	0.514699	0.519634	0.525404	0.550476	0.601885	0.537756	0.517731	0.628673	0.656938	

o   AVE < r² for both latent variables   o   AVE < r² for one of the latent variables   o   AVE > r² for both latent variables

Thirty-seven of the squared inter-latent variable correlations (56%) are smaller than both the AVE values associated with the latent variable pairs being correlated. The latent variables involved in these 37 pairs therefore account for more variance in their indicator variables that were tasked to reflect them than they account for in each other. Nine of the squared inter-latent variable correlations (13.6%) are smaller than one of the AVE values associated with one of the latent variables in the pair of variables being correlated. However twenty of the squared inter-latent variable correlations (56%) are larger than both the AVE values associated with the latent variable pairs being correlated.

The finding that none of the 12 latent performance dimensions correlate unity means that they each have unique aspects although they share variance (more so the higher they correlate and hence the desire not to have the correlations too high). The finding that the confidence intervals do not include unity has a bearing on the question whether the latent variables are qualitatively distinct. The question as to the magnitude of the correlations (Table 4.53) and the magnitude of the coefficient of determination (Table 4.55) has a bearing on the question how distinct the latent variables are. The comparison of the AVE values and the coefficient of determination have a bearing on the question whether their measures of each latent variables successfully captures the distinction that exists in the latent variables. The finding that AVE is less than the coefficient of determination means that the unique part of the latent variable has not been adequately measured. The measures therefore do not allow us to successfully discriminate between the unique aspects of the latent variables involved.

4.5.5   POWER ASSESSMENT

In this study the close fit null hypothesis was not rejected. This indicates that the observed population covariance matrix (Σ) closely reflects the reproduced population covariance ($\hat{\Sigma}$) matrix derived from the model parameters. The question however is whether the decision not to reject H_{02} was the correct decision. This concern grows when there is a decrease in sample size. A decrease in sample size lowers the statistical power of the analysis. The statistical power of the analysis refers to the probability to reject H_{02} if H_{02} is false (i.e., to reject the claim that a model fits closely in the parameter when it actually has mediocre

fit). When the decision not to reject the null hypothesis of close fit happens under conditions of low power, uncertainty increases and therefore confidence in the evidence decreases. In such a case it is not clear if the decision was the result of an accurate model or due to insensitivity of the test to distinguish specification errors in the model. Statistical power is the conditional probability of rejecting a false null hypothesis (P[reject H_0: RMSEA $\leq$ .05 | H_0 false]). The close fit null hypothesis explains that the proposed model closely reflects reality. Within the context of SEM, statistical power reflects the probability of rejecting an incorrect model. Not rejecting H_{02}: RMSEA $\leq$ .05 indicates a good fit of the model to the extent that the statistical power of the close fit evaluation is reasonably high.

In the application of the chi-square test, type I errors are taken into account. For this reason a power analysis should also be conducted to account for the probability of Type II errors (Diamantopoulos & Siguaw, 2000). The difference between these two errors in structural equation modelling is as follows:

> When we test a model's fit by, say, the chi-square test, we emphasize the probability of making a Type I error, i.e. rejecting a correct model; this probability is captured by the significance level, άwhich is usually set at 0.05. A significant chi-square result indicates that if the null hypothesis is true (i.e. the model is correct in the population), then the probability of incorrectly rejecting it is low (i.e. less than five times out of 100 if ά = 0.05). However, another error that can occur is not to reject an incorrect model. This type of error is known as Type II error and the probability associated with it is denoted as β The probability of avoiding a Type II error is, therefore, 1-β and it is the probability that indicates the power of our test; thus the power of the test tell us how likely it is that a false null hypothesis (i.e. incorrect model) will be rejected (Diamantopoulos & Siguaw, 2000, p 93).

The power associated with the test of close fit was evaluated accordingly. The close fit null hypothesis explains that the model has a close but an imperfect fit in the population. This is calculated by using the value of the RMSEA statistic. When a model has a close fit in the population, the error caused by approximation is set at .05 and the null hypotheses H_{02a} is tested against H_{a2a} (Diamantopoulos & Siguaw, 2000). A specified value for the parameter needs to be assumed under H_{a2} when determining the test of the close fit

hypothesis. The RMSEA = .08 is a good value to use because RMSEA = .08 is the upper limit of a satisfactory fit.

The power of the test becomes a function of the degrees of freedom (v) in the model $(v = \frac{1}{2}([p][p+1]-t) = 1081\text{-}158 = 923$. The higher the degrees of freedom, the greater the power of the test (Diamantopoulos & Siguaw, 2000). MacCallum, Browne, and Sugawara (1996) assembled power tables but only makes provision for degrees of feedom $\leq$ 100 and N $\leq$ 500. Syntax developed by Preacher and Coffman (2006) in R and available at http://www.quantpsy.org/rmsea/rmsea.htm was utilised to determine the statistical power of the test of close fit. For this purpose a significance level of .05 was specified, a sample size of 199, 923 degrees of freedom, RMSEA was set to .05 under H_0 and RMSEA was set to .08 under H_a. The Preacher and Coffman (2006) software returned a power value of unity. In the case of poor model fit, H_{02}, would therefore have been rejected. This was not the case which bolsters confidence in the decision.

4.5.6   SUMMARY

This chapter explored the psychometric properties of the Generic Performance Questionnaire (GPQ) to determine the construct validity of this instrument.

The substantive hypothesis tested in this study is that the GPQ provides a construct valid and reliable measure of job performance as defined by the instrument, amongst South African non-managerial personnel. This substantive hypothesis that the GPQ provides a construct valid and reliable generic measure of performance for non-managerial employees was tested in this study.

The operational hypothesis implied by the substantive research hypothesis is that the measurement model can closely reproduce the covariances observed between the item parcels formed from the items of the various subscales. The operational hypothesis implied by the substantive research hypothesis further implies that the factor loadings of the item parcels on their performance dimensions are significant, that the measurement error variances related to each parcel are statistically significant but small, that the latent

performance dimensions explain large proportions of the variance in the item parcels and finally that the latent performance dimensions correlate low-moderately with each other.

Multiple fit indices were utilised to test model fit. The results reflect a good fit of the model. The null hypothesis of close fit is not rejected. The position that the model shows close fit in the population is therefore tenable. The basket of LISREL results are indicative of good model fit in the sample. The majority if the fit statistics indicate good fit and the small percentage large standardized covariance residuals corroborate this conclusion. The small percentage of large modification indices calculated for the Λ_x and the Θ_δ matrices also indicate a good fit.

The latent performance dimension correlates moderate-strongly with each other in the sample. No excessively large correlations exist. Confidence intervals calculated for the parametric correlation failed to include unity for any of the 66 correlations in Φ. A worrisome finding, however, was that in the case of 44% of the latent performance dimension pairs one or both latent variables account for less variance in their indicator variables that were tasked to reflect them than they account for in each other. This finding implies that the unique parts of the latent variables have not been adequately measured. The measures therefore do not permit the successful discrimination between the unique aspects of the latent variables involved.

CHAPTER 5
CONCLUSION AND RECOMMENDATION

5.1   INTRODUCTION

The objectives of this study were to (a) define a generic performance construct that would be applicable for non-managerial, individual positions (b) to develop a South African performance measure that could be used to obtain multi-rater assessments of the generic, non-managerial, individual performance construct and (c) to validate the performance measure by evaluating the fit of the measurement model implied by the architecture of the instrument and the constitutive definition of the generic performance construct.

This chapter provides a summary of the results of this study. The implications of the findings are discussed and recommendations are made for future research.

5.2   SUMMARY OF PRINCIPAL FINDINGS AND DISCUSSIONS

After defining the generic performance construct and developing the Generic Performance Questionnaire (GPQ), the measurement model was fitted to the data. Item parcels were used for this purpose because of restrictions on the available sample size. Exploratory factor analysis and item analysis were performed on each sub-scale. The purpose of these analyses was to evaluate whether the items comprising each subscale successfully measure the intended latent performance dimension and whether each subset of items provides a unidimensional measure of the latent performance dimension that it was intended to measure.

Chapter 4 outlined the results of the psychometric analysis. The following conclusions are made to the dimensionality analysis, the item analyses, the item analyses and the fit of the measurement model.

5.2.1   DIMENSIONALITY ANALYSIS

Principal factor analyses with oblique rotation were performed on each of the 12 subscales of the Generic Performance Questionnaire. The purpose was to evaluate the assumption that each latent performance dimensions is a unidimensional construct and to evaluate the degree to which each item measures the specific performance dimension that it was intended to measure. The factor loadings of each item were used to determine the degree to which the item reflects the underlying performance dimension.

The eigenvalue-greater-than-one rule of thumb was used to determine the number of factors to extract. Four out of the 12 subscales failed the unidimensionality test, namely subscales A (task performance), F (Communication), I (Analysing and problem solving) and J (Counterproductive work behaviour). In all of these subscales, 2 factors with eigenvalues greater than one were extracted. In all cases the factor fission resulted in a meaningful refinement of the original conceptualisation of the performance dimensions. The measurement model was nonetheless not modified based on the feedback obtained from the exploratory factor analysis. To do so would require an elaboration of the pool of items available for the refined dimensions. To fathom the success with which the current items in those four subscales reflect the original performance dimension that now in effect operates as a second-order performance factor the extraction of a single factor was forced. In the process of forcing the extraction of a single factor, all the factor loadings were satisfactory.

If the design intention driving the design and development of the GPQ succeeded to develop sets of items that successfully reflect a specific latent performance dimension and this latent performance dimension is a uni-dimensional construct the extraction of a single factor and having each item load reasonably high on the single factor should allow the accurate reproduction of the observed inter-item correlation matrix. The extraction of a single factor and having each item load reasonably high on the single factor that allows the accurate reproduction of the observed inter-item correlation matrix does not, however, necessarily mean that the target latent performance dimension carrying a specific constitutive definition has been successfully measured. The extraction of a single factor,

along with adequate loadings on the factor does, however, mean that the hypothesis that items in the specific subscale all successfully measure the target latent performance dimension as constitutively defined has survived the opportunity to be falsified. Results for the exploratory factor analysis indicate that the items measuring 8 of the 12 performance dimensions measures what they intended to measure.

5.2.2 ITEM ANALYSIS

The items in each of the 12 subscales are meant to act as stimuli to which employees respond with behaviour that is primarily an expression of a specific underlying performance factor. When this is indeed the case, high correlations between items will occur, item-total correlations will be high, squared multiple correlations will be high when regressing each item on a weighted linear composite of the other items in the subscale, the internal consistency reliability will be high for the subscale and will decrease when any item is deleted from the subscale.

Item statistics were used to determine how well the items of a sub-scale represent the underlying performance dimension. In this process, poor items were identified. Poor items are items that fail to discriminate between different states of the latent variable.

All but one of the subscales reflect high alpha coefficients above the critical cut off value set for this study of .80. Two marginally problematic items were detected. Based on the basket of available evidence it was decided to retain both items. No items were therefore deleted from the GPQ.

5.2.3 MEASUREMENT MODEL FIT

The hypothesis of exact fit was rejected but the hypothesis of close fit could not be rejected (p > .05). Therefore the position that the measurement model fits the data closely in the population was found to be a tenable position. The fit indices reflected good model fit in the sample. This finding is supported by the small percentage of large standardized covariance residuals and the small percentage of significant Λ_x and Θ modification indices.

It can therefore be concluded that the measurement model provides a valid description of the psychological process underlying the GPQ in that the model with its parameter estimates was able to closely reproduce the observed covariance matrix.

5.3   LIMITATIONS

The sample size of this study was satisfactory when viewed from the perspective of statistical power given the method of item parcelling that was used, but a larger and more representative sample would have been preferable in that it would have allowed the GPQ measurement model to be fitted with individual items as indicator variables. In the final analysis the question was whether the GPQ provides a construct valid measure of the generic non-managerial construct can only be satisfactorily answered when representing the latent performance dimensions with the individual items of each subscale of the GPQ.
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The connotative meaning of the generic non-managerial performance construct lies in the internal structure of the construct as well as in the manner in which the construct is embedded in a larger nomological network of constructs. Evaluating the construct validity of the GPQ means evaluating whether the instrument successfully measures the generic non-managerial performance construct as constitutively defined. Evaluation of the construct validity of GPQ is done by fitting the measurement model, implied by the constitutive definition of the generic non-managerial performance construct, in conjunction with the design of the instrument. This however only evaluates the construct validity from the perspective of the internal structure of the instrument. Conclusive evidence that the GPQ measures the generic non-managerial performance construct as constitutively defined can only be obtained by also showing that a structural model reflecting the manner in which the 12 latent generic performance dimensions are embedded in a larger nomological networks fits data closely.

Another limitation seems to be the language of the questionnaire. Informal feedback suggests that the sample, especially those that are not fluent in English, struggled to complete the questionnaire with the correct understanding. Language could have played a

bigger role in employees' response than initially expected. The study can be criticized for not firstly running a formal trial run in which feedback was obtained on aspects like test length, clarity of test instructions and clarity of item wording.

5.4 RECOMMENDATIONS FOR FUTURE STUDY

The aim of the study was to evaluate the GPQ psychometrically as a freestanding generic measure of non-managerial job performance. The aim is to evaluate whether the design intentions of the GPQ succeeded. The design intention was that each item would provide a valid and reliable measure of one of 12 specific latent performance dimensions. The ideal approach therefore has to be to fit a measurement model in which the individual items serve as indicator variables of the latent generic performance dimensions. Fitting a measurement model in which each individual item serves as an indicator variable of the latent performance dimension would require the estimation of 258 model parameters 96 factor loadings, 96 measurement error variances and 66 covariance terms. To fit the GPQ measurement model with individual items therefore requires a larger and preferably also more representative sample of non-managerial employees. It is therefore strongly recommended that the study should be repeated on a larger sample on non-managerial employees.

Formal feedback has not been obtained from raters on the comprehensibility and ease of use of the GPQ. These aspects have not been probed in a pilot study or in the main study. Future research should rectify this shortcoming. *Ad hoc* feedback suggests that the difficulty level of the language might be too high for the intended target population. If future research will provide support for this concern the language of the questionnaire could be improved to make it more understandable for people not fluent in English as their first language.

Future studies should also investigate the measurement invariance and equivalence of the GPQ for different race, gender and language groups. These studies will, however, only really become meaningful once the fit of the individual item single group measurement model has been established.

A bit of a question mark hangs over the discriminant validity of the GPQ. If similar findings would emerge when the GPQ measurement model is fitted with the individual items as indicator variables the problem should be the focus of attention in future studies. One possibility would be to reduce the number of latent performance dimensions and in the process also minimise the correlation between the higher order performance components. An alternative approach would be to improve the validity and reliability of the items and thereby improve the factor loadings of items on latent variables. Simplifying the language in which the items are written may contribute to improved factor loadings. A further approach would be to inspect the modification indices calculated for Λx when the measurement model is fitted with the individual items as indicator variables to identify items that tend to cross-load on latent performance dimensions. These items should then be removed from the instrument.

This study interpreted the performance construct as a construct encompassing both a behavioural domain as well as an outcome domain. It was in addition argued that the latent variables comprising each domain are structurally inter-related within each domain as well as between domains. It was argued that very few if any comprehensive performance structural models exist that attempt to model the full complexity of the performance construct. To increase the effectiveness of Industrial Psychologists in practice, valid performance theory should be available to guide the development of human resource interventions. Developing and empirically testing comprehensive generic performance structural models, or alternatively termed comprehensive competency models, will provide practitioners with credible information on the determinants of performance and the manner in which they combine to base decisions on and will provide a sound foundation to build future performance theory. It was argued that the lack of comprehensive performance structural models inhibits the development of generic explanatory structural competency models. Instead the responsibility is placed on individual practitioners to conceptualise the job performance construct as it applies to specific jobs. A job-specific performance hypothesis then typically has to be developed as to which latent variables explain variance in performance to guide human resource management actions aimed at improving performance in the specific job. Such job-specific performance hypotheses, however, more often than not exist only implicitly in the mind

of the practitioner. Very seldom if ever, are explicit structural competency models developed and tested that relate latent behavioural performance dimensions to latent outcome variables. It was argued that in its failure to develop and test comprehensive generic managerial and non-managerial structural competency models the discipline has in effect let industrial psychological practice down. Practitioners should not have to develop job-specific performance hypotheses to guide human resource management actions aimed at improving performance. This study is the first step in building a generic non-managerial structural competency model. Future studies should attempt to map the generic non-managerial competencies on a nomological network of structurally linked outcome latent variables for which non-managerial employees are typically held accountable. The structural model depicted in Figure 2.1 can be used as a basis for this exercise. Future studies should in addition attempt to map the generic competency potential latent variables on the generic non-managerial competencies. In doing serious consideration should be given to the effect of situational characteristics on job performance. Logic and personal experience attests to the fact that behaviours varies as a function of the context in which it occurs. Despite this, however, in model building the role of situational characteristics has more often been negated than formally acknowledged (Funder, 2009; Mischel, 1973).

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Appendix A

Generic Performance Questionnaire

UNIVERSITEIT·STELLENBOSCH·UNIVERSITY
jou kennisvennoot • your knowledge partner

GENERIC PERFORMANCE QUESTIONNAIRE
[SELF ASSESSMENT FORM]

INFORMED CONSENT

You are asked to participate in a research study conducted by Daleen Myburgh [Hons BComm] from the Department of Industrial Psychology at Stellenbosch University. The results of the study will be contributed to my master's thesis. You were selected as a possible participant in this study because you occupy a non-managerial position in your organisation.

PURPOSE OF THE STUDY

The objective of the study is to develop a generic South Africa performance measure (called the Generic Performance Questionnaire) that could be used to obtain multi-rater assessments of non-managerial, individual performance and to validate the performance measure. Such a generic performance measure would allow the development of a comprehensive non-managerial structural competency model.

PROCEDURES

If you volunteer to participate in this study, we would ask you to do the following things:

- Complete the questionnaire.
- Completion of the questionnaire will takes approximately 20 minutes of your time.
- The completed questionnaire will then be placed in a closed box/container. The completed questionnaires will be couriered back to me.

POTENTIAL RISKS AND DISCOMFORTS

There are no foreseeable risks associated with participation in this research study. The results of the study will be treated as confidential. Only myself and my master's supervisor will have access to the data. Management will not have access to the appraisal of any individual. The need to collate the various ratings obtained for each focal employee prevents the data-gathering from being anonymous.

POTENTIAL BENEFITS TO SUBJECTS AND/OR TO SOCIETY

The development of a measure of generic non-managerial performance will allow the development of an actuarial decision-rule for all the jobs comprising a family of non-managerial jobs and to psychometrically evaluate the resultant decision-rule in terms of validity, fairness and utility. Moreover the development of a measure of generic non-managerial performance will allow the development and empirical testing of generic performance structural models. Very few if any comprehensive performance structural models exist that attempt to model the full complexity of the performance construct. To increase the effectiveness of human resource practitioners, valid (or close fitting) performance theory should be available to guide the development of human resource interventions. Developing and empirically testing comprehensive generic performance structural models (alternatively termed competency models) will provide practitioners with credible information on the determinants of performance and the manner in which they combine to base decisions on and will provide a sound foundation to build future performance theory.

PAYMENT FOR PARTICIPATION

You will not receive any payment for participating in this research study.

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 restricting access to the data to myself and my supervisor, by storing the data on a password-protected computer and by only reporting aggregate statistics for the validation sample.

The results of the study will be disseminated by means of an unrestricted electronic thesis and by means of an article published in an accredited scientific journal. A summary of the research findings will be presented to the management of your organisation. In none of these instances will the identity of any research participant be revealed nor will the performance assessments for any focal employee be reported. Only aggregated statistics reflecting the psychometric integrity of the GPQ will be reported.

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. You may also refuse to answer any questions you don't want to answer 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 Daleen Myburgh [0798949975; daleen@enstb.co.za] and/or Prof Callie Theron [0842734139; ccth@sun.ac.za] both from the Department of Industrial Psychology of Stellenbosch University.

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 Maléne Fouché at the Unit for Research Development [mfouche@sun.ac.za; 021808 4622].

PROVIDING INFORMED CONSENT

Tick in the "Agree to participate" box below if you have read the information provided and consent to participate in the research under the conditions that were outlined above. Tick in the "Decline invitation to participate" box below if you have read the information provided and do not consent to participate in the research under the conditions that were outlined above.

I agree to participate in the research study	
I decline invitation to participate in the research study	

INSTRUCTIONS

INTRODUCTION

Performance is defined as observable behavioural actions relevant to the organisation's goals that employees perform. These behaviours are regarded as relevant because they are instrumental in achieving specific, desired outcomes. The behaviours are expressions of underlying latent performance dimensions. This questionnaire attempts to assess the level of competence with which non-managerial personnel perform on these performance dimensions.

Your ratings along with those of other suitably qualified respondents will be combined to form an overall performance rating that will describe your work performance on each of the non-managerial performance dimensions. That will assist you to come to a better understanding of your performance strengths and weaknesses and to identify avenues to improve performance on those dimensions on which you are currently underperforming.

INSTRUCTIONS

The Generic Performance Questionnaire [GPQ] consists of 96 items measuring 12 latent performance dimensions. You have been asked to evaluate yourself. Please read each item carefully and choose the appropriate response option (1-5) that best describes the standard of performance that you displayed over the past 12 month by choosing the specific behaviours referred to in the item that the employee typically displayed over the assessment period and placing a cross on the corresponding scale value .

EXAMPLE

In your response to item A1 you should indicate the standard of task performance that you displayed over the past 12 month by choosing the specific behaviours that best describes the extent to which you meet production or services goals. If, for example, you over the past 12 months only seldom met production or service goals the response option 1 should be chosen by placing a cross on this option. If, however, you over the past 12 months consistently exceeded production or service goals the response option 5 should be chosen by placing a cross on this option. The response option 6 (Cannot rate) should be used as seldom as possible and only if you have had insufficient opportunity to observe the specific behavioural aspect the item refers to.

	Definitions	Well below standard 1	Below required standard 2	Satisfactory 3	Above required standard 4	Well above standard 5	Cannot rate
A	**TASK PERFORMANCE: The extent to which the employee effectively performs activities that contribute to the organization'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.**						
A1	Production or service goals	I seldom meet production or service goals; I find excuses for not meeting goals		I normally meet production or service goals, but I do not exceed goals		I exceed production or service goals every time	6
		1	2	3	4	5	

IMPORTANT

Evaluate your performance on each performance dimension according to its own merits. Please <u>be honest</u>, even it means giving poor ratings.

BIOGRAPHICAL INFORMATION

Please fill out the biographical information requested below. Your name is required to collate the various ratings of the candidate whose performance is being appraised. The remainder of the biographical information is required for research purposes to ensure that measures comply with Employment Equity legislation requirements.

Surname and initials of the person being rated (ratee):									
Position of rater		**Gender of rater**				**Job grade of rater (Peromnes)**			
Self		Male		Female		7-12	13-16		17-19
First language of rater		**Race of rater**				**Time working in your current position**			
English	Other language	Black	Coloured	Indian	Chinese	White	6 months	1 year	2-5Years	➢ 5 years

Continue to next page
Performance rating

PERFORMANCE RATING

	Definitions	Well below standard 1	Below required standard 2	Satisfactory 3	Above required standard 4	Well above standard 5	Cannot rate
A	**TASK PERFORMANCE: The extent to which the employee effectively performs activities that contribute to the organization's technical core, performs the foundational, substantive or technical tasks that are 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.**						
A1	Production or service goals	I seldom meet production or service goals; I find excuses for not meeting goals		I normally meet production or service goals, but do not exceed goals		I exceed production or service goals every time	6
		1	2	3	4	5	
A2	Quantity of work output	The amount of work I deliver is significantly below the required output		Normally I deliver the amount of work required, but no more		I consistently exceed the amount of work required; I always do more than is expected	6
		1	2	3	4	5	
A3	Quality of work output	The quality of work I deliver is substantially below the required standards		Normally I deliver products or services of the required quality		I consistently exceed the quality of work required; consistently exceed quality standards	6
		1	2	3	4	5	
A4	Core task productivity	I achieve significantly less output than most employees with the same resources		I achieve basically the same output than most employees with the same resources		I achieve significantly more output than most employees with the same resources	6
		1	2	3	4	5	

	Definitions	Well below standard 1	Below required standard 2	Satisfactory 3	Above required standard 4	Well above standard 5	Cannot rate
A5	Task effectiveness	I perform the core tasks that are essential for the specific job very ineffectively; I use significantly more resources than typically required.		I perform the core tasks that are essential for the specific job effectively; I use the amount of resources typically required.		I perform the core tasks that are essential for the specific job highly effectively; I use significantly less resources than typically required.	6
		1	2	3	4	5	
A6	Task performance reputation for adding value	I have a task performance reputation for undermining the success of the organization or unit		I generally have a satisfactory task performance reputation for contributing to the success of the organization or unit.		I have an excellent task performance reputation for contributing to the success of the organization or unit	6
		1	2	3	4	5	
A7	Stick to the task role instruction	I fail to stick to the task roles prescribed by the job description		I generally stick to the task roles prescribed by the job description		I fully stick to the task roles prescribed by the job description	6
		1	2	3	4	5	
B	**EXERTING 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.**						
B1	Time	I regularly work less hours than required		I regularly work the required hours, rarely less, seldom more		I regularly work longer hours than required	6
		1	2	3	4	5	

	Definitions	Well below standard	Below required standard	Satisfactory	Above required standard	Well above standard	Cannot rate
		1	2	3	4	5	
B2	Care	I tend to be negligent; my work needs a lot of correction		I give reasonable attention to detail but my work often still needs some correction		I give a lot of attention to detail; my work needs almost no correction	6
		1	2	3	4	5	
B3	Perseverance	When circumstances gets though I give up		I keep going as long as the circumstances is reasonably good		When the circumstances are tough, I keep going	6
		1	2	3	4	5	
B4	Effort	I can be counted on not to exercise extra effort if the task would need it		I sometimes would exercise extra effort if the task would need it but not always		I can be counted on to exercise extra effort if the task would need it	6
		1	2	3	4	5	
B5	Commitment	I show a lack of commitment to my work		I am neither uncommitted nor really committed		I show passionate commitment to my work	6
		1	2	3	4	5	
B6	Energy investment	I invest very little energy in my work		I invest only the energy that is necessary to get the job done		I invest more energy than is necessary in my work	6
		1	2	3	4	5	
B7	Dedication	I demonstrate no dedication to work		I demonstrate some dedication to work		I demonstrate high dedication to work	6
		1	2	3	4	5	

C	ADAPTABILITY: **The extent to which the employee adapts and responds effectively in situations where change is unavoidable, manages pressure effectively and copes well with setbacks, shows willingness to change his/her schedules in order to accommodate demands at work.**						
C1	Change	I resist change		I adapt to change		I welcome and embrace change	6
		1	2	3	4	5	
C2	Adaptation	I fail to keep up with most new developments in my field		I stay up to date with most new developments in my field		I initiate new developments in my field	6
		1	2	3	4	5	
C3	Setbacks	I continue with the original plan when initial attempts fail to produce the desired effect		I initially continue with the original plan when initial attempts fail to produce the desire effect but eventually attempts alternative solutions		I seek innovative alternative solutions when initial attempts fail to produce the desire effect	6
		1	2	3	4	5	
C4	Change in plans	I am upset and confused by unexpected change in plans		I am not upset and remain composed by unexpected change in plans		I enjoy the challenges brought by unexpected change in plans	6
		1	2	3	4	5	
C5	Work schedule	I resist changing my schedule in order to accommodate demands at work		I change my schedule in order to accommodate demands at work		I willingly, without bitterness, change my schedule in order to accommodate demands at work	6
		1	2	3	4	5	

C6	Pressure	My performance worsens when I have to work under pressure		I succeed in maintaining performance when I have to work under pressure		My performance excel when I have to work under pressure	6
		1	2	3	4	5	
C7	Prior notice	I dislike it when I am not informed well ahead of time of plans		I do not mind if I only learn about plans at the last moment		I enjoy it if I only learn about plans at the last moment	6
		1	2	3	4	5	
C8	Openness	I insist that things should be done the way they have always been done		I do not insist that things should be done the way they have always been done		I insist that things cannot forever be done the way they have always been done	6
		1	2	3	4	5	
D	**INNOVATING: The extent to which the employee displays creativity, not only in his/her individual job, but also on behalf of the whole organization, shows openness to new ideas and experiences, handles novel situations and problems with innovation and creativity, thinks broadly and strategically, supports and drives organisational change.**						
D1	Creativity	I consistently display a lack of imagination, originality and inventiveness, not only in my individual job, but also on behalf of the whole organization		I display some originality, inventiveness and creativeness, not only in my individual job but also on behalf of the whole organization		I consistently display exceptional originality, inventiveness and creativeness, not only in my individual job but also on behalf of the whole organization	6
		1	2	3	4	5	
D2	Openness	I consistently resist and attempt to avoid new ideas and experiences		I am open to new ideas and experiences		I consistently search for, investigate and explore new ideas and experiences	6
		1	2	3	4	5	

D3	New problems	I consistently try to fit inappropriate existing solutions to new problems		I sometimes find innovative and creative solutions to new problems		I consistently find innovative and creative solutions to new problems	6
		1	2	3	4	5	
D4	Change	I almost never suggest ways of improving the way work is done; I am content with the way things are done		I regularly suggest ways of improving the way work is done		I continuously suggest innovative and creative ways of improving the way work is done	6
		1	2	3	4	5	
D5	Open-mindedness	I consistently think narrowly, short-term and operationally		I sometimes think broadly, long-term and strategically		I consistently think broadly, long-term and strategically	6
		1	2	3	4	5	
D6	Brainstorming	I consistently come up with only a limited range of obvious and unimaginative alternatives		I sometimes come up with some unusual but thought-provoking alternatives		I consistently come up with a broad range of unusual but thought-provoking alternatives	6
		1	2	3	4	5	
D7	Exploration	I almost never explore unfamiliar terrain to identify "white space/blue ocean" business opportunities		I occasionally explore unfamiliar terrain to identify "white space/blue ocean" business opportunities		I regularly explore unfamiliar terrain to identify "white space/blue ocean" business opportunities	6
		1	2	3	4	5	
D8	Improvement	I almost never reflect on possible ways of improving the way work is done		I sometimes reflect on possible ways of improving the way work is done		I continuously reflect on possible ways of improving the way work is done	6
		1	2	3	4	5	

E	LEADERSHIP POTENTIAL: The extent to which the employee spontaneously empowers others, brings out extra performance in other employees, supports peers, helps them with challenges they face, motivates and inspires other employees, models appropriate behaviour, initiates action, provides direction and takes responsibility. The extent to which the employee spontaneously acts as *de facto* leader without actually occupying a formal leadership position.						
E1	Empowers colleagues	I almost never spontaneously help colleagues to develop their strengths and improve their weaknesses, facilitate the personal growth of colleagues and promote continuous learning		I occasionally spontaneously help colleagues to develop their strengths and improve their weaknesses, facilitate the personal growth of colleagues and promote continuous learning		I consistently spontaneously help colleagues to develop their strengths and improve their weaknesses, facilitate the personal growth of colleagues and promote continuous learning	6
		1	2	3	4	5	
E2	Supports colleagues	I almost never spontaneously show concern for the wellbeing of colleagues and for the ambitions, needs and feelings of others		I occasionally spontaneously show concern for the wellbeing of colleagues and for the ambitions, needs and feelings of others		I consistently spontaneously show concern for the wellbeing of colleagues and for the ambitions, needs and feelings of others	6
		1	2	3	4	5	
E3	Extra performance	I almost never spontaneously motivate colleagues to go the extra mile and to improve their performance		I occasionally spontaneously motivate colleagues to go the extra mile and to improve their performance		I consistently spontaneously motivate colleagues to go the extra mile and to improve their performances	6
		1	2	3	4	5	

E4	Inspires	I almost never spontaneously inspire colleagues to buy into a vision for the organisational unit I form part of		I sometimes spontaneously inspire colleagues to buy into a vision for the organisational unit I form part of		I regularly spontaneously inspire colleagues to buy into a coherent vision for the organisational unit I form part of	6
		1	2	3	4	5	
E5	Provides direction	I almost never spontaneously provide direction when colleagues are uncertain on how to proceed and bring clarity when confusion reigns		I sometimes spontaneously provide direction when colleagues are uncertain on how to proceed and bring clarity when confusion reigns		I regularly spontaneously provide direction when colleagues are uncertain on how to proceed and bring clarity when confusion reigns	6
		1	2	3	4	5	
E6	Visioning	I almost never spontaneously communicate any vision for the organisational unit I form part of		I sometimes spontaneously communicate a vision for the organisational unit I form part of		I regularly spontaneously communicate a coherent vision for the organisational unit I form part of	6
		1	2	3	4	5	
E7	Serves as role model	Almost no colleague regards me as a role model worth imitating		I am generally regarded by colleagues as a role model worth imitating		I am almost without exception regarded by colleagues as a role model worth imitating	6
		1	2	3	4	5	

E8	Informal leader	I never spontaneously act as an informal leader amongst colleagues and I am not regarded by colleagues as such		I often spontaneously act as an informal leader amongst colleagues and I am generally accepted by colleagues as such		I continuously spontaneously act as an informal leader amongst colleagues and I am unanimously accepted by colleagues as such	6
		1	2	3	4	5	
F	**COMMUNICATION: The degree 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.**						
F1	Written communication	I always produce poorly worded written documents, memorandums and letters		Sometimes I produce sophisticatedly and eloquently worded written documents, memorandums and letters		I consistently produce sophisticatedly and eloquently worded written documents, memorandums and letters	6
		1	2	3	4	5	
F2	Written communication	I consistently produce unnecessary complicated, confusing, poorly structured written documents, memorandums and letters		I often produce clear, easily comprehensible, well-structured written documents, memorandums and letters		I consistently produce clear, easily comprehensible, well-structured written documents, memorandums and letters	6
		1	2	3	4	5	
F3	Verbal communication	I consistently formulate poorly worded comments, explanations and arguments		I often formulate sophisticatedly and eloquently worded comments, explanations and arguments		I consistently formulate sophisticatedly and eloquently worded comments, explanations and arguments	6
		1	2	3	4	5	

F4	Verbal communication	I consistently formulate confusing, poorly structured comments, explanations and arguments		I often formulate clear, easily comprehensible, well-structured comments, explanations and arguments		I consistently formulate clear, easily comprehensible, well-structured comments, explanations and arguments	6
		1	2	3	4	5	
F5	Networking	I have developed and successfully maintained only a small network of work-related contacts		I have developed and successfully maintains a reasonably large network of work-related contacts		I have developed and successfully maintains an extensive network of work-related contacts	6
		1	2	3	4	5	
F6	Networking	I do not use my network of contacts effectively to the advantage of the organisation		I use my network of contacts reasonably effectively to the advantage of the organisation		I use my network of contacts very effectively to the advantage of the organisation	6
		1	2	3	4	5	
F7	Persuasion	I am rather ineffective in persuading and influencing colleagues		I am reasonably effective in persuading and influencing colleagues		I am very effective in persuading and influencing colleagues	6
		1	2	3	4	5	
F8	Body language	I am seen by almost all of my colleagues as an unapproachable, tense, difficult-to-talk-to person		I am seen by most of my colleagues as an friendly, relaxed, easy-to-talk-to person		I am seen by almost all of my colleagues as an friendly, relaxed, easy-to-talk-to person	6
		1	2	3	4	5	

G	**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 organization.**						
G1	Relationships	I maintain negative relationships with almost all of my colleagues in the organisation		I maintain positive, pleasant relationships with most of my colleagues in the organisation		I maintain positive, friendly relationships with almost all of my colleagues in the organisation	6
		1	2	3	4	5	
G2	Social interaction	I almost never interact on a social level with my colleagues		I sometimes interact on a social level with my colleagues		I regularly interact on a social level with my colleagues	6
		1	2	3	4	5	
G3	Pro-social behaviour	I consistently display anti-social behaviour at work		I generally display pro-social behaviour at work		I always display pro-social behaviour at work	6
		1	2	3	4	5	
G4	Cooperates	I consistently cooperate and collaborate poorly with my colleagues in the organisation		I generally cooperate and collaborate well with my colleagues in the organisation		I consistently cooperate and collaborate well with my colleagues in the organisation	6
		1	2	3	4	5	
G5	Respect	I consistently show a lack of respect and lack of positive regard when interacting with my colleagues at work		I generally show respect and positive regard when interacting with my colleagues at work		I consistently show respect and positive regard when interacting with my colleagues at work	6
		1	2	3	4	5	

G6	Solidarity	I consistently display discord with colleagues at work		I generally display unity with colleagues at work		I consistently display unity with colleagues at work	6
		1	2	3	4	5	
G7	Getting along	I get along with almost none of my colleagues in the organisation		I get along with most of my colleagues in the organisation		I get along with almost all of my colleagues in the organisation	6
		1	2	3	4	5	
G8	Values	I consistently fail to behave in a reliable, dependable manner with clear personal values that compliment those of the organization		I generally behave in a reliable, dependable manner with clear personal values that compliment those of the organization		I consistently behave in a reliable, dependable manner with clear personal values that compliment those of the organization	6
		1	2	3	4	5	
H	**MANAGEMENT: The extent to which the employee plans ahead and works in a systematic and organised way, follows directions and procedures, articulates goals for his/her performance, organises workload, monitors progress, helps to solve problems and to overcome crises, effectively coordinates different work roles.**						
H1	Plans ahead	I consistently fail to plan ahead and I am often caught unprepared		I generally plan ahead and I am seldom caught unprepared		I consistently plan ahead and I am never caught unprepared	6
		1	2	3	4	5	
H2	Works systematically	I consistently approach my work in an unsystematic and disorganised manner		I generally approach my work in a systematic and organised manner		I consistently approach my work in a systematic and organised manner	6
		1	2	3	4	5	

H3	Organises work	I consistently fail to effectively organise my work load and consequently struggle to successfully meet all my work responsibilities		I generally effectively organise my work load so as to successfully meet all my work responsibilities		I consistently effectively organise my work load so as to successfully meet all my work responsibilities	6
		1	2	3	4	5	
H4	Follows procedure	I carelessly move away from prescribed work procedures		I generally stick to prescribed work procedures		I diligently stick to prescribed work procedures	6
		1	2	3	4	5	
H5	Sets goals	I consistently fail to set any specific, challenging performance goals for myself		I generally set performance goals for myself		I consistently set specific, challenging performance goals for myself	6
		1	2	3	4	5	
H6	Monitors progress	I almost never monitor my progress towards achieving work goals		I generally monitor my progress towards achieving work goals		I consistently monitor my progress towards achieving work goals	6
		1	2	3	4	5	
H7	Coordinates	I consistently fail to coordinate my different work roles		I generally succeed in coordinating my different work roles		I consistently succeed in coordinating my different work roles	6
		1	2	3	4	5	
H8	Problems	I consistently require somebody else to solve problems and crises related to my work		I generally solve problems and crises related to my work myself		I consistently solve problems and crises related to my work myself	6
		1	2	3	4	5	

I	**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 choosing the appropriate option from available information.**						
I1	Analytical thinking	I consistently fail to use analytic thinking at work to solve problems, to motivate my position in debates and to identify the appropriate course of action to take		I generally use analytic thinking at work to solve problems, to motivate my position in debates and to identify the appropriate course of action to take		I consistently use analytic thinking at work to solve problems, to motivate my position in debates and to identify the appropriate course of action to take	6
		1	2	3	4	5	
I2	Diagnostic thinking	I consistently attempt to solve problems without first attempting to diagnose the cause of the problem		I generally attempt to solve problems by first attempting to diagnose the cause of the problem		I consistently attempt to solve problems by first attempting to diagnose the cause of the problem	6
		1	2	3	4	5	
I3	Theorising	I almost never use logical theoretical arguments to arrive at solutions to problems		I generally use logical theoretical arguments to arrive at solutions to problems		I consistently use logical theoretical arguments to arrive at solutions to problems	6
		1	2	3	4	5	
I4	Core issues	I consistently fail to identify the heart of the matter in complex situations and problems		I generally succeed in identifying the heart of the matter in complex situations and problems		I consistently succeed in identifying the heart of the matter in complex situations and problems	6
		1	2	3	4	5	

I5	Problem solving	I consistently attempt to solve problems at work in a illogical, disorganized way		I generally attempt to solve problems at work in a logical systematic way		I consistently attempt to solve problems at work in a logical systematic way		6
		1	2	3	4	5		
I6	Deductive decision-making	I consistently make decisions by illogically and emotionally choosing an option from available alternatives		I generally make decisions by logically choosing the appropriate option from available alternatives		I consistently make decisions by logically choosing the appropriate option from available alternatives		6
		1	2	3	4	5		
I7	Technology	I never learn and utilise new technology		I occasionally learn and utilise new technology		I continuously learn and utilise new technology		6
		1	2	3	4	5		
I8	Intelligence	I consistently come up with inappropriate solutions to problems		I generally come up with intelligent solutions to problems		I consistently come up with intelligent solutions to problems		6
		1	2	3	4	5		
J	**COUNTERPRODUCTIVE WORK BEHAVIOUR: The extent to which the employee displays behaviour that threatens the wellbeing of an organization, 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 organizational goals.**							
J1	Organisational wellbeing	I frequently display behaviour that threatens the wellbeing of the organisation		I occasionally display behaviour that promotes the wellbeing of the organisation		I frequently display behaviour that promotes the wellbeing of the organisation		6
		1	2	3	4	5		

J2	Organisational rules	I tend to disobey organisational rules and ignore procedures		I generally obey organisational rules and procedures		I diligently submit to organisational rules and procedures	6
		1	2	3	4	5	
J3	Personal discipline	I show poor personal discipline		I show reasonably good personal discipline		I show excellent personal discipline	6
		1	2	3	4	5	
J4	Confrontation	I am difficult to get along with: I tend to be involved in destructive inter-personal conflict with colleagues and superiors		I get along with most: I am seldom involved in destructive inter-personal conflict with colleagues and superiors		I get along well with almost everybody: I succeed in keeping out of-destructive inter-personal conflict with colleagues and superiors	6
		1	2	3	4	5	
J5	Trouble	I tend to be in trouble for disobeying the disciplinary code of the organisation		I generally avoid disobeying the disciplinary code of the organisation		I diligently avoid disobeying the disciplinary code of the organisation	6
		1	2	3	4	5	
J6	Instructions	I intentionally or through carelessness fail to execute lawful instructions		I generally execute lawful instructions		I diligently execute lawful instructions	6
		1	2	3	4	5	
J7	Sexual harassment	I tend to treat members of the opposite sex with disrespect: I tend to abuse relationships		I generally treat members of the opposite sex with respect: I generally do not abuse relationships		At all times I treat members of the opposite sex with respect: I do not abuse relationships with colleagues	6
		1	2	3	4	5	

J8	Theft	I tend to inappropriately use and/or take organisation property for myself		I generally avoid the inappropriate use and theft of organisation property		I carefully avoid the inappropriate use and theft of organisation property	6
		1	2	3	4	5	
J9	Substance abuse	Substance abuse tends to interfere with my performance at work		I generally avoid substance abuse at work		I am never guilty of substance abuse at work	6
		1	2	3	4	5	
J 10	Bullying	I tend to bully colleagues at work		I generally avoid bullying colleagues at work		I never bully colleagues at work	6
		1	2	3	4	5	
K	**ORGANIZATIONAL CITIZENSHIP BEHAVIOUR: The extent to which the employee displays voluntary behaviour contributing towards the overall effectiveness of the organization, 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 constructively involved in organisational affairs.**						
K1	Helping behaviour	I very seldom help colleagues with work problems unless explicitly instructed to do so		I sometimes, help colleagues with work problems without being instructed to do so		I regularly help colleagues with work problems without being instructed to do so	6
		1	2	3	4	5	
K2	Sportsmanship	I tend to complain and become negative when faced by unavoidable inconveniences and burdens arising from my work		I tolerate unavoidable inconveniences and burdens arising from my work		I maintain a positive attitude despite unavoidable inconveniences and burdens arising from my work	6
		1	2	3	4	5	

K3	Organisational loyalty	I criticise, oppose and attack the organisation in front of outsiders		I refrain from criticising, opposing and attacking the organisation in front of outsiders		I passionately endorse, support and defend the organisation to outsiders	6
		1	2	3	4	5	
K4	Civic virtue	I show an unwillingness to actively participate in organisational governance and to look out for the organisations' best interests		I am willing but not really keen to participate in organisational governance and to look out for the organisation's best interests		I show a keen willingness to actively participate in organisational governance and to look out for the organisation's best interests.	6
		1	2	3	4	5	
K5	Organisational compliance	I regularly fail to submit to organisational rules and procedures		I generally follow organisational rules and procedures		I follow organisational rules and procedures to the letter at all times	6
		1	2	3	4	5	
K6	Beyond call of duty	I only do what is expected of me. I refuse to go the extra mile.		I am willing but not really keen to go beyond the call of duty and to go the extra mile		I always show a willingness to go beyond the call of duty and to go the extra mile	6
		1	2	3	4	5	
K7	General OCB	I almost never display voluntary behaviour that is not formally part of my job description that contributes towards the overall effectiveness of the organization.		I sometimes display voluntary behaviour that is not formally part of my job description that contributes towards the overall effectiveness of the organization.		I regularly display voluntary behaviour that is not formally part of my job description that contributes towards the overall effectiveness of the organization.	6

		1	2	3	4	5	
L	**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 seeks opportunities for self-development and career advancement.**						
L1	Responsibility	I accept no responsibility for my own career development		I accept some responsibility for my own career development		I accept full responsibility for my own career development	6
		1	2	3	4	5	
L2	Opportunity	I allow most opportunities for self-development to pass me by		I utilise some available opportunity for self-development but still allow too many valuable opportunities to pass me by		I make use of almost every available opportunity for self-development	6
		1	2	3	4	5	
L3	Development areas	I have no clear picture of the areas in which self-development is required		I have a basic idea of the areas in which self-development is required		I have a comprehensive understanding of the areas in which self-development is required	6
		1	2	3	4	5	
L4	Career objective	I have no clear picture of where my career is heading		I have a vague idea of where my career is heading		I have a clear, well-defined career path for the future	6
		1	2	3	4	5	
L5	Career planning	I have no clear plans on how my career goals are to be achieved		I have vague plans on how my career goals are to be achieved		I have clear, well-defined plans on how my career goals are to be achieved	6
		1	2	3	4	5	

L6	Internal control	I passively accept how the organisation dictates that my career should unfold over time		I exercise limited control over the direction in which my career develops over time; I largely allow the organisation to determine matters.		I exercise active control over the direction in which my career develops over time; I work in active partnership with the organisation		6
		1	2	3	4	5		
L7	Self-development	I do very little to improve my ability to perform my job		I show limited initiative at improving my ability to perform my job		I work purposefully at improving my ability to perform my job		6
		1	2	3	4	5		
L8	Self-development	I do practically nothing to try to keep up with new developments in my field		I make some attempt to try to keep up with new developments in my field		I work diligently to keep up to date with new developments in my field		6
		1	2	3	4	5		
L9	Perspective	I assume that the organisation will facilitate career success		I vaguely sense that I have to be actively involved in career development to achieve career success.		I clearly understand that I have to work in active partnership with the organisation to achieve career success		6
		1	2	3	4	5		

THANK YOU

GENERIC PERFORMANCE QUESTIONNAIRE
[OTHER ASSESSMENT FORM]

INFORMED CONSENT

You are asked to participate in a research study conducted by Daleen Myburgh [Hons BComm] from the Department of Industrial Psychology at Stellenbosch University. The results of the study will be contributed to my master's thesis. You were selected as a possible participant in this study because you are sufficiently familiar with the work performance of the person you are requested to evaluate.

PURPOSE OF THE STUDY

The objective of the study is to develop a generic South Africa performance measure (called the Generic Performance Questionnaire) that could be used to obtain multi-rater assessments of non-managerial, individual performance and to validate the performance measure. Such a generic performance measure would allow the development of a comprehensive non-managerial structural competency model.

PROCEDURES

If you volunteer to participate in this study, we would ask you to do the following things:

- Complete the questionnaire.
- Completion of the questionnaire will takes approximately 20 minutes of your time.
- The completed questionnaire will then be placed in a closed box/container. The completed questionnaires will be couriered back to me.

POTENTIAL RISKS AND DISCOMFORTS

There are no foreseeable risks associated with participation in this research study. The results of the study will be treated as confidential. Only myself and my master's supervisor will have access to the data. Management will not have access to the appraisal of any individual. The need to collate the various ratings obtained for each focal employee prevents the data-gathering from being anonymous.

POTENTIAL BENEFITS TO SUBJECTS AND/OR TO SOCIETY

The development of a measure of generic non-managerial performance will allow the derivation of an actuarial decision-rule for all the jobs comprising a family of non-managerial jobs and to psychometrically evaluate the resultant decision-rule in terms of validity, fairness and utility. Moreover the development of a measure of generic non-managerial performance will allow the development and empirical testing of generic performance structural models. Very few if any comprehensive performance structural models exist that attempt to model the full complexity of the performance construct. To increase the effectiveness of human resource practitioners, valid (or close fitting) performance theory should be available to guide the development of human resource interventions. Developing and empirically testing comprehensive generic performance structural models (alternatively termed competency models) will provide practitioners with credible information on the determinants of performance and the manner in which they combine to base decisions on and will provide a sound foundation to build future performance theory.

PAYMENT FOR PARTICIPATION

You will not receive any payment for participating in this research study.

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 restricting access to the data to myself and my supervisor, by storing the data on a password-protected computer and by only reporting aggregate statistics for the validation sample.

The results of the study will be disseminated by means of an unrestricted electronic thesis and by means of an article published in an accredited scientific journal. A summary of the research findings will be presented to the management of your organisation. In none of these instances will the identity of any research participant be revealed nor will the performance assessments for any focal employee be reported. Only aggregated statistics reflecting the psychometric integrity of the GPQ will be reported.

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. You may also refuse to answer any questions you don't want to answer 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 Daleen Myburgh [0798949975; daleen@enstb.co.za] and/or Prof Callie Theron [0842734139; ccth@sun.ac.za] both from the Department of Industrial Psychology of Stellenbosch University.

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 Maléne Fouché at the Unit for Research Development [mfouche@sun.ac.za; 021808 4622].

PROVIDING INFORMED CONSENT

Tick in the "Agree to participate" box below if you have read the information provided and consent to participate in the research under the conditions that were outlined above. Tick in the "Decline invitation to participate" box below if you have read the information provided and do not consent to participate in the research under the conditions that were outlined above.

I agree to participate in the research study	
I decline invitation to participate in the research study	

INSTRUCTIONS

INTRODUCTION

Performance is defined as observable behavioural actions relevant to the organisation's goals that employees perform. These behaviours are regarded as relevant because they are instrumental in achieving specific, desired outcomes. The behaviours are expressions of underlying latent performance dimensions. This questionnaire attempts to assess the level of competence with which non-managerial personnel perform on these performance dimensions.

Your ratings along with those of other suitably qualified respondents will be combined to form an overall performance rating for the focal employee on each of the non-managerial performance dimensions. That will assist him/her to come to a better understanding of his/her performance strengths and weaknesses and to identify avenues to improve performance on those dimensions on which employees are currently underperforming.

INSTRUCTIONS

The Generic Performance Questionnaire [GPQ] consists of 96 items measuring 12 latent performance dimensions. You have been asked to evaluate yourself. Please read each item carefully and choose the appropriate response option (1-5) that best describes the standard of performance that you displayed over the past 12 month by choosing the specific behaviours referred to in the item that the employee typically displayed over the assessment period and placing a cross on the corresponding scale value .

EXAMPLE

In your response to item A1 you should indicate the standard of task performance that you displayed over the past 12 month by choosing the specific behaviours that best describes the extent to which you meet production or services goals. If, for example, you over the past 12 months only seldom met production or service goals the response option 1 should be chosen by placing a cross on this option. If, however, you over the past 12 months consistently exceeded production or service goals the response option 5 should be chosen by placing a cross on this option. The response option 6 (Cannot rate) should be used as seldom as possible and only if you have had insufficient opportunity to observe the specific behavioural aspect the item refers to.

	Definitions	Well below standard 1	Below required standard 2	Satisfactory 3	Above required standard 4	Well above standard 5	Cannot rate
A	**TASK PERFORMANCE: The degree to which the employee effectively performs activities that contribute to the organization'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.**						
A1	Production or service goals	Seldom meets production or service goals; finds excuses for not meeting goals		Normally meets production or service goals, but does not exceed goals		Exceeds production or service goals every time	6
		1	2	3	4	5	

IMPORTANT

Please be objective. Do not allow yourself to be influenced by positive or negative feelings about the person you are rating. Evaluate his/her performance on each performance dimension according to its own merits. Please <u>be honest</u>, even it means giving poor ratings.

Continue to next page
Biographical information

BIOGRAPHICAL INFORMATION

Please fill out the biographical information requested below. The name of the ratee is required to collate the various ratings of the candidate whose performance is being appraised. The remainder of the biographical information is required for research purposes to ensure that measures comply with Employment Equity legislation requirements.

Surname and initials of the person being rated (ratee):										
Position of other rater		**Gender of rater**					**Job grade of rater (Peromnes)**			
Peer	Superior	Male		Female			7-12	13-16		17-19
First language of rater		**Race of rater**					**Tenure of rater in current position**			
English	Other language	Black	Coloured	Indian	Chinese	White	6 months	1 year	2-6 Years	➢ 5 years

Continue to next page

Performance rating

PERFORMANCE RATING

	Definitions	Well below standard 1	Below required standard 2	Satisfactory 3	Above required standard 4	Well above standard 5	Cannot rate
A	**TASK PERFORMANCE: The extent to which the employee effectively performs activities that contribute to the organization's technical core, performs the foundational, substantive or technical tasks that are 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.**						
A1	Production or service goals	He/she seldom meets production or service goals; finds excuses for not meeting goals		He/she normally meets production or service goals, but does not exceed goals		He/she exceeds production or service goals every time	6
		1	2	3	4	5	
A2	Quantity of work output	The amount of work he/she delivers is significantly below the required output		Normally he/she delivers the amount of work required, but no more		He/she consistently exceeds the amount of work required; he/she always does more than is expected	6
		1	2	3	4	5	
A3	Quality of work output	The quality of work he/she delivers is substantially below the required standards		Normally he/she delivers products or services of the required quality		He/she consistently exceeds the quality of work required; consistently exceeds quality standards	6
		1	2	3	4	5	
A4	Core task productivity	He/she achieves significantly less output than most employees with the same resources		He/she achieves basically the same output than most employees with the same resources		He/she achieve significantly more output than most employees with the same resources	6

	Definitions	Well below standard 1	Below required standard 2	Satisfactory 3	Above required standard 4	Well above standard 5	Cann ot rate
		1	2	3	4	5	
A5	Task effectiveness	He/she performs the core tasks that are essential for the specific job very ineffectively; he/she uses significantly more resources than typically required.		He/she performs the core tasks that are essential for the specific job effectively; he/she uses the amount of resources typically required.		He/she performs the core tasks that are essential for the specific job highly effectively; he/she uses significantly less resources than typically required.	6
		1	2	3	4	5	
A6	Task performance reputation for adding value	He/she has a task performance reputation for undermining the success of the organization or unit		He/she generally has a satisfactory task performance reputation for contributing to the success of the organization or unit.		He/she has an excellent task performance reputation for contributing to the success of the organization or unit	6
		1	2	3	4	5	
A7	Stick to the task role instruction	He/she fails to stick to the task roles prescribed by the job description		He/she generally sticks to the task roles prescribed by the job description		He/she fully sticks to the task roles prescribed by the job description	6
		1	2	3	4	5	
B	**EXERTING 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.**						
B1	Time	He/she regularly works less hours than required		He/she regularly works the required hours, rarely less, seldom more		He/she regularly works longer hours than required	6

	Definitions	Well below standard	Below required standard	Satisfactory	Above required standard	Well above standard	Cannot rate
		1	2	3	4	5	
		1	2	3	4	5	
B2	Care	He/she tends to be negligent; his/her work needs a lot of correction		He/she gives reasonable attention to detail but their work often still needs some correction		He/she gives a lot of attention to detail; their work needs almost no correction	6
		1	2	3	4	5	
B3	Perseverance	When circumstances gets though he/she tends to give up		He/she keeps going as long as the circumstances is reasonably good		When the circumstances are tough, he/she keeps going	6
		1	2	3	4	5	
B4	Effort	He/she can be counted on not to exercise extra effort if the task would need it		He/she sometimes would exercise extra effort if the task would need it but not always		He/she can be counted on to exercise extra effort if the task would need it	6
		1	2	3	4	5	
B5	Commitment	He/she shows a lack of commitment to their work		He/she is neither uncommitted nor really committed		He/she shows passionate commitment to their work	6
		1	2	3	4	5	
B6	Energy investment	He/she invests very little energy in their work		He/she invests only the energy that is necessary to get the job done		I He/she invests more energy than is necessary in their work	6
		1	2	3	4	5	
B7	Dedication	He/she demonstrates no dedication to work		He/she demonstrates some dedication to work		He/she demonstrates high dedication to work	6

	Definitions	Well below standard 1	Below required standard 2	Satisfactory 3	Above required standard 4	Well above standard 5	Cann ot rate
		1	2	3	4	5	
C	**ADAPTABILITY**: **The extent to which the employee adapts and responds effectively in situations where change is unavoidable, manages pressure effectively and copes well with setbacks, shows willingness to change his/her schedules in order to accommodate demands at work.**						
C1	Change	He/she resists change		He/she adapts to change		He/she welcomes and embraces change	6
		1	2	3	4	5	
C2	Adaptation	He/she fails to keep up with most new developments in their field		He/she stays up to date with most new developments in their field		He/she initiates new developments in their field	6
		1	2	3	4	5	
C3	Setbacks	He/she continues with the original plan when initial attempts fail to produce the desired effect		He/she initially continues with the original plan when initial attempts fail to produce the desire effect but eventually attempts alternative solutions		He/she seeks innovative alternative solutions when initial attempts fail to produce the desire effect	6
		1	2	3	4	5	
C4	Change in plans	He/she is upset and confused by unexpected change in plans		He/she is not upset and remains composed by unexpected change in plans		He/she enjoys the challenges brought by unexpected change in plans	6
		1	2	3	4	5	

	Definitions	Well below standard 1	Below required standard 2	Satisfactory 3	Above required standard 4	Well above standard 5	Cann ot rate
C5	Work schedule	He/she resists changing my schedule in order to accommodate demands at work		He/she changes their schedule in order to accommodate demands at work		I He/she willingly, without bitterness, changes their schedule in order to accommodate demands at work	6
		1	2	3	4	5	
C6	Pressure	He/she's performance worsens when they have to work under pressure		He/she succeeds in maintaining performance when they have to work under pressure		He/she performance excels when they have to work under pressure	6
		1	2	3	4	5	
C7	Prior notice	He/she dislikes it when they are not informed well ahead of time of plans		He/she does not mind if I only learn about plans at the last moment		He/she enjoys it if they only learn about plans at the last moment	6
		1	2	3	4	5	
C8	Openness	He/she insists that things should be done the way they have always been done		He/she does not insist that things should be done the way they have always been done		He/she insists that things cannot forever be done the way they have always been done	6
		1	2	3	4	5	

D	INNOVATING: The extent to which the employee displays creativity, not only in his/her individual job, but also on behalf of the whole organization, shows openness to new ideas and experiences, handles novel situations and problems with innovation and creativity, thinks broadly and strategically, supports and drives organisational change.						
D1	Creativity	He/she consistently displays a lack of imagination, originality and inventiveness, not only in their individual job, but also on behalf of the whole organization		He/she displays some originality, inventiveness and creativeness, not only in their individual job but also on behalf of the whole organization		He/she consistently displays exceptional originality, inventiveness and creativeness, not only in their individual job but also on behalf of the whole organization	6
		1	2	3	4	5	
D2	Openness	He/she consistently resists and attempts to avoid new ideas and experiences		He/she is open to new ideas and experiences		He/she consistently searches for, investigate and explores new ideas and experiences	6
		1	2	3	4	5	
D3	New problems	He/she consistently tries to fit inappropriate existing solutions to new problems		He/she sometimes finds innovative and creative solutions to new problems		He/she consistently finds innovative and creative solutions to new problems	6
		1	2	3	4	5	
D4	Change	He/she almost never suggests ways of improving the way work is done; he/she is content with the way things are done		He/she regularly suggests ways of improving the way work is done		He/she continuously suggests innovative and creative ways of improving the way work is done	6
		1	2	3	4	5	

			1	2	3	4	5	
D5	Open-mindedness	He/she consistently thinks narrowly, short-term and operationally		He/she sometimes thinks broadly, long-term and strategically		He/she consistently thinks broadly, long-term and strategically		6
		1	2	3	4	5		
D6	Brainstorming	He/she consistently comes up with only a limited range of obvious and unimaginative alternatives		He/she sometimes comes up with some unusual but thought-provoking alternatives		He/she consistently comes up with a broad range of unusual but thought-provoking alternatives		6
		1	2	3	4	5		
D7	Exploration	He/she almost never explores unfamiliar terrain to identify "white space/blue ocean" business opportunities		He/she occasionally explores unfamiliar terrain to identify "white space/blue ocean" business opportunities		He/she regularly explores unfamiliar terrain to identify "white space/blue ocean" business opportunities		6
		1	2	3	4	5		
D8	Improvement	He/she almost never reflects on possible ways of improving the way work is done		He/she sometimes reflects on possible ways of improving the way work is done		He/she continuously reflects on possible ways of improving the way work is done		6
		1	2	3	4	5		

E	**LEADERSHIP POTENTIAL: The extent to which the employee spontaneously empowers others, brings out extra performance in other employees, supports peers, helps them with challenges they face, motivates and inspires other employees, models appropriate behaviour, initiates action, provides direction and takes responsibility. The extent to which the employee spontaneously acts as *de facto* leader without actually occupying a formal leadership position.**					
E1	Empowers colleagues	He/she almost never spontaneously helps colleagues to develop their strengths and improve their weaknesses, facilitates the personal growth of colleagues and promotes continuous learning		He/she occasionally spontaneously helps colleagues to develop their strengths and improve their weaknesses, facilitate the personal growth of colleagues and promotes continuous learning		He/she consistently spontaneously helps colleagues to develop their strengths and improve their weaknesses, facilitates the personal growth of colleagues and promotes continuous learning	6
		1	2	3	4	5	
E2	Supports colleagues	He/she almost never spontaneously shows concern for the wellbeing of colleagues and for the ambitions, needs and feelings of others		He/she occasionally spontaneously shows concern for the wellbeing of colleagues and for the ambitions, needs and feelings of others		He/she consistently spontaneously shows concern for the wellbeing of colleagues and for the ambitions, needs and feelings of others	6
		1	2	3	4	5	
E3	Extra performance	He/she almost never spontaneously motivates colleagues to go the extra mile and to improve their performance		He/she occasionally spontaneously motivates colleagues to go the extra mile and to improve their performance		He/she consistently spontaneously motivates colleagues to go the extra mile and to improve their performance	6
		1	2	3	4	5	

E4	Inspires	He/she almost never spontaneously inspires colleagues to buy into a vision for the organisational unit they form part of		He/she sometimes spontaneously inspires colleagues to buy into a vision for the organisational unit they form part of		He/she regularly spontaneously inspires colleagues to buy into a coherent vision for the organisational unit they form part of	6
		1	2	3	4	5	
E5	Provides direction	He/she almost never spontaneously provides direction when colleagues are uncertain on how to proceed and brings clarity when confusion reigns		He/she sometimes spontaneously provides direction when colleagues are uncertain on how to proceed and brings clarity when confusion reigns		He/she regularly spontaneously provides direction when colleagues are uncertain on how to proceed and brings clarity when confusion reigns	6
		1	2	3	4	5	
E6	Visioning	He/she almost never spontaneously communicates any vision for the organisational unit they form part of		He/she sometimes spontaneously communicates a vision for the organisational unit they form part of		He/she regularly spontaneously communicates a coherent vision for the organisational unit they form part of	6
		1	2	3	4	5	
E7	Serves as role model	Almost no colleague regards him/her as a role model worth imitating		He/she is generally regarded by colleagues as a role model worth imitating		He/she is almost without exception regarded by colleagues as a role model worth imitating	6
		1	2	3	4	5	

E8	Informal leader	He/she never spontaneously acts as an informal leader amongst colleagues and they are not regarded by colleagues as such		He/she often spontaneously acts as an informal leader amongst colleagues and they are generally accepted by colleagues as such		He/she continuously spontaneously acts as an informal leader amongst colleagues and they are unanimously accepted by colleagues as such	6
		1	2	3	4	5	
F	**COMMUNICATION: The degree 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.**						
F1	Written communication	He/she always produces poorly worded written documents, memorandums and letters		Sometimes he/she produces sophisticatedly and eloquently worded written documents, memorandums and letters		He/she consistently produces sophisticatedly and eloquently worded written documents, memorandums and letters	6
		1	2	3	4	5	
F2	Written communication	He/she consistently produces unnecessary complicated, confusing, poorly structured written documents, memorandums and letters		He/she often produces clear, easily comprehensible, well-structured written documents, memorandums and letters		He/she consistently produces clear, easily comprehensible, well-structured written documents, memorandums and letters	6
		1	2	3	4	5	

F3	Verbal communication	He/she consistently formulates poorly worded comments, explanations and arguments		He/she often formulates sophisticatedly and eloquently worded comments, explanations and arguments		He/she consistently formulates sophisticatedly and eloquently worded comments, explanations and arguments	6
		1	2	3	4	5	
F4	Verbal communication	He/she consistently formulates confusing, poorly structured comments, explanations and arguments		He/she often formulates clear, easily comprehensible, well-structured comments, explanations and arguments		He/she consistently formulates clear, easily comprehensible, well-structured comments, explanations and arguments	6
		1	2	3	4	5	
F5	Networking	He/she has developed and successfully maintained only a small network of work-related contacts		He/she has developed and successfully maintains a reasonably large network of work-related contacts		He/she has developed and successfully maintains an extensive network of work-related contacts	6
		1	2	3	4	5	
F6	Networking	He/she does not use their network of contacts effectively to the advantage of the organisation		He/she uses their network of contacts reasonably effectively to the advantage of the organisation		He/she uses their network of contacts very effectively to the advantage of the organisation	6
		1	2	3	4	5	

F7	Persuasion	He/she is rather ineffective in persuading and influencing colleagues		He/she is reasonably effective in persuading and influencing colleagues		He/she is very effective in persuading and influencing colleagues	6
		1	2	3	4	5	
F8	Body language	He/she is seen by almost all of their colleagues as an unapproachable, tense, difficult-to-talk-to person		I He/she is seen by most of their colleagues as an friendly, relaxed, easy-to-talk-to person		He/she is seen by almost all of their colleagues as an friendly, relaxed, easy-to-talk-to person	6
		1	2	3	4	5	
G	**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 organization.**						
G1	Relationships	He/she maintains negative relationships with almost all of their colleagues in the organisation		He/she maintains positive, pleasant relationships with most of their colleagues in the organisation		He/she maintains positive, friendly relationships with almost all of their colleagues in the organisation	6
		1	2	3	4	5	
G2	Social interaction	He/she almost never interact on a social level with their colleagues		He/she sometimes interact on a social level with their colleagues		He/she regularly interact on a social level with their colleagues	6
		1	2	3	4	5	
G3	Pro-social behaviour	He/she consistently displays anti-social behaviour at work		He/she generally displays pro-social behaviour at work		He/she always displays pro-social behaviour at work	6
		1	2	3	4	5	

G4	Cooperates	He/she consistently cooperates and collaborate poorly with their colleagues in the organisation		He/she generally cooperates and collaborate well with their colleagues in the organisation		He/she consistently cooperates and collaborate well with their colleagues in the organisation	6
		1	2	3	4	5	
G5	Respect	He/she consistently shows a lack of respect and lack of positive regard when interacting with their colleagues at work		He/she generally shows respect and positive regard when interacting with their colleagues at work		He/she consistently shows respect and positive regard when interacting with their colleagues at work	6
		1	2	3	4	5	
G6	Solidarity	He/she consistently displays discord with colleagues at work		He/she generally displays unity with colleagues at work		He/she consistently displays unity with colleagues at work	6
		1	2	3	4	5	
G7	Getting along	He/she gets along with almost none of their colleagues in the organisation		He/she gets along with most of their colleagues in the organisation		He/she gets along with almost all of their colleagues in the organisation	6
		1	2	3	4	5	
G8	Values	He/she consistently fails to behave in a reliable, dependable manner with clear personal values that compliment those of the organization		He/she generally behaves in a reliable, dependable manner with clear personal values that compliment those of the organization		He/she consistently behaves in a reliable, dependable manner with clear personal values that compliment those of the organization	6
		1	2	3	4	5	
H	**MANAGEMENT: The extent to which the employee plans ahead and works in a systematic and organised way, follows directions and procedures, articulates goals for his/her performance, organises workload, monitors progress, helps to solve problems and to overcome crises, effectively coordinates different work roles.**						

H1	Plans ahead	He/she consistently fails to plan ahead and is often caught unprepared		He/she generally plans ahead and is seldom caught unprepared		He/she consistently plans ahead and is never caught unprepared	6
		1	2	3	4	5	
H2	Works systematically	He/she consistently approaches their work in an unsystematic and disorganised manner		He/she generally approaches their work in a systematic and organised manner		He/she consistently approaches their work in a systematic and organised manner	6
		1	2	3	4	5	
H3	Organises work	He/she consistently fails to effectively organise their work load and consequently struggles to successfully meet all their work responsibilities		He/she generally effectively organises their work load so as to successfully meet all their work responsibilities		He/she consistently effectively organises their work load so as to successfully meet all their work responsibilities	6
		1	2	3	4	5	
H4	Follows procedure	He/she carelessly moves away from prescribed work procedures		He/she generally sticks to prescribed work procedures		He/she diligently sticks to prescribed work procedures	6
		1	2	3	4	5	
H5	Sets goals	He/she consistently fails to set any specific, challenging performance goals for themselves		He/she generally sets performance goals for themselves		He/she consistently sets specific, challenging performance goals for themselves	6
		1	2	3	4	5	

H6	Monitors progress	He/she almost never monitors their progress towards achieving work goals		He/she generally monitors their progress towards achieving work goals		He/she consistently monitors their progress towards achieving work goals	6
		1	2	3	4	5	
H7	Coordinates	He/she consistently fails to coordinate their different work roles		He/she generally succeeds in coordinating their different work roles		He/she consistently succeeds in coordinating their different work roles	6
		1	2	3	4	5	
H8	Problems	He/she consistently requires somebody else to solve problems and crises related to their work		He/she generally solves problems and crises related to their work by themselves		He/she consistently solves problems and crises related to their work by themselves	6
		1	2	3	4	5	
I	**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 choosing the appropriate option from available information.**						
I1	Analytical thinking	He/she consistently fails to use analytic thinking at work to solve problems, to motivate their position in debates and to identify the appropriate course of action to take		He/she generally uses analytic thinking at work to solve problems, to motivate their position in debates and to identify the appropriate course of action to take		He/she consistently uses analytic thinking at work to solve problems, to motivate their position in debates and to identify the appropriate course of action to take	6
		1	2	3	4	5	

I2	Diagnostic thinking	He/she consistently attempts to solve problems without first attempting to diagnose the cause of the problem		He/she generally attempts to solve problems by first attempting to diagnose the cause of the problem		He/she consistently attempts to solve problems by first attempting to diagnose the cause of the problem	6
		1	2	3	4	5	
I3	Theorising	He/she almost never uses logical theoretical arguments to arrive at solutions to problems		He/she generally uses logical theoretical arguments to arrive at solutions to problems		He/she consistently uses logical theoretical arguments to arrive at solutions to problems	6
		1	2	3	4	5	
I4	Core issues	He/she consistently fails to identify the heart of the matter in complex situations and problems		He/she generally succeeds in identifying the heart of the matter in complex situations and problems		He/she consistently succeeds in identifying the heart of the matter in complex situations and problems	6
		1	2	3	4	5	
I5	Problem solving	He/she consistently attempts to solve problems at work in a illogical, disorganized way		He/she generally attempts to solve problems at work in a logical systematic way		He/she consistently attempts to solve problems at work in a logical systematic way	6
		1	2	3	4	5	
I6	Deductive decision-making	He/she consistently makes decisions by illogically and emotionally choosing an option from available alternatives		He/she generally makes decisions by logically choosing the appropriate option from available alternatives		He/she consistently makes decisions by logically choosing the appropriate option from available alternatives	6
		1	2	3	4	5	

I7	Technology	He/she never learns and utilises new technology		He/she occasionally learns and utilises new technology		He/she continuously learns and utilises new technology			6
		1	2	3	4	5			
I8	Intelligence	He/she consistently comes up with inappropriate solutions to problems		He/she generally comes up with intelligent solutions to problems		He/she consistently comes up with intelligent solutions to problems			6
		1	2	3	4	5			
J	**COUNTERPRODUCTIVE WORK BEHAVIOUR: The extent to which the employee displays behaviour that threatens the wellbeing of an organization, 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 organizational goals.**								
J1	Organisational wellbeing	He/she frequently displays behaviour that threatens the wellbeing of the organisation		He/she occasionally displays behaviour that promotes the wellbeing of the organisation		He/she frequently displays behaviour that promotes the wellbeing of the organisation			6
		1	2	3	4	5			
J2	Organisational rules	He/she tends to disobey organisational rules and ignores procedures		He/she generally obeys organisational rules and procedures		He/she diligently submits to organisational rules and procedures			6
		1	2	3	4	5			
J3	Personal discipline	He/she shows poor personal discipline		He/she shows reasonably good personal discipline		He/she shows excellent personal discipline			6
		1	2	3	4	5			

J4	Confrontation	He/she is difficult to get along with: He/she tends to be involved in destructive inter-personal conflict with colleagues and superiors		He/she get along with most: He/she is seldom involved in destructive inter-personal conflict with colleagues and superiors		He/she gets along well with almost everybody: He/she succeeds in keeping out of-destructive inter-personal conflict with colleagues and superiors	6
		1	2	3	4	5	
J5	Trouble	He/she tends to be in trouble for disobeying the disciplinary code of the organisation		He/she generally avoids disobeying the disciplinary code of the organisation		He/she diligently avoids disobeying the disciplinary code of the organisation	6
		1	2	3	4	5	
J6	Instructions	He/she intentionally or through carelessness fails to execute lawful instructions		He/she generally executes lawful instructions		He/she diligently executes lawful instructions	6
		1	2	3	4	5	
J7	Sexual harassment	He/she tends to treat members of the opposite sex with disrespect: He/she tends to abuse relationships		He/she generally treats members of the opposite sex with respect: He/she generally does not abuse relationships		At all times he/she treats members of the opposite sex with respect: He/she does not abuse relationships with colleagues	6
		1	2	3	4	5	
J8	Theft	He/she tends to inappropriately uses and/or takes organisation property for themselves		He/she generally avoids the inappropriate use and theft of organisation property		He/she carefully avoids the inappropriate use and theft of organisation property	6
		1	2	3	4	5	

J9	Substance abuse	Substance abuse tends to interfere with his/her performance at work		He/she generally avoids substance abuse at work		He/she is never guilty of substance abuse at work	6
		1	2	3	4	5	
J 10	Bullying	He/she tends to bully colleagues at work		He/she generally avoids bullying colleagues at work		He/she never bullies colleagues at work	6
		1	2	3	4	5	
K	**ORGANIZATIONAL CITIZENSHIP BEHAVIOUR: The extent to which the employee displays voluntary behaviour contributing towards the overall effectiveness of the organization, 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 constructively involved in organisational affairs.**						
K1	Helping behaviour	He/she very seldom helps colleagues with work problems unless explicitly instructed to do so		He/she sometimes, helps colleagues with work problems without being instructed to do so		He/she regularly helps colleagues with work problems without being instructed to do so	6
		1	2	3	4	5	
K2	Sportsmanship	He/she tends to complain and is negative when faced by unavoidable inconveniences and burdens arising from work		He/she tolerates unavoidable inconveniences and burdens arising from their work		He/she maintains a positive attitude despite unavoidable inconveniences and burdens arising from their work	6
		1	2	3	4	5	
K3	Organisational loyalty	He/she criticises, opposes and attacks the organisation in front of outsiders		He/she refrains from criticising, opposing and attacking the organisation in front of outsiders		He/she passionately endorses, supports and defends the organisation to outsiders	6
		1	2	3	4	5	

K4	Civic virtue	He/she shows an unwillingness to actively participate in organisational governance and to look out for the organisations' best interests		He/she is willing but not really keen to participate in organisational governance and to look out for the organisation's best interests		He/she shows a keen willingness to actively participate in organisational governance and to look out for the organisation's best interests.	6
		1	2	3	4	5	
K5	Organisational compliance	He/she regularly fails to submit to organisational rules and procedures		He/she generally follows organisational rules and procedures		He/she follows organisational rules and procedures to the letter at all times	6
		1	2	3	4	5	
K6	Beyond call of duty	He/she only does what is expected of them. He/she refuses to go the extra mile.		He/she is willing but not really keen to go beyond the call of duty and to go the extra mile		He/she always shows a willingness to go beyond the call of duty and to go the extra mile	6
		1	2	3	4	5	
K7	General OCB	He/she almost never displays voluntary behaviour that is not formally part of their job description that contributes towards the overall effectiveness of the organization.		He/she sometimes displays voluntary behaviour that is not formally part of their job description that contributes towards the overall effectiveness of the organization.		He/she regularly displays voluntary behaviour that is not formally part of their job description that contributes towards the overall effectiveness of the organization.	6
		1	2	3	4	5	

L	**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 seeks opportunities for self-development and career advancement.**						
L1	Responsibility	He/she accepts no responsibility for their own career development		He/she accepts some responsibility for their own career development		He/she accepts full responsibility for their own career development	6
		1	2	3	4	5	
L2	Opportunity	He/she allows most opportunities for self-development to pass them by		He/she utilises some available opportunity for self-development but still allows too many valuable opportunities to pass them by		He/she makes use of almost every available opportunity for self-development	6
		1	2	3	4	5	
L3	Development areas	He/she has no clear picture of the areas in which self-development is required		He/she has a basic idea of the areas in which self-development is required		He/she has a comprehensive understanding of the areas in which self-development is required	6
		1	2	3	4	5	
L4	Career objective	He/she has no clear picture of where their career is heading		He/she has a vague idea of where their career is heading		He/she has a clear, well-defined career path for the future	6
		1	2	3	4	5	
L5	Career planning	He/she has no clear plans on how their career goals are to be achieved		He/she has vague plans on how their career goals are to be achieved		He/she has clear, well-defined plans on how their career goals are to be achieved	6
		1	2	3	4	5	

L6	Internal control	He/she passively accepts how the organisation dictates that their career should unfold over time		He/she exercises limited control over the direction in which their career develops over time; He/she largely allows the organisation to determine matters.		He/she exercises active control over the direction in which their career develops over time; He/she works in active partnership with the organisation	6
		1	2	3	4	5	
L7	Self-development	He/she does very little to improve their ability to perform the job		He/she shows limited initiative at improving their ability to perform the job		He/she works purposefully at improving their ability to perform the job	6
		1	2	3	4	5	
L8	Self-development	He/she does practically nothing to try to keep up with new developments in their field		He/she makes some attempt to try to keep up with new developments in their field		He/she works diligently to keep up to date with new developments in their field	6
		1	2	3	4	5	
L9	Perspective	He/she assumes that the organisation will facilitate career success		He/she vaguely senses that they have to be actively involved in career development to achieve career success.		He/she clearly understands that they have to work in active partnership with the organisation to achieve career success	6
		1	2	3	4	5	

THANK YOU

Appendix B

SPSS syntax for the calculation of item parcels

```
DATASET ACTIVATE DataSet1.
COMPUTE PA1=Mean(A1,A7).
EXECUTE.

COMPUTE PA2=Mean(A2,A3,A6).
EXECUTE.

COMPUTE PA3=Mean(A4,A5).
EXECUTE.

COMPUTE PB1=Mean(B1,B7).
EXECUTE.

COMPUTE PB2=Mean(B2,B6,B3).
EXECUTE.

COMPUTE PB3=Mean(B4,B5).
EXECUTE.

COMPUTE PC1=Mean(C1,C8).
EXECUTE.

COMPUTE PC2=Mean(C2,C7).
EXECUTE.

COMPUTE PC3=Mean(C3,C6).
EXECUTE.

COMPUTE PC4=Mean(C4,C5).
EXECUTE.

COMPUTE PD1=Mean(D1,D8).
EXECUTE.

COMPUTE PD2=Mean(D2,D7).
EXECUTE.

COMPUTE PD3=Mean(D3,D6).
EXECUTE.

COMPUTE PD4=Mean(D4,D5).
EXECUTE.

COMPUTE PE1=Mean(E1,E8).
EXECUTE.

COMPUTE PE2=Mean(E2,E7).
EXECUTE.

COMPUTE PE3=Mean(E3,E6).
EXECUTE.

COMPUTE PE4=Mean(E4,E5).
EXECUTE.

COMPUTE PF1=Mean(F1,F8).
EXECUTE.

COMPUTE PF2=Mean(F2,F7).
EXECUTE.

COMPUTE PF3=Mean(F3,F6).
EXECUTE.
```

```
COMPUTE PF4=Mean(F4,F5).
EXECUTE.

COMPUTE PG1=Mean(G1,G8).
EXECUTE.

COMPUTE PG2=Mean(G2,G7).
EXECUTE.

COMPUTE PG3=Mean(G3,G6).
EXECUTE.

COMPUTE PG4=Mean(G4,G5).
EXECUTE.

COMPUTE PH1=Mean(H1,H8).
EXECUTE.

COMPUTE PH2=Mean(H2,H7).
EXECUTE.

COMPUTE PH3=Mean(H3,H6).
EXECUTE.

COMPUTE PH4=Mean(H4,H5).
EXECUTE.

COMPUTE PI1=Mean(I1,I8).
EXECUTE.

COMPUTE PI2=Mean(I2,I7).
EXECUTE.

COMPUTE PI3=Mean(I3,I6).
EXECUTE.

COMPUTE PI4=Mean(I4,I5).
EXECUTE.

COMPUTE PJ1=Mean(J1,J10).
EXECUTE.

COMPUTE PJ2=Mean(J2,J9).
EXECUTE.

COMPUTE PJ3=Mean(J3,J8).
EXECUTE.

COMPUTE PJ4=Mean(J4,J7).
EXECUTE.

COMPUTE PJ5=Mean(J5,J6).
EXECUTE.

COMPUTE PK1=Mean(K1,K7).
EXECUTE.

COMPUTE PK2=Mean(K2,K6,K3).
EXECUTE.

COMPUTE PK3=Mean(K4,K5).
EXECUTE.
```

```
COMPUTE PL1=Mean(L1,L9).
EXECUTE.

COMPUTE PL2=Mean(L2,L8).
EXECUTE.

COMPUTE PL3=Mean(L3,L7).
EXECUTE.

COMPUTE PL4=Mean(L4,L6,L5).
EXECUTE.
```