AN INVESTIGATION INTO THE INTERNAL STRUCTURE OF THE UNIT PERFORMANCE CONSTRUCT AS MEASURED BY THE PERFORMANCE INDEX (PI)

By

Roline Henning

ASSIGNMENT SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS
FOR THE DEGREE OF
MASTERS OF ARTS (INDUSTRIAL PSYCHOLOGY) AT THE
UNIVERSITY OF STELLENBOSCH

SUPERVISOR: PROF. C.C. THERON

DECEMBER 2002

DECLARATION

I, the undersigned, hereby declare that the work contained in this assignment is my own original work and that I have not previously in its entirety or in part, submitted it at any university for a degree.

Date: 28.11.2002

ABSTRACT

The responsibility for the performance of any organisational unit ultimately lies with the leadership of the unit. Given this perceived pivotal role of leadership in work unit performance, the ultimate objective is to capture the nature of the presumed relationship between leadership and unit performance in a comprehensive structural model. To validate such a leadership model, however, requires an explanation of the manner in which the unit performance dimensions affect each other. Spangenberg and Theron (2002b) developed a generic, standardized unit performance measure (PI) that encompasses all the unit performance dimensions for which the unit leader could be held responsible.

The objective of this paper is to investigate the internal structure of the PI in order to establish the inter-relationships between the eight unit performance latent variables. The PI consists of 56 questions covering eight dimensions. The validation sample consisted of 304 completed PI questionnaires. However, after imputation 273 cases with observations on all 56 items remained in the validation sample. Item analysis and dimensionality analysis was performed on each of the sub-scales using SPSS. Thereafter, confirmatory factor analysis was performed on the reduced data set using LISREL. The results indicated satisfactory factor loadings on the measurement model. Acceptable model fit was achieved for the measurement model. Subsequently, the structural model was tested using LISREL. The results provided statistics of good fit. Only four hypotheses failed to be corroborated in this study.

Conclusions were drawn from the results obtained and suggestions for further research are made.

OPSOMMING

Die prestasie van enige organisatoriese werkeenheid is die uiteindelike verantwoordelikheid van die leierskap van die eenheid. Gegewe hierdie waargenome sleutelrol van leierskap in werkeenheidprestasie, is die uiteindelike doelwit om die aard van die veronderstelde verwantskap tussen leierskap en eenheidprestasie in 'n omvattende strukturele model vas te lê. Die validering van so 'n leierskapmodel vereis egter 'n uiteensetting van die wyse waarop die eenheidprestasie-dimensies mekaar onderling beïnvl oed. Spangenberg en Theron (2002b) het 'n generiese, gestandaardiseerde eenheidprestasie-meetinstrument (PI) ontwikkel wat al die eenheidprestasie-dimensies insluit waarvoor die leier van die eenheid verantwoordelik gehou kan word.

Die doel van hierdie studie is om ondersoek in te stel na die interne struktuur van die PI ten einde die inter-verwantskappe tussen die agt eenheidprestasie latente veranderlikes vas te stel. Die PI bestaan uit 56 vrae wat die agt dimensies dek. Die validasiesteekproef bestaan uit 304 voltooide PI vraelyste. Na vervanging van ontbrekende waardes is die validasiesteekproef egter gereduseer tot 273 gevalle met waarnemings op al 56 items. Item-ontleding en dimensieanalise is op elk van die sub-skale met behulp van SPSS gedoen. Daaropvolgend is bevestigende faktor-analise op die verkorte datastel gedoen met behulp van LISREL. Die passingstatistieke het hier aanvaarbare resultate opgelewer. Vervolgens is die strukturele model met behulp van LISREL getoets. Die resultate het hier bevredigende passingstatistieke gelewer. Daar kon vir slegs vier hipoteses nie steun gevind word in die studie nie.

Op grond van die resultate is daar tot bepaalde gevolgtrekkings gekom en daar word aanbevelings vir verdere navorsing gemaak.

ACKNOWLEDGEMENTS

1. My thanks go to my study leader, Prof. C. C. Theron, who has been a pillar of moral support throughout this thesis. His enthusiasm for the topic was contagious and carried me through many difficult moments. Thanks Prof. for your guidance and patience over the past year. I could not have done it without you!

2. To my darling husband Ockert: Thank you for being my best friend.

CONTENTS

LIST OF TABLES

LIST OF FIGURES

1. INTRODUCTION

Leadership is one of the most researched aspects of organisational life. Today, as organisations struggle to remain competitive in the face of increasing foreign and domestic competition, interests centre on the leader's role in influencing performance, both in his/her subordinates and in his/her work unit as a whole. Teamwork is one of the means used by organisations to increase productivity and is increasingly becoming an integral part of organisational life (Barrett, 1987; Bettenhausen, 1991; Galagan, 1988; Hoerr, 1989). Thus, a leader's effectiveness is measured by the performance of his or her team (Kolb, 1996).

Several researchers have found in support of the above mentioned that an effective team leader is critical for successful team performance (Boss, 1978; Hirokawa & Keyton, 1995; Larson & LaFasto, 1989). In addition, the performance of the leader influences overall organisational unit performance. House (1988) reported that changes in managerial effectiveness were directly related to changes in organisational effectiveness. Given this focus on the leader's role in influencing performance, considerable practitioner interest and substantial research efforts have centred on the behaviours and competencies of successful leaders (Alexander, Penley & Jernigan, 1992; Luthans & Lockwood, 1984; Trujillo, 1985; Wellmon, 1988; Yukl, 1987). Spangenberg and Theron (2002a) have developed, specifically for the South African context, a comprehensive leadership behaviour index (LBI) to identify those latent leadership dimensions on which a leader performs relatively less well in order to improve leader effectiveness and ultimately unit performance.

Spangenberg and Theron (2002b) also developed a generic, standardized unit performance measure (PI) that encompasses all the unit performance dimensions for which the unit leader could be held responsible. Given the perceived pivotal role of leadership in work unit performance, their objective is to capture the nature of the presumed relationship between leadership and unit performance in a comprehensive structural model. Each of the eight unit performance dimensions of the PI was item-analysed through the SPSS Reliability Procedure (SPSS, 1990). Given the intended use of the PI as a comprehensive criterion measure against which to validate leadership and other competency assessments, the relatively high item homogeneity found by Spangenberg and Theron (2002b) for each dimension, as indicated by the Cronbach alpha values (alpha values > 0,8310) are extremely gratifying.

The intention of Spangenberg and Theron (2002b) to develop a comprehensive structural model that would explain the manner in which the various latent leadership dimensions affect the endogenous unit performance latent variables however requires an explanation of the manner in which the unit performance dimensions affect each other. The development of this section of the comprehensive structural model, furthermore, should occur prior to trying to link the various dimensions of leadership to unit performance. The objective of this paper thus is to investigate the internal structure of the PI in order to establish the inter-relationships between the eight unit performance latent variables.

Subsequently, the development of the PI by Spangenberg and Theron (2002b) will be described and thereafter an argument will be presented as to how the eight unit performance latent variables influence each other.

2. MODELS OF ORGANISATIONAL EFFECTIVENESS

2.1 Goal and systems approach

According to Spangenberg and Theron (2002b) the literature describes two main approaches to organisational performance and effectiveness, namely the goal approach and the systems approach. The goal model focuses on outcomes of the organisation - the more closely an organisation's outputs meet its goals, the more effective it is considered to be. Organisational effectiveness is measured in terms of financial measures of performance such as profitability, ROI, market share and return on assets (Etzioni, 1960; 1964).

A discernable trend in performance measurement, however, seems to be to move away from extensive and/or exclusive use of financial measures to the use of both financial and non-financial measures.

Weaknesses of the goal model lead to the development of systems models of organisational effectiveness, which focus on the means to achieve the objectives of organisations, rather than on the ends themselves (Miles, 1980). The main outcomes of the systems model are survival, growth, and stability or decline (Denison, 1990).

The systems approach led to the idea of measuring the characteristics of major components of the systems model that results in organisational survival and growth. According to Reiman in Spangenberg and Theron (2002b), system model measures can predict organisational survival and growth. Nicholson and Brenner (1994) further substantiated such measurement by successfully testing a four-element model of organisational performance on a sample of 4,000. The model that comprises four elements, namely wealth, markets, adaptability, and climate describes the management process as the linkage between the elements, forming a cycle of actions and outcomes. An additional parameter, expected future growth, was developed to serve as an overall index of future expected performance.

Another factor that impacts on the systems model of effectiveness is time. Considering that the organisation is part of a larger system, namely the environment, through time the organisation acquires, processes and returns resources to the environment. The ultimate criterion of organisational effectiveness is sustainability in the environment. Survival of the organisation is, therefore, the long-term criterion of effectiveness.

2.2 Time-Dimension Model

According to Gibson, Ivansevich and Donnelly (1991) the time-dimension model defines organisational effectiveness criteria over the short term, intermediate term and long term. Gibson, et al. (1991) classified the large number of short-term measures into three overall criteria of effectiveness, namely production, efficiency and satisfaction. In this context, production reflects the ability of an organisation to produce the quantity and quality of products and services demanded by the environment. Efficiency comprises the ratio of outputs to inputs. Satisfaction refers to the consideration given to benefits received by stakeholders such as customers, clients, and employees. Effectiveness in the medium term comprises adaptiveness and development. Adaptiveness reflects the extent to which the organisation can and does respond to external and internal changes. Development ensures effectiveness over time by way of investing resources in such a way that the organisation is able to meet future environmental demands. Survival is the ultimate criterion of effectiveness. Spangenberg and Theron (2002b) extended the time-dimension model by including an additional dimension, namely nature of measurement: financial versus non-financial, based on literature that emphasises the need for non-financial measurements to facilitate the creation of value for the organisation.

Short-term non-financial performance measures include outputs (for the purpose of clarity the term production is replaced by outputs), efficiency and employee satisfaction.

Medium range non-financial performance measures are viewed as important contributors of value to organisations and are aptly called value drivers or lead variables. The following growth-orientated facilitators will be discussed: development, adaptability and corporate climate. In order to meet future environmental demands, organisations have to invest resources for development wisely. This includes continued investment both in production capacity and building out the capabilities of managerial and non-managerial staff. Gibson, et al. (1991) argues that future oriented investment of resources may reduce production and efficiency in the short term, but if properly managed, development efforts often are the key to survival.

Systems theory stresses the importance for the organisation of adapting to the external and internal environments and adapt its visioning and strategising, management practices, and policies in response to those changes (Denison & Mishra in Spangenberg & Theron, 2002b). Research conducted by Nicholson and Brenner (1994) allowed perceptual measures of interrelatedness amongst the systems model's elements to be tested by means of LISREL. The model comprises four elements, namely wealth, markets, adaptability, and climate, with expected future growth as an overall index of future expected performance. Results confirm some of the model's predicted relationships and shed light on the possible significance of relationships among the performance measures. The main finding is that adaptability emerged as the core of organisational effectiveness. This applied either when adaptability is directly associated with other outcomes (system elements) or when it mediated them. According to Nicholson and Brenner (1994), the finding is consistent with their view that mastery of uncertainty (adaptability) is a survival requirement in facing the demands of the modern corporation.

In their model of organisational effectiveness Nicholson and Brenner (1994) define climate as the ambiance of an organisation as reflected in its morale, conviviality, satisfaction, and shared commitment. The second major finding of their study on organisational effectiveness is the central role played by global climate, both as an intervening variable and as a predictor of perceived future success. According to Nicholson and Brenner (1994), and Denison (1990), climate is essential for understanding organisational performance. Furthermore, a favourable attitudinal climate is a precondition to the continued effectiveness of the high performance, market/client driven organisation.

The long-term outcome indicator of survival is not described by Gibson, et al. (1991). Spangenberg and Theron (2002b) replaced survival by survival and future growth with the emphasis on future growth. Nicholson and Brenner (1994) include five variables in their conceptualisation of future growth, namely market share, profits, capital investments, staff levels and acquisitions.

3. LINKAGE BETWEEN FINANCIAL AND NON-FINANCIAL PERFORMANCE MEASURES

In a comprehensive literature review, Ittner and Larcker (1998) report on two streams of research that address the association between non-financial performance measures and organisational performance. The first stream investigates claims that non-financial performance measures are "leading" indicators that provide information on future performance that is not reflected by traditional performance measures. According to Ittner and Larcker (1998), surveys however indicate that organisations experience considerable difficulty in linking these measures to indicators of future financial performance.

The second stream of research focused on the use and performance consequences of non-financial measures in organisations applying TQM or other advanced manufacturing systems. In nearly all studies positive correlations were found between the emphasis placed on TQM, just-in-time (JIT) production practices or manufacturing flexibility and provision of non-financial measures such as defect rates, on-time delivery, and machine utilisation (Abernety & Lillis, 1995; Banker, Potter & Schroeder, 1993; Daniel & Reitsperger, 1991a, 1991b; Perera, Harrison & Poole, 1997). Empirical support for the hypothesised performance benefits from these indicators is, however, marginal (Ittner & Larcker, 1998).

Kaplan and Norton's (2001) exposition of the factors that prevent valid evaluation of intangible (non-financial) assets on balance sheets may however partly explain the weak association between individual non-financial performance measures and financial performance of organisations. Firstly, the value from intangible assets is indirect and, therefore, assets such as knowledge and technology seldom have a direct impact on revenue and profit. Instead, improvements in intangible assets affect financial performance through a series of cause-effect relationships that may comprise a number of stages (Becker & Huselid, 1998; Huselid, 1995).

Secondly, the value of intangible assets depends on organisational context and strategy. This value cannot be separated from the organisational processes that transform intangibles into customer and financial outcomes. The balance sheet, however, is a linear, additive document that records each class of asset separately and calculates the total by adding up each asset's recorded value. In contrast, the value created by investing in individual intangible assets is neither linear nor additive.

4. THE PERFORMANCE INDEX (PI) OF SPANGENBERG AND THERON

Based on the foregoing discussion covering organisational effectiveness and financial and non-financial performance measures, Spangenberg and Theron (2002b) compiled a base-line structure for a model of work unit performance effectiveness. The model is a combination of Nicholson and Brenner's systems approach, Conger and Kanungo's leadership outcomes (Conger & Kanungo, 1998) and Gibson et al.'s (1991) time-dimension model of organisational performance.

Four dimensions of Nicholson and Brenner's systems approach (1994), namely wealth, markets, adaptability and climate (plus the additional parameter of future growth) were retained and expanded or adapted as follows.

The three dimensions of wealth, adaptability, and climate, and the parameter of future growth were retained. The dimension market share was expanded to address the needs of non-profit organisations and its name was changed to market share/scope/standing. The dimension of climate was split into work unit climate and individual climate (satisfaction) because of a relatively large number of items that pertain to individual employee sentiments, including outcomes of leadership effectiveness (Conger & Kanungo, 1998). The short-term dimension of outputs/production-efficiency of the UPQ (Cockerill, Schroder & Hunt, 1993; Gibson, et al., 1991) was added, with slightly changed items.

The only major adaptation subsequently made to the model was the inclusion of the dimension core people processes. Core people processes represent Beckhard's (1969) and Beckhard and Harris (1987) criteria of organisational health and effectiveness that are mostly people-related processes and systems, e.g. communication, decision-making and rewarding performance.

Subsequently the Performance Index questionnaire was developed and consists of 56 questions covering eight latent dimensions. The dimensions, with a brief description of each dimension, are presented in Table 1.

Table 1. Brief summaries of the PI unit performance dimensions

1	Production and efficiency	Include quantitative outputs such as meeting goals, quantity, quality and cost-effectiveness, and task performance.
2	Core people processes	Reflect organisational effectiveness criteria such as goals and work plans, communication, organisational interaction, conflict management, productive clashing of ideas, integrity and uniqueness of the individual or group, learning through feedback and rewarding performance.
3	Work unit climate	Is a global perception of the psychological environment of the unit, and gives an overall assessment of the integration, commitment and cohesion of the unit. It includes working atmosphere, teamwork, work group cohesion, agreement on core values and consensus regarding the vision, achievement-related attitudes and behaviours and commitment to the unit.
4	Employee satisfaction	Centres around satisfaction with the task and work context, empowerment, and career progress, as well as with outcomes of leadership, e.g. trust in and respect for the leader and acceptance of the leader's influence.
5	Adaptability	Reflects the flexibility of the unit's management and administrative systems, core processes and structures, capability to develop new products/services and versatility of staff and technology. Overall, it reflects the capacity of the unit to appropriately and expeditiously to change.
6	Capacity (wealth of resources)	Reflect the internal strength of the unit, including financial resources, profits and investment, physical assets and materials supply and quality and diversity of staff.
7	Market share/scope/standing	Includes market share (if applicable), competitiveness and market-directed diversity of products or services, customer satisfaction and reputation for adding value to the organisation.
8	Future growth	Serves as an overall index of projected future performance and includes profits and market share (if applicable), capital investment, staff levels and expansion of the unit.

5. A PROPOSED UNIT PERFORMANCE STRUCTURAL MODEL

When evaluating the success of an organisational unit, all eight aspects of the PI need to form part of the spectrum of unit performance dimensions that should be assessed. What this study seeks to establish is the nature of causal linkages between the eight unit performance dimensions and thus more specifically the extent to which these unit performance dimensions are directly and indirectly dependant on each other. The proposed linkages between the unit performance dimensions are based on the following argument.

Organisational units do not constitute natural phenomena but rather man made phenomena and exist for a definite reason and with a specific purpose. The explicit purpose for existence is either the production of a specific product (or component thereof) or service (or component thereof) that satisfies the multitude of needs of society. In order to be instrumental in the satisfaction of these multitudes of needs, organisational units (in a free market economy) have to combine and transform scarce production factors into products and services with maximum economic utility. Organisational units are thus confronted with a choice of alternative utilisation possibilities regarding the limited factors of production it has access to. However, organisational units are guided in this choice by the economic principle which commands organisational units to attain with the lowest possible input of production factors the highest possible output of products and/or services in order to satisfy needs.

Organisational units are evaluated in terms of the efficiency with which they produce these specific products (or component thereof) or services (or component thereof) with the minimum factors of production and in terms of the extent to which they satisfy their client's quality, quantity and distributional expectations. If an organisational unit consistently succeeds in delivering a superior output to its clients over an extended period of time, it thereby develops an elevated market standing and a satisfied client base. An increase in market standing enhances the overall reputation of the organisational unit. The organisational unit tends to become synonymous with the type of product/service in question and simultaneously expands its market share. A causal linkage is thus proposed between Production and Efficiency (Product) and Market standing/scope/share (Market).

The environment in which organisational units operate is characterised by instability and unpredictability; in other words the environment is dynamic and complex. To ensure that current high production will continue in future and to ensure future growth, it requires from the organisational unit the ability to respond appropriately and expeditiously to changes in the environment. However, in order to respond in such a manner, it is essential that the unit be given the appropriate direction in which change should occur. In addition, however, the organisational unit should possess the structural and procedural flexibility to timeously respond to such directives. Only if the organisational unit has flexible management and administrative systems, flexible core processes and flexible structures combined with versatile, multi-skilled staff, can it respond appropriately (under visionary leadership) and expeditiously to environmental change so as to maintain its dominant market position and achieve future growth. If an organisational unit currently has a high market standing due to its consistently efficient delivery of a superior product/service and the organisational unit has the ability to adapt to internal and/or external environmental changes, should they occur, the unit will currently be characterized by high future growth prospects. A causal linkage is thus hypothesized between Market standing/scope/share (Market) and Future growth (Growth), between Capacity (Capacit) and Future growth (Growth), and between Adaptability (Adapt) and Market standing/scope/share (Market). Given the perceptual nature of the PI, Market standing/scope/share is thus assumed to mediate the effect of Adaptability on Future growth perceptions. Adaptability (Adapt) is also hypothesized to influence Production and Efficiency (Product) positively. Adaptability is thus assumed to have both a mediated and an unmediated effect on Market standing/scope/share. No direct causal linkage is proposed between Production and Efficiency (Product) and Future growth (Growth).

Current high market standing due to consistently efficient delivery of a superior product/service cannot be achieved without at least three additional broad prerequisites being met.

Efficient core people processes and structures represent a first, indispensable requirement for high unit production efficiency. Extensive research supports the notion that human recourses management practices (HRM) impact on productivity. Cutcher-Gershenfeld (1991) found that organisations adopting "transformational" labour relation practices – those emphasising corporation and dispute resolution - had lower costs, higher productivity and a greater return on direct labour hours than did firms using "traditional" adversarial labor relations practices. Katz, Kochan and Weber (1985) demonstrated that highly effective industrial relations systems, defined as those with fewer grievances and disciplinary actions and lower absenteeism, increased product quality and direct labour efficiency. Katz, Kochan and Keefe (1987) further showed that a number of innovative work practices improved productivity. Katz, Kochan and Gobeille (1983) and Schuster (1983) found that quality of work life (QWL), quality circles and labour-management teams increased productivity. Bartel (1994) established a link between the adoption of training programmes and productivity growth while Holzer (1987) showed that extensive recruiting efforts increased productivity. Guzzo, Jette and Katzell's (1985) meta-analysis demonstrated that training, goal setting and sociotechnical systems design had significant and positive effects on productivity. Links between incentive and positive effects on productivity have consistently been found as well (Gerhart & Milkovich, 1992; Weitzman & Kruse, 1990). It is thus with great confidence that a direct positive linkage is hypothesized between Core people processes (Core) and Production and Efficiency (Product).

Efficient core people processes, characterized by clear goals and work plans, open communication, vibrant interaction and productive clashing of ideas aimed at improving unit performance in which contributions of individual unit members are valued and rewarded, should result in high employee satisfaction. In as far as clear purpose and fruitful, open, orderly interaction between unit members constitute an expression of effective unit leadership, efficient core people processes should also result in trust and respect for the unit leader and acceptance of the leader's influence. Core people processes (Core) is thus hypothesized to positively influence Employee satisfaction (Satisf).

A clear sense of purpose combined with genuine unit member participation and involvement should foster a highly cohesive, well-integrated work unit with shared values committed to a common vision. If unit members have trust in the unit leader and they buy into what the unit is trying to achieve and how it is trying to achieve it due to them being allowed the opportunity to affect the operations of the unit, a positive work unit climate should emerge. Core people processes (Core) is thus hypothesized to influence work unit climate (Climate) directly and indirectly via Employee satisfaction (Satisf).

Continuous creative productive clashing of ideas, a willingness to experiment with and learn from novel ideas and practices in addition seems to represent an important prerequisite for the unit to respond timeously and expeditiously to change in the environment. A positive linkage is thus proposed between Core people processes (Core) and Adaptability (Adapt) and between Core people processes (Core) and Future growth (Growth).

Being a member of a unit with the capacity to react appropriately and expeditiously to environmental change should foster a feeling of confidence, of being in control – especially if such capacity, combined with efficient core people processes has resulted in sustained production and efficiency over time. A positive causal linkage is thus hypothesized between Adaptability (Adapt) and Employee satisfaction (Satisf).

A second but equally indispensable requirement to achieve high production efficiency is the continuous and sufficient access to superior quality physical, financial, natural and human resources. A causal linkage is thus hypothesized between Capacity (Capacit) and Production and Efficiency (Product).

A third essential requirement to achieve high productivity efficiency is a favourable global attitudinal work unit climate that constitutes an expression of a set of shared core values and a commitment to a shared unit vision and mission (Spangenberg and Theron, 2002b). Nicholson en Brenner (1994) in their study concluded and emphasised the central role of global climate as an intervening variable between satisfaction and production and indirectly as a predictor of future growth. A favourable global attitudinal climate is not just a desirable add-on to the profitable and market-effective company, but a precondition for its continued effectiveness. A linkage between Work unit climate (Climate) and Production and Efficiency (Product) is thus hypothesized.

Figure 1 provides a representation of the proposed unit performance structural model. The structural model depicted in Figure 1 differs from preliminary proposals in this regard presented in Spangenberg and Theron (2002b).

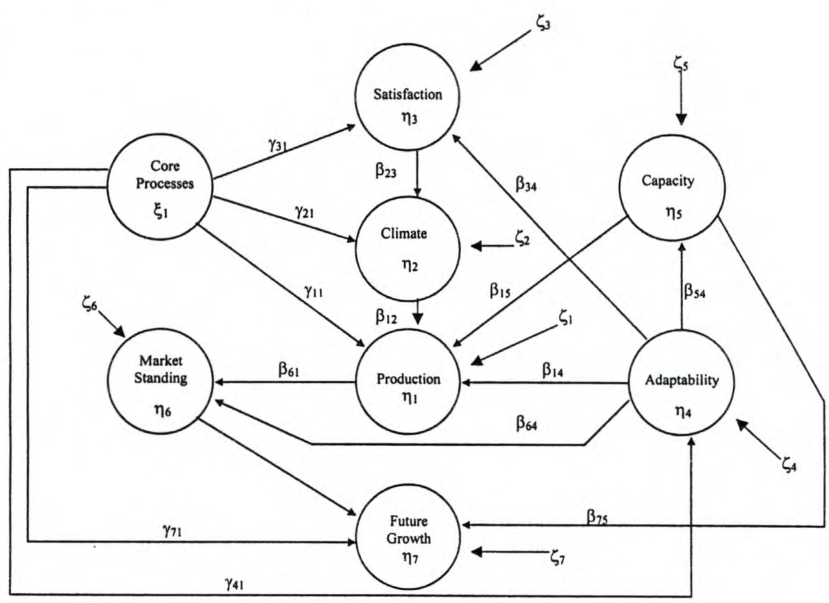

Figure 1. Unit performance structural model

6. STATISTICAL ANALYSIS AND RESULTS

6.1 Sample

For the purpose of this study, two sets of data were combined. In both instances non-probability samples of organisational units were selected. Although the objective initially was to obtain 360° ratings from two subordinates, two peers and a single superior, the need for a large as possible sample size, in conjunction with the difficulties encountered when trying to apply a questionnaire of this length to respondents on this high a job level, necessitated a deviation from the ideal in a number of cases. The first data set is that of Spangenberg and Theron (2002b) and exists of a total of 257 completed questionnaires. The second set of data is that of the author and exists of 47 completed questionnaires obtained from an initial sample of size 100. The research was conducted within a large FMCG company and included three different functional departments.

6.2 Missing values

Missing values presented a problem that had to be addressed before the data could be analysed. Various options to solve the missing value problem were explored and it was subsequently decided to use imputation as a method to solve the problem. Imputation refers to a process of the substituting of real values for missing values. The substitute values replaced for a case are derived from one or more other cases that have a similar response pattern over a set of matching variables (Jöreskog & Sörbom, 1996). The imputation of a missing value on variable y_a for a specific case a with no missing values on a set of p matching variables x_1, x_2 , ..., x_p involves the following procedure:

a) All cases b_i; i = 1, 2, ..., n are identified with no missing values on either y_{bi} or on the set of matching variables for which $W = \Sigma(z_{bi} - z_{ai})^2$; i = 1, 2, ..., n is a minimum.

b) If only n = 1 case exists for which W is a minimum, then y_a is simply replaced by y_b.

c) If, however W is a minimum for n>1 cases, with y values $y_1^{(m)}$, $y_2^{(m)}$, ..., $y_n^{(m)}$, the mean $E(y^m) = (1/n)\Sigma y_i^{(m)}$ and variance $s^2_m = (1/[n-1])\Sigma(y_1^{(m)} - E(y^m))$ of the y-values of the matching cases will be calculated.

d) If $s^2_m/s^2_y < v$, where the variance ratio v was set equal to 0,50, y_a is replaced by $E(y^m)$. If the variance ratio does not pass the critical value, no imputation is done (Jöreskog & Sörbom, 1996a).

The ideal is to use matching variables that will not be utilized in the structural equation modelling. This was, however, not possible in this case. The items least plagued by missing values were firstly identified. A set of eleven variables with three or less missing values per variable was subsequently defined to serve as matching variables. The PRELIS program (Jöreskog & Sörbom, 1996b) was used to impute missing values. The subsequent PRELIS run on the reduced item set proved to be gratifyingly effective in countering the missing value problem. By default, cases with missing values after imputation are eliminated. After imputation, 273 cases with observations on all 56 items remained in the validation sample.

6.3 Item analysis

Item analysis was conducted on the validation sample before and after imputation. Each of the 8 PI sub-scales were item analysed through the SPSS Reliability Procedure (SPSS, 1990) to identify and eliminate possible items not contributing to an internally consistent description of the sub-scale in question. No items needed to be deleted. The results of the item analyses are shown in Table 2.

Given the intended use of the PI as a comprehensive criterion measure against which to validate leadership and other competency assessments, the relatively high item homogeneity found for each sub-scale in both cases (before and after imputation), as indicated by the Cronbach alpha values in Table 2, are extremely satisfying. Table 2 clearly indicates that imputation has a weak attenuating effect on the coefficient of internal consistency calculated for each sub-scale.

Table 2. Reliability of PI sub-scale measures

	Sample *after* imputation (n = 273)			Sample *before* imputation			
Scale	**Alpha**	**Mean**	**Variance**	**Sample size(n)**	**Alpha**	**Mean**	**Variance**
Production & Efficiency	0,7446	18,7106	8,8240	276	0,7636	18,7391	9,0735
Core People Processes	0,8480	31,2381	34,4762	263	0,8661	31,1977	37,1058
Work Unit Climate	0,8756	25,1465	25,7064	292	0,8908	25,3493	26,3449
Employee Satisfaction	0,8870	30,9341	38,1133	279	0,8882	31,0143	37,9854
Adaptability	0,8208	24,1575	21,0597	268	0,8233	24,4179	20,1393
Capacity	0,8183	22,6593	23,9166	182	0,8248	22,6593	23,9496
Market Share	0,7978	24,4908	21,2435	173	0,8367	24,5607	25,6315
Future Growth	0,7290	16,1685	13,3318	126	0,8168	16,5079	16,1239

6.4 Dimensionality Analysis

Unrestricted principal component analyses with Varimax rotation were performed on each on the 8 PI sub-scales, each representing a facet of the multi-dimensional unit performance construct. The objective of these analyses was to confirm the uni-dimensionality of each sub-scale and to remove items with inadequate factor loadings and/or split heterogeneous sub-scales into two or more homogenous subsets of items if necessary (and make concomitant adjustments to the underlying unit performance model). SPSS (1990) was used for these analyses.

Two of the eight sub-scales failed the uni-dimensionality test. In these cases, however, the problem could not be solved through the deletion of single wayward items. Both sub-scales presented clear, relatively easily interpretable two-factor orthogonal factor structures. Each of the two sub-scales was then subdivided into two orthogonal uni-dimensional scales and defined based on the common theme in the items loading strongly on each factor. All items allocated to the subdivided sub-scales loaded satisfactory ($0,51 < \lambda < 0,893$) on a single factor. The Employee Satisfaction sub-scale could be subdivided into two independent, uni-dimensional sub-scales, namely (1) a Work Satisfaction sub-scale and (2) a Leadership Satisfaction sub-scale. The first sub-scale refers to the extent to which the employee is satisfied with the task and work context, salary and fringe benefits, career progression and empowerment. The second sub-scale incorporates outcomes of leadership e.g. trust in and respect for the leader, acceptance of the leader's influence and quality of supervision. The Market Standing sub-scale could also be subdivided into two independent, uni-dimensional sub-scales, namely (1) a Market dominance sub-scale and (2) a Reputation sub-scale. The first dimension refers to market share, competitiveness in markets and diversity of markets. The second dimension refers to the competitiveness and diversity of products or services, customer satisfaction and reputation for adding value.

Although in each case the factor fission was found to result in a conceptually meaningful division of the original unit performance dimension in question, and thus a theoretically meaningful refinement of the unit performance model, the original unit performance dimension will not be extended for the purpose of this paper. To do so would further complicate an already complex structural model. If the hypothesized structural model satisfactory fits the data, subsequent analyses could investigate refinements suggested by the foregoing results.

6.5 Structural Equation Modelling

Structural equation modelling (SEM) was used to perform a confirmatory factor analysis on the sub-scales of the PI. The 8 latent variables could be divided into 1 exogenous variable and 7 endogenous variables in accordance with the hypothesized structured model depicted in Figure 1 thus resulting in two separate measurement models. Core people processes is the independent or exogenous latent variable in this study and is thus called ksi-1 (ξ_1). Core_1 and Core_2 are the indicator variables designed to load on the latent variable Core people processes (ξ_1) and were obtained by calculating the unweighted averages of the odd numbered items and the even numbered items of each sub-scale. Consequently, Core_1 contained all the odd numbered items and Core_2 contained all the even numbered items that were designed to load on Core people processes.

Production, Climate, Employee Satisfaction, Adaptability, Capacity, Market standing and Future growth form the dependent or endogenous latent variables and are termed eta-1 (η_1), eta-2 (η_2), eta-3 (η_3), eta-4 (η_4), eta-5 (η_5), eta-6 (η_6) and eta-7 (η_7) respectively. Product_1 and Product_2 are the indicator variables designed to load on Production (η_1), Climate_1 and Climate_2 are the indicator variables designed to load on Climate (η_2), Satisf_1 and Satisf_2 are the indicator variables designed to load on Employee satisfaction (η_3), Adapt_1 and Adapt_2 are the indicator variables designed to load on Adaptability (η_4), Capacit_1 and Capacit_2 are the indicator variables designed to load on Capacity (η_5), Market_1 and Market_2 are the indicator variables designed to load on Market standing (η_6) and Growth_1 and Growth_2 are the indicator variables designed to load on Future growth (η_7). Product_1, Product_2, Climate_1, Climate_2, Satisf_1, Satisf_2, Adapt_1, Adapt_2, Capacit_1, Capacit_2, Market_1, Market_2, Growth_1 and Growth_2 were obtained by calculating the unweighted averages of the odd numbered items and the even numbered items of each sub-scale. Consequently, Product_1 contained all the odd numbered items and Product_2 contained all the even numbered items that were designed to load on Production. The same logic was followed for the

Climate, Employee Satisfaction, Adaptability, Capacity, Market standing and Future growth dimensions respectively. The creation of two indicator variables for each sub-scale has the added advantage of creating more reliable indicator variables. However, rather than fitting the two separate measurement models, a single confirmatory factor analysis was performed on all 8 dimensions. The exogenous measurement model would have consisted of a single latent variable (Core) measured by two indicator variables. Despite its simplicity the model would, however, not have been identified (Diamantopoulos & Siguaw, 2000), thus preventing the finding of a unique solution for the parameters to be estimated (Kelloway, 1998).

6.6 A graphic presentation of the measurement model

The measurement model underlying the PI is shown in matrix format as equation 1.

$X = \Lambda^x\xi + \delta$ --1

Where:

X is a 16x1 column vector of observable indicator variables;

Λ^x is a 16x8 matrix of factor loadings;

ξ is a 8x1 column vector of latent exogenous variables; and

δ is a 16x1 column vector of measurement errors in X. It indicates systematic non-relevant, as well as random error influences (Jöreskog & Sörbom, 1996).

The measurement model is portrayed in the form of a path diagram in Figure 2.

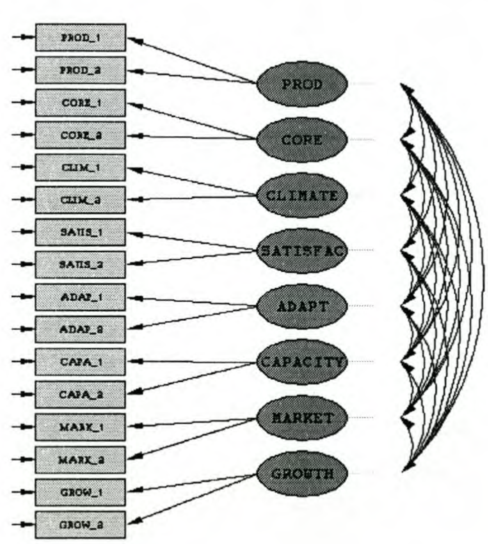

Figure 2. PI Measurement Model

The objective of the confirmatory factor analysis is to determine whether the specific paths hypothesized by the measurement model portrayed in Figure 2 could have created the observed correlation/covariance matrix Σ. If unsatisfactory model fit would be found, the conclusion would be that the measurement model does not provide an acceptable explanation for the observed covariance matrix and thus that the PI does not measure the unit performance domain as intended. The converse, however, is not true. A high degree of fit between the observed and estimated covariance matrices would only imply that the processes portrayed in the measurement model provide one plausible explanation for the observed covariance matrix but not that it necessarily must have produced it.

6.7 Information on the parameters for the measurement model

LISREL 8.30 (Jöreskog, Sörbom, du Toit & du Toit, 2000) was used to perform a confirmatory factor analysis on the PI to determine the fit of the model shown in Figure 2. For the purposes of confirmatory factor analysis the measurement model was treated as an exogenous model simply due to programming advantages. The imputed data was first read into PRELIS (Jöreskog & Sörbom, 1996a) to compute a covariance matrix to serve as input for the LISREL analysis. Maximum likelihood estimation was used to estimate the parameters set free in the model. The latent variables contained in the model as such have no inherent scale, and neither are the values expressed in a meaningful unit of measurement. In specifying the model, the scales of measurement of the latent variables were not specified by setting the factor loadings on the first observed variable to unity. Instead of defining the origin and unit of the latent variable scales in terms of observable reference variables, the latent variables were rather standardized (Jöreskog & Sörbom, 1993). The unit of measurement thus becomes the standard deviation $\sigma_i[\xi]$. In the case of ordinally scaled (in contrast to ratio scaled) observed variables, this option seems preferable since the scale and origin of the observed variables are then essentially arbitrary as well. All factor loadings of each latent unit performance variable were set free to be estimated, but only with regards to its designated observed variables. All remaining elements of Λ_X were fixed at zero loadings to reflect the assumed factorial simplicity of the indicator variables (Tabachnick & Fidell, 1989). The elements of the covariance/correlation matrix(Φ) and the diagonal elements of the variance/covariance matrix (θ_δ) were treated by default as free.

6.8 An assessment of multiple fit indices of the measurement model

An admissible final solution of parameter estimates for the PI measurement model was obtained after 10 iterations. The full spectrum of indices provided by LISREL to assess the absolute and comparative fit of the model is presented in Table 3. Tests of absolute fit are concerned with the ability of the fitted model to reproduce the correlation/covariance matrix (Kelloway, 1998). Tests of comparative fit, by contrast, indicate the success with which the model under scrutiny explains the observed covariance/correlation matrix compared to some baseline model (Kelloway, 1998). For the comparisons, the independence model and the saturated model serve as the two baseline models. This represent the two ends of the model complexity continuum. The independence model is a model in which all parameters have been set to zero. Therefore, it is a model in which all paths have been pruned away and the degrees of freedom equal the number of equations in the model (See Table 3). The saturated model refers to a model in which the number of equations equals the number of unknowns and the model has no degrees of freedom (Medsker, Williams & Holahan, 1994). A saturated model is also referred to as a just-identified model and will always produce a unique set of path parameter estimates that will be able to perfectly reproduce the observed correlation/covariance matrix.

Table 3. Goodness of fit statistics

Degrees of Freedom = 76
Minimum Fit Function Chi-Square = 144,23 (P = 0,00)
Normal Theory Weighted Least Squares Chi-Square = 140,78 (P = 0,00)
Estimated Non-centrality Parameter (NCP) = 64,78
90 Percent Confidence Interval for NCP = (35,27 ; 102,10)
Minimum Fit Function Value = 0,53
Population Discrepancy Function Value (F0) = 0,24
90 Percent Confidence Interval for F0 = (0,13 ; 0,38)
Root Mean Square Error of Approximation (RMSEA) = 0,056
90 Percent Confidence Interval for RMSEA = (0,041 ; 0,070)
P-Value for Test of Close Fit (RMSEA < 0,05) = 0,24
Expected Cross-Validation Index (ECVI) = 0,96
90 Percent Confidence Interval for ECVI = (0,85 ; 1,10)
ECVI for Saturated Model = 1,00
ECVI for Independence Model = 12,03
Chi-Square for Independence Model with 15 Degrees of Freedom = 3240,62
Independence AIC = 3272,62
Model AIC = 260,78
Saturated AIC = 272,00
Independence CAIC = 3346,37
Model CAIC = 537,34
Saturated CAIC = 898,89
Normed Fit Index (NFI) = 0,96
Non-Normed Fit Index (NNFI) = 0,97
Parsimony Normed Fit Index (PNFI) = 0,61
Comparative Fit Index (CFI) = 0,98
Incremental Fit Index (IFI) = 0,98
Relative Fit Index (RFI) = 0,93

Critical N (CN) = 203,89
Root Mean Square Residual (RMR) = 0,017
Standardized RMR = 0,030
Goodness of Fit Index (GFI) = 0,94
Adjusted Goodness of Fit Index (AGFI) = 0,89
Parsimony Goodness of Fit Index (PGFI) = 0,52

The chi-square (χ^2) statistic was used to test the null hypothesis, shown as equation 2.

H_0: $\Sigma = \Sigma(\theta)$ --2

where Σ is the population covariance matrix of the observed variables, $\Sigma(\theta)$ is the population covariance matrix implied by a specific model and (θ) is a vector containing the free parameters of the model (Bollen & Long, 1993). The exceedence probability reported by LISREL and shown in Table 3 is the probability of obtaining a χ^2 value larger than the calculated value, given that the null hypothesis stated in equation 2 is true. The aim, contrary to conventional inferential statistics, is therefore to find an insignificant test statistic since it would imply a small enough difference between the observed and estimated covariance matrices that could have arisen by chance under H_0 (Hair, Anderson, Tatham & Black, 1995; Kelloway, 1998). The p-value associated with the χ^2 value in Table 3 clearly indicates highly significant test statistics. χ^2, however, is sensitive to sample size. It is therefore unlikely to obtain an insignificant χ^2 in large samples, even if the model fits the data, although the approximation of the χ^2 distribution occurs only in large samples ($n \geq 200$). χ^2 must increase with an increase in sample size, which makes an insignificant χ^2 unlikely in large samples (Kelloway, 1998).

Expressing the χ^2 value in terms of its degree of freedom has been suggested as a way of getting around the aforementioned problem associated with this measure (Kelloway, 1998). This is, however, not normally reported by LISREL and thus not shown in Table 3. A value of 1,85 results in this case. The interpretation of the ratio χ^2/df, however, seems somewhat problematic in that no clear, generally agreed upon guidelines seem to exist (Kelloway, 1998; Medsker, Williams, & Holahan, 1994). Generally, good fit is indicated by values between 2 and 5. A value less than 2 could, however, indicate over-fitting (Kelloway, 1998). Judged by these standards the measurement model could, when viewed optimistically, be seen to fit the data well, or, when viewed somewhat more pessimistically, be seen to have been over-fitted.

The root mean squared residual (RMR) and standardized RMR reflect the square root of the mean of the squared discrepancies between the observed and estimated covariance matrices. Table 3 reports values of 0,017 and 0,030 for these two measures of fit. Values of less than 0,05 on the latter index are regarded as indicative of a model that fits the data well (Diamantopoulos & Siguaw, 2000; Kelloway, 1998).

The root mean squared error of approximation (RMSEA) expresses the difference between the observed and estimated covariance matrices in terms of the degrees of freedom of the model (Steiger, 1990). RMSEA values below 0,10 indicate a good fit to the data and values below 0,05 indicate a very good fit to the data (Diamantopoulos & Siguaw, 2000; Kelloway, 1998; Steiger, 1990). Hair et al. (1995) consider RMSEA values between 0,05 and 0,08 indicative of acceptable fit. Brown and Cudeck (1993) regard a RMSEA value of 0,05 indicative of a close fit and RMSEA values up to 0,08 indicative of reasonable errors of approximation. Though rarely encountered, RMSEA values below 0,01 indicate a model that fits the data exceptionally well (Kelloway, 1998). Table 3 reports a RMSEA value of 0,056. In addition to the RMSEA point estimate, LISREL also provides a 90% confidence interval for the index. The 90% confidence interval for RMSEA shown in Table 3 (0,041 – 0,070) indicates that the fit of the measurement model could be regarded as good to very good. A test of the significance of the obtained value is performed by LISREL by testing H_0: RMSEA $\leq$ 0,05 against H_a: RMSEA $>$ 0,05. Table 3 indicates that the obtained RMSEA value of 0,056 does not differ significantly from the target value of 0,05, thus indicating good or acceptable model fit. This conclusion is supported by the aforementioned Standardized RMR value of 0,030. Judged in terms of the foregoing fit indices, acceptable model fit has been achieved for the measurement model.

6.9 Examining the obtained solution

All estimated factor loadings λ_{ij} in Λ_X shown in Table 4 differ significantly ($p < 0{,}05$) from zero (standard errors and t-values are not shown). The fit of the model would therefore deteriorate significantly if any of the existing paths in Figure 2 would be eliminated, thus fixing the corresponding parameters in Λ_X to zero. None of the existing paths should be removed, as all item parcels appear to significantly reflect the unit performance dimension they were designed to denote.

Table 4. Completely standardized lambda-X, factor-loading matrix

	SATISF	CLIMATE	PRODUCT	CORE	ADAPT	CAPACIT	MARKET	GROWTH
PRODUCT 1			0,93					
PRODUCT 2			0,64					
CORE 1				0,87				
CORE 2				0,86				
CLIMATE 1		0,94						
CLIMATE 2		0,91						
SATISF 1	0,92							
SATISF 2	0,91							
ADAPT 1					0,87			

ADAPT 2					0,86			
CAPACIT 1						0,81		
CAPACIT 2						0,87		
MARKET 1							0,88	
MARKET 2							0,84	
GROWTH 1								0,79
GROWTH 2								0,78

Although all item parcels appear to significantly reflect the unit performance dimension it was designed to denote, the question arises how well each item parcel measures its designated unit performance dimension. The proportion of item parcel variance that is explained by the model is shown in Table 5 for each of the indicator variables. The values shown in Table 5 should simultaneously be interpreted as lower bound estimates of the item parcel reliabilities ρ_{ii}. The reliability of item parcel i, ρ_{ii} is defined by equation 3:

$$\rho_{ii} = \lambda^2_i/[\lambda^2_i + \theta_{\delta i}]$$
$$= 1 - (\theta_{\delta i}/[\lambda^2_i + \theta_{\delta i}])$$
$$= 1 - \theta_{\delta I}$$
$$= \lambda^2_I \text{ -- } 3$$

where $\theta_{\delta i}$ represent the error variance elements of the completely standardized diagonal matrix Θ_δ (shown in Table 6) and λ_i the factor loadings in the completely standardized Λ_X matrix (shown in Table 4). Since the error term δ_i comprises not only a true random measurement error component but also a systematic error component unique to X_i, ρ_{ii} can also be interpreted as an indicator variable validity coefficient expressing the success with which the latent unit performance dimension ξ_j manifests itself in the indicator variable X_{ij}.

Inspection of Tables 4, 5 and 6 indicates that the majority of item parcels do provide relatively uncontaminated and comprehensive reflections of their designated latent dimensions. The second item parcel of the Production and Efficiency sub-scale (Product_2) is the only indicator that appears to have somewhat questionable relevance for the unit performance dimension to which it is currently linked. Only 40% of the variance in the item parcel Product_2 can be explained in terms of the Production and Efficiency dimension while the remaining approximately 60% of the variance in this item parcel should be attributed to measurement error. The questionable relevance of this indicator variable was also indicated by the relative low factor loading of the item parcel on the latent variable shown in Table 4.

Table 5. Squared multiple correlations for item parcels

PRODUCT 1	PRODUCT 2	CORE 1	CORE 2	CLIMATE 1	CLIMATE 2	SATISF 1	SATISF 2
0,86	0,40	0,76	0,74	0,89	0,83	0,85	0,83
ADAPT 1	ADAPT 2	CAPACIT 1	CAPACIT 2	MARKET 1	MARKET 2	GROWTH 1	GROWTH 2
0,76	0,74	0,65	0,76	0,78	0,71	0,62	0,62

Table 6. Completely standardized theta-delta matrix

PRODUCT 1	PRODUCT 2	CORE 1	CORE 2	CLIMATE 1	CLIMATE 2	SATISF 1	SATISF 2
0,14	0,60	0,24	0,26	0,11	0,17	0,15	0,17
ADAPT 1	ADAPT 2	CAPACIT 1	CAPACIT 2	MARKET 1	MARKET 2	GROWTH 1	GROWTH 2
0,24	0,26	0,35	0,24	0,22	0,29	0,38	0,38

The phi-matrix of correlations between the 8 latent unit performance dimensions is shown in Table 7. The off-diagonal elements of the Φ-matrix are the inter-unit performance dimension correlations disattenuated for measurement error. The correlations are all moderate to high thus confirming the need identified by Spangenberg and Theron (2002b) to expand the model through the addition of a limited set of two, or possibly three, second-order factors. The Φ-matrix is, moreover, fortunately still positive definite with no off-diagonal entries exceeding unity, thus making the expansion of the basic PI measurement model in terms of second-order factors in the manner suggested by Spangenberg and Theron (2002b) technically feasible.

Table 7. Completely standardized phi matrix of disattenuated inter latent dimension correlations

	SATISF	CLIMATE	PRODUCT	CORE	ADAPT	CAPACIT	MARKETS	GROWTH
SATISF	1,00							
CLIMATE	0,79	1,00						
PRODUCT	0,59	0,60	1,00					
CORE	0,83	0,81	0,63	1,00				
ADAPT	0,76	0,68	0,50	0,75	1,00			
CAPACIT	0,63	0,58	0,44	0,65	0,79	1,00		
MARKETS	0,58	0,57	0,45	0,62	0,65	0,79	1,00	
GROWTH	0,46	0,43	0,36	0,59	0,57	0,69	0,75	1,00

6.10 Evaluation of the full LISREL model

The proposed structural model that serves as the basis for this study is portrayed in Figure 1. The specific paths depicted in the structural model represent hypothesized causal linkages between specific unit performance dimensions derived through systematic theorizing presented earlier.

The design and structure of the structured model implies a specific structural equation. The structural model relevant to this study is shown in matrix form as equation 4.

$\eta = B\eta + \Gamma\xi + \zeta$-- -4

η is a 7x1 column vector of endogenous latent variables;

B is a 7x7 symmetrical matrix of path/regression coefficients (β) describing the regression of η_i on η_j in the structural model;

Γ is a 7x1 matrix of path/regression coefficients (γ) describing the regression of η_i on ξ_i in the structural model;

ξ is a 1x1 column vector of exogenous latent variables; and

ζ is a 7x1 vector of residual error terms or equation errors in the structural relationship between ξ and η (Jöreskog & Sörbom, 1996).

More specifically the causal relationships hypothesized earlier and depicted in Figure 1 can be expressed as matrix equation 5.

$$\begin{pmatrix}\eta_1\\ \eta_2\\ \eta_3\\ \eta_4\\ \eta_5\\ \eta_6\\ \eta_7\end{pmatrix} = \begin{pmatrix}0 & \beta_{12} & 0 & \beta_{14} & \beta_{15} & 0 & 0\\ 0 & 0 & \beta_{23} & 0 & 0 & 0 & 0\\ 0 & 0 & 0 & \beta_{34} & 0 & 0 & 0\\ 0 & 0 & 0 & 0 & 0 & 0 & 0\\ 0 & 0 & 0 & \beta_{54} & 0 & 0 & 0\\ \beta_{61} & 0 & 0 & \beta_{64} & 0 & 0 & 0\\ 0 & 0 & 0 & 0 & \beta_{75} & \beta_{76} & 0\end{pmatrix}\begin{pmatrix}\eta_1\\ \eta_2\\ \eta_3\\ \eta_4\\ \eta_5\\ \eta_6\\ \eta_7\end{pmatrix} + \begin{pmatrix}\gamma_{11}\\ \gamma_{21}\\ \gamma_{31}\\ \gamma_{41}\\ 0\\ 0\\ \gamma_{71}\end{pmatrix}\begin{bmatrix}\xi_1\end{bmatrix} + \begin{pmatrix}\zeta_1\\ \zeta_2\\ \zeta_3\\ \zeta_4\\ \zeta_5\\ \zeta_6\\ \zeta_7\end{pmatrix} \text{-------5}$$

Equation 5 implies the statistical hypothesis presented in Table 8 on the B and Γ population matrices.

Table 8. Statistical hypotheses on the B and Γ population matrices

Hypothesis 1: H_o: $\gamma_{31} = 0$ Ha: $\gamma_{31} > 0$	Hypothesis 4: Ho: $\gamma_{71} = 0$ Ha: $\gamma_{71} > 0$	Hypothesis 7: Ho: $\beta_{12} = 0$ Ha: $\beta_{12} > 0$	Hypothesis 10: Ho: $\beta_{14} = 0$ Ha: $\beta_{14} > 0$	Hypothesis 13: Ho: $\beta_{76} = 0$ Ha: $\beta_{76} > 0$
Hypothesis 2: Ho: $\gamma_{21} = 0$ Ha: $\gamma_{21} > 0$	Hypothesis 5: Ho: $\gamma_{41} = 0$ Ha: $\gamma_{41} > 0$	Hypothesis 8: Ho: $\beta_{34} = 0$ Ha: $\beta_{34} > 0$	Hypothesis 11: Ho: $\beta_{64} = 0$ Ha: $\beta_{64} > 0$	Hypothesis 14: Ho: $\beta_{61} = 0$ Ha: $\beta_{61} > 0$
Hypothesis 3: Ho: $\gamma_{11} = 0$ Ha: $\gamma_{11} > 0$	Hypothesis 6: Ho: $\beta_{23} = 0$ Ha: $\beta_{23} > 0$	Hypothesis 9: Ho: $\beta_{15} = 0$ Ha: $\beta_{15} > 0$	Hypothesis 12: Ho: $\beta_{75} = 0$ Ha: $\beta_{75} > 0$	Hypothesis 15: Ho: $\beta_{54} = 0$ Ha: $\beta_{54} > 0$

Reporting the results of the evaluations of the structural model fit is based on the guidelines of Raykov, Tomer and Nesselroade (1991). LISREL 8.30 (Jöreskog et al., 2000) was used to perform structural equation modelling on the PI to determine the fit of the model expressed as equation 5. The data was read into PRELIS to compute a covariance matrix to serve as input for the LISREL analysis. It is generally accepted in LISREL analyses that the covariance matrix of the manifest variables should be used as input rather than the correlation matrix (Diamantopoulos & Siguaw, 2000). Bentler and Chou (1987, p.90) advises that "the practice of substituting correlation for covariance matrixes in analysis is only rarely justified since the associated statistics will usually be inappropriate."

The method of parameter estimation that was used in this study was Maximum Likelihood (ML). Maximum Likelihood estimators are known to be consistent and asymptotically efficient in large samples under the assumption of multivariate normality and is relatively robust to moderate departures from this assumption (Diamantopoulos & Siguaw, 2000; Kelloway, 1998). ML is a full information technique, because one is able to estimate all parameters (i.e. path values) simultaneously. Raykov et al. (1991) point out that χ^2 and the standard errors need to be interpreted with caution when ML is used as a method of parameter estimation.

6.11 Assessing overall goodness-of-fit of the structural model

The logic underlying assessment of fit of the structural model is the same as that of the measurement model. Consequently, the same structure will be followed in analysing fit. The goodness-of-fit statistics are displayed in Table 9.

Table 9. Goodness-of-fit of the structural model

Degrees of Freedom = 89
Minimum Fit Function Chi-Square = 199,13 (P = 0,00)
Normal Theory Weighted Least Squares Chi-Square = 195,81 (P = 0,00)
Estimated Non-centrality Parameter (NCP) = 106,81
90 Percent Confidence Interval for NCP = (70,16 ; 151,21)
Minimum Fit Function Value = 0,73
Population Discrepancy Function Value (F0) = 0,39
90 Percent Confidence Interval for F0 = (0,26 ; 0,56)
Root Mean Square Error of Approximation (RMSEA) = 0,066
90 Percent Confidence Interval for RMSEA = (0,054 ; 0,079)
P-Value for Test of Close Fit (RMSEA < 0,05) = 0,017
Expected Cross-Validation Index (ECVI) = 1,07
90 Percent Confidence Interval for ECVI = (0,93 ; 1,23)
ECVI for Saturated Model = 1,00
ECVI for Independence Model = 12,03

Chi-Square for Independence Model with 120 Degrees of Freedom = 3240,62
Independence AIC = 3272,62
Model AIC = 289,81
Saturated AIC = 272,00
Independence CAIC = 3346,37
Model CAIC = 506,46
Saturated CAIC = 898,89
Normed Fit Index (NFI) = 0,94
Non-Normed Fit Index (NNFI) = 0,95
Parsimony Normed Fit Index (PNFI) = 0,70
Comparative Fit Index (CFI) = 0,96
Incremental Fit Index (IFI) = 0,97
Relative Fit Index (RFI) = 0,92
Critical N (CN) = 168,93
Root Mean Square Residual (RMR) = 0,023
Standardized RMR = 0,043
Goodness of Fit Index (GFI) = 0,92
Adjusted Goodness of Fit Index (AGFI) = 0,87
Parsimony Goodness of Fit Index (PGFI) = 0,60

The p-value associated with the χ^2 value in Table 9 clearly indicates highly significant test statistics. Following the earlier logic, a non-significant χ^2 indicates model fit in that the model can reproduce the observed covariance matrix (Bollen & Long, 1993; Kelloway, 1998). In this case the model is not able to reproduce the observed covariance matrix to a degree of accuracy that could be explained in terms of sampling error only.

The evaluation of fit on the basis of the ratio χ^2/df (χ^2/df = 2,2001) for the structural model suggest that the model fits the data well. Kelloway (1998), however, comments that the guidelines indicative of good fit (ratios between 2 and 5) have very little justification other than researcher's personal modelling experience and advises against a strong reliance on its use.

The RMSEA value of 0,066 supports the notion of a good fit, where a very good fit is indicated by a value of less than 0,05. The RMR (0,023) and standardized RMR (0,043) also indicates good fit. Values of less than 0,05 on the latter index are regarded as indicative of a model that fits the data well (Kelloway, 1998).

The 90% confidence interval for RMSEA shown in Table 9 (0,054 – 0,079) indicates that the fit of the structural model could be regarded as reasonable to good. A test of the significance of the obtained value is performed by LISREL by testing Ho: RMSEA $\leq$ 0,05 against Ha: RMSEA $>$ 0,05.

Table 9 indicates that the obtained RMSEA value of 0,066 is significantly greater than the target value of 0,05 (i.e. H_0 is rejected; $p < 0,05$), and since the confidence interval does not include the target value of 0,05, a very good fit seems not to have been achieved. In terms of the Brown and Cudeck (1993) guideline, however, the upper bound of the confidence interval still suggests acceptable fit. This conclusion is supported by the aforementioned Standardized RMR value of 0,035.

The goodness-of-fit index (GFI) measures are "based on a ratio of the sum of the squared discrepancies to the observed variances (for generalized least squares, the maximum likelihood version is somewhat more complicated)" (Kelloway, 1998, p. 27). The adjusted GFI (AGFI) adjusts the GFI for degrees of freedom in the model (Kelloway, 1998). Both these two measures should be between zero and unity with values exceeding 0,9 indicating good fit to the data (Jöreskog & Sörbom, 1993; Kelloway, 1998). Evaluating the fit of the model in terms of these two indices (0,92 & 0,87) a relatively favourable conclusion on model fit emerges. Kelloway (1998), however, warns that these guidelines for the interpretation of GFI and AGFI are grounded in experience, are somewhat arbitrary and should therefore be used with some circumspection.

Indices of comparative fit that use as a baseline an independence model, contrast the ability of the model to reproduce the observed covariance matrix with that of a model known apriori to fit the data poorly, namely one that postulates no paths between the variables in the model. The indices of comparative fit reported by LISREL and shown in Table 9 seem to indicate good model fit relative to that of the independence model. The normed fit index (NFI = 0,94), the non-normed fit index (NNFI = 0,95), the incremental fit index (IFI = 0,97), the comparative fit index (CFI = 0,96) and the relative fit index (RFI = 0,92) all can assume values between 0 and 1 with 0,90 generally considered indicative of a well fitting model (Bentler, 1990; Bentler & Bonett, 1980; Hair et al., 1995; Kelloway, 1998). The values of all of the aforementioned indices exceed the critical value of 0,90 thus indicating good comparative fit relative to the independence model.

The assessment of parsimonious fit acknowledges that model fit can always be improved by adding more paths to the model and estimating more parameters until perfect fit is achieved in the form of a saturated or just-identified model with no degrees of freedom (Kelloway, 1998). The objective in model building is, however, to achieve satisfactory fit with as few model parameters as possible (Jöreskog & Sörbom, 1993). The objective is therefore to find, in this sense, the most parsimonious model. Indices of parsimonious fit relate the benefit that accrues in terms of improved fit to the cost incurred (in terms of degrees of freedom lost) to affect the improvement in fit (Hair et al., 1995; Jöreskog & Sörbom, 1993). The parsimonious normed fit index (PNFI = 0,70) and the parsimonious goodness-of-fit index (PGFI = 0,60) shown in Table 9 approaches model fit from this perspective. Its meaningful use, however, necessitates a second, explicitly formulated and fitted, model that contains a number of additional paths that can be theoretically justified so that the initial model is nested within the more elaborate model. In this case no such alternative model exists. The values for the expected cross-validation index (ECVI = 1,07), the Aiken information criterion (AIC = 289,81) and the consistent Aiken information criterion (CAIC = 506,46) shown in Table 9 all suggest that the fitted structural model provides a more parsimonious fit than the independent/null model since smaller values on these indices indicate a more parimonious model (Kelloway, 1998).

6.12 Examination of residuals

Residuals refer to the differences between corresponding cells in the observed and fitted covariance/correlation matrices (Jöreskog & Sörbom, 1993). Residuals, and especially standardized residuals, thereby provide diagnostic information on sources of lack of fit in models (Jöreskog & Sörbom, 1993; Kelloway, 1998). A stem-and-leaf plot of the standardized residuals is provided in Figure 3.

```
- 3|51
- 2|765442100
- 1|99776555444421111110
- 0|98887777766665443332220000000000000000
  0|11122222333455555677777888888999999
  1|00011223344557778
  2|00223689
  3|999
  4|
  5|08
  6|888
  7|0
```

Figure 3. Stem-and-leaf plot of standardized residuals

Large positive and negative standardized residuals would be indicative of relationships (or the lack thereof) between indicator variables that the model fails to explain. Large positive residuals would indicate that the model underestimates the covariance between two observed variables. The problem could, therefore, be rectified by adding paths to the model that could account for the covariance. Conversely, large negative residuals would indicate that the model overestimates the covariance between specific observed variables. The remedy, in turn, would thus lie in the pruning away of paths that are associated with the indicator variables in question. From the stem-and-leaf plot depicted in Figure 3, the distribution of standardized residuals appears to be distributed slightly positively skewed. This would suggest that the model fails to account for one or more influential paths. The leptokurtic nature of the distribution would suggest that relatively few covariance terms in the observed covariance matrix were inadequately accounted for by the fitted model. However, although the negative standardized residuals seems to be mostly of only modest magnitude (smallest, -3,51), the presence of a number of large positive residuals do cause some concern (largest 6,98). Standardized residuals can be interpreted as standard normal deviates (i.e. z-scores) Standardized residuals with absolute values greater than 2,58 could thus be considered large (Diamantopoulos & Siguaw, 2000). Twelve large positive residuals and four large negative residuals thus indicate sixteen observed covariance terms (out of 120) in the observed sample covariance matrix (S) being poorly estimated by the derived model parameter estimates. Inspection of the variables associated with these standardized residuals reveal no clear specific suggestions for possible model modification. The predominance of indicator variables associated with Capacity, Markets and Growth do, however, suggest that these latent variables should be the focus of future efforts to improve the model. Somewhat problematic model fit is further indicated by the fact that the standardized residuals for all pairs of observed variables tend to deviate from the 45° reference line in the Q-plot in the upper and lower regions of the x-axis. The Q-plot for the PI structural model is given in Figure 4.

6.13 Model modification indices

The proposed model depicted in Figure 1 seems to fit the data reasonably well. The foregoing analysis of the standardized residuals does, however, suggest that the addition of one or more paths would probably improve the fit of the model. The question subsequently arises which paths, when added to the model, would significantly improve the parsimonious fit of the model. The modification indices calculated by LISREL show the decrease in the χ^2 statistic if currently fixed parameters are set free and the model re-estimated. Large modification index values (> 6,6349) thus indicate parameters that, if set free, would improve the fit of the model significantly ($p < 0,01$) (Diamantopoulos & Siguaw, 2000). Kelloway (1998), however, cautions that model modifications suggested by modification indices should be resisted unless such alterations to the model can be supported by clear and convincing theoretical justification. Examination of the modification indices calculated for the B matrix indicates four additional paths that would significantly improve the fit of the model. Results suggest that Markets influence Capacity (37,47), and conversely that Capacity influence Markets (37,03). A reciprocal causal linkage between Market standing and Capacity is thus suggested. Such a linkage does seem to make substantive theoretical sense. Future growth is also indicated to influence Capacity (26,8) and Markets (21,52). These linkages also do not appear to be unreasonable. The standardized expected change associated with the aforementioned paths is all of sufficient magnitude to consider freeing them. Examination of the modification indices and the completely standardized expected parameter change associated with the fixed parameters in Γ indicate that no paths originating from the single exogenous latent variable, if added to the model, should result in a significant decrease in the χ^2 measure at the 1% significance level.

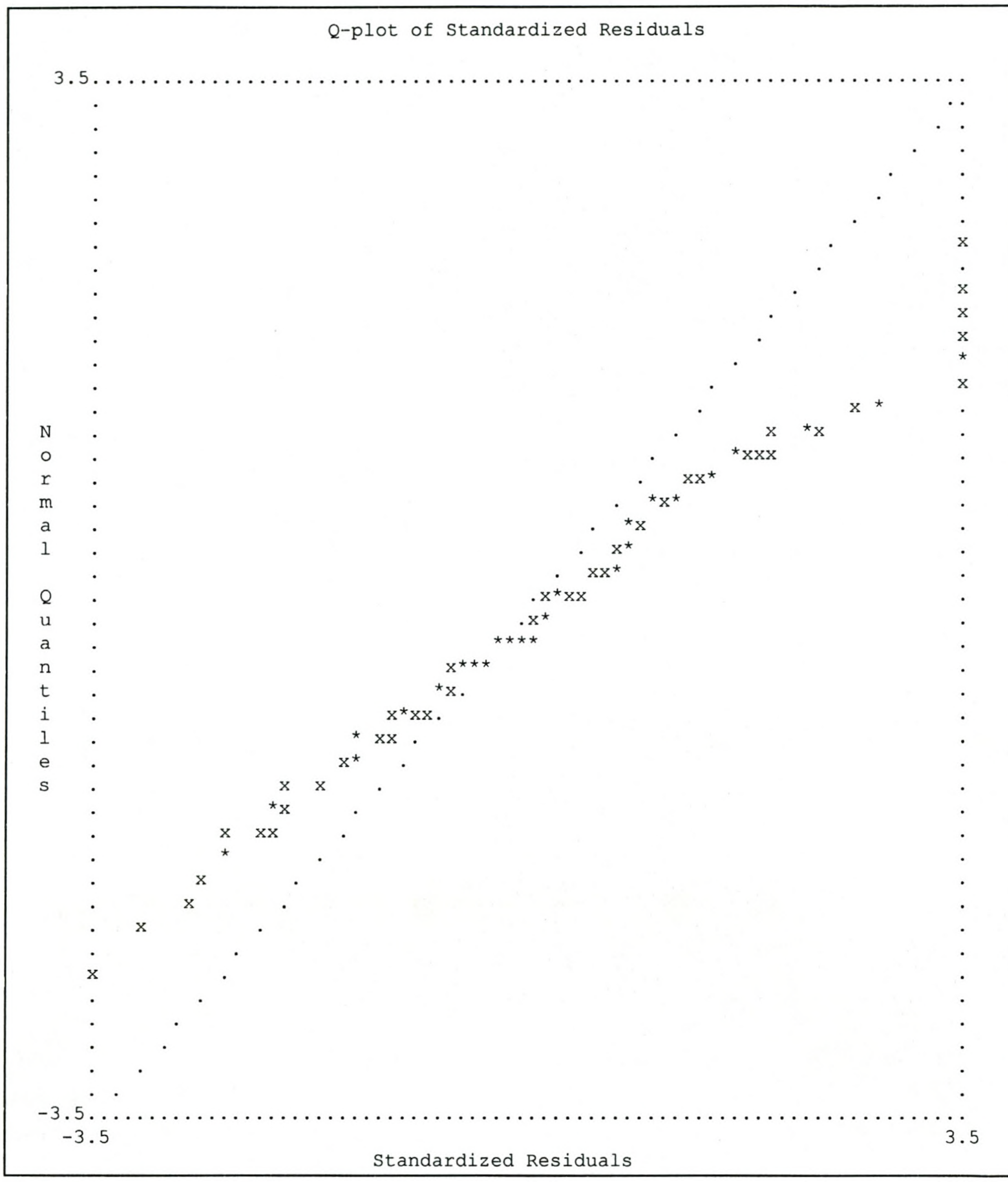

Figure 4. Q-plot of standardized residuals

If the parameter with the largest modification index (β_{56}) is relaxed and the model is re-estimated (Jöreskog & Sörbom, 1998), the fit of the model improves. Although the χ^2 statistic remains significant (p< 0,05), the RMSEA improves to 0,054. The 90% confidence interval for RMSEA (0,040 – 0,067) indicates that the fit of the modified structural model could be regarded as good to very good.

The obtained RMSEA value of 0,054 is not significantly greater than the target value of 0,05 (i.e. H_0: RMSEA$\leq$0,05 is not rejected; p > 0,05), and since the confidence interval does include the target value of 0,05, a good fit seems to have been achieved. The standardized RMR of the modified model is a satisfactory 0,033. The distribution of standardized residuals also improved in terms of symmetry and dispersion with the addition of a directional linkage between Market standing and Capacity. Examination of the modification indices calculated for the expanded B matrix indicates no additional paths that would significantly improve the fit of the modified model.

Examination of the modification indices and the completely standardized expected parameter change associated with the fixed parameters in the Θ_ε matrix reveal nine covariance terms that, if set free, would result in significant (p < 0,01) decreases in the χ^2 measure. The expected magnitude of the completely standardized covariate estimates, however, hardly warrants seriously considering setting these parameters free. The expected completely standardized covariance between the measurement error terms associated with Satisf_1 and Satisf_2 (0,48) is the only exception. The remaining completely standardized expected change estimates are all sufficiently small. This in turn would suggest that the assumption of uncorrelated error terms remains largely tenable.

Examination of the modification indices calculated for the variance-covariance matrix Ψ reveal that allowing for correlations amongst the residual error terms ζ would result in a significant (p < 0,01) improvement in model fit in the case of only one covariance term. The modification index value associated with ζ(Capacity)-ζ(Markets) covariance (37,03) seems to suggest that the pair of latent variables is both influenced by at least one common latent variable not recognized by the model. The magnitude of the standardized expected change associated with these two correlation terms, however, is not really substantial (< 0,24). Although not necessarily the case, this result could possible due to the models inability to make provision for a reciprocal relationship between these two latent variables.

6.14 Assessment of measurement model

The parameter estimates for the endogenous and exogenous measurement models were evaluated. The results obtained in the full LISREL analysis agree with the results reported earlier for the PI measurement model. All indicator variables load significantly ($p < 0,05$) on the latent variables they were designed to reflect. But for Product_2, a satisfactory proportion of the variance in each indicator variable is explained by its underlying latent variable. The operationalization of the latent unit performance dimensions in terms of the item parcels formed on the PI sub-scales thus seems to have been successful. The absence of crucial deficiencies in the measurement part of the model justifies the subsequent evaluation of the structural part of the model. "Unless we can trust the quality of our measures, any assessment of the substantive relations will be problematic" (Diamantopoulos & Siguaw, 2000, p.89).

6.15 Assessment of the structural model

The analysis of the structural relationship should reveal whether the theoretical structural model, and thus the hypotheses, could be confirmed. The relevant matrices for the direct effects between the constructs are the beta (B) and gamma (Γ) matrices reflecting the regression of η_i on η_j and the regression of η_i on ξ_j respectively. The matrices are depicted in Tables 10 and 11 respectively.

Table 10. Completely standardized Beta (B) matrix

	PRODUCT	CLIMATE	SATISF	ADAPT	CAPACIT	MARKET	GROWTH
PRODUCT	-	0,24 (2,15) 2,09*		-,02 (0,16) -,10	0,04 (0,21) 0,28	-	-
CLIMATE	-	-	0,37 (0,10) 3,70*	-	-	-	-
SATISF	-	-	-	0,32 (0,06) 3,67*	-	-	-
ADAPT	-	-	-	-	-	-	-
CAPACIT	-	-	-	0,84 (0,07) 7,49*	-	-	-
MARKET	0,10 (0,08) 1,51	-	-	0,67 (0,09) 7,23*	-	-	-
GROWTH	-	-	-	-	0,25 (0,11) 2,56*	0,52 0,07) 5,15*	-

* t-values >|1,96| indicate significant path coefficients

Four issues are of relevance when evaluating the structural model:

a) The significance of the parameter estimates (β_i and Υ_i) representing the paths hypothesized between the latent unit performance dimensions;

b) The consistency of the signs of the parameter estimates and the hypothesized nature of the relationships between the latent unit performance dimensions;

c) The magnitude of the parameter estimates indicating the strength of the hypothesized relationships; and

d) The proportion of variance in each endogenous latent variable that is explained by the latent variables linked to it in terms of the hypothesized structural model.

From the t-values in the beta (B) matrix (Table 10), it can be derived that for statistical hypotheses 6, 7, 8, 11, 12, 13 and 15 (see Table 8), H_{oi}: $\beta = 0$ can in each case be rejected in favour of H_{ai} ($p < 0,05$). Thus, the causal relationships that are postulated between these respective endogenous latent variables in the structural model (see Figure 1), are thereby corroborated. In addition the signs associated with all the significant β parameter estimates are consistent with the nature of the relationships hypothesized to exist between these endogenous latent unit performance dimensions. An insignificant ($p > 0,05$) relationship is however evident between Capacity and Production. Consequently, research hypothesis 9 is not corroborated (H_{o9} can thus not be rejected in favour of H_{a9}). The path coefficients associated with the hypothesized linkages between Adaptability and Production and between Production and Market standing also failed to reach significance ($p > 0,05$). H_{o10} and H_{o14} thus also were not rejected.

In the modified model the estimated standardized parameter (0,50) associated with the influence of Markets on Capacity is significant ($p < 0,05$). The influence of Capacity and Adaptability on Production remains insignificant ($p > 0,05$). The previously insignificant path from Production to Markets, however, becomes significant ($p < 0,05$) in the modified model. The influence of Capacity on Growth, although significant in the original model, is insignificant in the modified model ($p > 0,05$).

Table 11. Completely standardized Gamma (Γ) matrix

	CORE
PRODUCT	0,44 (0,22) 2,75*
CLIMATE	0,50 (0,12) 4,67*
SATISF	0,58 (0,11) 5,80*
ADAPT	0,78 (0,14) 9,02*
CAPACIT	-
MARKET	-
GROWTH	0,08 (0,09) 0,93

* t-values >|1,96| indicate significant path coefficients

From the t-values in the gamma (Γ) (see Table 11) matrix it can be inferred that the casual relationship hypothesized between Core processes and Employee satisfaction, Climate, Production and Adaptability respectively are all significant ($p < 0,05$). H_{0i} for statistical hypotheses 1, 2, 3 and 5 are therefore rejected. The signs associated with all the significant Υ parameter estimates are consistent with the nature of the relationships hypothesized between the exogenous latent variable Core and the aforementioned endogenous latent variables. The path coefficient associated with the path hypothesized between Core processes and Future growth, however, is not significant ($p > 0,05$). H_{04} is therefore not rejected. The particular path coefficient remains insignificant ($p > 0,05$) in the modified model.

The completely standardized β and Γ parameter estimates reflect the average change in standard deviation units in an endogenous latent variable directly resulting from a one standard deviation change in an endogenous or exogenous latent variable to which it has been linked, holding the effect of all other variables constant. Table 11 would thus suggest that Core people processes has a relatively strong impact on the four of the five endogenous unit performance dimensions it has been linked to in the structural model, especially Adaptability. Table 10 would, however, suggest that the direct effect of Capacity on Future growth and the direct effect of Climate on Production, although significant, is somewhat less pronounced. The magnitude of the remaining significant β parameter estimates in Table 10 indicate moderate to relatively strong relationships. The direct effect of Adaptability on Capacity (0,84) shows up as the most influential.

The squared multiple correlations for the endogenous latent variables in the model are shown in Table 12.

Table 12. Squared multiple correlations for structural equations

SATISF	CLIMATE	PRODUCT	CAPACIT	ADAPT	MARKET	GROWTH
0,73	0,70	0,43	0,71	0,61	0,53	0,58

The proposed structural model satisfactorily succeeds in explaining variance in four of the seven endogenous latent variables (Satisf, Climate, Capacit, and Adapt). The model's ability to account for the variance in Product, Markets and Growth, although not all together problematic, nonetheless creates some reason for concern.

The completely standardized Ψ-matrix depicting the variance in the residual error terms ζ is presented in Table 13.

Table 13. Completely standardized Psi (Ψ) matrix

SATISF	CLIMATE	PRODUCT	CAPACIT	ADAPT	MARKET	GROWTH
0,27	0,30	0,57	0,29	0,39	0,47	0,42

The residual error terms ζ acknowledge the fact that all the variance in the endogenous latent variables most probably will not be explained by the model – some of the variance most probably will be due to effects not included in the model. Large residual error variance terms in Table 13 for Product and, to a lesser extent, Markets and Growth thus reiterate the conclusion derived from Table 12 that the model achieves relatively less success in accounting for the variance in these three unit performance dimensions. Taken in conjunction with the finding reported earlier on the nature of the possible path additions to the structural model that would improve the fit of the model, thus seems to suggest that the problem could be rectified by expanding the model with additional linkages between the latent variables concerned. This inference seems to agree with the findings derived from the modification indices calculated for the Ψ-matrix. With regards to the Production dimension the problem could possibly be explained in terms of the second item parcel's (Product_2) failure to reflect η_1.

7. CONCLUSION

The objective of this study was to establish the nature of causal linkages between the eight unit performance dimensions and more specifically the extent to which these unit performance dimensions are directly and indirectly dependent on each other. The ex post facto nature of the research design, however, precludes the drawing of causal inferences from significant path coefficients.

This study failed to find support for the hypothesis that there is a directional linkage between Production and Efficiency (Product) and Market standing/scope/share (Market). Thus, although it seems reasonable to propose that if an organisational unit consistently succeeds in delivering a superior output to its clients over an extended period of time, it thereby should develop an elevated market standing and a satisfied client base, the available empirical evidence does not corroborate this. The failure of the second Production item parcel (A12) to provide an uncontaminated measure of the production latent variable, however, suggests that it might be prudent to be a little cautious before abandoning this hypothesis. In the modified/expanded model the influence of Production on Market standing is significant.

This study, however, does provide support for the hypotheses that directional linkages exist between Market standing/scope/share (Market) and Future growth (Growth), between Capacity (Capacit) and Future growth (Growth), and between Adaptability (Adapt) and Market standing/scope/share (Market).

Market standing/scope/share is thus shown to mediate the effect of Adaptability on Future growth perceptions. The results moreover fail to show a positive directional linkage between Adaptability (Adapt) and Production and Efficiency (Product). Adaptability is thus shown to have only an unmediated effect on Market standing/scope/share. If an organisational unit thus has a high market standing, and the organisational unit has the ability to adapt to internal and/or external environmental changes, should they occur, the unit will currently be characterized by high future growth prospects.

The results of the study confirm a direct positive linkage between Core people processes (Core) and Production and Efficiency (Product) thus supporting the indispensable requirement for a smooth running, quick response, low friction, high-energy human system in order to pursue the production objectives.

The results furthermore support the notion that there is a positive directional linkage between Core people processes (Core) and Employee satisfaction (Satisf). Core people processes (Core) influences work unit climate (Climate) directly and indirectly via Employee satisfaction (Satisf). The findings of the study thus provides support for the positions held by Beckhard (1969) and Beckard and Harris (1987) that vibrant, purposeful, orderly interaction between unit members, characterized by open communication, respect for the individual and his contributions and a productive clashing of ideas focused on the goals and work plans of the unit, constitute an important prerequisite for a healthy (in terms of climate and satisfaction as defined in Table 1) organisational work unit.

The study supports the notion of a positive linkage between Core people processes (Core) and Adaptability (Adapt) but not between Core people processes (Core) and Future growth (Growth). Continuous creative productive clashing of ideas and a willingness to experiment with and learn from novel ideas and practices thus seem to be important prerequisites for the unit to respond timeously and expeditiously to change in the environment. A positive causal linkage is also supported between Adaptability (Adapt) and Employee satisfaction (Satisf).

The study, moreover, does not confirm the hypothesis that proposes a directional linkage between Capacity (Capacit) and Production and Efficiency (Product). This rather unexpected finding could most likely again be explained in terms of the failure of the second Production item parcel to comprehensively reflect variance in the Production and Efficiency latent variable.

The results support the proposed linkage between work unit Climate (Climate) and Production and Efficiency (Product) thus emphasizing the indispensable requirement of a favourable global attitudinal work unit climate that constitutes an expression of a set of shared core values and a commitment to a shared unit vision and mission in order to achieve high productivity efficiency.

The study somewhat tentatively suggests that as an organizational work unit develops a strong market standing, a satisfied client base and an enhanced overall reputation in which the organisational unit becomes well-known for the product or service they deliver, the unit tends to increase it wealth of resources. Both in terms of financial investments and in terms of the desirability of securing a position in a high flying unit, the proposed modification to the model seems reasonable.

A complex, intricate interplay between the various facets of unit performance is revealed. To fully capture this rich interplay in words in such a way that it conveys the full flavour of the complexity is, however, rather difficult to achieve.

Organisational units exist for a definite reason and with a specific purpose, namely the production of a specific product (or component thereof) or service (or component thereof) that satisfies the multitude of needs of society. In order to be instrumental in the satisfaction of these multitudes of needs, organisational units (in a free market economy) have to combine and transform scarce production factors into products and services with maximum economic utility. Organisational units are thus confronted with a choice of alternative utilisation possibilities regarding the limited factors of production it has access to. However, organisational units are guided in this choice by the economic principle which commands organisational units to attain with the lowest possible input of production factors the highest possible output of products and/or services in order to satisfy needs.

Organisational units are evaluated in terms of the efficiency with which they produce these specific products (or component thereof) or services (or component thereof) with the minimum factors of production and in terms of the extent to which they satisfy their client's quality, quantity and distributional expectations. If an organisational unit consistently succeeds in delivering a superior output to its clients over an extended period of time, it thereby should develop an elevated market standing and a satisfied client base (although the study fails to find unambiguous evidence to support this stance). An increase in market standing is accompanied by an enhanced overall reputation of the organisational unit. The organisational unit tends to become synonymous with the type of product/service in question and simultaneously expands its market share.

The environment in which organisational units operate is typically characterised by instability and unpredictability. To ensure that current high production will continue in future and to ensure future growth, it requires from the organisational unit the ability to respond appropriately and expeditiously to changes in the environment. However, in order to respond in such a manner, it is essential that the unit be given the appropriate direction in which change should occur. In addition, however, the organisational unit should possess the structural and procedural flexibility to timeously respond to such directives. Continuous creative productive clashing of ideas and a willingness to experiment with and learn from novel ideas and practices, in addition seems to represent an important prerequisite for the unit to respond timeously and expeditiously to change in the environment. Only if the organisational unit has flexible management and administrative systems, flexible core processes and flexible structures combined with versatile, multi-skilled staff, can it respond appropriately (under visionary leadership) and expeditiously to environmental change so as to maintain its dominant market position and achieve future growth. If an organisational unit currently has a high market standing due to its consistently efficient delivery of a superior product/service and the organizational unit has the ability to adapt to internal and/or external environmental changes, should they occur, the unit should currently be characterized by high future growth prospects.

Efficient core people processes and structures represent an indispensable requirement for high unit production efficiency. Efficient core people processes, characterized by clear goals and work plans, open communication, vibrant interaction and productive clashing of ideas aimed at improving unit performance in which contributions of individual unit members are valued and rewarded, should result in high employee satisfaction. In as far as clear purpose and fruitful, open, orderly interaction between unit members constitute an expression of effective unit leadership, efficient core people processes should also result in trust and respect for the unit leader and acceptance of the leader's influence. A clear sense of purpose combined with genuine unit member participation and involvement should foster a highly cohesive, well-integrated work unit with shared values committed to a common vision. If unit members have trust in the unit leader and they buy into what the unit is trying to achieve and how it is trying to achieve it due to them being allowed the opportunity to affect the operations of the unit and receive positively valenced feedback on their contributions, a positive work unit climate should emerge. Being a member of a unit with the capacity to react appropriately and expeditiously to environmental change should also foster a feeling of confidence, of being in control – especially if such capacity, combined with efficient core people processes has resulted in sustained production and efficiency over time.

A favourable global attitudinal work unit climate that constitutes an expression of a set of shared core values and a commitment to a shared unit vision and mission in addition seems to be an essential requirement to achieve high productivity efficiency. A favourable global attitudinal climate seems to be not just a desirable add-on to the profitable and market-effective company, but a precondition for its continued effectiveness.

Given the perceived pivotal role of leadership in organisational unit performance, the nature of the presumed relationship should be captured in a comprehensive leadership-unit performance structural model that would explain the manner in which the various latent leadership dimensions affect the endogenous unit performance latent variables. The evidence on the validity of the measurement and structural model underlying the PI reported in this study, in conjunction with the results on the LBI reported in Spangenberg and Theron (2001a), now paves the way for proceeding with the extremely challenging task of explicating and evaluating such a comprehensive leadership-unit performance structural model. Core people processes, Adaptability and Capacity seem to be possible vital portals through which unit leadership could effect organizational work unit performance.

8. REFERENCES

Abernethy, M.A. & Lillis, A.M. (1995). The impact of manufacturing flexibility on management control system design. *Accounting, Organisations and Society,* 20(4), 241 – 258.

Alexander. E.R.III, Penley, L.E. & Jernigan, I.E. (1992). The relationship of basic decoding skills to managerial effectiveness. *Management Communication Quarterly*, 6, 58 – 73.

Banker, R., Potter, G., & Schroeder, R.G. (1993). Reporting manufacturing performance measures to workers: An empirical study. *Journal of Accounting research*, 5(Fall), 33 – 55.

Barrett, F. D. (1987). Teamwork: How to expand its power and punch. *Business Quarterly*, 52(3), 24-31.

Bartel, A. P. (1994). Productivity gains from the implementation of employee training programs. *Industrial relations*, 33, 411 - 425.

Bettenhausen, K. L. (1991). Five years of groups research: What we have learned and what needs to be addressed. *Journal of Management*, 17, 345 - 381.

Becker, B. and Huselid, M. (1998). *High performance work systems and firm performance: A synthesis of research and managerial implications.* In Research in Personnel and Human Resources Management, 53 – 101. Greenwich, CT: JAI Press.

Beckhard, R. (1969). *Organisation development: strategies and models*. Reading, Mass: Addison Wesley.

Beckhard, R. & Harris, R.T. (1987). *Organisational transitions: Managing complex change*. Reading, Mass: Addison Wesley.

Bentler, P.M. (1990). Comparative fit indexes in structural models. *Psychological Bulletin*, 107(2), 238 - 246.

Bentler, P.M. & Bonett, D.G. (1980). Significance tests and goodness of fit in the analysis of covariance structures. *Psychological Bulletin*, 88(3), 588 - 606.

Bollen, K.A. & Long, J.S. (1993). *Testing Structural Equation Models*. Newbury Park: Sage Publications.

Boss, R.W. (1978). The effects of leader absence on a confrontation team-building design. *Journal of Applied Behavioral Science*, 14, 469 – 478.

Brown, M.W. & Cudeck, R. (1993). *Alternative ways of assessing model fit*. In K.A. Bollen & J.S. Long (Eds.): Testing Structural Equation Models. Newbury Park: Sage Publications.

Cockerill, A.P., Schroder, H. M. & Hunt, J. W. (1993). *Validation study into the High Performance Managerial Competencies*. Unpublished report, London Business School, London.

Conger, J. A. & Kanungo, R. N. (1998). *Charismatic leadership in organisations.* London: Sage Publications.

Cutcher-Gershenfeld, J. (1991). The impact on economic performance of a transformation in industrial relations. *Industrial and Labor Relations Review*, 44, 241 – 260.

Daniel, S.J. & Reitsperger, W.D. (1991a). Linking quality strategy with management control systems: Empirical evidence from Japanese industry. *Accounting, Organisations and Society*, 16(7), 601 – 618.

Daniel, S.J. & Reitsperger, W.D. (1991b). Management control systems for J.I.T.: An empirical comparison of Japan and the U.S. *Journal of International Business Studies*, 22(4), 603 - 607.

Denison, D.R. (1990). *Corporate culture and organisational effectiveness*. New York: Wiley.

Diamantopoulos, A. & Siguaw, J.A. (2000). *Introducing LISREL*. London, New Delhi: Sage Publications.

Etzioni, A. (1960). Two approaches to organisational analysis: A critique and a suggestion. *Administrative Science Quarterly*, 5, 257 – 258.

Etzioni, A. (1964). *Modern Organisations*. Englewood Cliffs. NJ: Prentice-Hall.

Galagan, P. (1988). Donald E. Petersen: Chairman of Ford and champion of its people. *Training and Development Journal*, 42, 20 – 24.

Gerhart, B. & Milkovich, G.T. (1992). *Employee compensation: Research and practice*. In M.D. Dunnette & L.M. Hough (Eds.). Handbook of industrial and organisational psychology, 3, 481 – 569. Palo Alto. CA: Consulting Psychologists Press.

Gibson, J.L., Ivancevich, J.M. & Donnelly, J.H. (1991). *Organisations*. Irwin: Boston.

Guzzo, R.A., Jette, R.D. & Katzell, R.A. (1985). The effect of psychologically based intervention programs in worker productivity: A meta analysis. *Personnel Psychology*, 38, 275 – 291.

Hair, J.F., Anderson, R.E, Tatham, R.L. & Black, W.C. (1995). *Multivariate data analysis with readings*. New Jersey: Prentice-Hall.

Hirokawa, R.Y. & Keyton, J. (1995). Perceived facilitators and inhibitors of effectiveness in organizational work teams. *Management Communication Quarterly*, 8, 424 – 446.

Hoerr, J. (1989). The payoff from teamwork. Business Week, 10 July, 56 – 62.

Holzer, H.J. (1987). *Hiring procedures in the firm: Their economic determinants and outcomes*. In M.M. Kleiner, R.N. Block, M. Roomkin & S.W. Salsburg (Eds.). Human resources and the performance of the firm. Washington, DC: BNA Press.

House, R.J. (1988). *Leadership research: Some forgotten, ignored, or overlooked findings*. In J.G Hunt, B.R. Boliga, H.P. Dachler & C.A. Schriesheim (Eds.). Emerging Leadership vistas, 245 – 260. Lexington, MA: Lexington Books.

Huselid, M.A. (1995). The impact of human resource management practices on turnover, productivity, and corporate financial performance. *Academy of Management Journal*, 38(3), 635 – 672.

Ittner C.D. & Larcker D.F. (1998a). Innovations in performance measurement: Trends and research implications. *Journal of Management Accounting Research*, 10, 205 – 239.

Ittner C.D. & Larcker D.F. (1998b). Are non-financial measures leading indicators of financial performance? An analysis of customer satisfaction. *Journal of Accounting Research,* 36, 1 – 35.

Jöreskog, K.G. & Sörbom, D. (1993). *LISREL 8: Structural equation modeling with SIMPLIS command language*. Chicago: Scientific Software International.

Jöreskog, K.G. & Sörbom, D. (1996a). *LISREL 8: User's reference guide*. Chicago: Scientific Software International.

Jöreskog, K.G. & Sörbom, D. (1996b). *PRELIS 2: User's reference guide*. Chicago: Scientific Software International.

Jöreskog, K.G. & Sörbom, D. (1998). *Structural equation modelling with the SIMPLIS command language*. Chicago: Scientific Software International.

Jöreskog, K.G., Sörbom, D., du Toit, S. & du Toit, M. (2000). *LISREL 8: New statistical features*. Chicago: Scientific Software International.

Kaplan, R.S. & Norton, D.P. (2001). Transforming the Balanced Scorecard from performance measurement to strategic management: Part 1. *Accounting Horizons*, 15(1), 87 – 102.

Katz, H.C., Kochan T.A. & Gobeille, K.R. (1983). Industrial relations performance, economic performance, and QWL programs: An interplant analysis. *Industrial and Labor relations Review*, 37, 3 – 17.

Katz, H.C., Kochan T.A. & Keefe, J.H. (1987). *Industrial relations and productivity in the U.S. automobile industry*. Washington, DC: Brookings Institution.

Katz, H.C., Kochan T.A. & Weber, M.R. (1985). Assessing the effects of industrial relations systems and efforts to improve the quality of working life on organisational effectiveness. *Academy of Management Journal*, 28, 526.

Kelloway, E.K. (1998). *Using LISREL for structural equation modelling; a researcher's guide*. Thousand Oaks: Sage Publications.

Kold, J.A. (1996). A comparison of leadership behaviors and competencies in high- and average-performance teams. *Communication Reports*, 9(2), 173 – 185.

Larson, C.E. & LaFasto, F.M. (1989). *Teamwork: What must go right, what can go wrong*. Newbury Park, CA: Sage.

Luthans, F. & Lockwood, D.L. (1984). *Toward an observation system for measuring leader behavior in natural settings*. In J.G. Hunt, D. Hosking, C.A. Schriesheim & R. Steward (Eds.). Leaders and managers: International perspectives on managerial behavior and leadership, 117 – 141. New York: Pergamon Press.

Medsker, G.J., Williams, L.J. & Holahan, P.J. (1994). A review of current practices for evaluating causal models in organizational behavior and human resources management research. *Journal of Management*, 20, 439 - 464.

Miles, R.H. (1980). Macro-Organisational behaviour. Glenview, IL: Scott, Foresman.

Nicholson, N. & Brenner, S.O. (1994). Dimensions of perceived organisational performance: tests of a model. *Applied Psychology: an International Review*, 43(1), 69 - 108.

Perera, S., Harrison, G. & Poole, M. (1997). Customer-focused manufacturing strategy and the use of operations-based non-financial performance measures: A research note. *Organisations and Society*, 15(3), 199 - 220.

Raykov, T., Tomer, A., & Nesselroade, J.R. (1991). Reporting structural equation modelling results in psychology and aging: Some proposed guidelines. *Psychology and Aging*, 6(4), 499 - 503.

Schuster, M. (1983). The impact of union-management cooperation on productivity and employment. *Industrial and Labor Relations Review*, 36, 415 – 430.

Spangenberg, H.H., Schroder, H.M. & Duvenhage, A. (1998). *Adapting a Leadership Competence Utilization Questionnaire for South African managers* (Phase 1). Paper presented at the 6th International Conference on Work and Organisational Values and Behaviour, organised by the International Society for the Study of Work and Organisational Values (ISSWOV), Istanbul, 12 – 15 July.

Spangenberg, H.H., Schroder, H.M. & Duvenhage, A. (1999). A Leadership competence utilization questionnaire for South African managers. *South African Journal of Psychology*, 29(3), 117 - 123.

Spangenberg, H.H. & Theron, C.C. (2002a). Development of a uniquely South African Leadership questionnaire. *South African Journal of Psychology*, 32(2), 9 – 25.

Spangenberg, H.H. & Theron, C.C. (2002b). *Development of a performance measurement questionnaire for assessing organisational work unit effectiveness*. Manuscript presented for publication to the Journal of Organisational and Occupational Psychology.

SPSS. (1990). *SPSS reference guide*. Chicago, Illinois: SPSS International.

Steiger J.H. (1990). Structural model evaluation and modification: An interval estimation approach. *Multivariate Behavioral Research*, 25(2), 173 - 180.

Tabachnick, B.G. & Fidell, L.S. (1989). *Using multivariate statistics (Second edition)*. New York: Harper Collins Publishers.

Trujillo, N. (1985). Organisational communication as cultural performance: Some managerial considerations. *Southern Speech Communication Journal*, 50, 201 – 224.

Weitzman, M.L. & Kruse, D.L. (1990). Profit sharing and productivity. In A.S. Blinder (Ed.). *Paying for productivity*, 95 – 141. Washington, DC: Brookings Institution.

Wellmon, T.A. (1988). Conceptualizing organizational communication competence: A rules-based perspective. *Management Communication Quarterly*, 1, 515 – 534.

Yukl, G. (1987). *A new taxonomy in integrating diverse perspectives on managerial behavior*. Paper presented at the American Psychological Association Meeting, New York.