THE EFFECT OF FAIRNESS PERCEPTION OF PERFORMANCE MEASUREMENT IN THE BALANCED SCORECARD ENVIRONMENT

By

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Declaration

"I, Y Anni Aryani, declare that the PhD thesis entitled "The Effect of Fairness Perception of Performance Measurement in the Balanced Scorecard Environment" is no more than 100,000 words in length including quotations and exclusive of tables, figures, appendices, bibliography, references and footnotes. This thesis contains no material that has been submitted previously, in whole or in part, for the award of any other academic degree or diploma. Except where otherwise indicated, this thesis is my own work".

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Publications associated with this thesis

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Table of Contents

Page

Page

Page

Page

Page

.

List of Tables

Page

Page

List of Figures

Page

Abstract

Prior studies have identified problems with traditional management control and performance measurement systems to evaluate managerial and business unit performance (Kaplan and Norton, 1996; Olve, Roy, and Wetter, 1999). One response has been the use of the balanced scorecard (BSC) to provide a more causal-linked comprehensive set of financial and non-financial measures of performance. However, recent research suggests the use of the BSC has its own difficulties including one referred to as common-measure bias (Lipe and Salterio, 2000); accordingly the benefits of the BSC cannot be fully exploited.

The existence of the common-measure bias, due to senior managers focusing on common measures to evaluate divisional/unit managers, may also produce the feeling of unfairness from the divisional/unit managers. The divisional/unit managers might perceive that the performance evaluation process is not fair since common measures exclude any specialised assessments of their other abilities and capabilities which can affect divisional characteristics. Although many scholars have tried to examine methods to reduce or overcome the common-measure bias phenomenon (see, for example, Lipe and Salterio, 2002; Libby, Salterio and Webb, 2004; Robert, Albright and Hibbets, 2004; Banker, Chang and Pazzini, 2004; Dilla and Steinbart, 2005), the issue has not been fully resolved.

Drawing on organisational justice theories, this study proposes a fairness model to help overcome the problem of common-measure bias found by Lipe and Salterio (2000) in the BSC environment. Using the concepts of *fairness perception*, *divisional/unit manager participation* and *interpersonal trust* between the parties involved in the performance evaluation process, the model investigates issues associated with common-measure bias in the context of a BSC environment. This fairness model provides a review of the relationship between the drivers of fairness perception, which include *participation*, *procedural justice*, and *distributive justice* on the performance measurement in a BSC environment, and the *interpersonal trust* between parties involved in the performance evaluation process. The effects of those variables on managerial performance also are considered.

A survey research method is employed to test empirically the hypotheses developed in this model. The survey for this study is carried out over all sectors of the Australian economy with divisions (or business unit) as the unit of analysis. The top 300 largest companies listed on the Australian Stock Exchange (ASX), as measured by market value of equity as of 30 June 2006 are used as the sampling frame. Statistical analysis methods and Structural Equation Modelling (SEM) with Analysis of Moment Structures (AMOS) version 7.0 are used to analyse data.

The findings suggest that participation in developing the performance measures significantly influences the use of the performance measure as the common-measure bias decreases. Moreover, participation was seen significantly to influence the fairness perception (both procedural and distributive) of the performance measures. Furthermore, the increase in procedural and distributive fairness had a significant positive effect on trust between parties involved in the performance evaluation process. In addition, the procedural fairness perception of the performance measures was found to influence significantly division managerial performance.

However, the results also suggest that the distributive fairness perception of the performance measures does not significantly influence the division's managerial performance. Similarly, the trust between parties involved in the performance evaluation process was seen not to influence significantly the division's managerial performance. Additionally, participation in developing the performance measures does not significantly influence the trust between parties involved in the performance evaluation process. However, participation indirectly influences the trust via the fairness perception of the performance measures.

In terms of the fairness of financial vs. non-financial measures, the results of the finding suggest that divisional managers perceive financial measures as being fairer than non-financial measures.

List of Abbreviation

ABB	Activity-Based Budgeting
ABC	Activity-Based Costing
ABCM	Activity-Based Cost Management
ABM	Activity-Based Management
AMOS	Analysis of Moment Structures
AOS	Accounting, Organizations and Society
ASX	Australian Stock Exchange
BSC	Balanced Scorecard
CAPEX	Capital Expenditure
CFA	Confirmatory Factor Analysis
CFI	Comparative Fit Index
CMB	Common-Measure Bias
DBSC	Distributor Balanced Scorecard
DFAIR	Distributive Fairness (latent construct)
DF	Distributive Fairness (indicator)
df	Degree of Freedom
DIFOT	Delivered In Full on Time
EBIT	Earnings before Interest and Taxes
EBITDA	Earnings before Interest, Tax, Depreciation and Amortisation
EM	Expectation Maximisation
ETS	Educational Testing Service
EVA	Economic Value Added
FFvsNF	Financial Fairness vs. Non-Financial Fairness
GenPercpPM	General Perception of Performance Measures
GFI	Goodness-of-Fit Index
IFOT	In-Full On-Time
ISA	International Strategic Alliances
JMAR	Journal of Management Accounting Research
LTIFR	Lost Time Injury Frequency Rates
MAR	Management Accounting Research
MCAR	Missing Completely At Random

MIs	Modification Indices
ML	Maximum Likelihood
MLE	Maximum Likelihood Estimation
MPD	Managerial Performance based on Division Manager self-assessment (latent construct)
mpd	Managerial Performance based on Division Manager self-assessment (indicator)
MPS	Managerial Performance based on division manager's view of Senior manager's perspective of performance (latent construct)
mps	Managerial Performance based on division manager's view of Senior manager's perspective of performance (indicator)
MPDQ	Management Position Description Questionnaire
N	Population
n	Sample Size
nfi	Net Farm Income
NFI	Normed Fit Index
NPAT	Net Profit After Tax
OCB	Organisational Citizenship Behaviour
OH&S	Occupational Health and Safety
PFAIR	Procedural Fairness (latent construct)
pf	Procedural Fairness (indicator)
PGFI	Parsimony Goodness-of-Fit Index
PNFI	Parsimony Normed Fit Index
POPS	Population Size (in cellular trade)
PRTCPT	Participation (latent construct)
prtcp	Participation (indicator)
SMC	Squared Multiple Correlation
RMSR	Root Means Square Residual
RMSEA	Root Mean Square Error of Approximation
RNI	Relative Noncentrality Index
ROA	Return on Assets
ROI	Return on Investment
ROS	Return on Sales

SEM	Structural Equation Modelling
SRCM	Standardised Residual Covariance Matrix
SRMR	Standardised Root Mean Residual
TIFR	Time Injury Frequency Rates
TLI	Tucker Lewis Index
TRST	Trust
upm	Use of Performance Measure

Chapter 1 Introduction

1.1 Background to the Research

Prior studies show disadvantages from traditional management control and performance measurement systems to evaluate managerial performance (see, for example, Johnson and Kaplan, 1987; Kaplan and Norton, 1996a; Olve, Roy and Wetter, 1999). In the last decade, traditional management control and performance measurement systems have been increasingly criticised on the basis that they were designed for an environment of mature products and stable technologies. This is in contrast to businesses today, which are changing rapidly (Olve et al., 1999). Hence, evaluations based solely on these attempts will not meet the needs of the contemporary business environment.

In response to the criticisms aimed at the traditional management control and performance measurement systems, many scholars tried to develop new concepts of management control and performance measurement systems to overcome the limitations of the traditional systems (see, for example, Kaplan and Norton, 1992; Otley, 2001). Some of the innovations included: activity-based costing; activity-based budgeting; activity-based cost management; economic-value-added; and the balanced scorecard (BSC), developed by Kaplan and Norton (Otley, 2001). Of these innovations, the BSC arguably constitutes the most significant development in management accounting. This is reflected by the fact that it has been adopted widely around the world (Malina and Selto, 2001). The BSC has been developed to provide a superior combination of non-financial and financial measures to meet the shortcomings of traditional management control and performance measurement systems (Kaplan and Norton, 1992).

However, implementing the BSC is not an easy task. Prior studies that examined BSC implementation identified mistakes or difficulties in the development and implementation of it. For example, companies do not build good communication and commitment prior to the implementation of the BSC (Letza, 1996); company philosophy had not been incorporated into the BSC (Letza, 1996); at times, the

BSC measures the wrong thing right (Ittner and Larcker, 2003); while its implementation can result in conflict between managers (Ittner and Larcker, 2003). Another mistake that can be identified from prior research is the existence of the common-measure bias phenomenon in the BSC. This phenomenon was found to be due to human cognitive limitation that has been identified from psychology theory (Slovic and MacPhillamy, 1974; Lipe and Salterio, 2000).

1.2 Research Problem

The present research argues that one possible explanation for the difficulties in developing and implementing the BSC may be the fairness perception of the divisional/unit managers[1] involved in the performance evaluation process. However, no studies focus on examining the effects of fairness perception of measures on managerial performance or the associated process in the context of the BSC. Therefore, the research question that arises on this issue is: what is the effect of fairness perception of measures, and the process of development of the measures, on managerial performance in a BSC environment?

1.3 Objectives of the Study

As mentioned above, the BSC is one of the innovations that respond to the limitations of the traditional management control and performance measurement systems. However, recent research suggests that the use of the BSC has its own difficulties including one referred to as common-measures bias[2] (Lipe and Salterio, 2000). The purpose of the present thesis is to overcome the problem by using the concepts of *fairness perception, divisional/unit manager participation* and *interpersonal trust* between the parties involved in the performance evaluation process, to investigate issues associated with the common-measures bias in the context of a BSC environment. Specifically, the aims of this study are:

[1] In this study the term senior managers will be used to refer to managers as the evaluator in the performance evaluation process, while divisional/unit managers will be used to refer to managers being evaluated in the performance evaluation process.

[2] Common-measure bias phenomenon is the concept where managers or decision-makers faced with comparative evaluations tend to use information that is common to both objects and to underweight or ignore the information that is unique to each object (Slovic and MacPhillamy, 1974; Lipe and Salterio, 2000).

1 to evaluate the relationship between *participation* and *fairness perception* regarding the divisional/unit performance measures used in a BSC environment;

2 to examine whether financial or non-financial measures are perceived as being more fair in a BSC environment;

3 to examine the effect of *participation* on the development of, and use of, the performance measures in the performance evaluation process;

4 to examine the relationship between *participation* and *interpersonal trust* between parties involved in the performance evaluation process in a BSC environment; and

5 to investigate the effect of *participation*, *fairness perception* and *interpersonal trust* in the development of performance measures on divisional/unit managerial performance in a BSC environment.

1.4 Significance of the Study

In order to exploit fully the benefit of the BSC, successful implementation and use of the BSC is very important (Lipe and Salterio, 2000). Therefore:

1. this research will help managers involved in the performance evaluation process to improve and overcome the problems arising from the implementation and use of the BSC;
2. this study will highlight the importance of fairness perception of performance measures as well as interpersonal trust in the performance evaluation process; and
3. this study will provide empirical evidence for managers about the importance of participation to enhance fairness perception and interpersonal trust. It will also provide them with recommendations on how they should participate in the development, implementation and use of the BSC.

1.5 Contributions of the Research

The study will lead to a significant contribution to knowledge as:

1. it will be the first study to investigate the effect of fairness perception of measures and interpersonal trust in the performance evaluation process in the BSC environment;
2. it will be one of the few studies that use procedural and distributive fairness theories (e.g., Lau and Lim, 2002a; Lau and Sholihin, 2005) to evaluate fairness perception of performance measures in the context of BSC; and
3. it will fill the existing gap associated with common-measures bias found in prior studies (see: Lipe and Salterio, 2000; Lau and Sholihin, 2005) and extend knowledge by providing empirical evidence regarding the effect of fairness perception of performance measures on managerial performance in a BSC environment.

1.6 Scope of the Research

The scope of the current thesis focuses on the division (business unit) managers from the top 300 largest companies listed on the Australia Stock Exchange (ASX), as measured by market value of equity as at 30 June 2006. The population of this study comprised all sectors of the Australian economy, except for government industry.

The present research focuses on the area of participation on the development of the performance measures, along with: the use of the performance measures; the fairness perception of the performance measures; the trust between parties in the performance evaluation process; and managerial performance.

1.7 Definition of Key Terms

A performance measure is a variable (or metric) used to quantify the efficiency and/or effectiveness of an action (Neely, Gregory and Platts, 1995, p. 80). In this present study, performance measures refer to measures (financial and non-financial) that are commonly used in the performance evaluation process to evaluate divisional (business unit) manager performance.

A performance measurement is a process of quantifying the efficiency and effectiveness of action (Neely et al., 1995, p. 80)

A performance measurement system is a set of variables (or metrics) used to quantify the efficiency and effectiveness of actions, as well as the technology (software, hardware) and the procedures associated with the data collection (Lohman, Fortuin and Wouters, 2004, p. 268).

The term balanced scorecard (BSC) refers to an environment where financial and non-financial measures are commonly used in the performance evaluation process.

Common-measure bias phenomenon refers to the fact that when managers or decision-makers are faced with situations involving comparative evaluations, they will tend to use information that is common to both objects, while underweighting or ignoring the information that is unique to each object (Slovic and MacPhillamy, 1974; Lipe and Salterio, 2000).

Throughout the present research, the term 'senior managers' is used to refer to managers as the evaluator in the performance evaluation process, while 'divisional/unit managers' is used to refer to managers being evaluated in the performance evaluation process.

In the present study, distributive fairness is defined as the fairness of the outcome of the process of the development of performance measures – *financial* and *non-financial* measures – that eventually are used in the performance evaluation process.

In the present study, procedural fairness is defined as the fairness of the process to develop performance measures – *financial* and *non-financial* measures – that are finally used in the performance evaluation process.

In the present study, participation is defined as the participation of both senior and divisional (business unit) managers in the development of performance measures – financial and non-financial – that are used in the performance evaluation process along with the targets of the measures. Here, participation can be construed as the ability to perform ‘voice’ and influence the performance measures. In addition, participation means the ability to provide information and input for the development of the performance measures.

In the present study, the definition of interpersonal trust is the definition of trust by Tomkins (2001, p. 165) which is:

> The adoption of a belief by one party in a relationship that the other party will not act against his or her interests, where this belief is held without undue doubt or suspicion and the absence of detailed information about the actions of that other party.

1.8 The Organisation of the Thesis

This present thesis is structured to provide a critical review of relevant information regarding the common-measures bias phenomenon found in the BSC environment, the fairness perception of the performance measures, the participation in the development of the performance measures, the trust between parties involved in the performance evaluation process and the managerial performance. This will be followed with a discussion of the proposed framework along with the hypotheses developed in this study. An operationalisation of the variables and research methodology will also be undertaken. Next, the data are analysed to provide evidence for support of the hypotheses. Based on the research findings, the implications of the study will be derived. This thesis consists of nine chapters as follows.

Chapter 1 provides a brief introduction to the background of the study along with the research problem. It also outlines the objectives of the study, the significance, contributions, scope, key terms and structure of the research.

Chapter 2 reviews the prior literature regarding the financial and non-financial measures in the BSC environment together with the common-measures bias phenomenon.

Chapter 3 reviews the prior literature regarding the fairness perception that includes procedural and distributive fairness, along with a discussion of participation as the important driver to increase the fairness perception. The trust between parties involved in the performance evaluation process, as well as the managerial performance, is also reviewed.

Chapter 4 proposes the theoretical framework that is employed to guide the research in this current thesis, as well as the hypotheses development. The discussions of the operationalisation of the variables that are used in this present study along with the justification of each of the variables are also presented in this chapter.

Chapter 5 presents the research methodology along with the justification of choices and uses. It includes the justification for using the survey method with a mail questionnaire, the assessment of data quality, the discussion of the survey, the development of the questionnaire, the examination of the sample and the administration of the survey. Furthermore, the method to analyse the data that includes data editing, coding, screening and analysing is also described.

Chapter 6 shows the descriptive analysis of the current study. It comprises the analysis of demographic characteristics of the respondents, the general perceptions relating to performance measures and the test of reliability analysis for the main constructs.

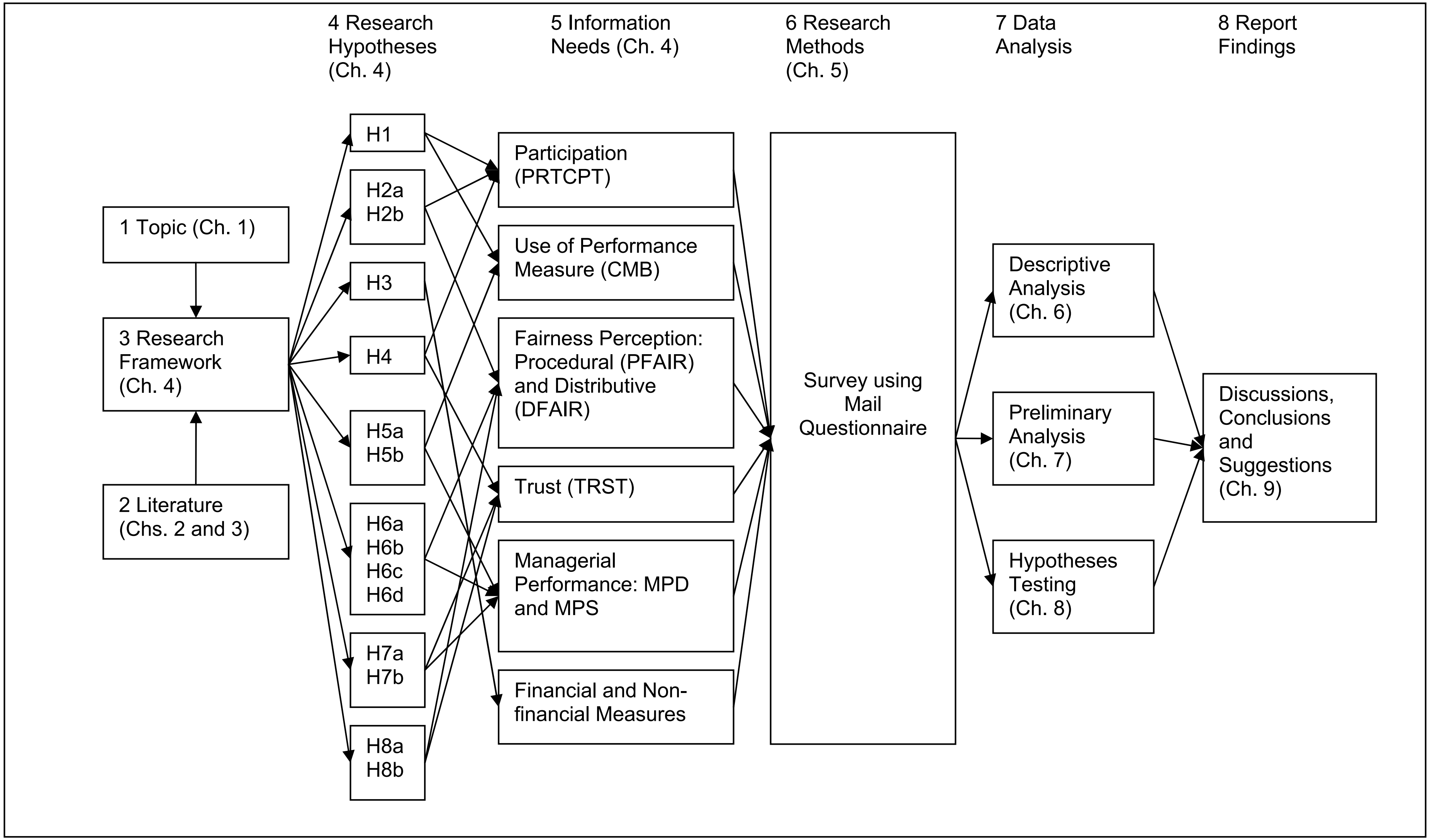
Chapter 7 presents the preliminary data analysis before hypotheses testing. It includes the assessment of the construct reliability and discriminant validity. The assessment of the discriminant validity is conducted by the examination of single-factor congeneric model for each of the key constructs and the assessment of confirmatory factor analysis.

Chapter 8 presents the analysis of the results in the present research. It includes all the steps conducted to analyse the data. The fairness perception model and the financial and non-financial fairness perception results are then presented.

Chapter 9 includes the discussions and concluding remarks of this current study along with the implications derived from the results, the limitations of the study and suggested future research.

Using the structure of a thesis report diagram by Veal (2005, p 321), the structure of the current thesis is also presented in Figure 1.1.

Figure 1.1: The Organisation of the Thesis



Chapter 2 Literature Review: The Balanced Scorecard and Its Common-Measure Bias Problem

2.1 Introduction

This chapter reviews several accepted concepts of performance measurement systems with emphasis on the balanced scorecard (BSC). To begin with, a discussion of the limitations of traditional performance measurement systems and an assessment of financial and non-financial measures is undertaken. The next section details the BSC method and the extent to which it has been adopted. The final part of the chapter describes the main criticisms of the BSC with particular emphasis on the emergence of the common-measure bias problem.

2.2 Review of Performance Measurement Systems[3]

Historically, literature concerning performance measurement can be divided into two phases (Ghalayini, Noble and Crowe, 1997). The first phase started in the 1880s and ended in the 1980s. This phase emphasised financial measures of performance such as profit, return on investment and return on assets. The second phase began in the early 1980s. This phase arose due to the emergence of global competition which forced companies to implement new technologies and philosophies of production and management (Ghalayini et al., 1997).

The onset of global competition and changing technologies has lead to criticism of traditional performance measurement systems. Therefore, this section will review the limitations of traditional performance measurement systems. This is

[3] This study adopts the following definitions as suggested by Neely et al. (1995) and Lohman et al. (2004), to distinguish three different concepts. They are:

- A *performance measure* is a variable (or metric) used to quantify the efficiency and/or effectiveness of an action (Neely et al., 1995, p. 80).
- A *performance measurement* is a process of quantifying the efficiency and effectiveness of action (Neely et al., 1995, p. 80)
- A *performance measurement system* is a set of variables (or metrics) used to quantify the efficiency and effectiveness of actions, as well as the technology (software, hardware) and the procedures associated with the data collection (Lohman et al., 2004, p. 268).

followed by a discussion of financial and non-financial measures and an assessment of the BSC.

2.2.1 Limitations of Traditional Performance Measurement Systems

Despite a multitude of literature on traditional performance measurement systems, no specific definition exists. In fact, researchers have used many terms to refer to traditional performance measurement systems. For example: cost accounting (manufacturing cost accounting) (Drucker, 1990; Blenkinsop and Burns, 1992); productivity (Skinner, 1986); traditional cost accounting systems (Kaplan, 1983; Ghalayini et al., 1997); traditional performance measurement systems, traditional management cost systems and traditional performance measures (Ghalayini et al., 1997; Bourne, Mills, Wilcox, Neely and Platts, 2000); traditional accounting systems (Eccles, 1991; Kaplan, 1983); traditional accounting-based approaches (Burgess, Ong and Shaw, 2007); and traditional measures of performance (Olsen et al., 2007).

Despite the proliferation of terms regarding traditional performance measurement systems, there seems to be agreement based on traditional accounting or cost accounting systems which focus on financial performance measures (Ghalayini et al., 1997), for example, return on investment (ROI), return on assets (ROA), return on sales (ROS), purchase price variances, sales per employee, profit per unit of production and productivity.

Over the last decade, traditional performance measurement systems have been increasingly criticised on the basis that they were designed for an environment of mature products and stable technologies (Drucker, 1990; Skinner, 1986; Ghalayini et al., 1997; Eccles, 1991; Kaplan, 1983; Johnson and Kaplan, 1987; Ittner and Larcker, 2001; Kaplan and Norton, 1996a; Olve et al., 1999; Bourne et al., 2000; Blenkinsop and Burns, 1992; Burgess et al., 2007; Olsen et al., 2007). Moreover, Neely (1999) argued that there are seven main reasons that lead to the criticism of the traditional performance measurement systems. These reasons are:

(1) the changing nature of work;
(2) increasing competition;

(3) specific improvement initiatives;
(4) national and international awards;
(5) changing organisational roles;
(6) changing external demands; and
(7) the power of information technology.

Therefore, traditional performance measurement systems are designed for a mature product with stable technology in contrast to the present rapidly changing business environment. Not surprisingly, the traditional performance measurement system is seen as inadequate in meeting the needs of the contemporary business environment (Olve et al., 1999).

In fact, many writers argue that the exclusive use of traditional measurements in today's businesses leads to several limitations, including the following.

- A concern with direct labour efficiency (Skinner, 1986; Drucker, 1990; Blenkinsop and Burns, 1992; Ghalayini et al., 1997). Specifically, the heavy focus on direct labour efficiency is based on the realities of the 1920s when direct labour accounted for 80% of all manufacturing costs other than raw materials. This technique would be misleading today since currently very few companies have direct labour costs that run as high as 25% (Drucker, 1990). As a result, it fails to provide or support a coherent manufacturing strategy, since the company effort focuses on being a low-cost producer (Skinner, 1986).
- Overemphasis to achieve and maintain short-term financial results (Kaplan, 1983; Skinner, 1986; Eccles, 1991; Kaplan and Norton, 1996b). This overemphasis on short-term financial results can be dangerous since it might force the manager to manipulate the reporting figures due to incentives (Eccles, 1991).
- Furnishes misleading information for decision-making (Drucker, 1990; Ghalayini et al., 1997). Financial reports are a lagging metric since they are usually closed monthly, and are a result of decisions made one or two months prior, making it too old to be useful (Ghalayini et al., 1997).

- Fails to consider the requirements of today's organisation and strategy (Skinner, 1986). The heavy emphases on cost reductions hinder innovation, as well as the ability to introduce rapidly product changes or develop new products (Skinner, 1986).
- Encourages short-term thinking and sub-optimisation (Skinner, 1986; Olve et al., 1999; Neely, 1999; Olsen et al., 2007). Thus, short-term financial focus discourages long-term thinking, for example, it can lead to R&D reductions, cutbacks in training and postponement of investment plans (Olve et al., 1999).
- Provides misleading information for cost allocation and control of investments (Johnson and Kaplan, 1987). Moreover, the numbers generated by traditional performance measurement systems often fail to support the investments in new technologies and markets that are essential for successful performance in global markets (Eccles, 1991).

To respond to the criticisms of the traditional performance measurement systems, many scholars tried to develop new concepts of performance measurement systems that can solve the limitations of the traditional systems (see, for example, Kaplan and Norton, 1992; Otley, 2001). Some of the innovations included activity-based costing; activity-based cost management, economic value added; and the BSC (Otley, 2001), which will be discussed later in the chapter. Consequently, over the last decade many companies have implemented non-financial measures to complement the financial measures (Ittner and Larcker, 2003), which in a way have move them closer to a BSC environment.

2.2.2 Financial and Non-Financial Measures

In their study, Ittner and Larcker (2003) found that those companies believed that the use of non-financial measures offered several benefits. Some of the benefits included:

1) managers can get a quick overview of their business' progress prior to financial reports being released;
2) employees can acquire superior information about the actions necessary to achieve strategic objectives; and

3) investors receive more accurate information about companies overall performance since non-financial measures usually reflect their intangible value, such as R&D productivity. Currently, traditional accounting rules fail to recognise this as an asset.

The increasing emphasis on the non-financial performance measures has been widely discussed in the growing body of accounting literature (see, for example, Amir and Lev, 1996; Ittner, Larcker and Rajan, 1997; Ittner and Larcker 1998a, 1998b; Banker, Potter and Srinivasan, 2000). Specifically, this is with regards to the predictive ability and the value relevance of the non-financial performance measures. The following is a review of the main studies related to this phenomenon.

Amir and Lev (1996) examined the value-relevance of non-financial information in the wireless communication industries. Their primary motivation centred on the fast-changing, technology-based industries, where investment activities in intangibles such as R&D, customer-base creation, franchise and brand development is very substantial. Such investments are either immediately expensed in financial reports or arbitrarily amortized. Consequently, while significant market values are created in these industries by production and investment activities, the key financial variables, such as earnings and book values, are often negative or excessively depressed and appear unrelated to market values.

In their study, Amir and Lev (1996) employed earnings, book values, and cash flows to represent financial information, while POPS (i.e., an abbreviation for 'Population Size' in the cellular trade (Amir and Lev, 1996, p. 21)) as a growth proxy and market penetration embodied the non-financial indicators. They found that financial information *alone* is largely irrelevant for the valuation of cellular companies. However, when combined with non-financial information, and after adjustments are made for the excessive expensing of intangibles, some of these variables do contribute to the explanation of stock prices. They concluded that their finding demonstrates the complementarity between financial and non-financial information, although the value-relevance of non-financial information in the cellular industry overwhelms that of traditional financial indicators.

Ittner et al. (1997) examined factors that influenced the choice of performance measures in annual bonus contracts. They argued that organisational strategy, quality strategy, regulation, financial performance, exogenous noise in financial performance measures, and the influence of a CEO over the board of directors are the most important factors that impact on the choice of performance measures in annual bonus contracts. Using cross-sectional latent variable regression analysis of data from 317 firms for the year 1993-1994 in the Lexis/Nexis database, Ittner et al. (1997) found that firms pursuing an innovation-orientated prospector strategy tend to place relatively greater weight on non-financial performance in their annual bonus contracts. Similarly, firms following a quality-orientated strategy place relatively more weight on non-financial performance.

Furthermore, they found evidence that regulation has an impact on the choice of performance measures, where regulated firms place relatively greater weight on non-financial performance than other firms. Ittner et al. (1997) also established that the noise[4] of financial performance influenced the choice of performance measures. Specifically, the greater the noise in financial performance, the more weight placed by the firms on non-financial performance. However, they were unable to provide any evidence to support claims that powerful CEOs use their influence over the board of directors to encourage the use of non-financial performance measures in annual bonus contracts.

In a further study Ittner and Larcker (1998b), using customer and business-unit data, found modest support for claims that customer satisfaction measures are leading indicators of customer purchase behaviour (retention, revenue, and revenue growth), growth in the number of customers and accounting

[4] Noise of performance measures is the level of precision of performance measures which provides information about manager action. Precision indicates a lack of noise (Banker and Datar, 1989), therefore the greater the noise of performance measures, the lower the precision of the performance measures. For further discussion, please refer to the following readings: Banker and Datar (1989), Feltham and Xie (1994).

performance (business-unit revenue, profit margins, and return on sales). They also found some evidence that firm-level customer satisfaction measures can be economically relevant to the stock market but are not completely reflected in contemporaneous accounting book value.

Banker et al. (2000) investigated the relationship between non-financial measures and financial performance and the performance impacts of incorporating non-financial measures in incentives contracts. To answer their research questions, they analysed time-series data for 72 months from 18 hotels managed by a hospitality firm in the United States of America. In their study, Banker et al. (2000) used consumer satisfaction as the non-financial performance measure, while employing operating profit and its various components to proxy financial performance measures. Their result suggests that at the research site, non-financial measures of customer satisfaction help predict future financial performance.

Additionally, the association between financial and non-financial performance may be a result of repeat purchase as opposed to increase price premiums charged to customers. This finding is consistent with the evidence obtained by Ittner and Larcker (1998b) who found customer satisfaction measures to be leading indicators of consumer growth. Nevertheless, Banker et al. (2000) did not find evidence that supported the assertion that increased customer satisfaction is associated with increased operating costs, although it is possible that expenditures on capital investments may have increased to support a customer-satisfaction strategy.

On the issue of the performance impact of incorporating non-financial measures in incentives contracts, Banker et al. (2000) discovered that the change to incentive plans had a significant positive effect on revenues after controlling for inflation and competitors' performance. Based on this result, Banker et al. (2000) concluded that both non-financial and financial performance improved following the implementation of an incentive plan that included non-financial performance measures.

A study by Said, HassabElnaby and Wier (2003) investigated the performance consequences of the implementation of non-financial performance measures. Using panel data (derived from Lexis/Nexis database), covering the period 1993-1998, they compared the performance of a sample of firms that used both financial and non-financial measures (1,441 firm-year observations) to a matched sample of firms that based their performance measurement solely on financial measures (1,441 firm-year observations). The intention of Said et al. (2003) was to examine the implications of non-financial performance measures included in compensation contracts on current and future performance. Their empirical evidence suggests that non-financial measures are significantly associated with future accounting-based and market-based returns, and with contemporaneous data, the same result held for market-based return but not accounting-based returns. These results are consistent with previous studies that show non-financial performance measures are associated with subsequent firm economic performance (Banker et al., 2000).

Said et al. (2003) also found evidence that the use of non-financial measures is significantly associated with an innovation-orientated strategy, adoption of strategic quality initiatives, length of product development, industry regulation and the level of financial distress. This discovery supports the results provided by Ittner et al. (1997) who examined the factors that influence the choice of performance measures in annual bonus contracts. Furthermore, Said et al. (2003) found evidence that the relationship between the use of non-financial measures and future and current firm performance depends on the match between use of non-financial measures and the firm's characteristics.

In line with previous studies that investigated non-financial performance measures (Ittner et al., 1997; Banker et al., 2000; Said et al., 2003), HassabElnaby, Said and Wier (2005) empirically examined firms' decisions to retain the use of non-financial performance measures as part of the compensation contracts following the initial implementation. Based on the sample of 91 firms examined in Said et al. (2003) that used non-financial performance measures during the period 1993-1998, HassabElnaby et al. (2005) found that firms performed significantly better when they retained their non-financial measures. The evidence shows the importance of performance as a motivation to retain the non-financial measures in compensation contracts. HassabElnaby et al. (2005) also found evidence consistent with prior research (Ittner et al., 1997; Said et al., 2003) that indicates the significance of considering the match between firm characteristics and the use of non-financial measures. Moreover, HassabElnaby et al. (2005) found that prior performance is time variant with respect to the decision to retain non-financial performance measures while firm characteristics are time invariant.

The discussion above illustrates that there is a growing body of literature devoted to potential benefits of non-financial performance measures. However, Ittner and Larcker (2003) found that only a few companies realize these benefits. They found that most companies fail to identify, analyse, and act on the right non-financial measures, where little attempt is made to identify areas of non-financial performance that might advance their chosen strategy. Additionally, these companies have not demonstrated a cause-and-effect link between improvement in those non-financial areas and the financial areas.

Ittner and Larcker (2003) argue that these companies often fail to establish the links partly due to laziness or thoughtlessness. Consequently, this lack of cause-and-effect link between non-financial and financial measures increases the possibility of self-serving managers being able to choose and manipulate measures for their own objectives, particularly to procure bonuses. Furthermore, Ittner and Larcker (2003) identified a number of mistakes that companies made when attempting to measure non-financial performance. Those mistakes were: 1) not linking measures to strategy; 2) not validating the links; 3) not setting the right performance targets; and 4) incorrect measurement.

Hence, the continued shortfalls of companies in identifying and implementing strategies optimally to exploit their advantages (financial and non-financial) gave rise to innovations of management control and performance measurement systems to overcome this (Ittner and Larcker, 2003).

As Otley (2001) identified, some of the innovations include activity-based costing (ABC); activity-based budgeting (ABB); activity-based cost management (ABCM); activity-based management (ABM) and economic value added (EVA).

The ABC was devised by Kaplan in 1983 (Innes and Mitchell, 1998) as a 'more accurate method of product costing'. It was considered a technical improvement to traditional accounting techniques; however, its major contribution was that it provided a platform for other measures to build from (Otley, 2001). Otley goes on to add that the advantages of implementing the ABC were due to its ability to develop better methods of overhead cost management and business practice improvement, rather than being able to provide a better knowledge of product costs. This can be seen with the development of the ABCM and ABM which were derived from the ABC.

The EVA approach is another recently popular approach (mid-1990s). It was developed by the Stern Stewart Corporation as an overall measure of financial performance, focusing on assisting the manager to deliver shareholder value. It does this by avoiding some of the performance measurement problems recently experienced with other financial performance measures (Otley, 1999).

Of all the proposed managerial control and performance measurement systems, however, it is the BSC which has proved to be the most significant development in management accounting, resulting in its world-wide adoption (Malina and Selto, 2001).

2.3 The Balanced Scorecard and Its Adoption

This section briefly reviews the four perspectives of performance measures in the BSC; which is then followed by a short discussion of the BSC adoption around the world.

2.3.1 What is the Balanced Scorecard?

According to its creators (Kaplan and Norton, 1992), the BSC[5] has been offered as a superior combination of non-financial and financial measures developed to meet the shortcomings of traditional management control and performance measurement systems.

The BSC incorporates the financial performance measures with the non-financial performance measures in areas such as customers, internal processes and learning and growth. Consequently, the BSC includes measures of financial performance, customer relations, internal business processes and organisational learning and growth. The combination of financial and non-financial measures of the BSC was developed to link short-term operational control to the long-term vision and strategy of the business (Kaplan and Norton, 1992, 1996a, 2001).

The BSC, therefore, explicitly adopts a multi-dimensional framework by combining financial and non-financial performance measures (Otley, 1999). Hence, the BSC allows a more structured approach to performance management while also avoiding some of the concerns associated with the more traditional control methods.

The BSC allows for the evaluation of managerial performance as well as the individual unit or division. In fact, Kaplan and Norton (1993, 2001) argue that one of the most important strengths of the BSC is that each unit in the organisation develops its own specific or unique[6] measures that capture the unit's strategy, beside common measures that are employed for all units (Kaplan and Norton, 1993, 2001). Therefore, there are financial and non-financial measures in all four perspectives (i.e., financial, customers, internal process, and learning and growth) that should be used to evaluate managerial/unit performance. Some of

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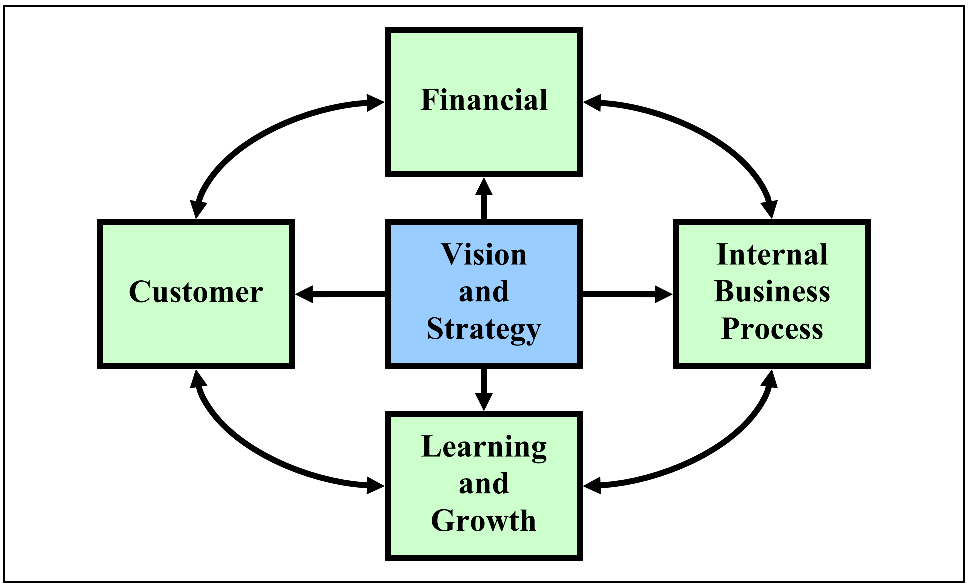
[5] In this study, the term balanced scorecard ("BSC") is used to refer to an environment where financial and non-financial measures are commonly used in the performance evaluation process.

[6] Some studies use the terms 'unique and common' measures to refer to measures used within each perspective of the BSC (see, for example, Lipe and Salterio, 2000, 2002; Libby, Salterio and Webb, 2004; Robert, Albright and Hibbets, 2004; Banker, Chang and Pazzini, 2004, Dilla and Steinbart, 2005), while other studies use the terms 'financial and non-financial' measures (see, for example, Lau and Sholihin, 2005). In this study, financial and non-financial measures will be used to refer to the measures within the four perspective of the BSC.

the specific measures chosen for each individual business unit in the organisation will likely differ from those from other units because in diversified organisations, individual business units may face different competitive pressures, operate in different product markets, and may therefore require different divisional strategies (Kaplan and Norton, 1993). Consequently, business units may develop customized scorecards to fit their unique situations within the context of the overall organisational strategy (Kaplan and Norton, 2001). Hence, even though business units within a company may have several BSC measures in financial measures, the non-financial measures represent what individual units must accomplish in order to succeed (Kaplan and Norton, 1996b).

The four critical perspectives that can be translated to conceptualise the organisation's vision and strategy (financial, customer, internal business process, and learning and growth) is illustrated in Figure 2.1. This is followed by a brief discussion of each perspective.

Figure 2.1: The balanced scorecard: A framework to translate a strategy into operational terms



Source: Kaplan and Norton (1996a, p. 76)

2.3.1.1 Financial Perspective

In the BSC model, Kaplan and Norton (1996a) still use the financial perspective due to its ability to summarise the readily measurable and important economic consequences of actions already taken. This indicates whether the organisation's strategy and its implementation are contributing to the bottom-line improvement (Kaplan and Atkinson, 1998). Measures of financial goals can range from traditional accounting approaches such as total costs, total revenue, profit margin, operating income, return on capital, to sophisticated value-added measures intended to link managerial goals to shareholder interests (McKenzie and Shilling, 1998).

2.3.1.2 Customer Perspective

From the customer perspective of the BSC, it is very important for managers to identify the customer and market segments where the organisation will compete with its competitors and determine the performance measures of the organisation in these targeted segments (Kaplan and Norton, 1996a). Furthermore, Kaplan and Norton (1996b) stated that understanding the customer and the market segments are critical for the managers in order to identify which of the targeted customer groups have contributed the greatest growth and profitability. Therefore, the managers can decide which particular strategy is to be used in those segments. The example of the measures of customer perspective include customer satisfaction, customer retention, new customer acquisition, customer profitability, market share in targeted segments, quality, and the value added to customers through products and services (Kaplan and Norton, 1996b).

2.3.1.3 Internal Business Process Perspective

From an internal business process perspective of the BSC, managers identify the critical internal processes at which the organisation must excel. According to Kaplan and Norton (1996a) identifying the critical internal business processes enables the company to: (1) deliver the value propositions that are crucial to attract and retain customers in targeted market segments; and (2) satisfy shareholders expectations for the excellent financial returns.

This is crucial since these procedures focus on the internal processes that have the greatest impact on achieving both customers' satisfaction and the financial goals of the organisation. From here, they developed a generic value chain model for creating value for customers and producing financial results. The generic value chain model comprises three principal business processes (Kaplan and Atkinson, 1998):

- innovation;
- operations; and
- post-sales service.

Kaplan and Atkinson (1998) explained that the first step in the generic value chain is innovation where the organisation's researcher identifies the customers' needs and creates the products and services that will meet those needs. In this step the organisation also identifies the new markets, new customers and the needs of existing customers. This step enables the organisation to design and develop new products and services in order to reach the new markets and customers and to satisfy customers' newly identified needs.

The second step in the generic value chain is to deal with operations where existing products and services are produced and delivered to customers. This process stresses efficient, consistent and timely delivery of existing products and services to existing customers. The important objectives of this step are operational excellence and cost reduction in producing and delivering products and services. However, in the whole of the internal value chain such operational excellence may be not the most critical component for achieving financial and customer objectives. The existing operations tend to be repetitive and traditionally its processes have been monitored and controlled by financial measures such as standard cost, budgets and variances. This focus on financial measures, however, can sometimes lead to highly dysfunctional actions. Therefore, some aspect such as measurement of quality and cycle time should be added as critical performance measures in the organisation's internal business process perspective (Kaplan and Atkinson, 1998)

The third and final step in the generic value chain is post-sales service. This is the service provided to the customer after the sale or delivery of service. It includes warranty and repair activities, treatment of defects and returns, and the processing and administration of payments, such as credit administration. Some of the organisations that deal with environmentally sensitive chemicals may provide performance measures that relate to the safe disposal of waste from the production process. All of these activities add value to the customers who used the organisation's product and service (Kaplan and Atkinson, 1998).

Kaplan and Atkinson (1998) argue that the internal business process perspective provides two basic differences between the traditional and the BSC methods to performance measurement. First, the traditional method focuses on monitoring and improving existing business processes, while the BSC method will usually identify new processes at which the organisation must excel to meet customer and financial objectives. Second, the traditional method focuses on the processes of delivering existing products and services to existing customers, while the BSC incorporates innovative processes into the internal business process perspective.

2.3.1.4 Learning and Growth Perspective

In the learning and growth perspective of the BSC, managers identify the infrastructure of the organisation that must be built in order to create long-term growth and improvement (Kaplan and Atkinson, 1998). They argue that the ability to continually improve one's capabilities to deliver value to their customers and shareholders is crucial in a globalised economy. Accordingly, there are three principal sources of value in the learning and growth perspective: people; systems; and organisational procedures. Often there is a large gap between financial, customer and internal business process objectives on the BSC with existing capabilities of people, systems and procedures and what will be required to achieve the objectives. Therefore, Kaplan and Atkinson (1998) argue that the organisation must invest in continuing training programs for employees at all levels, enhancing information technology and systems, and aligning organisational procedures.

From the discussion above, it is clear that the BSC emphasis is not only on financial measures but also on non-financial measures such as new product development, market share, customer satisfaction, safety and pollution reduction. Olve et al. (1999) declared that the BSC is a continuous process that combines the four perspectives, which are interrelated. For example, if the organisation wants to be profitable, they have to have loyal customers. To make the customers loyal, they have to provide good products and services. To provide those, they need appropriate and well functioning processes and for that purpose they must develop the capabilities of their employees. Not surprisingly, therefore, Kaplan and Norton (1996a) argue that a properly constructed BSC should tell the story of the organisation strategy. That is about the cause-and-effect relationship between outcome and the performance drivers of those outcomes. Every measure selected on a BSC should be an element in a chain of cause-and-effect relationships that communicates the meaning of the business's strategy to the organisation.

2.3.2 The Balanced Scorecard Adoption[7]

Many companies around the world have adopted the BSC; with a recent survey estimating 60% of Fortune 1000 firms have experimented with the BSC (Silk, 1998). Examples of BSC adopters include, in the US: KPMG Peat Marwick; Allstate Insurance; AT&T; Rockwater (part of Brown and Root); and Intel and Apple computers (Chow, Haddad and Williamson, 1997). In the UK, the BSC adopters include: BP Chemicals; Milliken; Natwest Bank; Abbey National; and Leeds Permanent (Letza, 1996). In Australia, some organisations that have implemented the BSC are: Hunter Health; Qantas; Nestle; University of Technology Sydney; Centrelink; the University of Newcastle, Australia (University of Newcastle, 2006); and Suncorp (Suncorp-Metway Ltd., 2006).

Kaplan and Norton (1992, 1993, 1996a) have reported their experiences in designing scorecards for a variety of US companies. Furthermore, they provide

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[7] This study is not specifically about the adoption of the BSC around the world. Rather the study is about common-measure bias phenomenon in the adoption of the BSC and one possible method to reduce it. Therefore, the adoption of the BSC around the world will not be discussed further beyond this section.

several examples of organisations that have successfully implemented customised divisional scorecards. However, little empirical evidence supported those examples. Likewise, there is little evidence available of how European companies are adopting and applying Kaplan and Norton's BSC model (Letza, 1996).

Ittner and Larcker (1996) stated that the implementation of more complex measurement systems like the BSC could also be quite costly. They quoted from a Towers Perrin survey that showed 25% of the respondents of the survey experienced problems, or major problems, with the extra time and expense required to implement and operate the BSC. Also, 44% encountered problems developing the extensive information systems needed to support the scorecard approach.

Letza (1996) conducted a study that examined companies which designed and implemented the BSC. The companies in Letza's (1996) study were: MC-Bauchemie Műller GmbH & Co; Rexam Custom Europe; AT & T EMEA (Europe/Middle East/Africa). He found that there were similarities in the processes adopted by all three companies in the designing and subsequent implementation, of their individual BSC. He added that in all cases it was clear that good communication and building of commitment was of the utmost importance. It was also very clear that the unique culture and existing company philosophy had to be incorporated into the BSC for it to be acceptable to managers. Closely aligned to this was a need to link performance measures with company strategy.

Furthermore, Ittner and Larcker (1996) found that most organisations that have been through the process of designing and implementing their own BSC recognise the mistakes they made during the process. From the case studies, Ittner and Larcker (1996) identified the following major mistakes.

- *The BSC measures the wrong thing right.*

  One manager at AT&T suggests that managers should ensure that the measures should relate to the overall strategic goals of the organisation.

- *All activities should be included.*

  This is to ensure that everyone is contributing to the organisation's strategic goals

- *Experiencing conflict between managers.*

  This could occur when internal measures of performance were put in place, for example, the manufacturing manager was not delivering information to the financial managers.

Given that, the design and implementation of the BSC is not an easy task since it is dependent on many factors. As Bittlestone (1994, p. 46) suggests, when designing a BSC designers should bear in mind that: '…analysing, dialogue, commitment and action are essential in developing a sound scorecard'.

2.4 Common-Measure Bias in Balanced Scorecard

As mentioned above, the design and implementation of a BSC is not an easy task. There are many factors to be considered in order to avoid the possible problems that can arise in its design process and implementation. One of the possible problems that can occur in the BSC is the common-measure bias phenomenon. This section reviews the common-measure bias in the BSC, followed by some of the methods to reduce the problem that have occurred in previous empirical studies.

2.4.1 Common-Measure Bias Phenomenon

As stated previously, the BSC developed by Kaplan and Norton was intended to overcome the limitation of traditional performance measurement to evaluate managerial performance as well as the unit or division as an entity. In order fully to exploit the benefit of the BSC, superiors[8] should use all of the measures,

[8] In prior studies (see, for example, Kaplan and Norton, 1993, 2001; Slovic and MacPhillamy, 1974), "superior" refers to managers as the evaluator in the performance evaluation process, while "subordinate" refers to the managers being evaluated in the performance evaluation process. However, in this study the term senior managers will be used to refer to managers as the evaluator in the performance evaluation process, while divisional/unit managers will be used to refer to the managers being evaluated in the performance evaluation process.

which are common and unique measures to evaluate the subordinates and/or the unit as an entity[9].

However, prior research in psychology has found that due to human cognitive limitations, senior managers or decision-makers faced with comparative evaluations tend to use information that is common to both objects and to underweight or ignore the information that is unique to each object (Slovic and MacPhillamy, 1974). This phenomenon is referred to as the common-measure bias phenomenon (Lipe and Salterio, 2000). Slovic and MacPhillamy (1974) examined the structural effect, which is the degree to which commonality of one dimension influences cue utilisation in situations requiring comparative judgments. Their motivation to examine this issue was based on the judgment process that centres on the manner in which certain structural characteristics of the judgment task influence: (a) the specific weights employed; and (b) the ability of the judge to weight cues according to his/her belief about their importance.

Literature on this issue stated that structural characteristics that influence cue utilisation include factors such as: the order of presentation of the cues to the judge; the manner in which the judge is asked to express his response; cue format; and cue variability (Slovic and Lichtenstein, 1971). One concept to explain this factor is the 'cognitive strain' concept (Bauner, Goodnow and Austin, 1956). This concept states that some cue characteristic's influence the judge and cause him/her to change their cue utilisation systematically in order to reduce the strain on memory, attention, and other components of reasoning. Slovic and MacPhillamy (1974) argued that cue dimensions will have greater influence on comparative judgments when they are common to each alternative than when they are unique to a particular alternative.

[9] No prior studies have explicitly examined a performance measure that has been applied differently to manager as an individual and the unit as an entity. However, companies (see, for example, Suncorp) have usually applied performance measures to evaluate both managers as an individual as well as their entity (Suncorp-Metway Ltd., 2006).

To test their argument, they conducted a series of experiments. In all those experiments, the participants (i.e., volunteers from the University of Oregon) were given information about pairs of students with common and unique cues. Then participants were asked to judge which students had the higher freshman GPA and estimate the size of the difference between the two students. They found that common cue dimensions would have greater weight than the unique cue.

The finding of Slovic and MacPhillamy (1974) in the issue of human cognitive limitation motivated scholars to explore this issue in the context of the BSC. More so, since the BSC contains a diverse set of performance measures incorporating financial performance, customer relations, internal business process, and organisational learning and growth (Kaplan and Norton, 1992). Kaplan and Norton (1993, 1996a) argue that such a large set of measures is required to capture the firm's desired business strategy and to include drivers of performance in all areas important to the firm. Therefore, the use of the BSC should improve managerial decision-making by aligning performance measures with the goals and strategies of the firm and the firm's business units (Lipe and Salterio, 2000).

2.4.2 Common-Measure Bias and the Balanced Scorecard

Lipe and Salterio (2000) examined the observable characteristics of the BSC, which measures common to multiple units vs. unique to particular units that may limit a managers' ability fully to exploit the information found in a diverse set of performance measures. Lipe and Salterio (2000) conducted an experiment with fifty-eight first year MBA students. In the experiment, they found that the experimental participants evaluated the division manager based only on the common financial measures. Consequently, the division manager's performance on unique non-financial measures had no effect on the evaluation judgments. Their finding is consistent with judgment and decision-making research that suggests that decision-makers faced with both financial and non-financial measures may place more weight on financial measures than non-financial measures (Slovic and McPhillamy, 1974). This work by Lipe and Salterio (2000) has proven to be seminal having influenced a range of studies that followed.

Lipe and Salterio (2000) argue that this result is probably due to the simplifying cognitive strategies where people tend to use financial information because it is easier to use in comparing the division managers as suggested by Slovic and MacPhillamy (1974). According to Payne, Bettman and Johnson (1993), this suggests that senior managers in a BSC firm, faced with financial and non-financial measures across business units, may concentrate on the financial measures to simplify their judgment task. Furthermore, Lipe and Salterio (2000) stated that judgmental difficulties in using non-financial measures may be compounded when the senior managers who carry out a unit's performance evaluation do not actively participate in developing that unit's scorecard and, consequently, may not appreciate the significance of the non-financial measures. Under-use of non-financial measures reduces the potential benefits of the BSC because the non-financial measures are important in capturing the unit's business strategy.

2.4.3 Some Approaches to Overcome the Common-measure Bias Phenomenon

The common-measure bias phenomenon found in prior studies has attracted research to examine if there are any approaches which can reduce or overcome this phenomenon. This is an important issue. If common-measure bias does exist then the benefits of BSC are unable to be exploited optimally. Lipe and Salterio (2002) tried to overcome the common-measure bias by employing a 'divide and conquer strategy' suggested by Shanteau (1988). Here, measures within each category are used to make an assessment of the category and these four assessments are then combined. As discussed above, the BSC contains many diverse sets of performance measures grouped in four categories: financial performance, customer relations, internal business processes, and learning and growth activities (Kaplan and Norton, 1992). Kaplan and Norton (1996b) encourage the inclusion of 4-7 measures in each category. Hence, firms adopting the BSC need to identify a much broader group of measures, resulting in a greater number of performance measures than they have traditionally used (Lipe and Salterio, 2002).

Research in cognitive psychology, however, shows that people are generally unable to process more than 7-9 items of information simultaneously (Baddeley, 1994; Miller, 1956). Therefore, based on prior literature, Lipe and Salterio (2002) argued that human cognitive limitation causes difficulty for senior managers in assessing complex measures in the BSC, which produces information beyond the limit of everyone's ability to process simultaneously. Nevertheless, the categorization of the complex performance measure into four perspectives may assist senior managers' use of this large volume of measures by suggesting a way to combine and use the data. They predict that judgments are likely to be moderated when multiple above-target (or below-target) measures are contained in a single BSC category. Conversely, judgments are unlikely to be affected when multiple above-target (or below-target) measures are distributed throughout the BSC categories. All of the results obtained in their experiment supported their predictions.

Libby et al. (2004) examine another approach to reduce common-measure bias by introducing *justifies* and *assurance*[10]. They argue that there are two possible reasons for common-measure bias, which are a lack of effort and data quality. Previous studies show that due to human cognitive limitation, difficulties arise in processing all the information which has led to greater effort being required for decision-making (see, for example, Heneman, 1986; Kennedy, 1995; Markman and Medin, 1995; Kurtz, Miao and Gentner, 2001; Zhang and Markman, 2001). One way to increase the effort is to establish *process accountability*. This is where the decision-makers are informed that they will have to justify their decision process *before* making a final decision or judgment (Tetlock, 1985; Simonson and Staw, 1992; Lerner and Tetlock, 1999). Therefore, Libby et al.

[10] Justifies and assurance are two methods proposed by Libby et al. (2004) to reduce the two possible reasons of common-measure bias which are a lack of effort and data quality. Justifies is a method to reduce a lack of effort in using non-financial measures by requiring the decisions maker to justify their decision in the performance evaluation process through the process of accountability. While assurance is a method to improve data quality through the provision of an assurance report.

(2004) argue, if the common measure bias is attributable to lack of effort, then prior research suggests invoking process accountability. This will result in senior managers applying some non-zero weight to all relevant information, including the previously ignored non-financial information, in preparing their performance evaluations.

The second reason for common-measure bias is due to data quality. As prior research illustrates survey results suggest corporate executives find both financial and non-financial measures to be important in evaluating performance, but they question the quality of the non-financial measures (Ittner and Larcker, 2001; Lingle and Schiemann, 1996). Therefore, Libby et al. (2004) argue that if the common measures bias is due to decision-maker's perception of the quality of the data, then one might employ assurance theory. Under this scenario, the perceived quality of data included in the BSC can be overcome by providing an assurance report. In their experiment, Libby et al. (2004) found that invoking process accountability via the requirement for senior managers to justify their evaluations or providing an assurance report over the BSC increases managerial use of non-financial measures.

Another approach to overcome the common-measure bias is via a '*disaggregated balanced scorecard*'[11] (Roberts et al., 2004). In their experiment, the participants had to: (1) evaluate performance separately for each of 16 performance measures; and (2) mechanically aggregate the separate judgments using pre-assigned weights for each measure. The result shows that the disaggregated strategy allows senior managers to utilize non-financial measures as well as financial measures. Additionally, when examining the relationship between performance and compensation, senior managers appear to use the disaggregated BSC performance evaluations as part of their judgment models for assigning bonuses. However, they are either inconsistent in their application of

[11] Disaggregated BSC is an aid that can be applied in the decision-making process when there is lack of effort. In their study, Roberts et al. (2004) suggested approaches to overcome the common-measure bias problem with two-steps: (1) disaggregate the evaluation decision using BSC into several smaller decisions; and (2) aggregate the smaller decisions into an overall score based on predetermined weights.

performance evaluation information or they adjust bonus allocations for additional factors not included in the BSC.

Banker et al. (2004) proposed a different approach to overcome the common-measure bias by linking the performance measures to the strategic objectives. Kaplan and Norton (1996a) stated that an essential aspect of the BSC is the articulation of linkages between performance measures and strategic objectives. Therefore, Banker et al. (2004) argue that senior managers will use performance measures that are linked to strategy. They predict that: (1) in evaluating performance, senior managers who have detailed strategy information will place greater (less) weight on strategically linked (non-linked) measures than those who have no detailed strategy information; (2) when senior managers have detailed strategy information, they will place more weight on strategically linked measures than they will on non-linked measures in evaluating performance. When senior managers do not have detailed strategy information, there will be no difference in the weights placed upon linked and non-linked measures; and (3) when senior managers have (do not have) detailed strategy information, they will place more (less) weight on non-financial linked measures than they will on financial non-linked measures in evaluating performance. The results of their study supported their predictions.

Dilla and Steinbart (2005) tried to reduce the common-measure bias by introducing *training*. They argue that the common-measure bias found by Lipe and Salterio (2000) is probably due to lack of participants knowledge of the BSC. They argue that decision-makers with experience in building BSC's are knowledgeable about its structure, and will utilise both financial and non-financial measure when making performance evaluation decisions. However, they will still place greater emphasis on financial rather than non-financial measures. Additionally, experienced decision-makers will use both financial and non-financial measures when making bonus allocation decisions, but once again will place greater emphasis on financial rather than non-financial measures. To examine their arguments, they conducted an experiment using Lipe and Salterio's (2000) case. Under this trial, the participants were trained in developing the BSC prior to the testing. The results of their research provided evidence that supported their arguments.

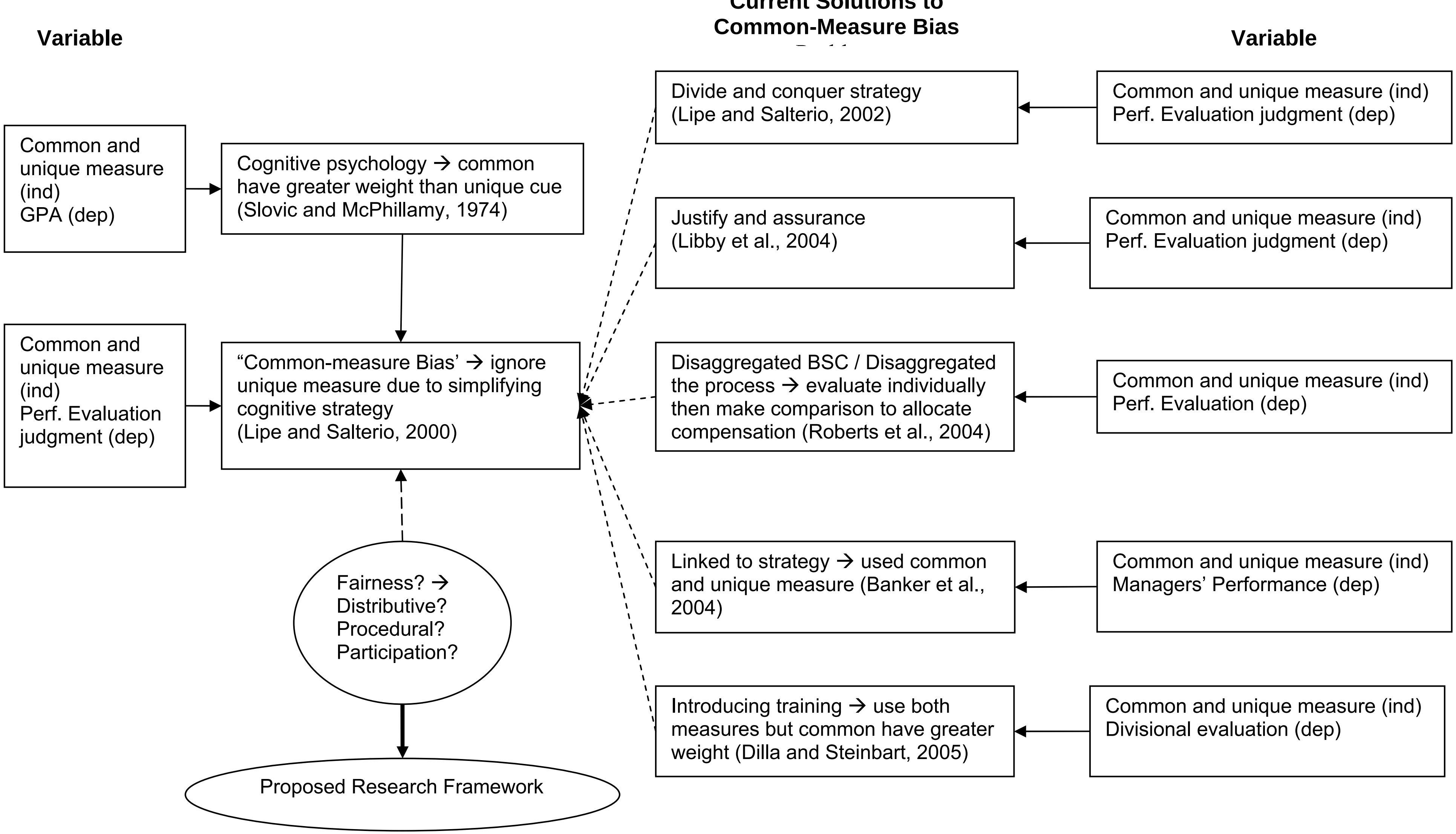
In their current study, Hibbets, Roberts and Albright (2006) introduce cognitive effort and general problem-solving ability to test the common-measure bias in the BSC. Their motivation was to test the explanation of the common-measure bias as the result of the unwillingness of decision-makers to use the non-financial information, due to the greater cognitive effort required to process the information (see, for example, Slovic and MacPhillamy, 1974; Lipe and Salterio, 2000). Additionally, the study also investigated the role of participants' problem-solving ability on mitigating the common-measure bias. Their argument is based on Kennedy's (1995) theory that decision biases could be reduced by replacing the decision-maker with someone possessing greater mental capacity for processing.

Formally, Hibbets et al. (2006) develop two arguments. (1) Senior managers who evaluate performance on individual BSC measures before making an overall performance evaluation will place more weight on non-financial performance measures. That is, the difference between the two division/unit managers' ratings will be smaller, in their overall performance judgments than those who assess individual BSC items after making an overall performance evaluation. (2) Senior managers with greater problem-solving ability will place more weight on non-financial performance measures, i.e., the difference between the two division/unit managers' ratings will be smaller, in their judgments.

To test their arguments Hibbets et al. (2006) conducted an experiment with MBA and Master of Accountancy students as their participants. In their trial, Hibbets et al. (2006) replicated Lipe and Salterio's (2000) experimental case (i.e., WCS Inc., a clothing firm, and two of its retail divisions, RadWear and WorkWear) except for the manipulations being tested. The results show that: (1) increasing the cognitive effort to evaluate performance on non-financial as well as financial measures does not reduce the reliance on financial measures in holistic performance evaluation; (2) evaluators with higher general problem-solving ability effectively use more of the non-financial information contained in the BSC.

However, an important question arising from this study is whether a stronger manipulation of effort is needed or an effort-based explanation for the common-measure bias does not hold. This provides an avenue for potential future research. The discussion about the common-measure bias in the BSC and some approaches that have been used to overcome the problem is summarised in Figure 2.2 and is discussed further in Chapter 4.

Figure 2.2: Diagram of common-measure bias



2.4.4 The Weighting Issue of Performance Measures

In the weighting issue of the BSC, prior studies offer no prescriptions concerning the relative weighting of performance measures. Libby et al. (2004) argue that senior managers should use both the financial and non-financial BSC measures in performance evaluation. Furthermore, they demonstrated that non-zero weights should be attached to all performance measures. Malina and Selto (2001) in their field study found that the designers of the DBSC (Distributor Balanced Scorecard)[12] consider the weightings of each performance measure in the DBSC as a function of two things which were the importance of the measures and the credibility of the numbers on the measures.

However, they do not focus their study on the weighting issue. Ittner, Larcker and Meyer (2003) issued a general conclusion which declared that zero weights are inappropriate. Organisational psychology research posits that performance evaluators tend to place less weight on measures considered to be less reliable (Blum and Naylor, 1968 cited in Libby et al., 2004). Therefore, it is possible that senior managers ignore the non-financial BSC measures because of concerns about their quality (i.e., reliability or relevance) (Ittner and Larcker, 2003; Yim, 2001).

2.5 Summary

In this chapter the limitations of traditional performance measurement systems have been examined. These limitations led to the development of several new concepts of performance measurement systems that incorporated financial and non-financial performance measures to overcome the limitations. One of the new systems is the BSC. The discussion then followed with the common-measure bias problem in the BSC.

From the discussion above, it can be stated that common-measure bias exists in the context of BSC due to human cognitive limitation. Even though research

[12] DBSC was the term that used in the research site in Malina and Selto (2001) field study. It was called DBSC because the BSC was implemented to measure the performance of the company distributorships.

shows that there are approaches to mitigate or overcome the problem, many questions or issues still remain, for example: (1) all of the above studies examine senior managers' evaluations of division/unit managers' performance by comparing two division/unit managers' performance. Yet they all failed to examine senior manager's evaluations of division/unit managers' performance *individually*, an area where common-measure bias might not exist; (2) none of the studies explain who developed the BSC. If the senior managers developed the BSC and imposed it on the division/unit managers, then it does not make any sense if those senior managers do not use non-financial measures to evaluate the division/unit managers' performance.

The existence of common-measure bias due to senior managers who only use financial measures to evaluate divisional/unit managers may also produce the feeling of unfairness from the divisional/unit managers. The divisional/unit managers may feel that their performance should be evaluated based on the unique measures that capture their own ability and capability, which are not a of the financial measures. In this case, participation in the development of performance measures, fairness perception of the performance measures and trust between parties involved in the performance evaluation process may be one approach to overcome the common-measure bias. In the next chapter, the fairness perception of the performance measures and the drivers of the perception of fairness will be discussed.

Chapter 3 Literature Review: Fairness Perception, Trust, and Managerial Performance

3.1 Introduction

In the previous chapter, the BSC and its common-measure bias problem was reviewed. This problem could lead to a feeling of unfairness from the divisional manager for being evaluated via a performance evaluation process based on an inappropriate selection of performance measures. In this chapter the fairness perception of the performance measures and the drivers of perception of fairness are discussed. This chapter is organised as follows. The first section examines the drivers of fairness perception via a discussion of broad organisational fairness. This is followed by a review of distributive fairness, procedural fairness and the impact of participation. In the next section, the trust between parties involved in the performance evaluation process is examined, while the final section discusses managerial performance.

3.2 The Drivers of Perceptions of Fairness[13]

Common-measure bias arising from senior managers who only use, or place greater weight, on financial measures to evaluate divisional/unit managers may also produce the feeling of an unfair performance evaluation process from the divisional/unit managers[14]. This perception is reinforced by Lau and Sholihin (2005) who argue that the adoption of non-financial measures may be perceived by divisional/unit managers as fair. They pointed out that non-financial measures are broad and varied and are generally set to suit the divisional/unit managers' operating environment, making them more relevant and meaningful from a divisional/unit manager's viewpoint. Thus, the broad scope of non-financial measures provides greater possibility for divisional/unit managers to perform to

[13] Prior studies used the term "fairness" and "justice" interchangeably. Most authors used both of the terms in their studies (see, for example, Linquist, 1995; Lau and Sholihin, 2005). In this study, for the purpose of consistency, the term "fairness" will be used.
[14] In this study the term senior managers will be used to refer to managers as the evaluator in the performance evaluation process, while divisional/unit managers will be used to refer to managers being evaluated in the performance evaluation process.

their ability in accordance with their operating environment. Hence, such performance evaluations are likely to be viewed by divisional/unit managers as fairer than those that only rely on the financial aspect of performance. However, in their study, Lau and Sholihin (2005) failed to find evidence that supports their argument; rather they found similar results with respect to the financial and non-financial measures model. Specifically, they established that the relationship between both the financial and non-financial performance measures and job satisfaction were indirect and mediated by fairness in performance evaluation procedures and trust in the supervisor.

However, questions arise about the study by Lau and Sholihin (2005). For instance, they did not compare perceived fairness between financial and non-financial performance measures. Instead, they only tested whether the relationship between the performance measures and job satisfaction was mediated by perceived fairness in performance evaluation procedures. Hence, the financial model and the non-financial model were tested separately. The distinctive approach taken here still leaves the possibility for one to argue that the financial and the non-financial performance measures are perceived similarly in term of fairness of both performance measures. The other concern is the involvement of divisional/unit managers in the development of the performance measures. Would the results remain the same if the divisional/unit managers were involved in the development of the performance measures? Lau and Sholihin (2005) suggest that this question would be appropriate for future research.

Thus, despite the Lau and Sholihin (2005) study, there is still a possibility that the divisional/unit managers might perceive that the performance evaluation process is not fair because financial measures alone are inappropriate in evaluating their real ability, capability and contribution to an organisation. This view is also supported by Kaplan and Norton (1992, 1996a, 1996b). Therefore, the fairness perception of performance measures might be one of the important factors to help overcome the common-measure bias. This leads one to ask then, what drives the perception of fairness?

In this study the perception of fairness will be studied in two forms: (i) procedural fairness; and (ii) distributive fairness. Both of these forms of fairness are part of organisational fairness theory. Linquist (1995) has suggested that one possible method to increase the perception of fairness is participation. In the following sub-section, organisational fairness in general will be discussed followed by distributive fairness, procedural fairness and, finally, the issue of participation.

3.2.1 Organisational Fairness

Issues of fairness have been considered by researchers since the 1960's. Scientists in social research have focussed their attention on examining the applicability of equity theory[15] on the distribution of payment and other work-related rewards (Greenberg and Cohen, 1982; Greenberg, 1987). However, other research has criticised equity theory, since the theory resulted in mixed and limited success when used as the basis for explaining many forms of organisational behaviour. The lack of progress from these theories led to many other theories centred on fairness.

In an organisational context, the fairness issue has been expressed as pertaining to: conflict resolution (Aram and Salipante, 1981); personal selection (Arvey, 1979); labour disputes (Walton and McKersie, 1965); and wage negotiation (Mahoney, 1975). Due to a variety of different theories underlining the fairness issue, Greenberg (1987) categorised various conceptualisations of fairness in a taxonomic scheme.

Greenberg (1987) developed the taxonomy based on the combination of two conceptually independent dimensions of fairness, which are a *reactive-proactive* dimension and a *process-content* dimension. Van Avermaet, McClintock and Moskowitz (1978) suggested that reactive theory of fairness focuses on people's effort either to avoid unfair matters or to escape from them. On the other hand,

[15] Equity theory, developed by Adams (1965), is a theory of fairness that addressed fairness from a comparison of ratios. That is, between the ratios of people's output (i.e., rewards) and the ratios of their input (i.e., contributions) with the corresponding ratios of a comparison other (see, for example, co-worker) (Greenberg, 1990b). This theory will be discussed in detail in section 3.2.1.1.

proactive theories examine people's behaviour to promote fairness (Greenberg, 1987). The second dimension which is the process-content dimension was inspired by a legal research distinction promoted by Walker, Lind and Thibaut (1979) and Mahoney (1983). Based on the legal research distinction, Greenberg (1987) stated that a process approach to fairness focuses on how the processes of various outcomes are determined. Therefore, this approach is concerned with the issue of fairness of the procedures used to make the outcome decisions and how to implement those decisions. The content approach, on the other hand, is concerned with the fairness of distribution of the outcome.

In the taxonomy scheme, Greenberg (1987) combined the two distinctions of justice theories that yield four distinct classes of justice conceptualisations. Greenberg (1987) provides an example of the theory in each of the four classes. However, he stated that the limitation of the examples does not imply that other theories would not fit in the four classes. The four classes of justice concept were: 1) reactive content theory; 2) proactive content theory; 3) reactive process theory; and 4) proactive process theory; as illustrated in Figure 3.1. The four classes of the theory will be briefly reviewed below.

Figure 3.1: Taxonomy of organisational justice theories with corresponding predominant exemplars

Reactive-Proactive Dimension	**Content-Process Dimension**	
	Content	**Process**
Reactive	*Reactive Content* Equity theory (Adams, 1965)	*Reactive Process* Procedural justice theory (Thibaut and Walker, 1975)
Proactive	*Proactive Content* Justice judgment theory (Laventhal, 1976a, 1980)	*Proactive Process* Allocation preference theory (Laventhal, Karuza and Fry, 1980)

Source: Greenberg, 1987, p. 10

3.2.1.1 Reactive Content Theory

Greenberg (1987) conceptualises reactive content theory as the theory of fairness that focuses on how individuals respond to unfair news. He classified theories such as the theory of distributive fairness by Homans (1961); the version of equity theory by Adams (1965) and Walster, Berscheid and Walster (1973); and the theory of relative deprivation by Crosby (1976, 1984) and Martin (1981); in this reactive content theory class. Greenberg (1987) argued that he classified these theories into the same class because these theories share an important common orientation, which is that people will respond to unfair relationships by displaying certain negative emotions. These negative emotions will then motivate them to avoid the experienced inequity altogether. Therefore, the theories focus on how people react to unfair distributions of rewards and resources.

The fairness related research in organisational settings was mostly inspired by Adams' (1965) theory of inequity. This theory specified that overpaid workers would feel "guilty" and that underpaid workers would feel "angry" (Greenberg, 1987, p. 11). This unsatisfied feeling of workers would eventually motivate them to change their behaviour related to the unfair states. For example, they may change their performance levels to the levels that they perceive to be in accordance with the outcomes received. Most of the research on equity theory was conducted within simulated work settings (see, for example, Lawler and O'Gara, 1967; Pritchard, Dunnette and Jorgenson, 1972). In general, research findings support the argument of equity theory that underpaid workers should be less productive and less satisfied than equitably paid workers and overpaid workers should be more productive and less satisfied than equitably paid workers (Greenberg and Cohen, 1982). The result of overpaid workers seems counter intuitive given that, generally, people remain satisfied as they continue to be overpaid.

From a sociological perspective, a particular theory dealing with the issue of fairness is the status value version of equity theory proposed by Berger, Zelditch, Anderson and Cohen (1972). This theory examines the feeling of unfairness based on the comparisons within the general group. Therefore, this theory suggested that a person would feel inequity or unfairness due to his/her comparisons within the general group, and not with another specific person. However Jasso's (1980) theory of distributive fairness, which extends the status value approach, actually ignored the comparisons with outside. Instead, he defined fairness in terms of the comparisons people made between their actual share of goods and their beliefs about a "just share" (Greenberg, 1987). Regardless of the conceptually different comparisons basis, both of the theories were classified in the reactive content theory in the Greenberg's taxonomy of fairness.

Another theory classified in reactive content theory is the theory of relative deprivation (Crosby, 1976, 1984; Martin, 1981). This theory argued that certain reward distribution patterns will encourage people to make certain social comparisons, which will lead to feelings of deprivation and resentment (Martin, 1981). Furthermore, Martin (1981) states that the feelings of deprivation causing various negative reactions may range from frustration to conducting violent riots. Because this theory examines a person's reaction to reward distribution, this theory was classified in the reactive content theory under Greenberg's taxonomy of fairness.

3.2.1.2 Proactive Content Theory

In contrast with his own conceptualisation of reactive content theory that focuses on a person's reaction to an unfair outcome distribution, Greenberg (1987) defines proactive content theories as theories that focus on a person's effort to promote fair outcome distributions. The categorisation of this theory was mostly influenced by theoretical statements that have come from Laventhal's (1976a, 1980) work. In his work, Laventhal conducted a series of laboratory studies to examine the reaction of reward allocation decisions by manipulating concerns about fairness.

Laventhal (1976b) argued that people often attempt to create fair reward distributions that are proportional to the contribution made, since this is most beneficial to all concerned parties in the long run. Indeed, this argument was supported by research findings (see, for example, Greenberg and Laventhal, 1976; Laventhal and Michaels, 1969) that decision-makers often distribute resources equitably between recipients. However, previous studies also showed that when decision-makers were allocating resources for rewards, such as by dividing equally or accordance with recipients needs, they often violated the norms of fairness (Schwinger, 1980). Laventhal (1976a, 1980) however, argued that such violations were probably completely fair under appropriate circumstances. Consequently, he proposed the theory of justice judgment model. In this model, he stated that people will attempt to apply rules that they will perceive as fair to make allocations depending on the situations they confront.

Another proactive content theory of fairness is justice motive theory which was proposed by Lerner (Lerner, 1977; Lerner and Whitehead, 1980). Unlike Laventhal, Lerner (1982) argued that fairness is the pre-eminent concern of human beings and the objectives of fairness are in contrast to maximizing profit. Nevertheless, like Laventhal, Lerner recognized that the practices of reward allocation often go beyond the possibility of proportional equity. Yet, Lerner identified four principles that are commonly followed in order to promote fairness. The four principles are: 1) *competition* – allocations based on the outcome of performance; 2) *parity* – equal allocations; 3) *equity* – allocations based on relative contributions; and 4) *Marxian justice* – allocations based on needs (Lerner, 1982). Despite the differences in the underlying philosophies, both justice judgment theory and justice motive theory proposed similar predictions about how people will allocate rewards under various circumstances (Greenberg, 1987). Therefore, Greenberg classified these theories as proactive content theories.

3.2.1.3 Reactive Process Theory

Unlike both categories of theories mentioned above, which focus on the fairness of outcome of decisions, this theory focuses on the fairness of the process in making the decisions. Process theories are generally influenced by legal or law procedures, where legal scholars commonly agree that the procedures used to make judicial decisions will have a significant influence on the public's acceptance on them (Fuller, 1961). Influenced by research on legal procedures, Thibaut and Walker (1975) proposed the *theory of procedural fairness*. To test the theory, they conducted a series of investigations designed to compare reactions to various dispute resolution procedures. Thibaut and Walker (1975) distinguished three parties in the theory of procedural fairness, two of which are disputants, and one an intervening third party such as a judge. They also divided procedural fairness into two stages of the dispute-resolution process: the process stage, during which evidence is presented; and the decision stage, during which the evidence is used for dispute resolution.

Furthermore, Thibaut and Walker (1978) differentiated two kinds of control in the theory of procedural fairness which is process control and decision control. Process control is the ability to control the selection and development of the evidence used in the dispute resolution, while decision control is the ability to determine the outcome of the dispute itself (Thibaut and Walker, 1978). The degree of control the parties have over each stage in the dispute resolution identified the procedures that will be applied. In this case there are four types of procedures that can be identified: 1) *autocratic procedures,* where the third parties have control over both the outcomes and the process; 2) *arbitration procedures,* where the third parties have control over the outcomes but not the process; 3) *mediation procedures*, where the third parties have control over the process but not the outcomes; and 4) *bargaining procedures*, where the third parties have no control over either the outcomes or the process. Additionally, Sheppard (1984) has proposed another type of procedure where disputants and the third parties *share* the control over the outcomes and the process.

Because the theory is concerned about people's reaction on each of the decision-making procedures, Greenberg (1987) classified this theory as reactive process theory. This theory argues that both disputants and the third parties will be more satisfied with the procedures in which they control the process, than those in which they do not (Greenberg, 1987). Many studies using legal procedures have supported this argument (see, for example, Lind, Kurtz, Musante, Walker and Thibaut, 1980; Walker et al., 1979). In the organisational setting, researchers have applied the theory of procedural fairness into a variety of organisational contexts, such as in the resolution of labour disputes (Sheppard, 1984) and the appraisal of job performance (Greenberg, 1986a, 1986b).

3.2.1.4 Proactive Process Theory

The last theory category in Greenberg's taxonomy is proactive process theory. This category was mostly influenced by Laventhal et al.'s (1980) *allocation preference theory*. Actually this theory is proposed as the general model of allocation behaviour. However, since this theory has been applied almost exclusively to procedural decisions rather than distributive decisions, Greenberg (1987) has categorised it as a proactive process theory. Therefore, unlike the reactive process theory that focuses on the procedure of dispute resolution, proactive process theory focuses on allocation procedures. The allocation preference theory suggests that people hold an expectation that certain procedures will have different effects in meeting their goals (Greenberg, 1987). Hence, people will tend to prefer to choose procedures that mostly will attain their goals. There are eight procedures identified in the allocation preference theory that have the possibility to promote the attainment of fairness (Greenberg, 1987). The procedures are:

1. allow opportunities to select the decision-making agent;
2. follow consistent rules;
3. base on accurate information;
4. identify the structure of decision-making power;
5. employ safeguards against bias;
6. allow for appeals to be heard;
7. provide opportunities for changes to be made in procedures; and
8. base on prevailing moral and ethical standards.

The eight procedures to attain fairness proposed by Laventhal et al. (1980) have been supported by prior studies which found that determinants of procedures to promote fairness in performance evaluations were consistent with Laventhal et al.'s (1980) theory (Greenberg, 1986a). Another study found that, among the procedures proposed by Laventhal et al (1980), consistency was the most important determinant to attaining the perceived fairness in allocation setting (Fry and Cheney, 1981; Fry and Laventhal, 1979). This finding was confirmed by Barret-Howard and Tyler (1986), although they also found that other procedural determinants proposed by Laventhal et al. (1980) were of varying importance as determinants of fairness. This varying perception, however, was dependent on the types of social relationships which existed.

Greenberg (1987) claimed that the taxonomy is very useful to: a) clarify conceptual interrelationships; b) track trends in organisational fairness research; and c) identify an appropriate research area for conceptual development. In fact, this claim is hard to deny. In the trends of organisational fairness research, Greenberg (1987) identified that there were two shifts of research in organisational fairness. The two shifts are a shift from reactive to proactive theories and a shift from content to process theories.

3.2.2 Distributive and Procedural Fairness

Despite Greenberg's (1987) claim about the taxonomy of organisational fairness, however, many prior studies (see, for example, Korsgaard and Roberson, 1995; Linquist, 1995; Tyler, 1994) examining the issue of fairness perception did not use this taxonomy to distinguish conceptually the theories that they used in their studies. From a conceptual viewpoint, they differentiate the issue of fairness into two different concepts which are distributive fairness and procedural fairness (see, for example, Korsgaard and Roberson, 1995; Linquist, 1995; Tyler, 1994). The present study will also employ these two concepts of fairness – distributive fairness and procedural fairness theories – that are a part of organisational fairness theory. However, unlike previous research which normally examines both theories in the reward or resources allocations such as Folger and Konovsky (1989) or performance appraisal discussions by Korsgaard and Roberson (1995) and Fryxell and Gordon (1989), this present study will test both theories with respect to *performance evaluation* in the BSC environment.

The present study's main objective is to examine the effect of participation on the development of the BSC. Given this, the most appropriate approach is to examine the fairness of the process of development of the BSC as well as the fairness in the output of the decision of the BSC that will be used for performance measurement in the performance evaluation process. Therefore, this present study will be in line with the shifts identified by Greenberg (1987), specifically a shift from reactive to proactive theories and from content to process theories. This present study will examine the effects of participation in the development of performance measures that are used in the performance evaluation process. This will allow one to assess how managers have attempted to create perceived fairness of the performance measurement to be used in the performance evaluation process.

In the next section the two components of organisational fairness theories, distributive fairness theory and procedural fairness theory, will be reviewed along with participation.

3.2.3 Distributive Fairness

Conceptually, distributive fairness is fairness that focuses on content with emphasis on the fairness of the decisions achieved (Greenberg, 1987). At the beginning, distributive fairness theory was greatly influenced by the equity theory of Adams (1965). Equity theory states that people will compare the ratio of their rewards based on their perceived work outcomes with the ratio of their contributions or their perceived inputs, and with the ratio of others (such as their co-workers) (Greenberg, 1990b). If the ratios are equal then the people will perceive fairness which can lead to feelings of satisfaction, if ratios are not equal then inequity is said to be occurring. People with higher ratios are theorised as being inequitably overpaid which will tend to feelings of guilt. In contrast, people with lower ratios are theorised as being inequitably underpaid, and which will make them feel angry. Furthermore, the theory suggests that people will adjust their behaviour in reaction to perceived inequity fairness (Greenberg, 1984). Prior studies generally found that workers reduced their inputs such as by lowering their performance when they were underpaid and increasing their performance when they were overpaid (Greenberg and Cohen, 1982; Adams and Freedman, 1976).

Another approach which is based on equity theory, although from an organisational process perspective, is Laventhal's (1980) proactive fairness judgment model. Unlike the equity theory that focuses on people's reaction to pay inequity, the fairness judgment model focuses on people's efforts to attain fairness by proactively employing various fairness norms (Greenberg, 1990a). Both Adams's reactive approach and Laventhal's proactive approach are commonly referred to as conceptualisations of distributive fairness (Cohen, 1987; Tornblom, 1990) since both approaches focus on the fairness of outcome distribution (Greenberg, 1990b).

Prior studies have found that procedural fairness can enhance distributive fairness. As Laventhal (1980) stated, procedural fairness refers to fairness of the processes that lead to a decision outcome. Korsgaard and Roberson (1995) defined distributive fairness as the perceived fairness of the distribution of resources. This is in line with many prior studies that defined distributive fairness as the degree to which rewards are allocated in an equitable manner (Folger and Greenberg, 1985; Greenberg, 1990b; Lind and Tyler, 1988; Tyler and Bies, 1990).

However, Niehoff and Moorman (1993) declared that most research on procedural fairness had identified effects *independent* of distributive fairness. For example, Moorman (1991) found that when the two types of fairness were measured separately, procedural fairness predicted citizenship, but distributive fairness did not. Folger and Konovsky (1989) also found that procedural fairness was related to job attitudes, including organisational commitment and trust in management, but distributive fairness was only related to pay satisfaction. These findings suggest that both types of fairness can have different effects on behaviour even though procedural fairness can lead to distributive fairness.

In this present study, distributive fairness is defined as the fairness of the outcome of the process of the development of performance measures – *financial* and *non-financial* measures – that are eventually used in the performance evaluation process.

3.2.4 Procedural Fairness

Procedural fairness is fairness that focuses on process, or the fairness of the means used to achieve decisions (Greenberg, 1987). According to Laventhal (1976a), procedural fairness theory can be viewed as the extension of equity theory that has been applied in the domain of allocation processes (Greenberg, 1987). Laventhal (1980) argues that fairness of the decision process can be seen from the procedural fairness of the decision process. That is, procedural fairness refers to fairness of the processes that lead to a decision outcome. Furthermore, Laventhal (1980) argues that decision-making should follow procedural rules, as follows.

1. Consistent: the decision process must be consistently applied across time and persons.
2. Representative: the decision process must reflect the values, concerns and perspectives of all affected parties.
3. Correctable: the decision process must have provisions for correcting "bad" decisions.
4. Accurate: the decision process must be based on accurate information.
5. Non-Bias: the decision process should be free of bias from the decision-maker(s).
6. Ethical: the decision process must conform to accepted norms of morality and ethics.

On the other hand, Korsgaard and Roberson (1995), define procedural fairness as the perceived fairness of the procedures used to make allocation decisions. This definition is similar to prior researchers who defined procedural fairness as the degree to which those affected by allocation decisions perceived them to have been made according to fair methods and guidelines (Folger and Greenberg, 1985; Greenberg, 1990b; Lind and Tyler, 1988; Tyler and Bies, 1990).

Folger (1987) found that both procedural fairness and distributive fairness are independently related to attitude towards the decision and the organisation. However, fairness researchers believed that regardless of the perceived fairness of the decision itself, fair procedures will result in more positive behaviour

(Korsgaard and Roberson, 1995). Therefore, procedural fairness can promote positive behaviour towards decisions that might be otherwise viewed negatively.

Prior research has examined the approach to promote procedural fairness based on the six rules of procedural fairness proposed by Laventhal (1980). One way to promote procedural fairness was via the methods of monitoring[16] (Niehoff and Moorman, 1993). They examined the relationship between methods of monitoring and organisational citizenship behaviour and the possibility of fairness as the mediator of the relationship. Laventhal (1980) suggested that one of the most important components to enhance procedural fairness was the gathering of accurate and unbiased information. Niehoff and Moorman (1993) stated that one way to achieve this task is by monitoring. Furthermore, they argued that there are three reasons why methods of monitoring can influence procedural fairness perception. The three reasons are: 1) gathering information about performance can influence subordinates' perceptions of the fairness of decision because they believe that the leader is making decisions based on accurate information (the accuracy rule); 2) performance monitoring can provide the leader with broader knowledge in order to make unbiased decisions (the non-bias rule); and 3) monitoring can help the leader to make unbiased decisions across people and over time (the consistency rule).

In their study, Niehoff and Moorman (1993) conducted a survey with the employees and general managers of a national movie theatre management company that operated 11 theatres. The employees completed a survey describing their perceptions of distributive and procedural justice and monitoring methods of their general manager. The results showed that observation as a method of monitoring had direct and negative effects on the dimensions of employee organisational citizenship behaviour. However, the method has a positive effect on the dimensions of organisational fairness perceived by employees. Since the employees perceived the process of monitoring using observation method as fair, this eventually had a positive effect on organisational

[16] The methods of monitoring examined by Niehoff and Moorman (1993) were: observation; informal discussions; and formal meetings.

citizenship behaviour. Therefore, the relationship between observation as a method of monitoring and organisational citizenship behaviour was mediated by the perceptions of fairness.

Another approach that has been shown to promote the perceived fairness of decision process is participation. There are many studies that have been done on the effects of participation in the organisational fairness domain (see, for example, Kanfer, Sawyer, Early and Lind, 1987; Paese, Lind and Kanfer, 1988; Greenberg, 1986a, Lind, Kanfer and Early, 1990; Korsgaard and Roberson, 1995; Shapiro and Brett, 1993; Thibaut and Walker, 1975; Cropanzano and Greenberg, cited in Mossholder, Bennet and Martin, 1998; Tyler, 1990; Greenberg, 1990b; Organ and Moorman, 1993; Lind and Tyler, 1988; Tyler and Lind, 1992; Muhammad, 2004; Brownell, 1982; Ross, 1994; Dunk, 1989; Lau, Low and Eggleton, 1995; Lau and Tan, 1998; Lau and Lim, 2002b). These prior studies found that the level of participation will have different effects on behaviour; however in general, they concluded that participation can enhance the perceived organisational fairness. In line with prior research, this present study will examine the effects of participation to promote organisational fairness. However, unlike prior research, this present study will examine the divisional manager's participation in the development of BSC as performance measurement which is used in the performance evaluation process. The literature review relating to participation will be presented in the sub-section 3.2.5.

In the present study, *procedural fairness* is defined as the fairness of the process to develop performance measures – *financial* and *non-financial* measures – that are finally used in the performance evaluation process. In the context of the BSC, the financial measures can fulfil the consistency characteristic because it can be consistently applied across time and persons or divisions. On the other hand, non-financial measures embody the representativeness characteristic because they can reflect the values, concerns and perspectives of each division. The other characteristics of the procedural rules of decision-making can be fulfilled from both financial and non-financial measures of the BSC.

3.2.5 Participation

Fairness theories argue that there is a number of factors that can lead to perceived fairness. One aspect that can promote perceived fairness which has been extensively examined is process control or "voice" (Korsgaard and Roberson, 1995). Process control or "voice" is defined as the ability of people that will be affected by the decision to provide information that is relevant to the decision (Thibaut and Walker, 1975; Folger, 1977). Folger (1977) showed that giving workers a voice in the decisions affecting them, under certain circumstances, enhanced their reactions to the outcome of those decisions. Folger's (1977) finding has been supported by prior studies that found voice affects perceptions of procedural and distributive fairness. It also affects subsequent behaviours in many organisational contexts and is particularly relevant to performance evaluation (see, for example, Kanfer et al., 1987; Paese et al., 1988; Greenberg, 1986a, Lind et al., 1990; Korsgaard and Roberson, 1995).

There are two kinds of voice effects; instrumental and non-instrumental. Based on the argument put forward by Shapiro (1993) and Thibaut and Walker (1975), Korsgaard and Robertson (1995) explained that instrumental voice is voice that provides the perception of indirect control over decisions when direct control is impossible. Therefore, instrumental voice affects people's behaviour because they feel that they have the opportunity to influence indirectly the decision. The non-instrumental voice is the voice that is intrinsically valued regardless of whether it can influence the decision or not. Lind and Tyler (1988) stated that the non-instrumental voice is valued because it indicates a person's status in the group or organisation. Shapiro (1993) argues that the key difference between the two types of voice is the perceived potential of the voice to influence the decision, regardless of the impact of the voice in the decision.

Lind et al. (1990) examined instrumental and non-instrumental voices regarding fairness judgments. They conducted an experiment with one hundred and eighty male undergraduate psychology students as their participants. They found that the fairness rating provided support for both instrumental and non-instrumental theories of procedural fairness. Similarly, with their study, Korsgaard and

Roberson (1995) examined the role of instrumental and non-instrumental voice in performance appraisal discussions. However, unlike Lind et al. (1990), Korsgaard and Roberson (1995) conducted a survey of 221 managers, from which 168 responded. Their results illustrated that both instrumental and non-instrumental voice were related to satisfaction with the performance appraisal, while only non-instrumental voice had an impact on attitudes towards the managers.

Evidence from procedural fairness studies shows that perceptions of fairness are influenced not only by the outcomes individuals receive, but also the procedures through which outcomes have been determined (Cropanzano and Greenberg, in press, cited in Mossholder et al., 1998). Individuals tend to perceive greater procedural fairness when they believe they have had the chance to participate in the decision-making process and can ascertain that organisational authorities have been neutral and unbiased (Tyler, 1990).

Participation in the decision-making process can be reflected by the ability to voice views and arguments during a procedure and the ability to influence the actual outcome itself (Thibaut and Walker, 1975). Early studies within the practice of performance appraisals have demonstrated that giving employees the opportunity to express their views and feelings was strongly related to perceived fairness of their performance appraisal procedures (Greenberg, 1990a). Organisational research has consistently shown that the voice effect enhances individual's evaluation of procedural fairness (Greenberg, 1990a; Lind et al., 1990; Organ and Moorman, 1993; Lind and Tyler, 1988; Tyler and Lind, 1992). As Lind et al. (1990) did, it is reasonable to suggest that greater participation in decision-making allows employees greater voice into procedures, and thus perceptions of the fairness of those procedures should increase.

A model proposed by Lind and Early (1991, cited in Muhammad, 2004) suggests that an employee sees procedures as fair to the extent that they communicate that the employee is a respected and valued member of a work group. Allowing employees greater voice in procedures increases perceptions of the fairness of those procedures due to the following reasons: employees' having voice may influence the fairness of the distribution of rewards; and also because the opportunity to express opinions and feelings demonstrates that the group considers their input is of value (Muhammad, 2004).

Prior studies examining the effect of participation in a budgetary setting suggests that participation can enhance the perception of the fairness of a decision-making process that leads to beneficial behavioural outcomes. These include low job-related tension (Brownell, 1982; Ross, 1994), improved managerial performance (Brownell, 1982), organisational citizenship behaviour (Muhammad, 2004; Little, Magner and Welker, 2002; Organ and Moorman, 1993), job performance and propensity to create budgetary slack (Little et al., 2002).

In his study, Brownell (1982) stated that a high budget emphasis evaluation style should be matched with high participation. Conversely, a low budget emphasis evaluative style should be matched with low participation in order to obtain beneficial behavioural outcomes. However, other studies testing these propositions found that other combinations led to better behavioural outcomes than Brownell's (1982) combination (Dunk, 1989; Lau et al., 1995; Lau and Tan, 1998).

Lau and Lim (2002b) propose that participation may be important to subordinates in low budget emphasis situations. They argue that low budget emphasis situations are generally characterised by evaluative styles that are based on multiple non-accounting criteria, such as a BSC model. Furthermore, based on Hopwood (1972) and Ross (1994), Lau and Lim argue that even though non-financial performance indicators may have lead to the development of quantifiable non-accounting performance indicators, it is still likely that multiple non-accounting criteria are, in general, more subjective, ambiguous and confusing than accounting-based criteria. Consequently, subordinates in a low budget emphasis situation may need participation, in whatever forms, to seek clarification and information on the multiple non-accounting criteria that are used by their superiors to evaluate their performance.

In contrast with Brownell's (1982) finding, Lau and Lim (2002a) found that in a low budget emphasis situation, participation can have a positive effect on performance. This finding is consistent with Dunk (1989); Lau et al. (1995); Lau and Tan (1998); and Ross (1994). The evidence indicates that this particular combination can enhance performance as long as the subordinates perceive this combination as fair. On the other hand, when they perceive it as unfair, such an incompatible combination will lead to a decline in performance (Lau and Lim, 2002a).

Lau and Lim (2002a) also found that participation can have an intervening effect on the relationship between procedural justice and managerial performance. In their survey of 83 head managers of six major functional areas in manufacturing companies – manufacturing, marketing, sales, human resources management, accounting, and information system management – they concluded that there is an indirect relationship between procedural justice and performance through participation. Their result also confirms the suggestion of complex rather than simple relationships between procedural justice and performance. Parallel with this notion, it might be argued that fairness of perception of performance measurement may have a positive relationship with performance.

3.3 Trust and Performance Evaluation

Trust has long been regarded as playing a crucial role in organisations, with practitioners often regarding trust as the most important success factor in their business (see, for example, Glover, 1994). According to Gambetta (1988), trust is one of the basic variables in any human interaction. The concept of trust itself has been recognised in many areas as briefly reviewed as follows.[17]

1) In social psychology, trust is defined as a personal trait (Deutch, 1958; Rotter, 1967). Others suggest that trust is a function of imperfect information (see, for example, Lewis and Weigert, 1985; Oakes, 1990). In this case, Blomqvist (1997) argues that two factors are required for trust to exist; they are risk and information. Thus, when perfect

[17] Comprehensive overviews of the trust literature and classifications of the concept can be found in Blomqvist (1997).

information exists, there is no trust but simply rational calculation (Blomqvist, 1997).

2) From a philosophical standpoint, trust occurs in a variety of forms and versions; it can be unconscious, unwanted or forced, or it can occur when the trusted is unaware (Baier, 1986).
3) In economics, the role of trust has received little attention from economists (Lorenz, 1988), since the competitive market is supposed to control any deception. Therefore, in economics, trust is seen as a response to expected future behaviour (Blomqvist, 1997).
4) From a contract law perspective, trust is considered one of the important ethical foundations of exchange and contract, along with equity, responsibility and commitment (Blomqvist, 1997).
5) In marketing, trust has been acknowledged in the various streams within the relationship-marketing approach as a possible conduit to constructive and cooperative behaviour which is vital for long-term relationships (Young and Wilkinson, 1989; Morgan and Hunt, 1994). It also views trust as being an important attribute of industrial networks (Hallén and Sandström, 1991); important role in branding issues and services (Herbig and Milewicz, 1993); and sales activities (Schurr and Ozanne, 1985; Swan, Trawick and Silva, 1985; Oakes, 1990). Empirical market research also supports the positive functions of trust in relationship development and cooperation (Blomqvist, 1997).

Trust has also been acknowledged in the area of performance evaluation, which itself has long been regarded as an important function of management accounting. Although performance evaluation is used as a tool for ensuring improvements in organisational performance, it is also widely recognised that it can have dysfunctional effects on the evaluation of people's behaviour (Johansson and Baldvinsdottir, 2003). For instance, feelings of insecurity, job-tension and frustration can arise from the process. It can also change the relationship between parties in the performance evaluation process. In this case, prior research argues that trust is an important factor in the performance evaluation process. This is demonstrated via: job-related tension (see, for example, Hopwood, 1972; Otley, 1978; Kenis, 1979; Hirst, 1981, 1983; Brownell and Hirst, 1986; Dunk, 1991; Ross, 1994); job-satisfaction (see, for example, Lau and Sholihin, 2005); organisational citizenship behaviour (see, for example, Pearce, 1993; Pillai, Schriesheim and Williams, 1999; Wagner and Rush, 2000; Korsgaard, Whitener and Brodt, 2002); and through the use of accounting measures (see, for example, Johansson and Baldvinsdottir, 2003).

Ross (1994) examined trust as a moderator on the effect that performance evaluation style can have on job-related tension. In this study, he examined three categories of performance evaluation identified by Hopwood (1972) which were: the budget-constrained style; the profit-conscious style; and the non-accounting style. Specifically, Ross (1994) set out to determine whether the effect of the different styles of performance evaluation on the level of job-tension was affected by the level of trust. To answer the research question, he conducted a survey with managers working in 18 Australian organisations. He found that when the level of trust between parties involved in the performance evaluation is low, there is no effect on job tension due to the changing of evaluation styles. On the other hand, when the level of trust is high, job-tension can reduce, however, this only applies to budget constraint or profit conscious styles. The results indicate that there is no significant difference between the two styles of performance evaluation with respect to the effect that trust has on job-related tension. This is consistent with Otley (1978).

The effect of financial and non-financial performance measures on job satisfaction was investigated by Lau and Sholihin (2005). Based on a sample of 70 managers, they found that trust mediated the relationship between performance measures (financial and non-financial) and job satisfaction. This finding is consistent with results from previous studies (see for example: Hopwood, 1972; Otley, 1978; Ross, 1994). Furthermore, Lau and Sholihin (2005) conclude that there are no different effects – or outcomes - between the uses of either financial or non-financial performance measures on job satisfaction.

The importance of trust in relation to organisational citizenship behaviours (OCBs) has been examined in several studies (see for example: Pearce, 1993; Pillai et al., 1999; Wagner and Rush, 2000; Korsgaard et al., 2002). Each study examined both variables and they all found a positive relationship between trust and OCBs. Hence, the evidence that claims that trust affects OCB appears to be clear.

The use of accounting and the level of trust or distrust were examined by Johansson and Baldvinsdottir (2003). They investigated whether trust (distrust) between parties involved in the performance evaluation process is affected by the use of accounting measures. They argued that the use of accounting measures can create or violate trust between parties involved in performance evaluation. In their study, they adopted the definition of trust offered by Tomkins (2001, p. 165) which states:

> The adoption of a belief by one party in a relationship that the other party will not act against his or her interests, where this belief is held without undue doubt or suspicion and the absence of detailed information about the actions of that other party.

To address their argument, they conducted case study research into two small companies in Sweden comprising one firm of consultants and one manufacturing company. In the consultancy firm, the research was organised as a longitudinal case study where one researcher remained in the firm and was involved in real-life situations for over a year. The research at the manufacturing company was organised as an action research study. The study was done in the same period where both of the companies faced financial crisis. Johansson and Baldvinsdottir (2003) concluded that the change and the use of accounting data depended on the level of trust between the parties involved in the process of performance evaluation.

Trust also has been regarded as an important factor of inter-firm relationships. In this case, Tomkins (2001) proposed to investigate the interaction between trust and information needed in inter-firm relationships. Since trust is a fundamental factor in deciding the amount and type of information to be presented, Tomkins

(2001) argues that more work needs to be done to develop theories about how trust has to be taken into account in all the different dimensions of accounting. However, despite the argument of the importance of trust in inter-firm relationships, prior studies resulted in mixed findings regarding the importance of trust for inter-firm alliance performance. For example, Cullen, Johnson and Sakano (2000) and Lane, Salk and Lyles (2001) found that inter-partner trust results in economic benefit outcomes for international strategic alliances (ISAs), while other studies (see, for example, Aulakh, Kotabe and Sahay, 1996; Inkpen and Currall, 1997; Sarkar, Echambadi, Cavusgil and Aulakh, 2001; Fryxell, Dooley and Vyrza, 2002) found that there was no significant relationship between trust and the performance of ISAs. In addition, Lyles, Sulaiman, Barden and Kechik (1999, p. 647) claim that inter-partner trust is risky, costly and ultimately detrimental to alliance performance. Due to the diverse results, Robson, Katsikeas and Bello (2008) investigated the relationship between trust and performance in ISAs. Their results suggest that inter-partner trust was positively related to alliance performance, a relationship that becomes stronger when the size of the alliances decline.

Along with the performance evaluation process, trust has also long been regarded as an important factor for organisational performance (Argyris, 1964). However, despite many publications on trust, its relationship with performance is still unclear (Mayer and Gavin, 2005). This is due to the fact that some studies have found that trust has a positive impact on performance (see, for example, Earley, 1986; Deluga, 1995; Podsakoff, MacKenzie and Bommer, 1996; Rich, 1997; Pettit, Goris and Vaught, 1997); while other studies (see, for example, Konovsky and Cropanzano, 1991; MacKenzie, Podsakoff and Rich, 2001; Dirks and Ferrin, 2002; Mayer and Gavin, 2005) indicate no relationship between trust and performance. It seems that the evidence of the importance of trust for performance is clearer when it deals with job-related tension, job satisfaction and OCBs.

Dirks and Ferrin (2002) suggest that there was very little empirical research that examined how trust affects performance. However, a study by Mayer and Gavin

(2005) did investigate the relationship between 'in-role'[18] performance and OCB of the employees in an organisation and the employees trust in their plant managers and top management team. According to Mayer and Gavin (2005), when employees trust their managers it will either have a directly positive influence on in-role performance and OCB; or indirectly via their ability to focus. Thus, when employees trust their managers it can be expected that the employee will focus their attention to contribute to their organisation. The ability to focus is therefore defined as one's ability to pay attention to value-producing activities without any concern (due to the existence of trust) over the use of power by others in the organisation (Mayer and Gavin, 2005). In their study, Mayer and Gavin (2005) found that trust did not have a direct or indirect positive impact on in-role performance, although it did positively influence the OCB.

From the discussion above, it can be stated that all of the research performed examined interpersonal trust between the relevant parties involved in the performance evaluation. These parties comprise of: the evaluators; the person subjected to the evaluations; and either accountants or people who prepared the accounting figures and/or information as the evaluation tools. It can be inferred that interpersonal trust is very important in the performance evaluation process since the process might have negative as well as positive effects on people's behaviour. Therefore, promoting interpersonal trust in the performance evaluation process can be expected to increase the positive effects (and thus reduce the negative effects) of people's behaviour. Additionally, a high level of trust is also important for strategic change since it provides the basis to develop predictability in relationships, produce cooperation, solve problems and uncover innovative solutions (Dodgson, 1993; Sabel, 1993).

High levels of trust can occur in a variety of ways (Chenhall and Langfield-Smith, 2003). Personal trust exists because individuals can identify and understand the goals adopted by a group or organisation (Lewicki and Bunker, 1996). When people are assured about another party's reaction or behaviour in a

[18] Mayer and Gavin (2005) formally defined 'in-role' performance as part of one's job responsibility.

different situation, it can be expected that a cooperative relationship between the parties will occur since they have confidence in each other (Chenhall and Langfield-Smith, 2003). Unfortunately however, high levels of personal trust that are dependent on a commonality of values and norms rarely arise spontaneously in organisations (Lane, 1998). Hence, the organisation has actively to promote personal trust. Usually, the organisation promotes this through formal mechanisms, including performance measurement (Chenhall and Langfield-Smith, 2003), however, they found that not all types of formal mechanisms can promote personal trust. For example, mechanistic control systems based on financial rewards, such as gain-sharing systems, were found to be inconsistent with the development of personal trust when difficult competitive circumstances required high levels of innovation (Chenhall and Langfield-Smith, 2003). Conversely, gain-sharing systems have been found to support positively organisational trust (Chenhall and Langfield-Smith, 2003). This suggests that more open social controls are probably better suited to promote personal trust and cooperative innovation.

Another approach to promote interpersonal trust has been suggested by Six and Sorge (2008). Using a multi-method research approach, they studied a matched pair of two consulting organisations with different trust policies but with similar characteristics. Their findings suggest that a combination of four types of organisational policies were effective in promoting interpersonal trust among colleagues. These four types of policies covered both of the dimensions of trustworthiness: ability and intentions (Six and Sorge, 2008). The four trust policies are (Six and Sorge, 2008, p. 866):

> (1) creation of culture in which relationships are important and showing care and concern for the other person's needs is valued;
> (2) facilitation of (unambiguous) relational signalling among colleagues (vertically and horizontally);
> (3) explicit socialisation to make newcomers understand the values and principles of the organisation and how 'we do things around here'; and
> (4) mechanisms to manage, match and develop employees' professional competencies.

Although Six and Sorge (2008) identified the four trust policies, they claim that the ability to promote interpersonal trust - via the application of the four trust policies - is not easy since it requires a strong top level commitment 'by example' and not just proclamation.

The discussion in the section above demonstrates that trust is an important factor in many areas, including performance evaluation. However, the mixed results from prior studies suggest that the relationship between trust and performance is still ambiguous. Hence, the issue of trust, despite its relevancy, needs to be further explored as does the method to promote it.

It is argued in this current study that one way to promote interpersonal trust in the performance evaluation process is by allowing divisional/unit managers to participate in the development of a BSC, which is used to evaluate their managerial performance in the organisation. It is expected that the interpersonal trust between the relevant parties in the performance evaluation can promote the fairness perception of the BSC as a performance measure. This will then eventually have a positive effect on managerial performance. The current study will adopt Tomkins' (2001, p. 165) definition of interpersonal trust which was mentioned above. Tomkins asserted that trust is grounded in learning from experience, such as by way of performance evaluation (Johansson and Baldvinsdottir, 2003). Thus, by allowing divisional/business unit managers to participate in the development of performance measures that will be used in the performance evaluation process, they will gain such experience in the performance evaluation. This has the capacity to promote interpersonal trust between parties in the performance evaluation process. From hereon, the present research will use the term 'trust' as a short term for 'interpersonal trust' or 'personal trust'.

3.4 Managerial Performance

Managerial performance has long been an interesting research subject area. Traditionally, the previous literature in managerial performance addressed the topic from three perspectives: (a) the functions, behaviours and roles of managers; (b) the traits and skills of managers; and (c) the decisions of managers (Borman and Brush, 1993).

The studies of functions, behaviours and roles of managers started with the publication of Fayols' (1916) work on industrial and general administration and the identification of managerial functions, such as planning, organising, directing and controlling, which are still a part of recent texts (Borman and Brush, 1993). It was then followed by many studies that investigated the issue of managerial behaviours. For example, Hemphill (1959) identified 10 managerial dimensions through factor-analysis of responses to an 'executive position description'[19] questionnaire developed by Educational Testing Service (ETS). Tornow and Pinto (1976) developed a Management Position Description Questionnaire (MPDQ)[20] for objectively describing the job content of executive and management positions in terms of their responsibilities, concerns, restrictions, demands and activities. Using a factor-analysis of the MPDQ responses, Tornow and Pinto (1976) identified 13 position description factors. Several of the positions were similar to Hemphill's (1959) positions, which are: staff service; supervision; internal business control; and products/services responsibility. Morse and Wagner (1978) developed an instrument[21] to measure and evaluate managerial behaviour that results in effective managerial performance. Using factor-analysis methods, they identified six primary behavioural dimensions from a sample of more than 400 managers who responded to the instrument.

Another method that has been used by prior studies in examining the function, behaviour and roles of managers was diary studies. By examining managers'

[19] The questionnaire consisted of 575 possible job 'elements' that was organised into four parts: (1) position activities – 239 elements; (2) position responsibilities – 189 elements; (3) position demands and restrictions – 84 elements; and (4) position characteristics, miscellaneous – 63 elements (Hemphill, 1959).

[20] MPDQ consisted of 208 items divided into four groups: (a) 63 items were position activities; (b) 53 referred to position concerns and responsibility; (c) 43 belonged with position demands and restrictions; and (d) 49 items were sub-summed under miscellaneous position characteristics (Tornow and Pinto, 1976).

[21] The final instrument consisted of 51 statements that factor-analysed into six-role instruments: (1) managing the organisation's environment and its resources (11 statements); (2) organising and coordinating (13 statements); (3) information handling (7 statements); (4) providing for growth and development (8 statements); (5) motivating and conflict handling (7 statements); and (6) strategic problem solving (5 statements) (Morse and Wagner, 1978).

diaries, those studies tried to portray how managers spend their time (Mahoney, Jerdee and Caroll, 1965; Horne and Lupton, 1965; Stewart, 1972, 1975; Mintzberg, 1975). For example, Mahoney et al. (1965) reported a study of 452 management and executive jobs on the amount of time spent each day on eight different functions. The functional dimensions in their study applied as dimensions of managerial performance. It included: planning; investigating; coordinating; evaluating; supervising; staffing; negotiating; and representing. They found that while the distribution of performance profiles among jobs varied from one managerial level to another, each job type was represented at all levels (Mahoney et al., 1965). Mintzberg (1975) determined how executives spend their time and characterised managerial behaviour in terms of 10 basic roles. He found that managerial activity is characterised by brevity, variety and discontinuity.

The studies of traits and skills of managers especially about the personal qualities or characteristics of managers can be reviewed from Argyris (1953) and Stryker (1958). Although topics in this area are important to be examined, there has been little evidence that supports the correlation between manager traits and managerial performance (Borman and Brush, 1993). Furthermore, prior literature suggests that there is a shift from traits to broad skills, such as entrepreneurial skills (Mintzberg and Waters, 1982); information-processing skills (Mintzberg, 1973); decision-making skills under uncertainty (Drucker, 1974); and conceptual skills (Katz, 1974).

There is a number of studies regarding the decision-making function of managers. Within this area, the decision-making issue has been expanded as a way of explaining how decisions are made, particularly under conditions of ambiguity (Borman and Brush, 1993). Those studies span from the rationality of human decision-makers (Durkheim, 1964; and Allison, 1971) to the difficulties to examine such a decision-making process (Simon, 1945; March and Simon, 1958; and Nisbett and Ross, 1980).

In a more current study, Johnson, Schneider and Oswald (1997) derived inductively the taxonomy of managerial performance requirements from many empirical studies of manager performance. Using the factor-analysis method, they identified 18 dimensions of managerial performance. Johnson et al. (1997) investigated the profile similarity of managers across a number of managerial performance dimensions by applying a typological method to the performance domain. Here, the typological approach is a method to determine whether sub-groups of individuals share similar profiles across performance dimensions (Johnson et al., 1997). In their study they identified three managerial types: (1) Type 1 (task-orientated technicians) are relatively strong technically but relatively weak interpersonally; (2) Type 2 (amiable under-achievers) are managers who, although interpersonally sensitive, are neither interpersonally dominant nor ambitious; and (3) Type 3 (people-orientated leaders) are managers who have some weaknesses in the quantitative aspects of the job but they have strong interpersonal and supervisory skills (Johnson et al., 1997).

Despite a number of studies regarding managerial performance above, this present study adopted Mahoney et al.'s (1965) eight functional dimensions of manager and executive jobs to measure managerial performance. The choice of these eight functional dimensions is based on the applicability of the dimensions in the company with a BSC environment. Another reason is that this measurement has been applied in many prior studies (see, for example, Brownell and Dunk, 1991). The prior studies provide evidence that this measurement tends to exhibit a high Cronbach alpha which suggests that the measure is quite reliable. This is important since a more reliable measure will show greater consistency than a less reliable measure, when the measure is used repeatedly (Hair, Black, Babin, Anderson and Tatham, 2006).

3.5 Summary

In this chapter, the drivers of fairness perception that includes distributive justice, procedural justice, and participation have been examined. The discussion was then followed by the examination of trust in the performance evaluation process. In the last part of this chapter, managerial performance has been discussed. In the next chapter, the research framework used to guide the research is outlined.

Chapter 4 Research Framework

4.1 Introduction

In the previous chapter, the literature relating to the balanced scorecard (BSC) and its common-measure bias, the drivers of fairness perception on performance measure, the trust between parties involved in the performance evaluation process, and managerial performance were reviewed. The objective of this research is to examine the effects of fairness perception of performance measures, which is a lightly researched area of management accounting. Moreover, an alternative framework will be constructed to overcome the inherent limitations that exist. In broad terms, the framework will address the potential links between fairness perception of performance measures, trust and managerial performance. In this chapter, the research framework used to guide the research is outlined. This chapter is organised in the following way: first, the research question, which was identified in Chapter 1, will be explored in further detail and broken into five sub-questions which are necessary to answer the research question; second, the research framework is outlined; third, the hypotheses are developed; and finally, the variables to be employed in the analysis are defined.

4.2 Research Question

The review in Chapter 2 demonstrated that the BSC exhibits a common-measure bias due to human cognitive limitation (Slovic and MacPhillamy, 1974; Lipe and Salterio, 2000). Although research shows that some approaches exist to mitigate or overcome the problem, many issues still remain. For instance, the common-measure bias might not exist in the case of individual evaluations of the divisional/unit managers' performance. Since common-measure bias problems exist where evaluations on divisional/unit managers' performance by senior managers who have only used financial measures to compare one manager's performance against another. Additionally, none of the studies identified who in the organisation developed the BSC. Thus, if the senior managers developed the BSC and imposed it on the divisional/unit managers, then it is an inappropriate technique if they do not employ unique (non-financial) measures to evaluate their performance.

The existence of common-measure bias in the BSC environment has become an important issue since it potentially causes sub-optimal BSC outcomes (Lipe and Salterio, 2000). Its existence is due to senior managers that only use common measures to evaluate divisional/unit managers. This is likely to lead to a perception from divisional/unit managers of unfairness since they believe their evaluations should be based on a set of unique measures that capture their own abilities and capabilities.

The potentially negative effect due to the feeling of unfairness in the performance evaluation process increases the possibility of negative behaviour, which can influence job satisfaction, job related tension, organisational citizenship behaviour and managerial performance. A few studies have examined the relationship between the feelings of unfairness and behaviour (see, for example, Brownell, 1982; Organ and Moorman, 1993; Ross, 1994; Little et al., 2002; Muhammad, 2004), however, there are *no studies* that have focused on examining *the effect of fairness perception of measures on managerial performance, or the associated process, in the context of BSC.*

In the BSC setting, Lau and Sholihin (2005) found that a managers' fairness perception of performance measures is one of the intervening variables in the relationship between performance measures and managers' job satisfaction. However, they only examined procedural fairness (process) of the performance measures, and not distributive fairness (outcome). Therefore, the main research question that arises from this study is: what is the effect of the fairness perception of performance measures on managerial performance in a BSC environment? In this study it is argued that participation in the development, implementation and use of performance measures enhances the fairness perception of the performance measures. It also enhances trust between the parties involved in the performance evaluation process, leading to improve managerial and unit performance.

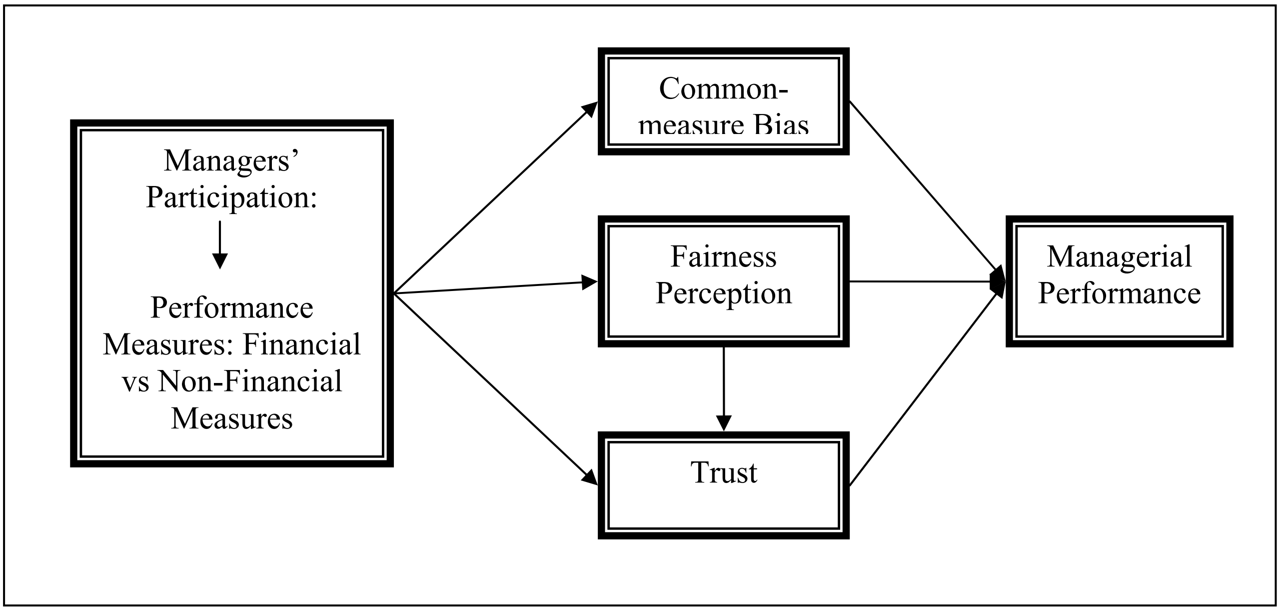
In order to answer this research question, it is necessary to investigate:

1 the relationship between *participation* and *fairness perception* regarding the divisional/unit performance measures used in a BSC environment;
2 whether financial or non-financial measures are perceived more fairly in a BSC environment;
3 the relationship between *participation* and *interpersonal trust* between parties involved in the performance evaluation process in a BSC environment;
4 the effect of *participation* on the development of the performance measures and the use of performance measures in the performance evaluation process; and
5 the effect of *participation*, *fairness perception*, and *interpersonal trust* in the development of performance measures on divisional/unit managerial performance in a BSC environment.

4.3 Research Framework

One aim of this thesis is to propose a method to overcome the common-measure bias problem in the context of a BSC environment. Currently, common-measure bias has been found in prior studies (see, for example, Lipe and Salterio, 2000; Lau and Sholihin, 2005), the present research will make a contribution to knowledge by providing empirical evidence regarding the effect of fairness perception of performance measures on managerial performance in a BSC environment. This can be achieved by investigating the concepts of *fairness perception* together with *divisional/unit manager participation* and *interpersonal trust* between parties involved in the performance evaluation process. Based on the prior research examined in Chapters 2 and 3, the key variable concepts such as participation, fairness perception and trust have been incorporated into the research framework illustrated in Figure 4.1.

Figure 4.1: The relationship between performance measures and managerial performance



Based on Figure 4.1, this study argues that the higher the level of managers' participation in developing performance measures, the greater the fairness perception of the performance measures which will result in greater trust between parties involved in the performance evaluation process. It is also expected that the more the manager participates in the development of the performance measures, the smaller the possibility of common-measure bias, which may, in turn, eventually increase managerial performance. Moreover, the greater the fairness perception of the performance measures and the stronger the trust between parties in the evaluation process, the more likely it is that managerial performance will improve. Finally, it is expected that there will be a positive relationship between the fairness perception of the performance measures and the trust between parties involved in the performance evaluation process.

4.4 Hypothesis Development

Guided by the research framework, the following hypotheses and their justifications are employed to formalise the arguments.

4.4.1 Participation, common-measure bias, fairness perception and trust

Previous research on participation in the decision-making process in the legal setting and budgeting setting has illustrated mixed results regarding the level of participation ranging from low to high level. However, most of the prior studies conclude that any level of participation enhances the fairness perception on the decision-making process (see, for example, Thibaut and Walker, 1975; Tyler and Lind, 1992; Little et al., 2002; Lau and Sholihin, 2005). Yet, there are no specific studies that examine the effect of participation on the development of performance measures in the BSC environment.

Therefore, the present research will employ: the participation concept; procedural fairness theory; and distributive fairness theory to investigate the effect of participation on the development of performance measures in the BSC environment. The present research argues that since the senior manager invites the participation of the division/business unit manager in the development of the performance measures, then intuitively, it can be expected that her/his senior manager will use all of the performance measures regardless of whether it is financial or non-financial measure. Consequently, the common-measure bias problem which currently exists in the BSC environment will be reduced. This argument can be re-stated in hypothesis 1.

H1: The higher the level of participation in developing the performance measures, the lower the common-measure bias.

The present research also argues that the participation of a manager in the development of the performance measures will enhance their fairness perception of the performance measures, both procedural fairness and distributive fairness. As procedural fairness theory claims, participation is one factor which can increase the fairness perception of the decision process (see, for example, Lind et al., 1990; Korsgaard and Roberson, 1995; Greenberg, 1990b; Organ and Moorman, 1993; Tyler and Lind, 1992; Muhammad, 2004; Brownell, 1982; Ross, 1994; Dunk, 1989; Lau, et al., 1995; Lau and Tan, 1998; Lau and Lim, 2002a). In this present study, the decision process is the process that will develop the performance measures which will be used in the performance evaluation process in the BSC environment. This argument can be re-stated in hypotheses 2a and 2b.

H2a: The higher the level of participation in developing the performance measures, the greater the procedural fairness perception of the performance measures.

H2b: The higher the level of participation in developing the performance measures, the greater the distributive fairness perception of the performance measures.

In the case of performance measures, non-financial measures are perceived to be fairer than financial measures. As Kaplan and Norton (1993) argue, one of the important strengths of the BSC is that each unit in the organisation develops its own specific or unique measures that capture the unit's strategy. Subsequently, the present study will employ distributive fairness theory to investigate the fairness of the performance measure (financial and non-financial measures) as an output of the process of development of performance measures in a BSC environment. This argument can be re-stated in hypothesis 3.

H3: Non-financial measures are perceived to be more fair than financial measures.

Previous research shows that participation in decision-making not only enhances the fairness perception of the decision-making process, but also increases the trust between parties involved in the process (Lau and Sholihin, 2005). However, as yet, no one has examined the effects of participation on trust if the parties involved in the performance evaluation process also participated in the development of performance measures used to evaluate performance in the BSC environment. It could be argued that if all parties involved in the evaluation process participate in the development of the performance measures used for their performance evaluation, that trust between the parties will increase as will the performance of the people being evaluated. This argument can be re-stated in hypothesis 4.

H4: The higher the level of participation in developing the performance measures, the stronger the trust between parties involved in the evaluation process.

4.4.2 Managerial Performance

The common-measure bias problem in the BSC environment (Lipe and Salterio, 2000) has an implication that the benefits of the BSC cannot be fully exploited. There is also the possibility that it could impact on managerial performance since this performance is a product of the performance evaluation process. Additionally, the common-measure bias problem also can detract from a manager's decision-making ability since the decision will be based on the performance measures which are used to evaluate their performance. Consequently, their managerial performance could be sub-optimal. Therefore, it is reasonable to argue that if all of the performance measures being set in the development of the performance measures are used in the performance evaluation process, then one can expect improved managerial performance. This argument can be re-stated in hypotheses 5a and 5b.

H5a: The lower the common-measure bias, the better the managerial performance of the divisional/unit managers (division manager's self-assessment).

H5b: The lower the common-measure bias, the better the managerial performance based on division manager's view of senior manager's perception of performance.

As argued above, a manager's participation in the development of performance measures can enhance the fairness perception of the performance measures being used in the performance evaluation process. Eventually, if the managers perceive the performance measures to be fair then it can be expected that their managerial performance will improve accordingly since they realise that their efforts will be evaluated fairly. This argument can be re-stated in hypotheses 6a, 6b, 6c and 6d.

H6a: The higher the procedural fairness perception of the performance measures by divisional/unit managers, the better the managerial performance of the divisional/unit managers (division manager's self-assessment).

H6b: The higher the procedural fairness perception of the performance measures by divisional/unit managers, the better the managerial performance based on division manager's view of senior manager's perception of performance.

H6c: The higher the distributive fairness perception of the performance measures by divisional/unit managers, the better the managerial performance of the divisional/unit managers (division manager's self-assessment).

H6d: The higher the distributive fairness perception of performance measures by divisional/unit managers, the better the managerial performance based on division manager's view of senior manager's perception of performance.

Additionally, a manager's participation in the development of performance measures increases the level of trust between parties involved in the performance evaluation process. In these instances, prior research argues that trust is an important factor in the performance evaluation process (see, for example, Ross, 1994; Tomkins, 2001; Johansson and Baldvinsdottir, 2003; Lau and Sholihin, 2005). However, none of those studies examined the effects of trust in the performance evaluation process on managerial performance. It might be argued that if divisional/unit managers trust that their senior managers incorporated the performance measures they participated in to evaluate their managerial performance, then it is expected that this trust will impact on their performance in a positive manner. This argument can be re-stated in hypotheses 7a and 7b.

H7a: The stronger the level of trust between parties involved in the performance evaluation process, the better the managerial performance of the divisional/unit managers (division manager's self-assessment).

H7b: The stronger the level of trust between parties involved in the performance evaluation process, the better the managerial performance based on division manager's view of senior manager's perception of performance.

As mentioned above, the fairness perception of performance measures and trust between parties involved in the performance evaluation process are the two important factors in the performance evaluation process. Both of the factors are expected to be a positive influence for managers and lead to improved managerial outcomes. Currently, no study has focused on the relationship between fairness perception of performance measures and trust between parties involved in the performance evaluation process. However, it can be argued that there is a positive relationship between fairness perception of performance measures and the trust between parties involved in the performance evaluation process. Accordingly, the present research will assess the relationship between fairness perceptions, both procedural and distributive fairness, of performance measures and trust in the performance evaluation process. This can be formalised into hypotheses 8a and 8b.

H8a: The higher the procedural fairness perception of the performance measures by divisional/unit managers, the stronger the trust between parties involved in the evaluation process.

H8b: The higher the distributive fairness perception of the performance measures by divisional/unit managers, the stronger the trust between parties involved in the evaluation process.

4.5 Operationalisation of the Key Constructs

The next step after the development of the research framework and hypotheses is the operationalisation of the key constructs. Operationalisation of the key construct refers to how a conceptual construct or variable is to be measured (Veal, 2005; Sekaran, 2003). In the present study, most of the key constructs are operationalised using a five-point Likert-scaled instrument. The development of measures for the variables is based on prior instruments where possible, or developed by the researcher based on an extensive literature review. The justification and the operationalisation of each variable will be discussed in the next sections.

4.6 Participation

As discussed in the previous chapter, participation in the decision-making process can enhance the fairness perception of the process. Participation in the decision-making process can be reflected by the ability to voice views and arguments during a procedure and the ability to influence the actual outcome itself (Thibaut and Walker, 1975; Korsgaard and Roberson, 1995; Folger, 1977). In the current study, the variable participation means participation in the development of performance measures that will be used in the performance evaluation process. The operationalisasion of the participation construct is discussed in the sub-section 4.6.1.

4.6.1 The Instrument

Although most measures of participation in prior literature are based on the budgetary setting, the review of balanced scorecard (BSC) development and implementation showed no evidence of this. Consequently, the participation variable in this study will be measured using a questionnaire derived from a budgetary setting which is then modified into the BSC setting. A ten-item five-point Likert-scaled instrument will be used. The questionnaire was derived mostly from Kenis (1979). These instruments have all been validated by other researchers and are seen to be relevant to this project.

Respondents were asked to indicate their agreement with each of the statements in the survey regarding their participation in performance measure development, especially in the determination of financial and non-financial performance measures. One example of a statement is: "I am allowed **a high degree** of influence in the determination of ***financial*** measures used to measure performance of my division (unit)”. The complete instrument is presented in Appendix I – Part A.

Each item had a five-point response scale with endpoints 1 (strongly disagree) and 5 (strongly agree). In the survey, the 0 (zero) response is also included for the response of “No Basis for Answering”. This allows respondents to answer even though they do not have any knowledge. This is to ensure that the data collected are valid, since it does not force a respondent to answer a questionnaire that she/he is not capable of answering.

This method is also applied for the measurement of the use of performance measures (Section 4.7.1), general perception relating to performance measures (Section 4.7.2), procedural fairness (Section 4.8.1), distributive fairness (Section 4.8.2), fairness of financial vs. non-financial measures (Section 4.8.3), interpersonal trust (Section 4.9) and managerial performance based on division manager’s view of senior manager’s perception (Section 4.10.2).

4.7 Financial and Non-Financial Performance Measures

The financial and non-financial performance measures examined in this study include the use of the performance measures, the general perception relating to the performance measures and the financial and non-financial measures that have been used in the performance evaluation process. Each of these issues are discussed below.

4.7.1 The Use of Performance Measures

A five-item, five-point Likert-scaled instrument was employed to measure the use of performance measures. The instruments are developed in the present study since this study is the first study to examine this issue. These instruments are crucial for the present research to test if there is a common-measure bias phenomenon in the BSC.

Respondents were asked to indicate their agreement with each of the statements in the survey regarding the use of performance measures in divisional (unit) performance evaluation. One example of a statement is: “My senior manager uses all of the performance measures (***financial*** and ***non-financial***) to evaluate my individual performance”. Each item had a five-point response scale of agreement as explained in Section 4.6.1. The complete instrument is presented in Appendix I – Part A.

4.7.2 General Perception Relating to Performance Measures

A five-item, five-point Likert-scaled instrument was used to measure the general perception relating to performance measures. The instruments are developed by the present research as part of its contribution to knowledge. This is intended to examine any differences in the use of performance measures to evaluate the performance of the division (unit) manager and the performance of the division (unit) as an entity. It is also intended to understand the division (unit) manager’s general perception relating to the performance measures.

Respondents were asked to indicate their agreement with each of the statements in the survey regarding their general perception of performance measures in divisional (unit) performance evaluation. One example of a statement is: “My performance as a divisional (unit) manager and the performance of the division are one and the same thing”. Each item had a five-point response scale of agreement as explained in Section 4.6.1. The complete instrument is presented in Appendix I – Part A.

4.7.3 Financial and Non-Financial Measures

To explore the financial and non-financial measures that have been used in performance evaluation, a partially structured instrument is used in this study. The survey lists key financial and non-financial measures within each of the four perspectives of BSC derived from Kaplan and Norton (1992, 1993, 1996a, 1996b, 2001) and from Olve et al. (1999), together with an ‘Other, please specify:” choice. The purpose of using a partially structured instrument is to get more insight into the respondent’s opinion about a subject. Consistent with Dillman’s (2007) argument, there is a potential predicament to list all of the alternative choices since financial and non-financial performance measures possibly vary from one company to another.

Respondents were asked to indicate the extent of their company's use of each performance measure across the four perspectives of BSC to evaluate managerial and divisional (unit) performance. Each item has a five-point response scale with the endpoints 1 (not at all) and 5 (to a great extent). In the survey, the 0 (zero) response is also provided for the response "No Basis for Answering" to allow respondents who do not have knowledge to response to the statement. This is to ensure the validity of the data. The complete instrument is presented in Appendix I – Part A.

4.8 Fairness Perception

As defined in the previous study, fairness perception can be seen not only from the decision process but also from the outcome itself (Laventhal, 1980). Therefore, in the present study the fairness perception of performance measures in the BSC environment is measured via the procedural fairness, distributive fairness and also the fairness of financial vs. non-financial measures. The fairness comparison between financial vs. non-financial measures is an important issue in the BSC environment since prior studies found that a common-measure bias problem exists in the BSC. The fairness measures are discussed below.

4.8.1 Procedural Fairness

Procedural fairness is the perceived fairness of the decision-making process. As previous studies illustrate, the process of decision-making is considered fair if the process fulfils the procedural fairness rules developed by Laventhal (1980). These rules are consistency over time, consistency across persons, correctability, voice, and accuracy norms. The operationalisation of the variable is discussed below.

4.8.1.1 The Instrument

The latent variable of perceived procedural fairness in this study is measured using an eight-item, five-point Likert-scaled instrument. The instruments are derived mostly from Little et al. (2002) modified into a BSC setting. The instrument in Little et al. (2002) is based on the theory of procedural fairness developed by Barret-Howard and Tyler (1986); Greenberg, (1986a); Thibaut and Walker (1975); and Laventhal (1980). The instruments are developed to address: consistency over time, consistency across persons, correctability, voice and accuracy norms that have been identified for fair formal decision-making procedures.

Respondents were asked to indicate their agreement with each of the statements in the survey regarding their perceived procedural fairness of the development of the performance measures. One example of a statement is: "The procedure for preparing the ***financial*** measures to evaluate divisional (unit) performance is applied consistently among the divisions (units)". Each item had a five-point response scale of agreement as explained in Section 4.6.1. The complete instrument is presented in Appendix I – Part A.

4.8.2 Distributive Fairness

Distributive fairness is the fairness of the output of the decision process. The operationalisation of the variable is discussed below.

4.8.2.1 The Instrument

A two-item, five-point Likert-scaled instrument was used. The questionnaire was derived mostly from Korsgaard and Roberson (1995), which was modified into a BSC setting. Respondents were asked to indicate their agreement with each of the statements in the survey regarding their perceived distributive fairness of the development of the performance measures. One example of a statement is: "The performance measures that have been used in the performance evaluation process are fair". Each item had a five-point response scale of agreement as explained in Section 4.6.1. The complete instrument is presented in Appendix I – Part A.

4.8.3 Fairness of Financial vs. Non-Financial Measures

The BSC is a performance measure consisting of financial and non-financial measures. In the current study, the variable is operationalised as follows.

4.8.3.1 The Instrument

A two-item, five-point Likert-scaled instrument was used. The instruments were developed in the present study to examine the fairness perception of financial vs. non-financial performance measures. This study is the first study to examine this issue. Respondents were asked to indicate their agreement with each of the statements in the survey regarding their perceived fairness of financial measures as a tool to measure performance compared with non-financial measures. One example of a statement is: "In my opinion the ***non-financial*** measures are fairer than the ***financial*** measures in the performance evaluation process of each division (unit)". Each item had a five-point response scale of agreement as explained in Section 4.6.1. The complete instrument is presented in Appendix I – Part A.

4.9 Interpersonal Trust

Interpersonal trust is one of the important factors in the performance evaluation process. In the current study, the variable is operationalised as follows.

4.9.1 The Instrument

The measure of interpersonal trust was derived from Read (1962). However, the four questions in Read (1962) were tailored into a five-item, five-point Likert-scaled instrument agreement statement that reflects the BSC setting. Respondents were asked to indicate their agreement with each of the statements in the survey regarding their interpersonal trust with the parties involved in the performance measurement process. One such example is: "My senior manager takes advantage of opportunities that come up to further my interest by his/her actions and decisions". Each item had a five-point response scale of agreement as explained in Section 4.6.1. The complete instrument is presented in Appendix I – Part A.

4.10 Managerial Performance

The latent construct of managerial performance in this current study is divided into two constructs, which are: 1) managerial performance based on division (business unit) manager perception of their performance (division manager's self-assessment); and 2) managerial performance based on division manager's view of senior manager's perception of performance. The instruments of the two constructs are discussed below.

4.10.1 Division (Unit) Manager Perception of Their Performance

The nine dimensional five-point Likert scaled employed by Mahoney et al. (1965) is a self-rating measure used in this study to evaluate the managerial performance variable. The scale comprises of eight performance dimensions and one overall effectiveness dimension. This self-rating measure is chosen because it has been used extensively in earlier studies (Heneman, 1974; Brownell, 1982; Brownell and Hirst, 1986; Brownell and McInnes, 1986; Brownell and Dunk, 1991).

The self-rating scales have been criticised for their tendency for respondents to be too lenient on themselves, thereby resulting in a small range in the score being observed (Prien and Liske, 1962; Thornton, 1968; Mia, 1989). However, according to Brownell (1982), it has the advantage of overcoming the problem of "halo error". "Halo error" is the tendency to evaluate "globally" or, in other words, to evaluate only one cognitive dimension (Brownell, 1982).

A high inter-correlation among separate dimensions is evidence of "halo error", which seems to occur with the ratings of senior managers (Thornton, 1968). Additionally, the nine dimensional structure of the measure clearly captures the multi-dimensional nature of performance without introducing the problem of excessive dimensionality (Brownell, 1982). Independent assessments of reliability and the validity of the Mahoney instrument provide supportive evidence of the measure's sound development (Heneman, 1974).

The nine dimensional structure of the Mahoney measure includes a single overall performance rating, together with ratings on eight sub-dimensions. Respondents were asked to rate their "performance as division (unit) manager" on the following dimensions: planning, investigating, coordinating, evaluating, supervising, staffing, negotiating, and representing. Each item had a five-point response scale with the endpoints 1 (extremely poor) and 5 (excellent), and responses were summed. In this survey, the 0 (zero) response is also provided for the response "No Basis for Answering" which allow respondents who lack of knowledge in this area to respond to the statement, and ensure that the data collected are valid. The complete instrument is presented in Appendix I – Part A.

4.10.2 Managerial Performance Based on Division Manager's View of Senior Manager's Perception

A self-rating single-item measure of a five-point Likert scale is developed to measure the division (unit) manager's performance based on the division manager's view of senior manager's perception. The self-rating single-item is chosen to confirm the self-rating measure of division (unit) manager's performance based on the division (unit) manager perception.

The single-item approach has been criticised by many researchers (Oshagbemi, 1999; Nagy, 2002). Wanous, Reichers and Hudy (1997) divided the single-item measure into two categories: (a) single-item that measures self-reported facts such as age, gender, education and so on; and (b) a single-item that measures psychological constructs such as job satisfaction. Furthermore, Wanous et al. (1997) argue that measuring self-reported facts with a single-item measure is a common and acceptable practice. However, using single-item measures to measure psychological constructs is usually discouraged.

The problems regarding the use of single-item measures have centred on the difficulty in establishing internal consistency and reliability (Oshagbemi, 1999; Nagy, 2002). However, prior research found that a single-item measure is acceptable so long as it represents and measures the constructs (Nagy, 2002), implies their use, or when situational constraints limit or prevent the use of multiple-item measures (Wanous et al., 1997). It is obvious that establishing internal consistency and reliability can be important to evaluate the validity of an instrument; however, having an instrument that is more inclusive of the construct is even more important (Nagy, 2002).

Moreover, based on their examination of single-items to measure job satisfaction, Wanous et al. (1997) identified several reasons why single-item measures may be preferable. They include: (a) single-item measures take less space in questionnaires compared to multiple-item measures; (b) single-item measures can cost less to develop; (c) single-item measures are likely to increase face validity, since a single-item is usually easier to understand than a multiple-item. Additionally, respondents may dislike being asked questions that appear to be repetitive; and (d) single-item measures are better for measuring changes in job satisfaction.

In the present study, a single-item was developed to capture the construct division (unit) manager's performance based on division manager's view of senior manager's perception. The single-item instrument was "In my most recent performance evaluation my senior manager rated my managerial performance as:…". That item had a five-point response scale with the endpoints 1 (extremely poor) and 5 (excellent). The response scales and zero response statement follow those mentioned previously.

In order to reinforce the respondent's answer about division (unit) manager's performance based on the division manager's view of senior manager's perception, two-item instruments were developed to measure the respondent's agreement of their senior manager's perception of their performance. The two-item instruments are derived from Korsgaard and Roberson (1995). They are: (1) I agree with the way my senior manager rated my managerial performance; and (2) I agree with my final rating. Each item has a five-point response scale with the endpoints 1 (strongly disagree) and 5 (strongly agree). The response scales and zero response statement follow those mentioned previously.

4.11 Summary

In this chapter the research question which guides the research has been explored. This research question led to the development of the research framework which will be used to guide the research. The framework makes explicit the link between: participation in the development of performance measures and the common-measure bias in the BSC; the fairness perception of the performance measure; the trust between parties involved in the performance evaluation process; and managerial performance. In the next part of the chapter, the set of hypotheses which ultimately answer the research question were formalised. This was followed by a discussion of the operationalisation of the key constructs along with the development of the indicators of each construct. The development of the indicator for the variables was based on prior instruments where possible, or developed by the researcher based on a thorough literature review. Qualitative tests to assess the scales were employed to ensure that the constructs were both valid and reliable. This was achieved by asking experts in the area of performance measurement using BSC and procedural justice. The measurement of each variable was discussed. In the next chapter, the research methodology issues will be explored in detail, including justification of the survey method used to facilitate the investigation in this research.

Chapter 5 Research Method

5.1 Introduction

In Chapter 4 the proposed research framework, the hypotheses development and the operationalisation of the key variables were discussed. In this chapter the research method employed to investigate the research question is described and justified. The chapter is organised as follows. First, the mail questionnaire survey method is outlined. Second, assessment of the data quality (measurement error) is explored. Third, the population and unit of analysis employed in this survey study are discussed. Fourth, the development of the questionnaire and the pilot testing conducted in this study are explained. Fifth, the sample details are outlined followed by the administration of the questionnaire. Sixth, the data editing and coding processes are discussed as is the data screening. Seventh, the generalisability of the findings is assessed. Eighth, the data analysis methods used in this study are discussed. Finally, ethics pertaining to this research and the summary of the chapter are discussed.

5.2 The Research Method

In social sciences, the most commonly used methods to examine the characteristics and interrelationship of sociological and psychological variables is the survey method (Robert, 1999; Nazari, Kline and Herremans, 2006). Researchers have used surveys to collect data on a variety of topics, for example, performance measurement with budgeting, managers' perceptions, managers' participation, etc. The present study also employs the survey method to collect its data. The justification for the survey method along with a mail questionnaire is provided in sub-sections 5.2.1 and 5.2.2.

5.2.1 Why a Survey Method?

Most of the previous research in the balanced scorecard (BSC) area employs an experimental research design (see, for example, Lipe and Salterio, 2000, 2002; Libby et al., 2004; Roberts et al., 2004; Banker et al., 2004; Dilla and Steinbart, 2005) to evaluate the performance evaluation processes. However, in those experiments they do not explain the development of the performance measures. In those experiments, participants acted as if they were managers in the performance evaluation process where performance measures were imposed on them. The results may have been different had the managers been involved in the development of the performance measures. Hence, this study will use a survey research method to address the research question by explicitly incorporating manager involvement; and to test the developed hypotheses.

In the social sciences, the survey method is used widely to examine empirically the characteristics and interrelation of sociological and psychological variables (Roberts, 1999; Nazari et al., 2006). Its development and application in the twentieth century has 'profoundly influenced the social sciences' (Kerlinger, 1986). It has many advantages such as being a cost-effective manner of collecting a large quantity of generalisable data while avoiding interviewer bias (Roberts, 1999).

Why is a survey method appropriate for this study? As Nazari et al. (2006) state, there are several underlying assumptions in survey research using *self-report* of attitudes, values, beliefs, opinions and/or intentions. These self-report assumptions, discussed below, reflect the present research's central purpose; which is to examine the perception of division (business unit) managers on the performance measures used in the performance evaluation process.

First, *the respondents are the most reliable source for certain types of information* (Nazari et al., 2006). In the performance evaluation process, the fairness perception of the performance measures used in the process is crucial. Division (business unit) managers are the most reliable source of information since they are involved in the performance evaluation process both as an evaluator as well as the one being subject to the process.

Second, *those subjective perceptions actually matter*. One can argue that perceptions may not be real; however, perceptions of reality can be more powerful than reality itself since very often people act on their perceptions (Nazari et al., 2006).

Third, *perceptions can be demonstrated to be linked to outcomes of interest to organisations* (Nazari et al., 2006). In other words, perceptions influence the behaviours that have real consequences for organisations. The common-measure bias found in previous studies might increase the unfairness perceptions of the performance measures in the performance-evaluation process. Those perceptions can negatively influence the behaviour of divisional (business unit) managers, such as lowering their performance, which impacts on the organisation. Given the main objective in this study, as well as considering the above assumptions of the self-report survey, a survey method is appropriate for this research.

However, as one would expect, this method is not free of criticism (Marsh, 1982; de Vaus, 1992); furthermore, Young (1996) questions its contribution to management accounting research. The main fundamental concern of those critics is the validity and reliability of the survey method (Van der Stede, Young and Chen, 2005; Young, 1996). Therefore, in order to minimise any potential problems, every effort will be undertaken to obtain qualified data to assess adequately the phenomenon of interest. This will be done with the appropriate survey questionnaire development and administration of the survey. These issues are discussed in Sections 5.5 and 5.7.

5.2.2 Why a Mail Questionnaire?

Mail questionnaire as a technique of data collection has been criticised due to its possible lack of response and the inability to verify the responses given (Kerlinger and Lee, 2000). However, the number of surveys conducted by self-administered mail questionnaires exceeds the number of interview surveys conducted each year, although, it is difficult to quote the exact numbers (Dillman, 2007). In managerial accounting research, a mail questionnaire survey is the survey method most frequently used (Van der Stede et al., 2005).

Nazari et al. (2006) stated that the aim of survey research in management accounting is to measure certain attitudes and/or behaviours of a population or a sample, and can be used either for exploratory or confirmatory purposes. Exploratory research is a study to find out basic facts and become familiar with the subject of the study. It usually focuses on finding out what construct to measure and how to measure them (Pinsonneault and Kraemer, 1993). On the other hand, confirmatory research is a theory testing study that assesses relationships between constructs that have been defined in prior research studies (Nazari et al., 2006).

With regard to the purposes of the survey, one of the characteristics of this present study is to confirm whether common-measure bias found in prior research experiments truly exists in organisations. If it exists, one must determine what the impact on the managerial performance is and how to reduce it. To confirm prior research findings, a large data set is needed from real organisations where the most relevant technique to gather such data is via a mail questionnaire survey.

5.3 Data Quality

Data quality is very important in conducting any research. Poor data quality can have significant effects on the analysis of relationships proposed in the research framework/model. There are two major sources of error in a survey study, namely, measurement error and sampling error. Measurement error is discussed in the section below, while sampling error is discussed in Sub-section 5.7.4.

5.3.1 Measurement Error

Measurement error is defined as ‘inaccuracies of measuring the “true” variable values due to the fallibility of the measurement instrument (i.e., inappropriate response scales), data entry errors, or respondent errors’ (Hair et al., 2006, p. 2). Therefore, the observed value obtained consists of the “true” value and the measurement error. When the observed value is used to compute correlations or means, the “true” effect is partially covered by the measurement error. As a result, the correlations become weaker and the means less precise. There are two important characteristics that should be addressed relating to measurement error: (i) validity; and (ii) reliability.

Validity, or construct validity, is the extent to which the constructs of theoretical interest are successfully operationalised in the research in terms of how it incorporates both the extent to which the constructs are measured reliably and whether the measure used captured the construct of interest (Abernethy, Chua, Luckett and Selto, 1999, p. 8). A thorough understanding of what is to be measured and then deciding an appropriate and precise instrument to measure is the most important way to ensure validity (Hair et al., 2006).

Reliability, on the other hand, is the degree to which the observed variable measures the "true" value. The more reliable measure will show greater consistency than a less reliable measure when the measure is used repeatedly (Hair et al., 2006). Therefore, to increase the validity and reliability, and thus minimise the measurement error, certain procedures (e.g., development and administration of the questionnaires) should be considered by the researcher.

Measurement error can result from both poor wording of the question and a faulty questionnaire construction (Dillman, 2007). Therefore, the development of the questionnaire should be considered carefully. In the present study, the development of the questionnaire followed the procedures suggested by Dillman (2007) and Andrews (1984). When available, prior research instruments have been used in this study, with some appropriate modification, to fit the research objective. The use of prior research instruments can increase the reliability of the data (Hair et al., 2006). The development of the questionnaire is discussed in sub-section 5.5.1.

5.4 The Population and Unit of Analysis of the Survey

The survey for this study was carried out over all sectors of the Australian economy. All industries were included in order to obtain a large enough sample and to provide sufficient variation in performance-measures evaluation in the BSC environment.

Divisions (or business units) were chosen as the unit of analysis because it is expected that divisions (business units) will comprise the middle level in firms' organisational structure. Thus, the managers of the division (business unit) may be acting as the evaluator as well as being evaluated in the performance evaluation process. The choice of managers of divisions (business units) and divisions (business units) as the unit of analysis is consistent with the objective of this study.

5.5 The Questionnaire

One set of questions was developed. The questionnaire included questions relating to all variables in the present research model and some general questions such as the personal details of the manager. The development of the questionnaire followed the guidelines of de Vaus (1992) and Dillman (2007). The empirically based suggestions from Andrews (1984) were used where considered relevant. The set of questions is included in Appendix I – Part A.

5.5.1 Development of the Questionnaire

The questionnaire was developed adhering to the following criteria.

a. For the measurement of most variables in the research framework, a number of items for each variable were included so that multi-item scales could be developed. Operationalisation of a variable in this way captures the complexity of the construct, simplifies data analysis, increases reliability, enables more precision, and increases validity (de Vaus, 1992). However, part of one variable (managerial performance) employed a single-item. The use of a single-item was justified in Chapter 4. Questions were kept as short as possible. The questionnaire contained 79 questions in eight parts.

b. Question clarity is important. Language was kept as simple as possible, instructions were carefully worded, and definitions were given when considered necessary.

c. Questions were asked in a direct fashion and most were closed.[22] Care was taken to avoid double-barrelled and ambiguous questions. Some questions were reverse-worded to avoid response set bias.
d. The characteristics of the response scales were carefully considered in the light of Andrews (1984). Five-point Likert scales from one to five were used for most of the items requiring an opinion. Although not in accordance with Andrews' (1984) assertion that more response categories leads to higher validity and lowers the measurement error, five-point Likert scales are widely used and accepted in social science research. In fact, the present researcher argues that they are the appropriate technique for the type of questions asked in this survey. Contrary to Andrews' (1984) finding that data quality increases when only the end points and some intermediate points are labelled,[23] the present survey scales were all labelled. It is expected that with the explicit meaning labelled in all categories, the indication for every possible answer will be much clearer. Consistent with his suggestion, the answer categories include an explicit "Don't know" option for most of the questionnaire items. In the present study the "Don't know" option was modified into "No Basis for Answering" option. Andrews (1984) found that the inclusion of an explicit "Don't know" option increases data quality as it provides an opportunity for respondents not to answer if they lack information to do so.
e. In respect of the length of both the introduction and questions, the current study, for the most part, followed Andrews' (1984) suggestion. The introduction to each part was within the recommended 16-24 words unless a clarification of terms was necessary. Most of the questions were medium length (16-24 words) although some were shorter (i.e., less than 16 words) and some were longer (i.e., more than 24 words). Most questions (including all questions using a Likert scale response) were phrased in comparative terms.

[22] Questions of financial and non-financial measures commonly used to evaluate managerial and divisional (business unit) performance (Part 6) invite divisional (business unit) managers to add other performance measures if they wish, and many did.
[23] Andrews (1984) suggested that this finding was surprising and not yet fully understood and therefore needs to be clarified and needs further investigation.

f. The length of each part was not considered explicitly in the development of the questionnaires; rather, the items relating to each variable were grouped together.
g. In accordance with Andrews (1984), the position of items within the questionnaire was carefully considered. Andrews found that data quality was lower when items were at the beginning or at the end of the questionnaire. In the present study, the ‘easy’ question (i.e., demographic data) was placed at the end of the questionnaire.

5.5.2 Pilot Testing

A thorough literature review related to each instrument was presented in Chapter 4. Accordingly, most of the instruments in the current study were adapted and modified from previous studies, while some of the items were developed where necessary. For example, the instruments for variable participation in the development of performance measures are developed based on Kenis’s (1979) questionnaire, while the instruments for variable procedural fairness are derived mostly from Little et al. (2002) (see Chapter 4, Section 4.5 for the discussion of the operationalisation of the key variables).

There were three steps taken during the questionnaire development process. First, group discussions were held with up to ten fellow academics and fellow PhD students in the School of Accounting and Finance. These discussions focussed on both the reliability and validity of the proposed items for the instruments.

Second, a mini-pilot project was conducted where the draft survey questionnaire was sent to a few academics outside the University and a few managers for feedback. Three academics and three managers (i.e., business director, business analysis manager, and senior business banking manager) had agreed to participate in the mini-pilot project. This mini-pilot project focussed on the wording and understandability of the questions and the covering letter, the setting out of the questionnaire, and the time estimates to complete the answers. Some minor changes to the questionnaire were made as a result of this mini-pilot project.

Application to the human research ethics committee of the University for approval also resulted in some minor changes. Conditions of approval included a guarantee of confidentiality, an outlined procedure for safeguarding the data, and an emphasis on the voluntary nature of the responses to complete the questionnaire.

Finally, another pilot test was undertaken where the survey questionnaire, along with a feedback questionnaire evaluation form, was sent to a few division (business unit) managers. The feedback questionnaire evaluation form is also included in Appendix 1 – Part A. The pilot project was intended to get feedback from actual targeted respondents and to test whether the method to determine the name of each division (business unit) and the address were correct. The survey was printed in two different colours – white and yellow. The white paper survey was sent directly to the manager division (business unit) while the yellow paper survey was sent to HR managers, asking them to distribute it to the manager division (business unit). This approach has been used due to the unavailability of locating all the relevant addresses and also provided the opportunity to explore any differences in response rates for the different distribution methods.

Eighty-two surveys were sent out for the final survey questionnaires for pilot testing. These amounts consisted of 60 surveys containing the address of each division (white paper) and 22 surveys that were sent to the HR manager (yellow paper) due to address unavailability. Nine managers (11%) completed the questionnaire and provided valuable feedback. The feedback includes the length of the questionnaire; the readability/difficulty of questions; the questions that should be omitted or included (if any); and additional comments from the respondents. The additional comments from the respondents were mostly about the inclusion of performance measures used in their division. Those responses consisted of white and yellow paper surveys. Consequently, the method to determine the name and the address of the division (business unit) managers seemed appropriate.

The questionnaires were then amended as necessary and administered as detailed in Section 5.7.

5.6 The Sample

5.6.1 Sample Selection

Two important issues that have to be considered in the sample selection are the sampling frame and the sampling method. Those issues are discussed in sub-sections 5.6.1.1 and 5.6.1.2.

5.6.1.1 The Sampling Frame

The top 300 largest companies listed on the Australian Stock Exchange (ASX), as measured by market value of equity as at 30 June 2006, were used as the sampling frame. The selection of the top 300 largest companies was based on the expectation that those companies would be structured into multiple divisions (business units) where some or all of the divisions (business units) will have implemented a BSC or used a combination of financial and non-financial measures to evaluate managerial and divisional (business unit) performance.

5.6.1.2 The Sampling Method

The identification of a division's (business unit) name as well its manager was completed in two steps due to the lack of an appropriate database. First, the name of the division (business unit) was identified from the annual reports of the top 300 largest companies listed on the ASX. Some of the annual reports provided the name of the division (business unit) manager as well as the address of each division (business unit); however, most of them only provided the name of the division (business unit) and the address. The main database was developed from the annual reports, and consisted of the name of the division (business unit) managers or the name of the division (business unit), the name of the company, and the address.

Second, to confirm that the data in the main database were correct, the web-sites of the top 300 largest companies listed on the ASX were explored. Some minor changes, as well as the addition of some information to the main database, were made as a result of these web-site explorations. The final main database consisted of 1371 divisions (business units). The 1371 divisions (business units) were numbered, and a sample of 1070 divisions (business units) was selected using a table of random numbers.

5.6.2 Sample Size

There are two important issues that have to be considered in determining the initial sample size. These include:

a. statistical power; and
b. manageability of the administration of the survey.

5.6.2.1 Statistical Power and the Number of Firms Selected

Statistical power refers to the probability of correctly rejecting the null hypothesis. The rejection region was carefully considered before the sample was selected. Statistical power is determined by three factors which are: effect size; alpha (α); and sample size. The relationship among them is quite complicated. Large samples improve statistical power and the chance of finding relationships that exist in the population. They also allow for small effect sizes. However, there is no definite guide to determine how large is large enough, since it all depends on the relationship between the three factors. Hair et al. (2006) employ Cohen's (1988) guidelines, which state that to achieve acceptable levels of power, the studies should be designed to achieve alpha levels of at least 0.05 with power levels of 80 percent.

Therefore, considering the response rate, the statistical power, the manageability of the administration of the survey, and the resources available, the sample size of this current study is 1070 divisions (business units) managers that were randomly selected from 171 firms in Australia.

5.6.3 Sample Details

Table 5.1 lists the industry categories of the 171 firms that received the questionnaire.

Table 5.1
Industry category of firms and divisions sent questionnaires

Industry Category	*Firms*		*Divisions*	
	Raw number	*(%)*	*Raw number*	*(%)*
Agricultural/mining/construction	46	26.9	297	27.8
Consulting/professional service	5	2.9	69	6.4
Hospitality/travel/tourism	5	2.9	14	1.3
Media/entertainment/publishing	14	8.2	102	9.5
Retail/wholesale/distribution	11	6.4	64	6.0
Transportation/logistics	4	2.3	46	4.3
Banking/Finance/Insurance	23	13.5	127	11.9
Education/research	2	1.2	16	1.5
Health care	10	5.8	38	3.6
Manufacturing	18	10.5	127	11.9
Real Estate	17	9.9	68	6.4
Telecommunications	4	2.3	44	4.1
Others	12	7.0	58	5.4
TOTAL	**171**	**100.0**	**1070**	**100.0**

From Table 5.1, it can be seen that the largest number of firms sent questionnaires in the present study were firms categorised in agricultural/mining/construction which was 46 firms (26.9 per cent). This was followed by banking/finance/insurance with 23 firms (13.5 per cent) and manufacturing with 18 firms (10.5 per cent). The number of divisions sent questionnaires in the present study show a similar pattern to the firm’s data. The result is not surprising since the divisions were basically derived from the firms, as discussed in sub-section 5.6.1.2.

5.7 Administration of the Survey

Similar to Baird, Harrison and Reeve (2004), the surveys were administered using the guidelines from Dillman, with the present thesis employing Dillman’s (2007) *Mail and Internet Surveys: The Tailored Design Method* in relation to the format and style of questionnaire as well as the covering letter, techniques to personalise the survey, distribution of the survey and follow-up procedures. While the guidelines were followed as closely as possible, some were not applicable because of technical reasons.

The purpose in following the guidelines was to reduce the non-response rate to acceptable levels. Although some of the reasons for non-response, such as a company policy of not completing any questionnaires, are very difficult to counteract, the methods taken in this survey to overcome other possible causes of non-response were undertaken. The methods are explained below. The follow-up procedures and their impact on the response rate are also discussed.

5.7.1 The Initial Mail-Out

All division (business unit) managers were sent a questionnaire, a covering letter and a return envelope. The following points discuss the procedures used in the first mail out in order to get a high initial response rate.

i. *To ensure the questionnaire reaches the company.*

- The addresses were double checked from the annual report and the company's web-site.
- Questionnaires were sent in envelopes with a return address printed on the front.

Some of the letters were returned with an unknown address; however, it is not clear whether it was necessarily because of an unknown address or an unwillingness of the respondent to participate in the survey. For instance, returned envelopes issued a note "please remove our firm from your database".

ii. *To reduce the possibility that the questionnaire reached the firm but was then thrown away.*

- All questionnaires were sent in University-logo envelopes, anticipating that the logo would signal the importance of the contents. Although the effectiveness of this method is unclear, one of the first responses received came from the division manager who is an alumnus of the University. This suggests that using University-logo envelopes was beneficial.
- Where possible, each letter was addressed to the individual manager by name and position title. Some letters were returned without being opened with a message implying an unwillingness to participate

(such as a 'please remove from your database' message). Sticker address labels were used in this survey.

iii. *To increase the probability that the questionnaire reaches the right person.*

- Both the envelope and the covering letter inside were personally addressed to the division (business unit) manager.
- The covering letter was on a University letterhead to signify potential importance.

iv. *To increase the probability of the division (business unit) manager completing and returning the questionnaire.*

- Following Dillman's (2007) guidelines, the covering letter was carefully worded and addressed personally to the division (business unit) manager, and dated. This letter indicated what the study was about and the reasons why survey participation was useful and important for the community as well as for academics. The letter also stressed confidentiality and included contact details for any queries. A real signature of the researcher also adorned the cover letter.
- In order to attract the interest of the division (business unit) managers, following Dillman's (2007) suggestion, the questionnaires were printed on laser-bond paper, in a booklet style in the white and blue colours of the University. With the questionnaire design, it was expected that they would be clearly detectable among other documents on the division (business unit) manager's desk.
- A pre-paid address envelope was included with the questionnaire in order to make it easy for division (business unit) managers to return.
- As suggested by Dillman (2007), the package, including the covering letter, the return envelope and the questionnaire, were folded carefully so that all of the three enclosures come out of the envelope at once. This was done by inserting the return envelope

inside the booklet questionnaire and wrapping the cover letter around the booklet. The package was then inserted into the mail-out envelope with the questionnaire title in front. However, Dillman's (2007) suggestions to send the mail using an express or special delivery could not be followed in this study due to limited resources.

- Although there is no clear evidence that the time of year or day of the week have significant effects on response rate, certain holiday periods (such as Christmas) should be avoided (Dillman, 2007). The first mail out was sent on 15 November 2007. It was expected that the survey would reach the division (business unit) managers at least one month before the Christmas holiday[24].

5.7.2 Follow-up Procedures

A few completed questionnaires were received a few days after the mail-out. In the first week of the mail-out, a few phone calls and e-mails were received from division (business unit) managers or their personal assistants. Some of the phone call/e-mail enquiries asked for further information about the survey. For example, how many divisions in their company were included in the database and whether other divisions could fill out the survey. Other phone calls/e-mails stated that they will not be able to participate in the survey either due to firm policy or due to time constraints. Some of them were kind enough to return the questionnaire which then could be sent to other firms. One e-mail asserted that the company was no longer listed on ASX, therefore making it unsuitable for the purposes of the survey.

Three weeks after the mail-out, the responses received began to decrease, therefore follow-up procedures were undertaken. The follow-up procedures comprised of three steps as discussed below.

[24] Interestingly, one division manager sent an e-mail informing that she just got the survey one day before the Christmas holiday period and promised to fill in after the holiday. She did as she promised.

i. *Phone call and e-mail follow-up.*

From the available database, around 300 divisions (business units) were randomly selected to be called. Not all of the divisions (business units) were called in this follow-up due to limited resources. Unfortunately, none of the phone calls made reached the division (business unit) manager. Normally the manager's personal assistant or secretary was kind enough to put the phone call through to the manager's line; however, it always went straight to the phone answering machine. In these situations, a message was left informing the manager of the researcher's identity including contact details and enquiries regarding the division (business unit) response[25].

Additionally, the phone call follow-up, via division managers' personal assistant, highlighted the fact that the questionnaires had not reached them. In some cases, this was due to a firm restructure which resulted in a change to a division name. Other cases suggest that the division (business unit) manager was too busy to participate in the survey. One personal assistant said that the person was no longer employed there and was kind enough to provide information regarding the name of the new division (business unit) manager.

E-mails were sent to some of the division (business unit) managers where their e-mail address was provided in the annual report or the company web-site. In total, ten division managers sent a replied e-mail, of these, only two agreed to participate. Based on the phone calls and e-mail follow-up, the new database was developed in order to do the second mail-out.

ii. *Second mail-out.*

The second mail-out was sent in the second week of January (i.e., January 14, 2008). This is because of the Christmas holidays where some of the

[25] It is interesting to note that two division (business unit) managers phoned back and said that they did not receive the questionnaire and asked it to be sent again after Christmas holiday period.

division (business unit) managers were still on leave in the first week of January.

iii. *Final mail- out.*

The final mail-out occurred in the first week of March 2008.

5.7.3 The Final Sample

Table 5.2 illustrates a summary of the overall response rates for firms and division managers.

Table 5.2
Sample size and response rate

	Number	Response Rate*
FIRMS		
Initial Sample	182	
Pilot Study	11	
Sent Questionnaire	171	
Usable Response	56	32.75%
Not Usable Response	7	4.09%
Total Response	63	36.84%
DIVISIONS		
Initial Sample	1152	
Pilot Study	82	
Sent Questionnaire	1070	
Usable Response	164	15.33%
Not Usable Response	76	7.10%
Total Response	240	22.43%

* Response rates exclude firms contacted for pilot study

From the Table 5.2, it can be seen that the response rate in terms of firms is above the average of 20% (Young, 1996), that is, 32.75% of usable responses. However, the response rate in terms of divisions is below the average of 20% as it only reached 15.33%. This result was anticipated since the present study uses a comprehensive survey that asks multiple questions about each construct of the five multi-measures variable constructs in order to increase construct validity. This condition will produce the potential risk of incurring a lower response rate (i.e., below the average of 20%) (Young, 1996). Although every possible effort (i.e., following Dillman, 2007 guidelines) was done to increase the response rate, the division managers response rate still below average.[26] One reason to explain this situation is that the respondents hold very high positions in their companies. They have a very tight schedule that prevents them participating in this survey. This reason is in line with Van der Stede et al.'s (2005) findings that there are lower response rate in studies involving top management and organisational representatives.

All of the analyses in this present study are based on the responses from 164 usable responses from division managers. These responses are then used for the statistical analysis of the research model. Descriptive statistics of the final samples used in the data analysis are given in Chapter 6. The hypotheses testing in the framework model are discussed in Chapters 7 and 8.

5.7.4 Sampling Error

It is very unlikely that a sample will perfectly represent the population from which the sample is being drawn. The difference between the sample and the population, which is due to sampling, is referred to as sampling error. Sampling error is the expected variation in any estimated parameter (intercept or regression coefficient) that is due to the use of a sample rather than the population (Hair et al, 2006, p. 174). Although chance alone can increase the sampling error, there are two other issues that have to be considered: sample selection; and non-response problem. The sample selection has been addressed in sub-section 5.6.1, while the non-response problem is discussed below.

[26] Despite a low response rate in the present study, Van der Stede et al. (2005) found there are quite a number of survey studies in management accounting published in good journals with as low as only 6 per cent response rate. Some of the studies are: 1) Kalagnanam and Lindsay (1999) published in Accounting, Organizations and Society (AOS) with only 13 per cent response rate; 2) Moores and Yuen (2001) published in AOS with 15 per cent response rate; 3) Klammer, Koch and Wilner (1991) published in Journal of Management Accounting Research (JMAR) with 20 per cent response rate; 4) Daniel and Reitsperger (1992) published in JMAR with 9 per cent response rate; 5) Kaplan and Mackey (1992) published in JMAR with 9 per cent response rate; 6) Shields and Young (1993) published in JMAR with 20 per cent response rate; 7) Foster and Sjoblom (1996) published in JMAR with 14 per cent response rate; 8) Sim and Killough (1998) published in JMAR with only 6 per cent response rate; 9) Widener and Selto (1999) published in JMAR with 14 per cent response rate; 10) Bright, Davies, Downes and Sweeting (1992) published in Management Accounting Research (MAR) with 12 per cent response rate; 11) Daniel, Reitsperger and Gregson (1995) published in MAR with 6, 18 and 8 per cent responses rate; 12) Luther and Longden (2001) published in MAR with 12 per cent response rate; and 13) Laitinen (2001) published in MAR with 11 per cent response rate. All of those survey studies used managers who hold high positions in companies.

5.7.4.1 Non-Response

The other important issue of sampling error is the problem of non-response bias. This occurs since most of the sample surveys attract a certain amount of non-response. In this case, the researcher should consider and pay attention to this problem, because a well produced sample can be jeopardised by the non-response bias (Byrman and Cramer, 1990). The problem is that respondents and non-respondents may differ in certain aspects and, hence, the respondents may not be representative of the population.

In this respect, a paired-samples t-test was conducted to address the non-response bias problem in the present study. A t-test is used to determine whether there is a significant difference between two sets of scores (Coakes, Steed and Price, 2008). In this case, the data were separated into: early respondents; and late respondents, since non-respondents tend to be similar to late respondents in responding to surveys (Miller and Smith, 1983). The t-test result is presented in Table 5.3 below.

Table 5.3
Test of measures for non-response bias

Variable	t-TEST		
	t-value	**df**	**Sig. (2-tailed)**
PRTCPT	.645	80	.521
PFAIR	-1.063	80	.291
DFAIR	-1.234	81	.221
FFvsNF	-.286	81	.776
TRST	-1.058	81	.293
MPD	2.003	81	.069
CMB	-.317	81	.752
GenPercpPM	-.792	81	.431
MPS	-.610	81	.544

From Table 5.3 it can be seen that the two-tail significance of all of the main variables is not significant at $p > 0.05$. This means that there are no differences between the early responses and the late responses. In other words, non-response bias can be ignored. Furthermore, this result is also important for the generalisability of the findings. This issue is discussed further in Sub-section 5.10.

5.8 Data Editing and Coding

The collected data need to be coded to transcribe them from the questionnaire before keying into the computer (Sekaran, 2003). Coding is the term used to describe the translation of question responses and respondent information to specific categories for purposes of analysis (Kerlinger and Lee, 2000, p. 607). In the present study, the data were coded by assigning character symbols. Each question or item in the questionnaire has a unique variable name, some of which clearly identify the information such as gender, age, company, division, and so on. The coding sheet is presented in Appendix I – Part B.

5.9 Data Screening

5.9.1 Initial Data Screening

After the coding process, the data need to be edited to assure the completeness of the data and to make sure there were no errors at the stage of keying data. This process has been done using descriptive statistics in SPSS. Each variable was screened to check if the score was out of range by checking the frequencies, minimum, maximum, mean and standard deviation. When finding errors, it is necessary to go back to the questionnaires to confirm those data before correcting them. Only then are the data ready to be analysed. The descriptive statistics for the initial data screening can be found in Appendix I – Part C.

5.9.2 Missing Data

In multi-variate analysis, it is common to find missing data where valid values of one of more variables are not available for analysis. There are two causes leading to missing data values (Hair et al, 2006). First, missing data can be caused from the researcher-side, such as data entry errors or data collection problems; and second, any action on the part of the respondents such as refusal to answer. The missing data problem can affect the generalisability of the results. Therefore, it is important for the researcher to address the issue. There are two actions that can be taken regarding the missing data: delete the cases with a consequence of reducing sample size, or by applying a remedy. However, before doing so, the researcher should identify the patterns and relationships of the missing data in order to maintain as close as possible the original distribution of values (Hair et al., 2006).

There are four steps in identifying missing data and applying remedies (Hair et al, 2006). The four steps are as follows.

1. *Determine the type of missing data*.

   There are two types of missing data, ignorable and not ignorable. If missing data are expected because it is inherent in the technique used, then it requires no remedy (Little and Rubin, 2002; Schafer, 1997). However, Analysis of Moment Structures (AMOS) needs a complete data set; therefore, the missing data cannot be ignored. Hence, step 2 in handling missing data has to be taken.

2. *Determine the extent of missing data*.

   In assessing the missing data, Hair et al. (2006) suggests tabulating: (1) the percentage of variables with missing data for each case; and (2) the number of cases with missing data for each variable. This can be done using SPSS missing data analysis. From the univariate statistic (see Appendix I – Part D), there are only two cases with missing data (0.6%). Since it is less than 10%, it can be ignored. However, as mentioned above, AMOS requires a complete data set, therefore, it is necessary to go to step 3.

3. *Diagnosing randomness of missing data*.

   In this step, Expectation Maximisation (EM) missing data analysis is employed (see Appendix I - D). The EM method is an iterative process to predict the values of the missing variables using all other variables relevant to the construct of interest (Cunningham, 2008). In this analysis, Little's MCAR (Missing Completely At Random) test shows Chi-Square = 83.086, DF = 96, and a significance level of 0.823. This result is not significant at an alpha level of 0.001, thus the missing data may be assumed to be missing at random. Consequently, the widest range of remedies can be used.

4. *Select the imputation method.*

Due to the requirement of AMOS, although with respect to the low level of missing data (below 10%) this could generally be ignored, it is necessary to complete the data. In this case, the regression method of imputation is selected to calculate the replacement values based on the rules that the missing data are less than 10% and classified as MCAR (missing completely at random). After handling the missing data using a regression imputation method with SPSS, the variables that will be used in SEM with AMOS data analysis are completed and free of missing data and, therefore, the data are ready for further analysis.

5.9.3 Multi-variate Outliers

After examining the missing data, the next step is to examine the data before further analysis is the detection of multi-variate outliers. An outlier is an observation that is substantially different from the other observations (i.e., has an extreme value) on one or more characteristics (variables) (Hair et al., 2006, p. 40). Furthermore, they state that an outlier cannot be categorically characterised as either beneficial or problematic, rather it must be viewed within the context of the analysis and should be evaluated by the types of information provided. Beneficial outliers may be an indication of a population characteristic that would not be discovered in the normal course of analysis. On the other hand, problematic outliers are not representative of the population. They are counter to the objectives of the analysis and can seriously impact statistical tests (Hair et al., 2006).

Multi-variate outliers are sometimes not easy to detect since they may involve extreme scores on two or more variables, or the pattern of scores is atypical (Kline, 2005). To examine the multi-variate outliers, AMOS provides the Mahalanobis d-squared statistic to indicate the observations farthest from the centroid (Mahalanobis distance). The Mahalanobis d-squared table is presented in Appendix I – D. Small numbers in the p1 column are to be expected. However, small numbers in the p2 column indicate observations that are implausibly far from the centroid under the hypothesis of normality (Arbuckle, 2006b). From the Mahalanobis d-squared table, the p1 column shows relatively small numbers, while the p2 column also exhibits some small numbers. This may be an indication of multi-variate outliers in the data.

There are two actions that can be taken in handling outliers, which are: retention; or deletion of the outliers. Following Hair et al. (2006), the outliers should be retained unless demonstrable proof indicates that they are really deviant and not representative of any observations in the population. In addition, by deleting the outliers, the researchers are improving the multi-variate analysis but at the cost of generalisability of the data. Therefore, the possible outlier's data were retained in the current study.

5.9.4 Multi-variate Normality

The earlier steps of handling missing data and multi-variate outliers were undertaken to clean the data to a format most suitable for multi-variate analysis. The other step in dealing with data is testing the compliance of the data with the statistical assumptions underlying the multi-variate technique and then deal with the basic way in which the technique makes statistical inferences and results. Some robust techniques are less affected when the underlying assumptions are violated; however, in all cases, complying with some of the assumptions critically determines a successful analysis (Hair et al., 2006).

In multi-variate analysis the most fundamental assumption is normality. Normality is referring to the distribution of sample data that corresponds to a normal distribution. It is an assumption or requirement for statistical methods in some parametric tests (Hair et al., 2006). A normal distribution of data describes a symmetrical, bell-shaped curve which has the greatest frequency of scores in the middle with smaller frequencies towards the extremes (Gravetter and Wallnau, 2000).

It is important to assess the impact of violating the normality assumption since statistical tests that depend on the normality assumption may be invalid. Consequently, the conclusions drawn from the sample observations and their statistics will be in question (Kerlinger and Lee, 2000). There are two dimensions to assess the severity of non-normality, which are: 1) the shape of the offending distribution; and 2) the sample size (Hair et al., 2006). It can be said that the extent of the non-normality distribution should be considered with the sample size, as the larger the sample size the smaller the effect of the non-normality distribution.

The data distribution, when it is different from the normal distribution, can be described by two measures, kurtosis and skewness (Hair et al., 2006). Accordingly, the assessment of the degree of normality can be examined from the value of the kurtosis and skewness. These values provide information about the shape of the distribution. Values for skewness and kurtosis are zero if the observed distribution is exactly normal (Coakes et al., 2008). Skewness measures the symmetry of a distribution (Hair, et al., 2006, p. 40). If most of the observation scores are piled up to the left, the distribution is said to be positively skewed; conversely if observation scores are piled up to the right, they are negatively skewed (Cunningham, 2008). Kurtosis refers to the peakedness of a distribution that measures the extent to which scores are clustered together (i.e., leptokurtic distribution) or widely dispersed (i.e., platykurtic distribution) (Cunningham, 2008). Newsom (2005) suggests that the absolute value of skewness less than or equal to 2 ($|skew| \leq 2$) and the absolute value of kurtosis less than or equal to 3 ($|kurtosis| \leq 3$) are acceptable limits for the condition of normality to be satisfied. While West, Finch and Curran (1995) recommend those absolute values of skewness and kurtosis greater than 2 and 7, respectively, were indicative of a moderately non-normal distribution.

In the present research, most of the uni-variate distributions are normal since the absolute values of kurtosis and skewness are below 2 and 3, respectively. However, the joint distributions of the variables may depart substantially from multi-variate normality. The existence of multi-variate normality can be tested by examining Mardia's coefficient for multi-variate kurtosis (Mardia, 1970). Analysis of Moment Structures (AMOS) software can generate this coefficient. The Mardia's coefficient is zero if the data are multi-variate normally distributed.

There is no absolute cut-off value of this coefficient, however, a value of 3 or more tends to be of concern (Wothke, 1993). In the present study, the Mardia's multi-variate coefficient is relatively high; therefore the data may not be normally distributed. The violation of the multi-variate normality assumption can have a large effect on the standard errors and tests of significance when maximum likelihood (ML) estimation is used in confirmatory factor analysis (CFA) (Browne, 1982). In the present study, due to the high multi-variate normality value, the bootstrap method was employed. This method is discussed in sub-section 5.11.2.

5.9.5 Multi-collinearity

Multi-collinearity is the extent to which a construct can be explained by the other constructs in the analysis (Hair et al., 2006, p. 709). The existence of multi-collinearity occurs when variables that appear separate actually measure the same thing. It can be detected with the value of correlations. Even though there is no concession about how high the correlations have to be to exhibit multi-collinearity, Pallant (2005) points out that a correlation of up to 0.8 or 0.9 is reasonable. While Hayduk (1987) suggests concerns for values greater than 0.7 or 0.8.

In the present research, the test of reliability illustrates that some of the variables are highly correlated, which suggests the existence of multi-collinearity. There are two ways to deal with multi-collinearity, one is to eliminate variables, while the other is to combine the redundant variables into a composite variable (Kline, 2005). In the current study, the first method, which is the removal of variable (s) from data analysis is taken in dealing with multi-collinearity. This can be performed when conducting construct reliability and discriminant validity (see chapter 7).

5.10 Generalisability of the Findings

Generalisability refers to the probability that the results of the research findings can be applied into other subjects, other groups and other conditions (Veal, 2005; Sekaran, 2003). Some key issues to consider about generalising findings in survey research are: 1) the population and sample; 2) response rate; 3) comparison of early, late, and non-respondents; and 4) the results of comparison (Radhakrishna and Doamekpor, 2008). Table 5.4 summarises the methods for generalising findings in survey research.

Table 5.4
Methods for generalising findings in survey research

Sample Type	Compared Early/Late/Non-Respondents	Results of Comparison	Generalise Findings to
Census	No	-	Only to those responded
Census	Yes	No difference	The census (all)
Random sample	No	-	Population*
Random sample	Yes	No difference	Population
Non-random sample	-	-	Cannot

* Somewhat limits the external validity of the study
Source: Radhakrishna and Doamekpor, 2008, p. 4.

There are many ways to compare the early/late/non-respondents such as: an independent t-test; ANOVA; or paired t-test. The paired t-test has been conducted to test the generalisability of the findings which compares the data from the first response and the late response in the present study. The result of the t-test was presented in section 5.7.4.1 in Table 5.3. From the table it can be seen that all of the t-tests show significant results at $\alpha = 0.05$ level, therefore the findings can be generalised to the population since there are no differences between the early responses and the late responses.

After finishing the steps of data screening and assessing the assumptions of multi-variate analysis, it is now possible to move to the next stage which is data analysis. The data analysis methods that will be used in this study are discussed in Section 5.11 below.

5.11 Data Analysis

Data analysis in this study was separated into two stages. The first stage involved testing the reliability (inter-item consistency reliability) and validity of the measurement (convergent validity). Here, descriptive statistics such as: minimum; maximum; frequency; percent; mean; standard deviation; skewness; and kurtosis were also employed via SPSS. The descriptive analysis was also employed for the demographic data. This analysis is presented in Chapter 6. The second stage involved testing the hypothesis proposed in the study by using the structural equation modelling (SEM) method using AMOS. This hypothesis testing is presented in Chapters 7 and 8. The justification of using the SEM approach is presented in Sub-section 5.11.1 below.

5.11.1 Structural Equation Modelling (SEM)

The main objective of this research is to investigate the effect of fairness perception of measures, and the process of development of the measures on managerial performance in a BSC environment. The argument underlying the objective was presented in the framework model that was developed in the study. In order to test the model, SEM is considered appropriate. It is expected that the model is both substantively meaningful and statistically well-fitting with the data (Jöreskog, 1993).

Structural equation modelling is a multi-variate technique that combines multi-variate regression and factor analysis to explain the relationship among multiple variables (Hair et al., 2006). Structural equation modelling is also known as path analysis with latent variables and has been used to represent dependency (arguable “causal”) relations in multi-variate data analysis in behavioural and social science (McDonald and Ho, 2002). It takes a confirmatory (i.e., hypothesis testing) approach to analysis of a structural theory underlying some phenomenon (Byrne, 2001). In addition, it conveys two important aspects of the procedures which are: 1) that the causal processes under study are represented by a series of structural equations; and 2) that these structural relations can be modelled pictorially to enable a clearer conceptualisation of the theory under study (Byrne, 2001).

Compared with other multi-variate analyses, SEM extends analysis in at least two important ways. First, SEM allows researchers to model the relationship among variables after accounting for the measurement error. Second, SEM provides tests for goodness-of-fit which is a very important aspect to test whether the sample data supports the hypothesis tested in the model (Cunningham, 2008).

Therefore, by using SEM, the hypothesised model can be tested statistically in a simultaneous analysis of the entire system of variables to determine the extent to which it is consistent with the data. If the goodness-of-fit is adequate, it means that the relationships among variables in the hypothesised model are supported by the data. In contrast, if the goodness-of-fit is inadequate, the tenability of such relations is rejected (Byrne, 2001).

5.11.2 Bootstrapping Procedures and Bollen-Stine Bootstrap Method

One of the critically important assumptions associated with SEM is the requirement that the data have a multi-variate normal distribution. As discussed in sub-section 6.9.4, it was found that the data in the present study do not have a multi-variate normal distribution, since the Mardia's multi-variate coefficient is relatively high. This means that the assumption of multi-variate normal distribution is violated. One approach to handling the presence of multi-variate non-normal data is to use a bootstrap procedure (West et al., 1995; Yung and Bentler, 1996; Zhu, 1997). Bootstrapping serves as a re-sampling procedure by which the original sample is considered to represent the population. From here, multiple sub-samples of the same size as the parent sample are drawn randomly, with replacement from this population, to provide the data for empirical investigation of the variability of parameter estimates and indices of fit (Byrne, 2001).

In the present study, the Bollen-Stine bootstrap method was used to test the hypothesised model under non-normal data, since this approach tests the adequacy of the hypothesised model based on a transformation of the sample data, such that the model is made to fit the data perfectly (Byrne, 2001). The bootstrapping procedure calculates a new critical chi-square value (adjusted chi-square) that represents a modified chi-square (χ^2) goodness-of-fit statistic. A new critical chi-square value is generated against which the original chi-square value is compared. Then the adjusted *p*-value is computed. If the Bollen-Stine p-value is less than 0.05 ($p<0.05$), the model is rejected. The number of bootstrap samples is typically in the range of 250 to 2000 (Bollen and Stine, 1992). Therefore, it is necessary to use the Bollen-Stine bootstrap in the current research due to the situation of non-normality.

5.11.3 Sample Size Requirements

In general, SEM requires larger samples relative to other multi-variate analysis. However, there are no statistical theories that provide a guideline as to just how large a "large" sample needs to be. In the issue of sample size requirements for SEM, Hair et al. (2006) found that sample sizes as small as 50 provide valid results, but they recommended a minimum sample size of 100-150 to ensure stable Maximum Likelihood Estimation (MLE) solutions. They suggest a sample size in the range of 150-400. In the present research, the sample size of 164 was considered sufficient to run SEM.

5.12 Ethics in this Research

Ethics in business research refers to a code of conduct of behaviour while conducting research (Sekaran, 2003). This conduct applies to the organisation that sponsored the research, the researcher who undertakes the research, and the respondents who provide the data. Such conduct is guided by the Principles of Human Research Ethics, which are: 1) Research merit and integrity; 2) Respect for human beings; 3) Beneficence; and 4) Justice (http://research.vu.edu.au/ordsite/hrec.php). The present research obtained approval from the University Human Research Ethics Committee. The conditions of approval included a guarantee of confidentiality, an outlined procedure for safeguarding the data, and an emphasis on the voluntary nature of the responses to complete the questionnaires.

5.13 Summary

In this chapter the steps undertaken to collect the data for the study were described. First, the reasons for employing a survey method with the mail questionnaire (e.g., cost-effective, self-report attitudes and confirmatory study) were explained based on the three assumptions of the self report survey and the characteristics of the objective of this study. Second, the survey data quality (validity and reliability) together with the measurement error were assessed. Issues of data quality could be overcome by adhering to the proper procedures outlined in the chapter in the development of questionnaires as well as the administration of the survey. The procedures followed in this study are from Dillman (2007), de Vaus (1992) and Andrews (1984). Third, the population and unit of analysis were described. Fourth, the questionnaire details, which included the development of the questionnaire and the pilot testing, were described as was the justification of the sample selection and size. Fifth, the administration of the survey, from the initial mail-out to the sampling error, was explained. Sixth, the processes of data editing and coding were addressed. Seventh, the data screening that includes missing data, multi-variate outliers, multi-variate normality and multi-collinearity were explained. This was followed by a discussion of the generalisability of the findings. Eighth, the data analysis that consisted of the discussion of SEM, bootstrapping procedures and sample size requirement was presented. In the final part, the ethics pertaining to the present research was addressed. In the next chapter, the descriptive analysis will be discussed.

Chapter 6 Descriptive Analysis

6.1 Introduction

In Chapter 5 the detailed research method along with the justification were discussed. This chapter presents a descriptive analysis of survey data collected over the period November 2007 – March 2008. The chapter is organised as follows. First, Section 6.2 provides descriptive analysis of demographic data that includes the companies, the divisions/units and individual respondents. Second, Section 6.3 provides descriptive analysis of the division managers' general perceptions regarding performance measures. Third, Section 6.4 presents an analysis of results regarding performance measures (financial and non-financial measures) that have been used in the divisions. Fourth, Section 6.5 provides the results of the reliability testing of the main scales. Finally, Section 6.6 concludes with a discussion and summary of the findings.

6.2 Respondents

Altogether, 56 companies (refer to Table 5.2 and Section 5.7.3) participated in the survey research. The following overall description illustrates sufficient sample diversity to conduct statistical analysis of data concerning the validation of theory argued in this study.

6.2.1 Companies

Table 6.1 shows the involvement of the companies based of the industry.

Table 6.1
Industry category of firms participating in this survey

Industry Category	*Raw number*	*Firms (%)*
Agricultural/mining/construction	46	28.0
Consulting/professional service	15	9.1
Hospitality/travel/tourism	1	0.6
Media/entertainment/publishing	14	8.5
Retail/wholesale/distribution	3	1.8
Transportation/logistics	6	3.7
Banking/Finance/Insurance	18	11.0
Education/research	0	0.0
Health care	3	1.8
Manufacturing	23	14.0
Real Estate	28	17.1
Telecommunications	5	3.0
Others	2	1.2
TOTAL	**164**	**100.0**

It can be seen in Table 6.1 that the largest number of companies that participated in the survey is involved in the agricultural/mining/construction industry (28.0 per cent). It then follows with real estate (17.1 per cent) and manufacturing (14.0 per cent). There are no companies from the group of government and education/research industries in this current study.

6.2.2 Divisions (Business Units)

Table 6.2 outlines the main activities of the divisions (business units) in the industry.

Table 6.2
Industry category of divisions (business units) participating in this survey

Industry Category	*Raw number*	*Firms (%)*
Agricultural/mining/construction	37	22.6
Consulting/professional service	16	9.8
Hospitality/travel/tourism	1	0.6
Media/entertainment/publishing	9	5.5
Retail/wholesale/distribution	16	9.8
Transportation/logistics	6	3.7
Banking/Finance/Insurance	20	12.2
Education/research	0	0.0
Health care	3	1.8
Manufacturing	18	11.0
Real Estate	23	14.0
Telecommunications	8	4.9
Others	7	4.3
TOTAL	**164**	**100.0**

Similar to the companies result, most of the divisions (business units) that participated in the survey belong to the agricultural/mining/construction industry group (22.6 per cent), followed by real estate and the banking/finance/insurance industry with 14.0 per cent and 12.2 per cent, respectively.

6.2.3 Division (Business Unit) Output Transfer Internally

Table 6.3 illustrates the proportion of division's product or service that is transferred internally. This information is useful to understand the different customer measures used by the division to measure consumer perspective performance. For example, one of the divisions does not use any of the consumer measures perspectives that are listed in the survey due to the fact that they responded that more than 75 per cent of the division output is transferred internally. Therefore, it implies that the division does not employ consumer measures because the division's product or service is only to fulfil internal organisation requirement.

Table 6.3
Percentage of output transferred internally

		Frequency	**Valid Percent**	**Cumulative Percent**
Valid	0%	65	39.6	39.6
	1-25%	56	34.1	73.8
	26-50%	4	2.4	76.2
	51-75%	11	6.7	82.9
	More than 75%	28	17.1	100.0
	Total	**164**	**100.0**	

Source: Output SPSS

The results in Table 6.3 reveal that most of the division's output is for the external consumer (39.6 per cent), while only a small portion of the output is transferred internally (34.1 per cent). However, there are also 17.1 per cent of divisions that internally transfer most of their product. These divisions might be structured to provide products to support other divisions in the company.

6.2.4 Division's Manager

Division's managers are described in terms of gender, age, period holding current position, working period in the company, and the number of employees under their responsibility. Details of the description follow.

6.2.4.1 Gender

Table 6.4 illustrates the gender distribution.

Table 6.4
Gender

		Frequency	Valid Percent	Cumulative Percent
Valid	Male	155	94.5	94.5
	Female	9	5.5	100.0
	Total	**164**	**100.0**	

Source: Output SPSS

From Table 6.4, it can be seen that almost all of the division managers were males (94.5 per cent). There were only a small number of females (5.5 per cent) responsible as division managers.

6.2.4.2 Age

Table 6.5 indicates the age distribution of division managers.

Table 6.5
Age

		Frequency	Valid Percent	Cumulative Percent
Valid	Less than 30 years	2	1.2	1.2
	30-40 years	35	21.3	22.6
	41-50 years	78	47.6	70.1
	51-60 years	41	25.0	95.1
	More than 60 years	8	4.9	100.0
	Total	**164**	**100.0**	

Source: Output SPSS

The results in Table 6.5 reveal that almost half of the respondents (47.6 per cent) were in the 41-50 years age group, and another 25 per cent in the 51-60 years age group. Only two division managers were aged less than 30, and only eight people were more than 60 years of age. From this and the previous table, it can be seen that division managers were most likely to be 41 to 60 years old males.

6.2.4.3 Period in Current Position

Table 6.6 shows the period of time in position as holding division manager.

Table 6.6
Period in the current position

		Frequency	Valid Percent	Cumulative Percent
Valid	Less than 2 years	62	37.8	37.8
	3-5 years	56	34.1	72.0
	6-8 years	24	14.6	86.6
	9-11 years	13	7.9	94.5
	More than 11 years	9	5.5	100.0
	Total	**164**	**100.0**	

Source: Output SPSS

Table 6.6 shows that many of the division managers (37.8 per cent) had held the position for less than 2 years, and 34.1 per cent had held the position between 3-5 years. Only nine (5.5 per cent) division managers had held the position for more than 11 years.

6.2.4.4 Duration Employed in the Company

Table 6.7 demonstrates the duration that the division manager's has been employed with the company. From the table, it can be seen that the duration employed in the company is spread almost equally in each period group. It ranged from less than 2 years to more than 11 years.

Table 6.7
Duration employed in the company

		Frequency	Valid Percent	Cumulative Percent
Valid	Less than 2 years	31	18.9	18.9
	3-5 years	37	22.6	41.5
	6-8 years	34	20.7	62.2
	9-11 years	27	16.5	78.7
	More than 11 years	35	21.3	100.0
	Total	**164**	**100.0**	

Source: Output SPSS

6.2.4.5 Number of Employees

Table 6.8 outlines the numbers of employees under the responsibility of the divisional manager.

Table 6.8
Numbers of employee

		Frequency	Valid Percent	Cumulative Percent
Valid	Less than 100 employees	74	45.1	45.1
	100-200 employees	36	22.0	67.1
	200-500 employees	31	18.9	86.0
	More than 500 employees	23	14.0	100.0
	Total	**164**	**100.0**	

Source: Output SPSS

It can be seen in Table 6.8 that the largest group of division managers (45.1 per cent) have less than 100 employees under their responsibility. It then increases gradually to 22.0 per cent are responsible for 100-200 employees, while 18.9 per cent have between 200-500 employees. There were 23 division managers (14.0 per cent) who have more than 500 employees.

6.3 General Perceptions Relating to Performance Measures

Table 6.9 outlines the general perceptions of division managers regarding the performance measures, financial and non-financial, used to evaluate their performance.

Table 6.9
Descriptive statistics of general perceptions relating to performance measures

	N	Minimum	Maximum	Mean	Std. Deviation
Individual performance = division performance	164	1.0	5.0	3.2	1.2
Performance measure affected motivation	164	1.0	5.0	3.1	1.1
Inappropriate performance measure negatively affect performance	164	0.0	5.0	2.8	1.1
Appropriate performance measure positively affect performance	164	2.0	5.0	3.8	0.9
Try best to reach target	164	2.0	5.0	4.3	0.7
Valid N (listwise)	164				

Source: Output SPSS
Note: Scale 0 = no basis for answering; 1 = strongly disagree; 5 = strongly agree.

This result shows that the mean for the statement, that the individual performance equal to divisional performance, is 3.2. This suggests that, on average, performance measures have been used to evaluate the personal performance of the division managers as well as the division's performance. Thus, the companies do not differentiate the performance measurement as a tool to evaluate the personal performance of the division (business unit) managers or to evaluate the division performance as an entity. Moreover, on average (3.1) the respondents agree that performance measures affect their motivation. Additionally, they agree that their performance is positively affected by appropriate performance measures. This is confirmed with the mean of 3.8. Finally, most of the respondents (4.3) agreed that they try their best to achieve the target being set in the performance measures. This result may suggest that developing appropriate performance measures is critical since it positively affects the performance and motivation to reach the target.

6.4 Financial and Non-financial Measures

Tables 6.10 until 6.13 are the list of the financial and non-financial measures that are commonly used to evaluate managerial and divisional (business unit) performance, based on the division managers' opinions on the extent in using each of the performance.

6.4.1 Financial Measures Perspective

Table 6.10 outlines the financial measures that are commonly used to evaluate managerial as well as divisional performance.

Table 6.10
Financial measures perspective

The Extent of Use	Net Profit ($)		Rev./TA (%)		ROI (%)		Total Expense ($)		Sales Growth	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
No Basis for Answering	3	1.8	5	3.0	3	1.8	2	1.2	11	6.7
Not at All	7	4.3	24	14.6	13	7.9	8	4.9	16	9.8
Very Little	5	3.0	17	10.4	6	3.7	16	9.8	8	4.9
Little	4	2.4	28	17.1	24	14.6	23	14.0	3	1.8
Somewhat	28	17.1	33	20.1	31	18.9	66	**40.2**	66	**40.2**
To A Great Extent	117	**71.3**	57	**34.8**	87	**53.0**	49	29.9	60	36.6
Total	**164**	**100.0**	**164**	**100.0**	**164**	**100.0**	**164**	**100.0**	**164**	**100.0**

Source: Summaries Output SPSS

The results show that most of the divisions applied net profit ($), ROI (per cent) and revenue/total asset (per cent) to a great extent by 71.3 per cent, 53.0 per cent and 34.8 per cent, respectively. Total expense (per cent) and sales growth are somewhat used by 66 (40.2 per cent) divisions. Interestingly, there are some divisions that employed other financial measures that have been indicated by the researcher in the survey questionnaire. Some of the divisions used to a great extent, other financial performance measures such as:

- budget performance-cost;
- EBIT/sales (per cent);
- working capital (per cent);
- sales revenue;
- gross profit;
- gross margin;
- sales volume;
- net profit (per cent)/sales;
- employee activity level;
- profit after funding;
- debtors;

- EBIT/sales ratio;
- profit after funding;
- operational budget;
- nfi (net farm income);
- NPAT (Net Profit After Tax);
- return on shareholders' funds;
- operating cash flow on funds employed;
- distribution per security;
- debt (rent collection);
- EXA style measure;
- EBITDA (Earnings Before Interest, Tax, Depreciation and Amortisation);
- cash flow;
- CAPEX (Capital Expenditure);
- non-invoicing;
- total sales revenue;
- cash flow;
- DIFOT (Delivered In Full On Time); and
- EBIT (Earnings before Interest and Taxes).

In addition, there was one division that somewhat used industrial relations as one of the financial performance measures.

From the information above, it can be seen that the financial measures used by the divisions (business units) in this present research were very diverse. The diversity of the financial performance reflects the diversity of divisions (business units) that participated in this present research. As the financial measures varied depending on the nature, characteristic and function of each of the divisions.

6.4.2 Customer Measures Perspective

Table 6.11 outlines the customer measures that are commonly used to evaluate managerial as well as divisional performance.

Table 6.11
Customer measures perspective

The Extent of Use	Customer Complaints (No.)		Market Share (%)		Annual Sales/ Customer ($)		Cust. Satisf.: Survey Ratings (%)		Customer Response Time	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
No Basis for Answering	12	7.3	17	10.4	18	11.0	8	4.9	14	8.5
Not at All	34	20.7	19	11.6	23	14.0	28	17.1	43	**26.2**
Very Little	28	17.1	17	10.4	17	10.4	35	**21.3**	18	11.0
Little	25	15.2	29	17.7	13	7.9	30	18.3	40	24.4
Somewhat	44	**26.8**	36	22.0	62	**37.8**	31	18.9	33	20.1
To A Great Extent	21	12.8	46	**28.0**	31	18.9	32	19.5	16	9.8
Total	**164**	**100.0**	**164**	**100.0**	**164**	**100.0**	**164**	**100.0**	**164**	**100.0**

Source: Summaries Output SPSS

The results illustrate that 46 (28.0 per cent) divisions employed market share (per cent) to a great extent as their customer performance measures. The number of customer complaints and annual sales/customer ($) are somewhat used by 44 (26.8 per cent) and 62 (27.8 per cent) divisions, respectively. In addition, customer satisfaction survey ratings (per cent) is used sparingly (very little) by the divisions. Furthermore, most of the divisions (43 divisions or 26.2 per cent) do not use customer response time as their customer performance measure.

Similar to financial measures, some of the division's managers employ customer measures that are different to the measures being indicated by the researcher in the present research. The divisions used, to a great extent, customer measures such as:

- DIFOT (Delivered In-Full On-Time);
- product lines/customer;
- number of customers;
- backorder value;
- customers won/lost;
- reputation;

- safety performances; and
- IFOT (In-Full On-Time).

Moreover, there were divisions that somewhat used customer performance measures which are: industry awards; number of clients; and growth in clients.

This suggests that the customer performance measures used by the divisions (business units) in this present study are very diverse. Similar to the aforementioned financial measures, the diversity of the customer measure is influenced by the nature, characteristic and function of each of the divisions (business units). Furthermore, the diversity of the customer measures indicates the diversity of the division in the present research.

6.4.3 Internal Business Process Perspective

Table 6.12 outlines the internal business process measures that are commonly used to evaluate managerial as well as divisional performance.

Table 6.12
Internal business process perspective

The Extent of Use	Admin. Expense/TRev. (%)		Length Time from Order Delivery		Inventory Turnover Ratio (%)		Rate of Prod. Capacity		Labour Efficiency Variance	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
No Basis for Answering	14	8.5	24	14.6	24	14.6	16	9.8	18	11.0
Not at All	28	17.1	31	18.9	31	18.9	36	**22.0**	37	22.6
Very Little	35	21.3	10	6.1	13	7.9	24	14.6	27	16.5
Little	24	14.6	29	17.7	32	19.5	29	17.7	39	**23.8**
Somewhat	46	**28.0**	43	**26.2**	30	18.3	28	17.1	27	16.5
To A Great Extent	17	10.4	27	16.5	34	**20.7**	31	18.9	16	9.8
Total	**164**	**100.0**	**164**	**100.0**	**164**	**100.0**	**164**	**100.0**	**164**	**100.0**

Source: Summaries Output SPSS

The results show that 34 (20.7 per cent) divisions applied inventory turnover ratio (per cent) as their internal business process performance measure to a great extent. Administration expense/total revenue (per cent) and length time from order delivery are somewhat used by 46 (28.0 per cent) and 43 (26.2 per cent) divisions, respectively. Moreover, labour efficiency variance is used a little by the divisions. In addition, 36 (22.0 per cent) of the divisions do not use at all the rate of production capacity as their internal business process performance measure.

The other internal business process performance measures that have been used to a great extent by the divisions (business units) are:

- stakeholder management;
- safety (manufacturing);
- product quality;
- TIFR (Time Injury Frequency Rates);
- LTIFR (Lost Time Injury Frequency Rates);
- delivery of projects; and
- OH&S (Occupational Health and Safety) measure.

In addition, there is one division that somewhat used sustainability targets as the internal business process performance measure. The results suggest that the performance measures used by the divisions were very diverse depending on the nature, characteristic and function of the divisions (business units).

6.4.4 Learning and Growth Perspective

Table 6.13 outlines the learning and growth performance measures that are commonly used to evaluate managerial as well as divisional performance.

Table 6.13
Learning and growth perspective

The Extent of Use	R&D Exp./ Tot.Exp. (%)		Cost Reduct. From quality prod.Improve		Invest. In new prod support ($)		Satisfied Employee Index (No.)		Training Exp /Tot Exp. (%)	
	Freq.	**%**	**Freq.**	**%**	**Freq.**	**%**	**Freq.**	**%**	**Freq.**	**%**
No Basis for Answering	16	9.8	5	3.0	11	6.7	11	6.7	13	7.9
Not at All	69	**42.1**	35	21.3	38	23.2	34	20.7	49	**29.9**
Very Little	23	14.0	23	14.0	23	14.0	16	9.8	32	19.5
Little	30	18.3	33	20.1	32	19.5	32	19.5	28	17.1
Somewhat	21	12.8	43	**26.2**	39	**23.8**	53	**32.3**	30	18.3
To A Great Extent	5	3.0	25	15.2	21	12.8	18	11.0	12	7.3
Total	**164**	**100.0**	**164**	**100.0**	**164**	**100.0**	**164**	**100.0**	**164**	**100.0**

Source: Summaries Output SPSS

The results show that the number of satisfied employee index, cost reduction from quality product improvement and investment in new product support ($) are somewhat used by 53 (32.3 per cent), 43 (26.2 per cent) and 39 (23.8 per cent) divisions, respectively. In addition, 69 (42.1 per cent) and 49 (29.9 per cent) divisions do not use at all R&D expense/total expense (per cent) and training expense/total expense (per cent), respectively, as their learning and growth performance measure.

The other divisions mention that they used learning and growth performance measures other than those indicated by the researcher in the present research. The other learning and growth performance measures that have been used to a great extent are:

- development training (e.g., platforms/capabilities; frameworks);
- preparation employee (e.g., development plans); and
- employee turnover.

This result suggests that the performance measures being used by the divisions (business units) are varied depending on the nature, characteristic and function of the division (business unit).

6.5 Reliability Analysis

There are several different reliability coefficients (Coakes and Steed, 2007, p. 118). Considerable debate centres about which of the reliability indicators is the best (Baron and Kenny, 1986). However, Cronbach's alpha is the one that is most commonly used (Hair et al., 2006; Coakes and Steed, 2007). Hair et al. (2006) suggests that the rule of thumb for a good reliability estimate is 0.7 or higher. A reliability estimate of between 0.6 and 0.7 may be acceptable if other indicators of model construct validity are good. Furthermore, Hair et al. (2006) note that high construct reliability values indicate the existence of internal consistency. This means that the measures all consistently represent the same latent construct. Table 6.14 demonstrates the analytical results for the reliability analysis of each construct.

Table 6.14
Cronbach's alpha (α) reliability coefficients for the main constructs

Construct	The number of measures before adjustment	Cronbach's α before adjustment	Cronbach's α after adjustment	The number of measures after adjustment
Participation (PRTCPT)	10	0.79	0.90	10
Procedural fairness (PFAIR)	8	0.74	0.74	8
Distributive fairness (DFAIR)	2	0.75	0.75	2
Financial vs non-financial (FF vs NF)	2	0.72	0.72	2
Trust (TRST)	5	0.70	0.70	5
Use performance measure (CMB)	5	0.50	0.67	5
Managerial performance of the divisional/unit managers (division manager's self-assessment) (MPD)	9	0.80	0.80	9
Managerial performance based on division manager's view of senior manager's perception of performance (MPS)	3	0.93	0.93	3

Source: Output SPSS

In Table 6.14, each reliability coefficient is higher than 0.7 except for CMB. However, there is one question (item) to measure CMB, which is question number 4 that was reverse-worded in order to avoid response set bias. Therefore, the data of the item needs to be reversed and the reliability test has to be conducted again. After the adjustment (reversing question number 4 on CMB), the coefficient of the dimension of CMB can be increased from 0.50 to 0.67. This reliability coefficient is still lower than 0.7 but it is an acceptable level since the other indicators of construct validity are good. Similar with CMB construct, there is also one question (item number 4) with a reverse-worded in PRTCPT construct. Hence, the same method has to be applied in this construct to test the reliability. After reversing the data of the question, the reliability coefficient for PRTCPT became much higher (0.90). In sum, the results show that all of the variable constructs are now reliable.

6.6 Summary

In this chapter, the descriptive analysis of demographic data was outlined. Firstly, the respondents' data that includes their companies and division in term of industry category were described. It was then followed with the detail data of the respondents that included: gender; age; period of holding the current position and the working period in the company and the number of employees under their responsibility. Secondly, the division manager's general perceptions of these performance measures explored. Thirdly, the financial and non-financial performance measures that have been used in the divisions (business units) were presented. Finally, the reliability testing of the main constructs was demonstrated. In the next chapter, the preliminary data analysis for hypotheses testing will be discussed.

Chapter 7 Preliminary Analysis

7.1 Introduction

In Chapter 6 descriptive statistics of the demographic data of the respondents, along with the reliability analysis, were discussed. The current chapter will investigate the preliminary analysis prior to testing the full structural equation modelling (SEM). This chapter is organised as follows. First, the construct of the research model is examined followed by the discussion of the construct reliability. Second, the measure of model fit is outlined. Third, the discriminant validity of the constructs is addressed. In this stage, single-factor congeneric model and confirmatory factor analysis are examined. Finally, a summary of the chapter is presented.

7.2 Constructs of the Research Model

The proposed research model comprises seven latent constructs. A latent construct is the operationalisation of a construct in SEM. This latent construct cannot be measured directly but can be represented or measured by one or more variables (indicators) (Hair et al., 2006). A latent construct is also known as a latent variable or factor. In SEM methodology, the observed variables serve as indicators of the underlying constructs (Byrne, 2001). The observed variable is a specific item, or answer, obtained either from respondents who answered the question from the questionnaire, or from some type of observation. Indicators are associated with each latent construct and are specified by the researcher (Hair et al., 2006).

In this present research, the seven latent constructs consist of one exogenous latent variable and six endogenous latent variables. An exogenous latent variable is synonymous with the independent variable. It is a variable that is not affected by other variables in the model. An endogenous latent variable, however, is synonymous with the dependent variable. Such a variable is influenced by the exogenous variable in the model, either directly or indirectly (Byrne, 2001). The exogenous variable in this present study is participation (PRTCPT) which was measured by 10 items (indicators/observed variables) comprising prtcp1 to prtcp10. The example of the endogenous variable in this present study is the use of performance measure (common-measure bias or CMB). This was measured via 5 items (indicators) which consist of upm1 to upm5. These codes, together with their meanings, are presented in the coding sheet in Appendix I – Part B. Table 7.1 summarises the seven latent variables in the present study.

Table 7.1
Seven constructs in the research model

Construct	Number of Items	Items	Codes (Names of constructs)	Definitions of the constructs
1*	10	prtcp1-prtcp10	PRTCPT	Participation
2**	8	pf1-pf8	PFAIR	Procedural Fairness
3**	2	df1-df2	DFAIR	Distributive Fairness
4**	5	upm1-upm5	CMB	Use of performance measure (common-measure bias)
5**	5	trust1-trust5	TRST	Trust
6**	9	mpd1-mpd9	MPD	Managerial performance based on division managers self-assessment
7**	3	mps1-mps3	MPS	Managerial performance based on division manager's view of senior manager's perception of performance

* = Exogenous latent construct
** = Endogenous latent construct

In the current study, the SEM data analysis adopts Anderson and Gerbing's (1988) two-step approach. This two-step approach was used in order to avoid the typical problem associated with the single-step approach, which is its inability to identify the source of a poor model fit (Kline, 2005). The single-step approach analyses the data by assessing measurement and structural models simultaneously (Singh and Smith, 2001). Conversely, the two-step approach involves: 1) the evaluation of measurement models to ensure that the items (indicators) used to measure each of the constructs are adequate; and 2) the assessment of the structural model which shows the relationship between the constructs (Anderson and Gerbing, 1988).

Before continuing to the SEM data analysis, it is important to assess the reliability and the validity of the constructs. The assessment of the reliability and validity of the constructs is discussed in Sections 7.3 and 7.5.

7.3 Constructs Reliability

As discussed in Chapter 6 (Section 6.4), the assessment of the construct reliability was conducted by examining the Cronbach's alpha coefficient of each main construct. Table 6.14 suggests that each construct has good reliability since their Cronbach's alpha coefficient is higher than 0.7, except for the CMB (use performance measure) construct with a coefficient of 0.67. However, this is still an acceptable level. The next step after examining the construct reliability is the assessment of discriminant validity. However, before the assessment of discriminant validity, it is important to discuss the measure of model fit which assesses the goodness-of-fit of the model. The discussion of the measure of model fit is presented in Section 7.4, while the assessment of the discriminant validity is presented in Section 7.5.

7.4 Measure of Model Fit

One of the important aims in the application of the SEM technique is the assessment of the goodness-of-fit of the model. The assessment of a model's goodness-of-fit is crucial to determine whether the data support the hypothesised model. While the most common and basic measures to evaluate a model's fit are the chi-square test (χ^2) and the associated *p*-value (Cunningham, 2008; Kline, 2005), there are many other ways to measure a model's fit. Specifically, the measures of a model's fit are classified into three groups: 1) absolute measure; 2) incremental (comparative) measure; and 3) parsimony fit measure (Hair et al., 2006; Byrne, 2001; Kline, 2005; Cunningham, 2008). These three groups of measurement model fit are discussed briefly as follows.

1. *Absolute fit measure*.

   Absolute fit measure is a measure that directly evaluates the degree to which the specified model reproduces the observed sample data (Hair et al., 2006; Cunningham, 2008). Some of these measures are: chi-square (χ^2) statistic; goodness-of-fit index (GFI); root means square residual (RMSR); standardised root mean residual (SRMR); and root mean square error of approximation (RMSEA).

2. *Incremental (comparative) fit measure*.

   Incremental (comparative) fit measure is a measure that assesses how well a specified model fits the sample data, by comparing it with an alternative base-line model (Hu and Bentler, 1998; Hair et al., 2006). The following indices are an example of this group's measure of fit: normed fit index (NFI); comparative fit index (CFI); Tucker Lewis index (TLI); and relative noncentrality index (RNI).

3. *Parsimony fit measure*.

   Parsimony fit measure is a measure developed to provide information about which is the best model among a set of competing models, after considering its fit relative to its complexity. In this case, the simpler the model the more parsimony fit the model has (Hair et al., 2006). Some of the parsimony fit measures are parsimony goodness-of-fit index (PGFI) and parsimony normed fit index (PNFI).

Given that there are many measures of fit that can be used to assess the goodness-of-fit of the specified model, one question arises regarding this issue. Which one among all the measures is the best measure that should be reported? Due to the surrounding debates on the issue (Cunningham, 2008), as well as the continuing development and refinement of the topic (Hair et al., 2006; Kline, 2005), there is no definite, correct, answer. Therefore, the present research will employ the chi-square ($\chi 2$) statistic, since it is the most common and basic measure to evaluate a model's fit, as well as employing other measures as confirmation such as GFI, SRMR, RMSEA, CFI and the TLI. In addition, due to the multi-variate non-normality of the data, the present study will also apply the Bollen-Stine *p*-value as a measure of data fit.

The summary of the measure of a model's fit indices (measures) reported in this present study are presented in Table 7.2.

Table 7.2
Summary of the fit measures used in this present study

Name	Acceptable Level of Fit Indication
Chi-square (χ^2 (df, p))	p > 0.05 (at the α = 0.05 level)
Goodness-of-Fit (GFI)	GFI > 0.95 (Values between 0.90 – 0.95 may also indicate satisfactory fit)
Standardised Root Mean-square Residual (SRMR)	SRMR < 0.05 (Large values for SRMR when all other fit indices suggest good fit may indicate outliers in the raw data)
Root Mean-Square Error of Approximation (RMSEA)	RMSEA < 0.05 (Values between 0.05 – 0.08 may also indicate satisfactory fit)
Comparative Fit Index (CFI)	CFI > 0.95 (Values between 0.90 – 0.95 may also indicate satisfactory fit. Values close to 0 indicate poor fit, CFI = 1 indicates perfect fit)
Tucker Lewis Index (TLI)	TLI > 0.95 (Values between 0.90 – 0.95 may also indicate satisfactory fit. Values greater than 1 may indicate overfit)
Bollen-Stine *p*-value	p > 0.05

Source: Smith, Cunningham and Coote, 2006, p. 3-13

7.5 Discriminant Validity

Discriminant validity refers to the extent to which a construct differs from other constructs (Hair et al., 2006). High discriminant validity provides evidence that a construct is unique and captures some phenomenon that is not captured by other constructs. Furthermore, discriminant validity means that individual observed variables should only represent one latent construct. In the present study, the two-step approach in SEM to analysing discriminant validity is used. It comprises: 1) examining the single-factor congeneric model; and 2) conducting confirmatory factor analysis (CFA).

7.5.1 Single-Factor Congeneric Model

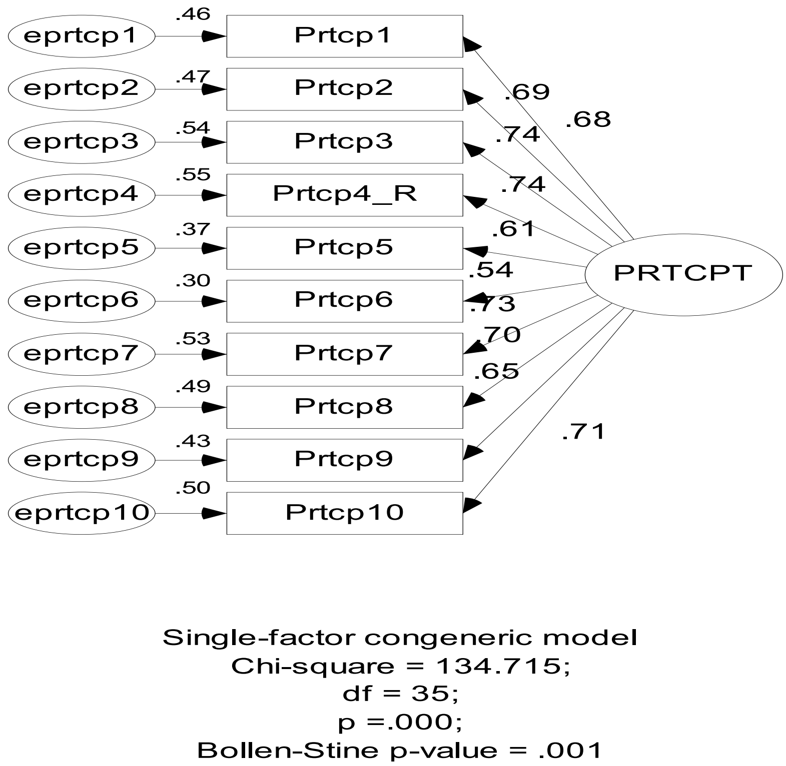
A congeneric model, or measurement model, is a model that specifies a priori the posited relations of the observed measures to latent variables representing underlying constructs (Cunningham, 2008). The simplest measurement model is the single-factor congeneric model which represents the regression of a set of observed variables on one latent variable. It measures a construct's uni-dimensionality, which can be from the absence of correlated error terms (Cunningham, 2008). In SEM, the goodness-of-fit of the single-factor congeneric model is also viewed as a confirmatory test of the content validity of the construct.

In the present research, five single-factor congeneric models of the latent variables were examined. These were single-factor congeneric models for: participation (PRTCPT); procedural fairness (PFAIR); trust (TRST); use of performance measure (CMB); and managerial performance of divisional manager self-assessment (MPD). Additionally, two single-factor congeneric models for latent variables: distributive fairness (DFAIR); and managerial performance of divisional manager based on division manager's view of senior manager's perception of performance (MPS), were conducted together with other latent variables in the CFA process (see sub-section 7.4.2). This was due to the fact that the variables had less then five items (indicators). The examinations of each of the single-factor congeneric models of latent variable are presented below.

7.5.1.1 Single-Factor Congeneric Model of Participation (PRTCPT)

In the present study, ten items (indicators) were used to capture the participation of the division managers in the development of performance measures. As mentioned in the reliability testing, item prtcp4 had to be reversed because the item is a reverse-worded question, prior to conducting the single-factor congeneric model. The reversed item prtcp4, then called prtcp4_R, will be used in all of the analyses. Figure 8.1 shows the standardised parameter estimates and chi-square fit statistics for the single-factor congeneric model of participation, together with the other AMOS outputs that should be considered in assessing the model (see Tables 7.3 – 7.6).

Figure 7.1: AMOS output for the single-factor congeneric model of participation (PRTCPT)



From Figure 7.1, it can be seen that the model does not fit the data well as indicated by the significant chi-square fit, χ^2 (35) = 134.715, p = 0.000, and the Bollen-Stine p-value = 0.001. In order to accept the model, meaning that the model does fit the data, the chi-square p-value should be greater than 0.05 at significant level of 0.05. The Bollen-Stine p-value is employed in this analysis due to the multi-variate non-normality of the data. The Bollen-Stine p-value should be greater than 0.05 at significance level of 0.05.

The factor coefficients in Figure 7.1, ranged from a low of 0.54 to a high of 0.74, which suggests that these coefficients are of reasonable magnitude (i.e., exceed at least 0.4) (Cunningham, 2008). Therefore, the items would likely all be retained if the model was a good fit to the data. However, since the model does not fit the data well, further examinations are necessary. These are presented from Table 7.3 to Table 7.6.

Table 7.3
Sample correlations of participation

	Prtcp1	Prtcp2	Prtcp3	Prtcp4_R	Prtcp5	Prtcp6	Prtcp7	Prtcp8	Prtcp9	Prtcp10
Prtcp1	1.000									
Prtcp2	.466	1.000								
Prtcp3	.644	.472	1.000							
Prtcp4_R	.476	.499	.551	1.000						
Prtcp5	.326	.380	.445	.421	1.000					
Prtcp6	.255	.427	.281	.450	.311	1.000				
Prtcp7	.448	.449	.500	.548	.531	.527	1.000			
Prtcp8	.387	.482	.489	.513	.521	.411	.554	1.000		
Prtcp9	.719	.395	.570	.446	.385	.251	.400	.420	1.000	
Prtcp10	.375	.632	.484	.568	.409	.447	.504	.503	.397	1.000

Condition number = 22.647
Eigenvalues 5.160 1.123 .762 .639 .501 .454 .409 .369 .355 .228

Table 7.4
Regression weights of participation

			Estimate	S.E.	C.R.	*p*-value
Prtcp10	<-	PRTCPT	1.000			
Prtcp9	<-	PRTCPT	1.028	.131	7.857	***
Prtcp8	<-	PRTCPT	.998	.119	8.386	***
Prtcp7	<-	PRTCPT	1.141	.131	8.690	***
Prtcp6	<-	PRTCPT	.805	.123	6.557	***
Prtcp5	<-	PRTCPT	.993	.136	7.312	***
Prtcp4_R	<-	PRTCPT	1.094	.123	8.868	***
Prtcp3	<-	PRTCPT	1.243	.141	8.837	***
Prtcp2	<-	PRTCPT	.997	.121	8.256	***
Prtcp1	<-	PRTCPT	1.258	.155	8.134	***

Note: *** *p*-value is statistically significant at the 0.01 level (two-tailed)

Table 7.3 shows that the sample correlations ranged from a low of 0.251 to a high of 0.719. This suggests that item redundancy is not a problem, since it is less than 0.8. Item correlations that is greater than 0.8 indicate possible item redundancy (Cunningham, 2008). The factor coefficients are also all significant (p-value < 0.05) as indicated in Table 7.4.

Table 7.5
Standardised residual covariances of participation

	Prtcp1	Prtcp2	Prtcp3	Prtcp 4_R	Prtcp 5	Prtcp6	Prtcp 7	Prtcp 8	Prtcp 9	Prtcp 10
Prtcp1	.000									
Prtcp2	.000	.000								
Prtcp3	1.645	-.404	.000							
Prtcp4_R	-.296	-.114	.055	.000						
Prtcp5	-1.013	-.444	-.042	-.332	.000					
Prtcp6	-1.359	.631	-1.425	.552	-.236	.000				
Prtcp7	-.490	-.567	-.389	.130	1.060	1.573	.000			
Prtcp8	-.998	.013	-.296	-.046	1.135	.362	.543	.000		
Prtcp9	**3.226**	-.637	1.004	-.440	-.146	-1.264	-.852	-.434	.000	
Prtcp10	-1.221	1.649	-.449	.477	-.264	.717	-.121	.072	-.777	.000

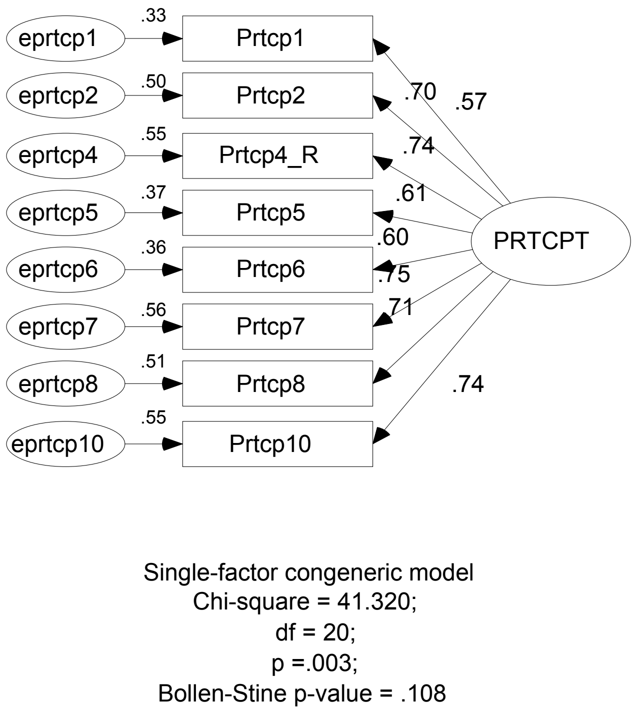
Table 7.6
Modification indices (MIs) of regression weights of participation

			M.I.	Par Change
Prtcp1	<---	Prtcp3	6.747	.172
Prtcp1	<---	Prtcp6	4.187	-.155
Prtcp1	<---	Prtcp9	**24.833**	.355
Prtcp2	<---	Prtcp10	6.936	.162
Prtcp3	<---	Prtcp1	8.323	.148
Prtcp3	<---	Prtcp6	5.805	-.155
Prtcp6	<---	Prtcp7	4.189	.129
Prtcp7	<---	Prtcp6	6.697	.157
Prtcp9	<---	Prtcp1	23.214	.251
Prtcp10	<---	Prtcp1	4.080	-.089
Prtcp10	<---	Prtcp2	7.478	.155

However, from Table 7.5, it can be seen that there is a large standardised residual covariance (3.226) between Prtcp9 and Prtcp1. An absolute value of standardised residual covariance larger than 2, or 2.58, indicates that a particular covariance is not well reproduced by the hypothesised model (Cunningham, 2008). This means that the single collegiality factor is unable to account for much of the covariation that exists between these two items. Therefore one, or both, of the items should be dropped as measures of collegiality.

The information obtained from the inspection of the modification indices (MIs) in Table 7.6 is consistent with that obtained from the inspection of the standardised residual covariance matrix (SRCM). The MIs information indicates that deleting Prtcp9 would result in a decrease of the χ^2 statistic of at least 24.833 for a reduction of df of 1.

Figure 7.2: Single-factor congeneric model fit of participation

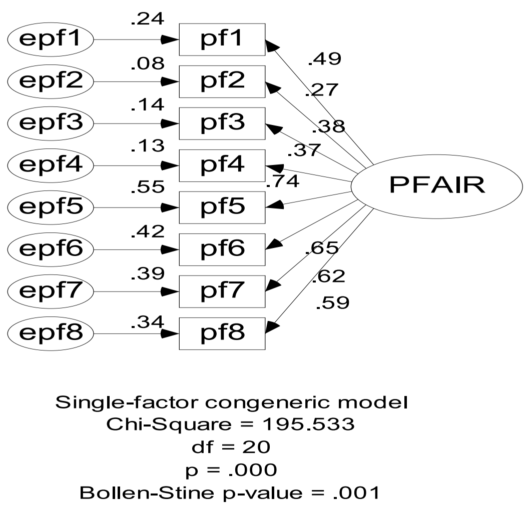


Given that, it seems reasonable to drop item Prtcp9. This process would be repeated until the model represents a good fit to the data. After deleting items Prtcp9 and Prtcp3, the model does fit the data well as illustrated in Figure 7.2 with χ^2 (20) = 41.320, p = 0.003, and Bollen-Stine p-value = 0.108 which is not significant at the level of 0.05.

7.5.1.2 Single-Factor Congeneric Model of Procedural Fairness (PFAIR)

This present research used eight items (indicators) to capture the fairness perception of a division manager during the development process of performance measures. Figure 7.3 shows the standardised parameter estimates and the chi-square fit statistics for the single-factor congeneric model of procedural fairness.

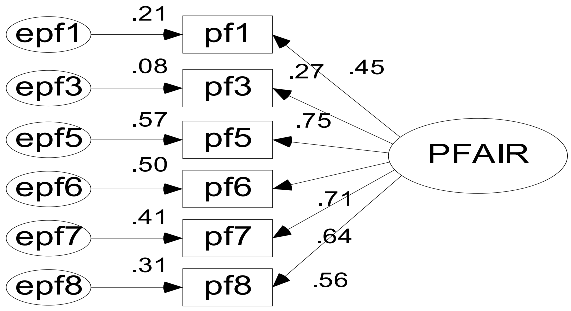
Figure 7.3: AMOS output for the single-factor congeneric model of procedural fairness



From Figure 7.3, it can be seen that the model does not fit the data well as indicated by: the significant chi-square fit, χ^2 (20) = 195.533; p = 0.000, and Bollen-Stine p-value = 0.001. A model that does fit the data should have not a significant chi-square fit or p-value greater than 0.05 at significant level of 0.05. The Bollen-Stine p-value is used due to the multi-variate non-normality of the data and this value should be greater than 0.05. Therefore, the model in Figure 7.3 needs to be re-specified.

The information in Figure 7.3 suggests that the factor coefficients ranged from a low of 0.27 to a high of 0.74. Given that there are three items (pf2, pf3 and pf4) that have a coefficient below 0.4, it is possible to delete those items from the model. However, since the model does not fit the data well, further examinations are necessary.

Figure 7.4: Single-factor congeneric model fit of procedural fairness



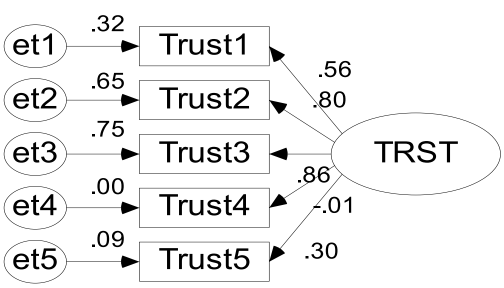
Single-factor Congeneric Model
Chi-Square = 36.823
df = 9
p = .000
Bollen-Stine p-value = .056

After following the process as discussed in Sub-section 7.5.1.1, two items (pf2 and pf3) are deleted to obtain a good fit model. The new model is presented in Figure 8.4 with χ^2 (9) = 36.823, *p* = 0.000, and Bollen-Stine *p*-value = 0.056 which is not significant at the level of 0.05.

7.5.1.3 Single-Factor Congeneric Model of Trust (TRST)

Five items (indicators) were used to capture the trust between parties in the performance-evaluation process. Figure 7.5 shows the standardised parameter estimates and chi-square fit statistics for the single-factor congeneric model of trust.

Figure 7.5: AMOS output for the single-factor congeneric model of trust

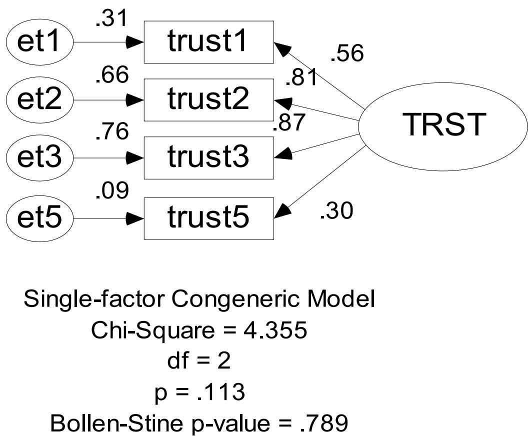


Single-factor Congeneric Model
Chi-Square = 23.360
df = 5
p = .000
Bollen-Stine p-value = .013

Figure 7.5 illustrates that the model does not fit the data well as indicated by: the significant chi-square fit, χ^2 (5) = 23.360; p = 0.000; and Bollen-Stine p-value = 0.013. In order to get a model that does fit the data, the chi-square fit should be not significant or a p-value greater than 0.05. Since there is multi-variate non-normality of the data, the Bollen-Stine p-value will be employed and should be greater than 0.05 at significance level 0.05. Given that, the model in Figure 7.5 should be re-specified.

Although the factor coefficients ranged from a low of 0.01 to a high of 0.86, two items (trust4 and trust5) have a coefficient below 0.4, with trust4 also possessing a very low factor coefficient of 0.01. Consequently, these two items could be deleted from the model. However, since the model does not fit the data well, further examinations are still necessary.

Figure 7.6: Single-factor congeneric model fit of trust

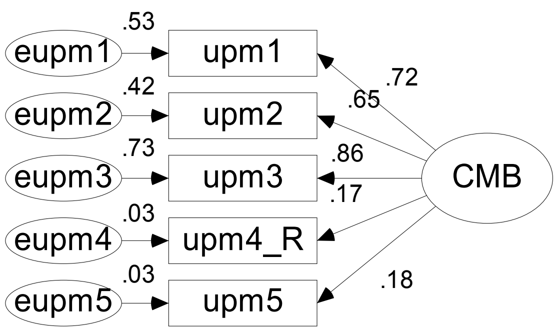


After following the process as discussed in Sub-section 7.5.1.1, item trust4 is deleted to get a good fit model. The new model is presented in Figure 7.6 with χ^2 (2) = 4.355, p = 0.113, and Bollen-Stine p-value = 0.789 which is not significant at the level of 0.05.

7.5.1.4 Single-Factor Congeneric Model of Use of Performance Measure (CMB)

Five items (indicators) were used to measure the use of performance measure (common-measure bias). Similar with the participation variable construct, there is one item reverse-worded, which is item number 4 (upm4). Hence, it is necessary to reverse the data before further analysis. The item is now called upm4_R and will be used in all of the analyses. Figure 7.7 shows the standardised parameter estimates and chi-square fit statistics for the single-factor congeneric model of the use of performance measure.

Figure 7.7: AMOS output for the single-factor congeneric model of use of performance measure (CMB)



Single-factor Congeneric Model
Chi-Square = 43.697
df = 5
p = .000
Bollen-Stine p-value = .001

Figure 7.7 illustrates that the model does not fit the data well as indicated by: the significant chi-square fit, $\chi 2$ (5) = 43.697; p = 0.000; and Bollen-Stine *p*-value = 0.001. Bollen-Stine *p*-value is used in this analysis because of the multi-variate non-normality data. This Bollen-Stine *p*-value should not be significant (greater than 0.05) at significance level 0.05. Hence, the model in Figure 7.7 needs to be re-specified.

It can be seen in Figure 7.7 that the factor coefficient ranged from a low of 0.17 to a high of 0.86. Moreover, two items (upm4_R and upm5), have a coefficient below 0.4. Consequently, these two items could be deleted from the model.

However, since the model does not fit the data well, further examinations are still necessary. After following the process as discussed in Sub-section 7.5.1.1, item upm4_R and upm5 are deleted to get a good fit model. The deletions of the two items in CMB construct variable results in only three items remaining to measure the construct. Therefore, further analysis of the CMB construct will be conducted together with other latent variables in the CFA process (see sub-section 7.4.2).

7.5.1.5 Single-Factor Congeneric Model of Managerial Performance Based on Division Manager's Self-Assessment (MPD)

Nine items (indicators) were used to capture the managerial performance based on division manager's self-assessment. Figure 7.8 shows the standardised parameter estimates and chi-square fit statistics for the single-factor congeneric model of managerial performance based on division manager's self-assessment.

Figure 7.8: Single-factor congeneric model fit of managerial performance based on division manager's self-assessment

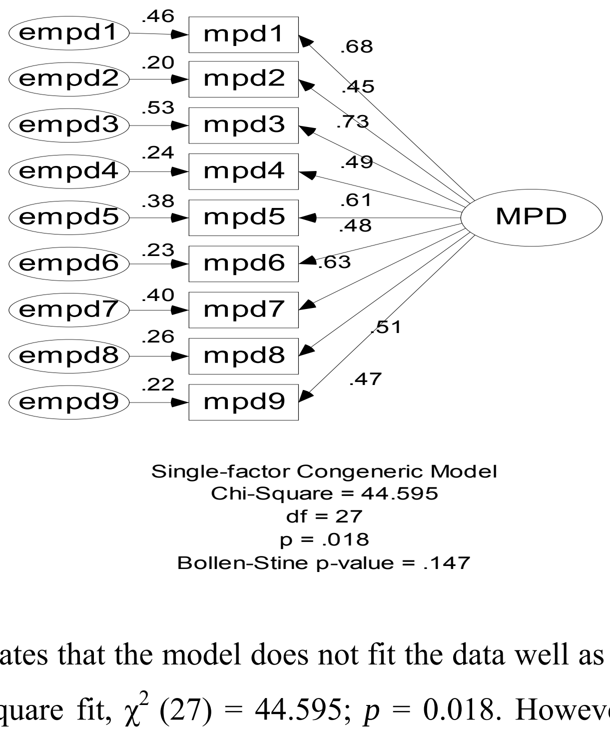


Figure 7.8 illustrates that the model does not fit the data well as indicated by: the significant chi-square fit, χ^2 (27) = 44.595; *p* = 0.018. However, since there is multi-variate non-normality of data, then the Bollen-Stine *p*-value will be used in this analysis. The model shows the Bollen-Stine *p*-value = 0.147, which is not significant at the level of 0.05. Hence, based on the Bollen-Stine *p*-value, the

model does fit the data well. The factor coefficients ranged from a low of 0.45 to a high of 0.73. Given that these coefficients are of reasonable magnitude since all exceed 0.4, all the items would be retained since the model fit the data well.

7.5.2 Confirmatory Factor Analysis (CFA)

The next step in the assessment of discriminant validity is CFA. Confirmatory factor analysis is a technique that requires a priori specification of indicators or items (observed variables) to their respective latent variables (Jöreskog, 1969). It is used to assess the measurement models in terms of their goodness-of-fit to the data (Cunningham, 2008). Based on the research framework that was developed in Chapter 4, and using the results of the examination of single-factor congeneric models in Sub-Section 7.5.1, four measurement models are examined using CFA.

The CFA should be employed on the four measurement models since there are seven latent constructs in the present study. In each round of CFA, there should be no more than five constructs under investigation (Holmes-Smith, Cunningham and Coote, 2006). The current research employs two latent variables of fairness which are: procedural fairness (PFAIR); and distributive fairness (DFAIR). There are also two latent variables of managerial performance comprising of: managerial performance of division manager's self-assessment (MPD); and managerial performance based on division manager's view of senior manager's perception of performance (MPS). This results in four measurement models, as follows.

1. The CFA of procedural fairness model with managerial performance of division manager's self-assessment (MPD).
2. The CFA of procedural fairness model with managerial performance based on division manager's view of senior manager's perception of performance (MPS).
3. The CFA of distributive fairness model with managerial performance of division manager's self-assessment (MPD).

4. The CFA of distributive fairness model with managerial performance based on division manager's view of senior manager's perception of performance (MPS).

The examination of each of the measurement models is presented below.

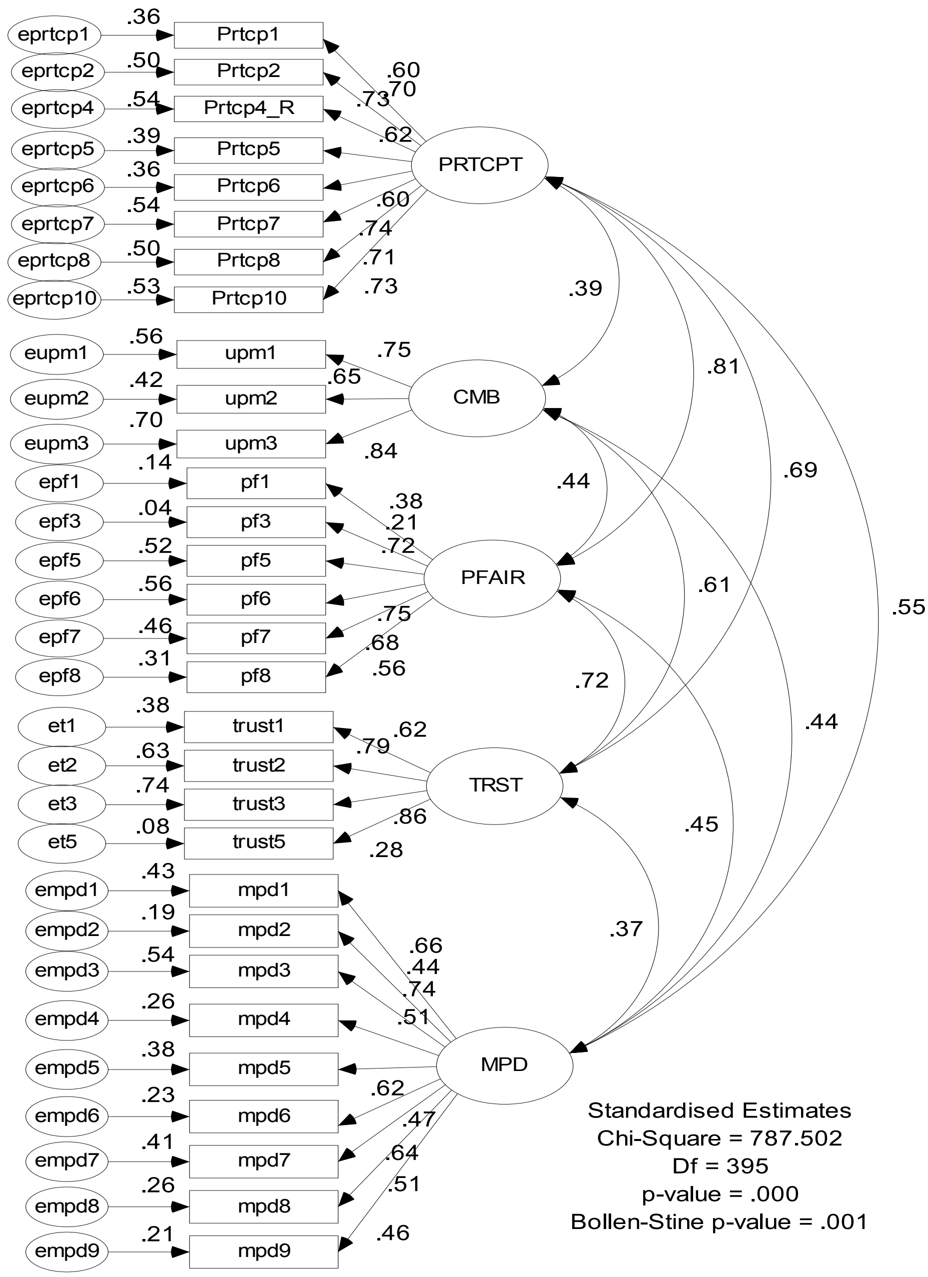
7.5.2.1 Confirmatory Factor Analysis of Procedural Fairness Model

Using the results of the examination of single-factor congeneric models, six latent variables are examined in the procedural fairness model, which are: participation in the development of performance measures (PRTCPT); use of performance measures (CMB); procedural fairness (PFAIR); trust (TRST); managerial performance of division manager's self-assessment (MPD); and managerial performance based on division manager's view of senior manager's perception of performance (MPS). The examination is divided into two measurement models: 1) CFA for constructs PRTCPT, CMB, PFAIR, TRST and MPD; and 2) CFA for constructs PRTCPT, CMB, PFAIR, TRST and MPS.

7.5.2.1.1 Procedural Fairness Model with MPD

Five latent variables, which are PRTCPT, CMB, PFAIR, TRST and MPD are analysed in the measurement model as shown in Figure 7.9.

Figure 7.9: AMOS output for the measurement model of procedural fairness with MPD



As illustrated in Figure 7.9 the model does not fit the data well as indicated by: the significant chi-square fit, χ^2 (395) = 787.502; *p* = 0.000; and Bollen-Stine *p*-

value = 0.001. To accept a model that does fit the data well, the chi-square fit should be not significant or the *p*-value should be greater than 0.05. Furthermore, since there are multi-variate non-normality data, the Bollen-Stine *p*-value will be used. This Bollen-Stine *p*-value should be not significant or greater than 0.05 at significant level 0.05. Therefore, further examinations are necessary to re-specify the model. From the inspection of the standardised residual covariance matrix (SRCM) (see Table 1 in Appendix II – Part A), there are eight pairs of indicators that have an absolute value of standardised residual covariance larger than 2. In other words, there are sixteen absolute values that are greater than 2. This is an indication that a particular covariance is not reproduced well by the hypothesised model (Cunningham, 2008). Thus, some or all of the items should be dropped. The information obtained from the inspection of the MIs in Table 2 (Appendix II – Part A) is also consistent with that obtained from the inspection of standardised residual covariance matrix (SRCM). After deleting the following nine items (prtcp1, prtcp6, upm2, pf1, pf3, trust1, mpd4, mpd6 and mpd8), the model does fit the data well. This is illustrated in Figure 7.10.

Figure 7.10: Measurement model fit of procedural fairness with MPD

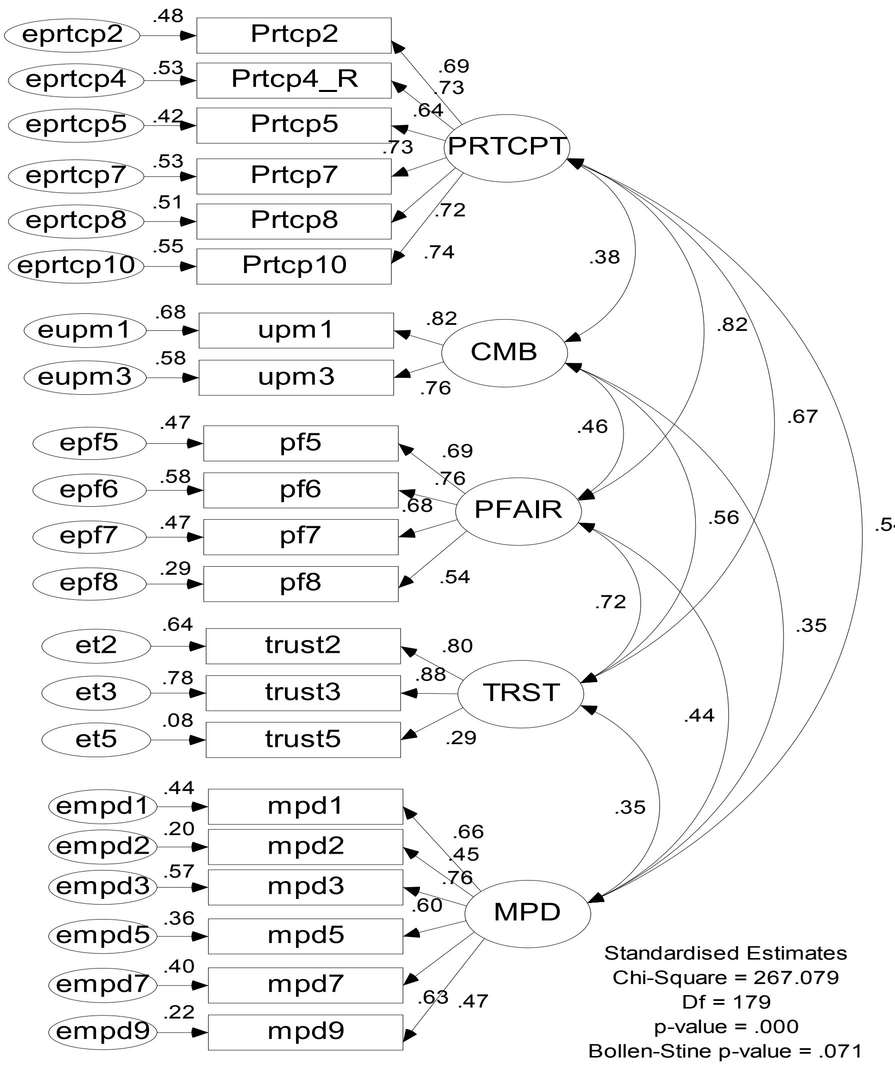


Table 7.7
Correlations for five latent constructs of procedural fairness with MPD model

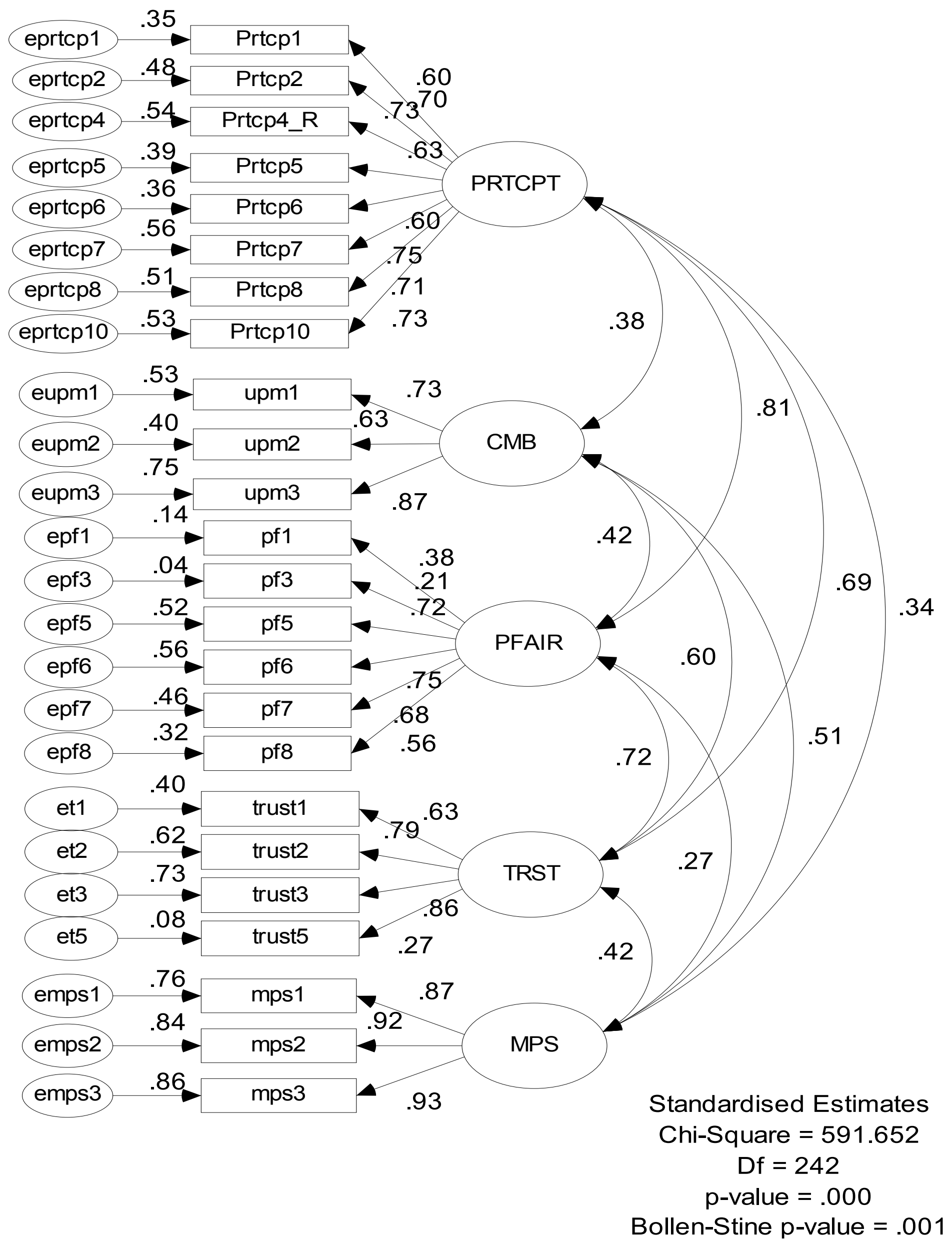
			Estimate
PRTCPT	<-->	CMB	.376
PRTCPT	<-->	PFAIR	.823
PRTCPT	<-->	TRST	.675
PRTCPT	<-->	MPD	.544
CMB	<-->	PFAIR	.458
CMB	<-->	TRST	.562
CMB	<-->	MPD	.350
PFAIR	<-->	TRST	.718
PFAIR	<-->	MPD	.436
TRST	<-->	MPD	.348

The model in Figure 7.10 yields χ^2 (179) = 267.079, p = 0.000 and Bollen-Stine p-value = 0.071, which is not significant at the level of 0.05. It indicates that the model fits the data very well. The five latent constructs are different because correlations between latent constructs are not larger than 0.8 or 0.9. Larger correlations between latent constructs (greater than 0.8 or 0.9) suggest a lack of discriminant validity (Cunningham, 2008). The maximum correlation (between PRTCPT and PFAIR) is 0.82 (see Table 7.7). After the deletion of the nine items, all of the standardised residual co-variances were less than two in magnitude (see Table 3 in Appendix II – Part A). In addition, from all implied moments examination (see Table 4 in Appendix II – Part A), the pattern and structure coefficients demonstrate that the five constructs in the measurement model are empirically distinguishable. These suggest discriminant validity occurs between the five latent constructs in the model.

7.5.2.1.2 Procedural Fairness Model with MPS

The five latent variables: participation in the development of performance measures (PRTCPT); use of performance measures (CMB); procedural fairness (PFAIR); trust (TRST); and managerial performance based on division manager's view of senior manager's perception of performance (MPS) are analysed in the measurement model as shown in Figure 7.11.

Figure 7.11: AMOS output for the measurement model of procedural fairness with MPS



From Figure 7.11, it can be seen that the model does not fit the data well as indicated by: the significant chi-square fit, χ^2 (242) = 591.652; p = 0.000; and Bollen-Stine p-value = 0.001. A non-significant chi-square p-value or Bollen-Stine p-value is required in order to accept a model. Therefore, the model needs to be re-specified. After the examination of the standardised residual covariance matrix (SRCM), as well as modification indices (MIs) (see Table 1 and 2 in Appendix II – Part B), six items comprising of: prtcp1, prtcp6, upm2, pf1, pf3 and trust1 were deleted to obtain a good fit model. The new model is presented in Figure 7.12.

Figure 7.12: Measurement model fit of procedural fairness with MPS

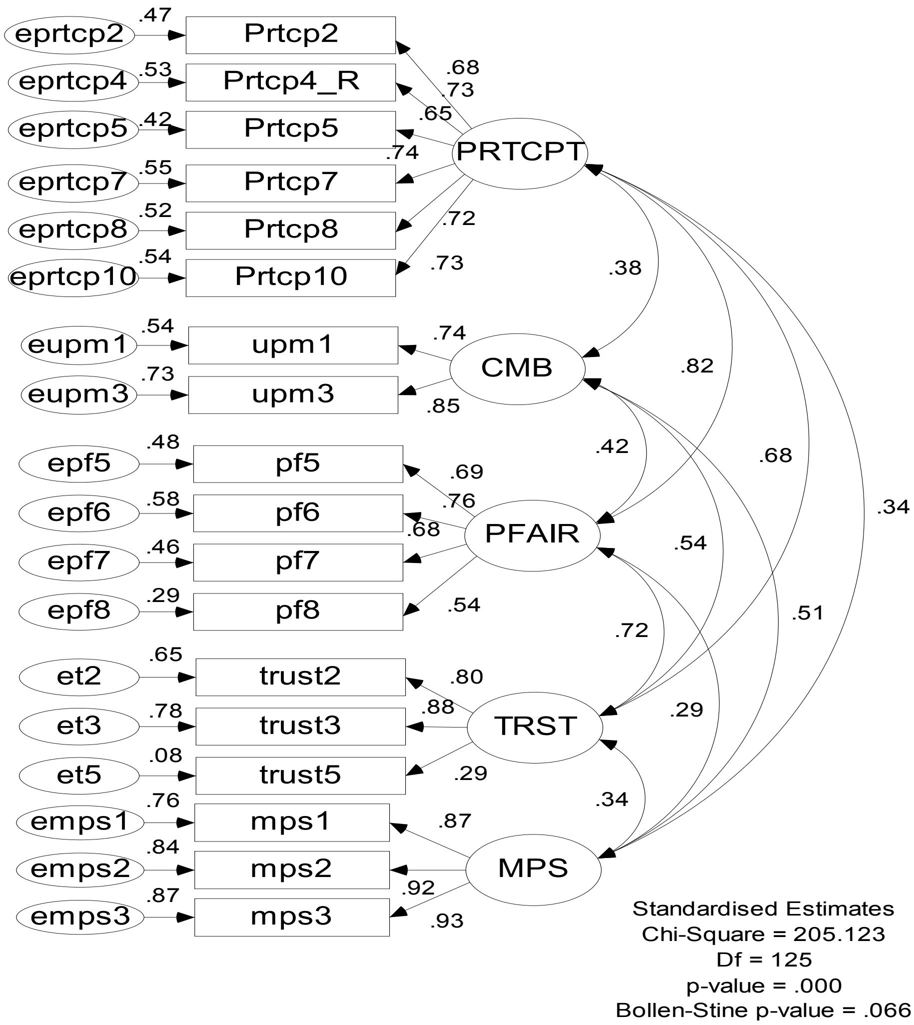


Table 7.8
Correlations for five latent constructs of procedural fairness with MPS model

			Estimate
PRTCPT	<-->	CMB	.379
PRTCPT	<-->	PFAIR	.823
PRTCPT	<-->	TRST	.676
CMB	<-->	PFAIR	.425
CMB	<-->	TRST	.537
PFAIR	<-->	TRST	.717
PRTCPT	<-->	MPS	.339
CMB	<-->	MPS	.509
PFAIR	<-->	MPS	.288
TRST	<-->	MPS	.339

The model in Figure 7.12 yields χ^2 (125) = 205.123, *p* = 0.000, and Bollen-Stine *p*-value = 0.066 which is not significant at the level of 0.05. This indicates that the model fits the data very well. After the deletion of the six items, there are still two pairs of indicators (trust5 – mps1 and upm1 – pf7) that have an absolute value of standardised residual covariance larger than 2 (see Table 3 in Appendix II – Part B). This suggests that a particular covariance is not well reproduced by the hypothesised model (Cunningham, 2008). This means that the single collegiality factor is unable to account for much of the covariance that exists between these two pairs of items. Hence, one or both of the items should be dropped as measures of collegiality. However, since the model fits the data well, as indicated by the non-significant Bollen-Stine *p*-value, those items are maintained in this model.

Furthermore, the examination of all implied moments (see Table 4 in Appendix II – Part B) also shows the pattern and structure coefficients, which confirm that the five constructs in the measurement model are empirically distinguishable. In addition, the maximum correlation (between PRTCPT and PFAIR) is 0.82 (see Table 7.7). This indicates that discriminant validity amongst the five latent constructs occurs in the model.

7.5.2.2 Confirmatory Factor Analysis of Distributive Fairness Model

Using the results of the examination of single-factor congeneric models, six latent variables are examined. They are: participation in the development of performance measures (PRTCPT); use of performance measures (CMB); distributive fairness (DFAIR); trust (TRST); managerial performance of division manager's self-assessment (MPD); and managerial performance based on division manager's view of senior manager's perception of performance (MPS). The examination is divided into two measurement models: 1) CFA for constructs PRTCPT, CMB, DFAIR, TRST and MPD; and 2) CFA for constructs PRTCPT, CMB, DFAIR, TRST and MPS.

7.5.2.2.1 Distributive Fairness Model with MPD

Five latent variables (PRTCPT, CMB, DFAIR, TRST and MPD) are analysed in the measurement model as shown in Figure 7.13.

Figure 7.13: AMOS output for the measurement model of distributive fairness with MPD

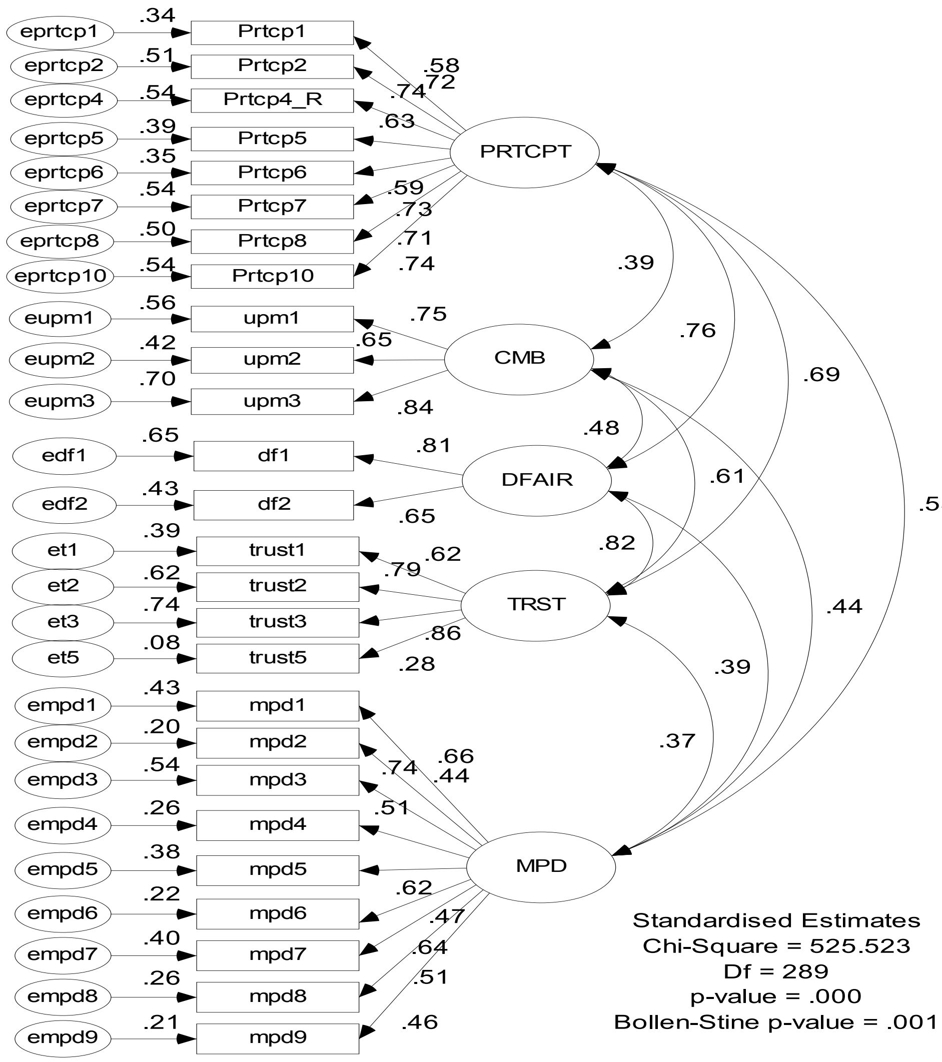


Figure 7.13 shows that the model does not fit the data well as indicated by the significant chi-square fit, χ^2 (289) = 525.523, *p* = 0.000, and Bollen-Stine *p*-value = 0.001. A model that fits the data well, should have a non-significant chi-square *p*-value or be greater than 0.05. Since the data is multi-variate non-normality, a Bollen-Stine *p*-value will be used. This Bollen-Stine *p*-value should be not significant or greater than 0.05 at significance level of 0.05 in order to accept the model. Therefore, the model needs to be re-specified.

After the examination of the standardised residual covariance matrix (SRCM) and modification indices (MIs) (see Table 1 and 2 in Appendix II – Part C), seven items: prtcp1; prtcp6; upm2; trust1; mpd4; mpd6; and mpd8 are deleted to obtain a good fit model. This deletion has to be conducted because those items have an absolute value of standardised residual covariance greater than 2. This is an indication that a particular covariance is not well reproduced by the hypothesised model (Cunningham, 2008). Following the deletion, the new model does fit the data well as can be seen in Figure 7.14.

Figure 7.14: Measurement model fit of distributive fairness with MPD

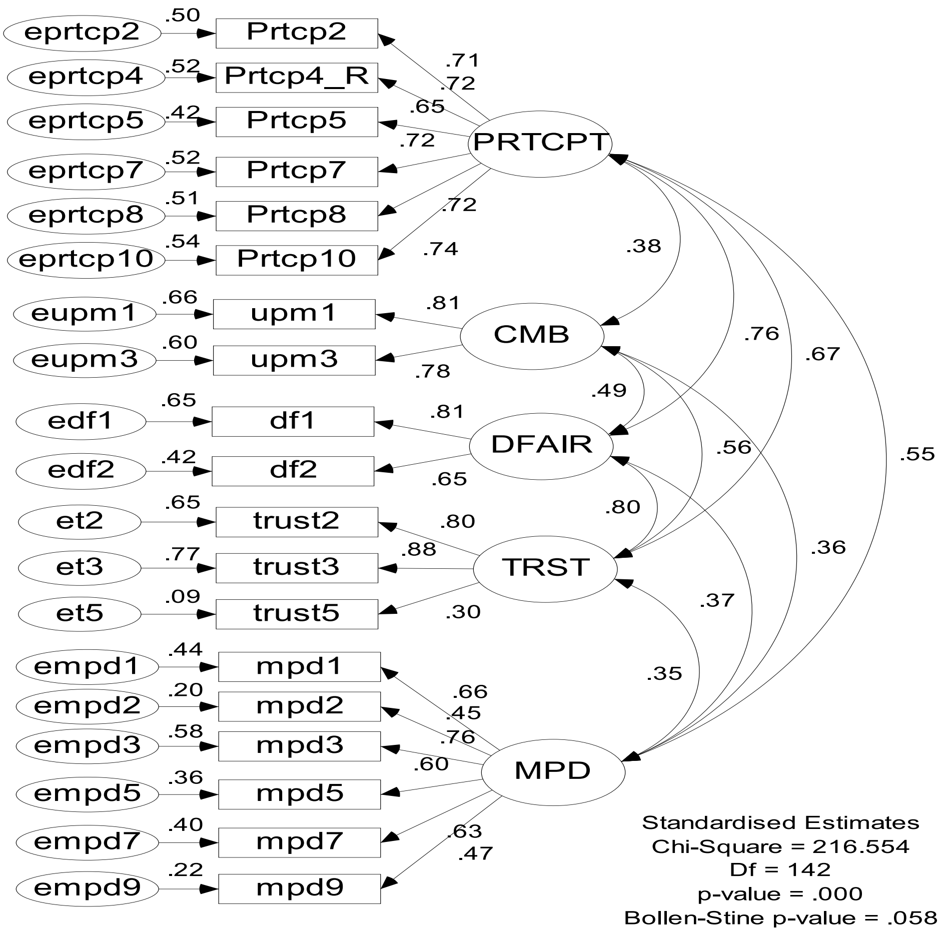


Table 7.9
Correlations for five latent constructs of distributive fairness with MPD model

			Estimate
PRTCPT	<-->	CMB	.379
PRTCPT	<-->	TRST	.674
PRTCPT	<-->	MPD	.546
CMB	<-->	TRST	.563
CMB	<-->	MPD	.355
TRST	<-->	MPD	.348
PRTCPT	<-->	DFAIR	.764
CMB	<-->	DFAIR	.493
TRST	<-->	DFAIR	.796
MPD	<-->	DFAIR	.368

The model in Figure 7.14 yields the following results: χ^2 (142) = 216.554; p = 0.000, and Bollen-Stine p-value = 0.058, which confirm that the model fits the data very well. After the deletion of the seven items, all of the standardised residual co-variances were less than two in magnitude (see Table 3 in Appendix II – Part C). Moreover, the examination of all implied moments (see Table 4 in Appendix II – Part C) also shows that the pattern and structure coefficients are confirmed and that the five constructs in the measurement model are empirically distinguishable. In addition, the maximum correlation (between PRTCPT and DFAIR) is 0.76 (see Table 7.9), hence discriminant validity of the five latent constructs occurs in the model.

7.5.2.2.2 Distributive Fairness Model with MPS

The five latent variables, participation in the development of performance measures (PRTCPT), use of performance measures (CMB), distributive fairness (DFAIR), trust (TRST) and managerial performance based on division manager's view of senior manager's perception of performance (MPS) are analysed in the measurement model as shown in Figure 7.15.

Figure 7.15: AMOS output for the measurement model of distributive fairness with MPS

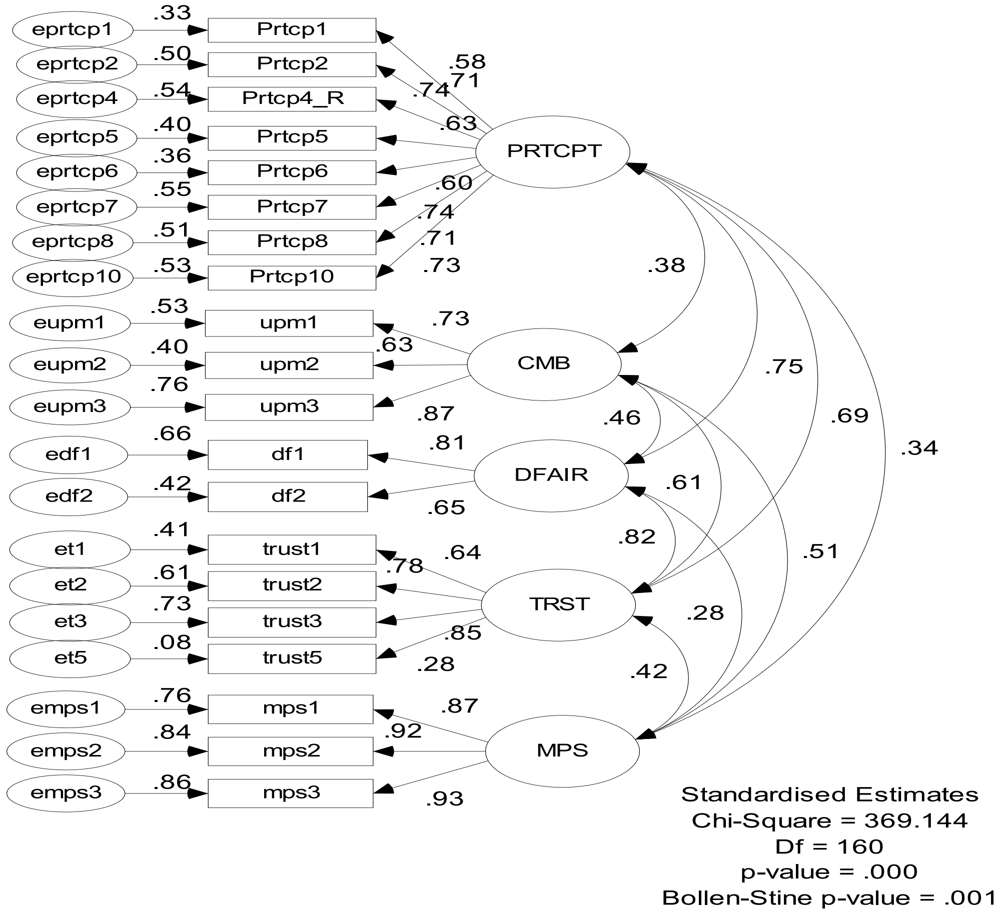


Figure 7.15 shows that the model does not fit the data well. This is demonstrated by the significant chi-square fit, χ^2 (160) = 369.144, p = 0.000, and Bollen-Stine p-value = 0.001. As a result, the model needs to be re-specified. After the examination of the standardised residual covariance matrix (SRCM), as well as the modification indices (MIs) (see Table 1 and 2 in Appendix II – Part D), five items comprising of prtcp1, prtcp6, upm2, trust1 and mps1 were deleted to get a good fit model. The deletion process has to be done because those items have an absolute value of standardised residual covariance greater than 2. According to Cunningham (2008) that indicates that a particular covariance is not well reproduced by the hypothesised model. This new model is presented in Figure 7.16.

Figure 7.16: Measurement model fit of distributive fairness with MPS

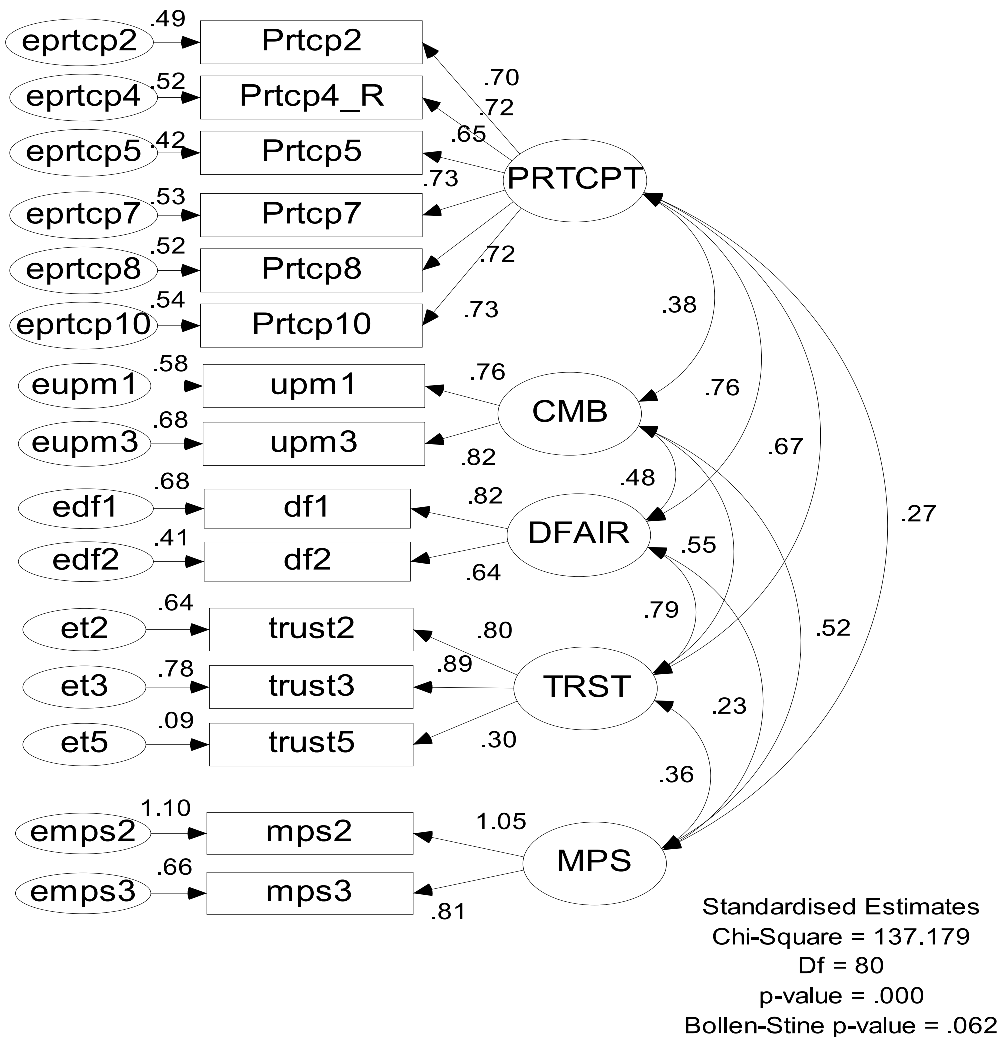


Table 7.10
Correlations for five latent constructs of distributive fairness with MPS model

			Estimate
PRTCPT	<-->	CMB	.384
PRTCPT	<-->	TRST	.675
CMB	<-->	TRST	.552
PRTCPT	<-->	MPS	.266
CMB	<-->	MPS	.521
TRST	<-->	MPS	.359
PRTCPT	<-->	DFAIR	.756
CMB	<-->	DFAIR	.480
TRST	<-->	DFAIR	.787
MPS	<-->	DFAIR	.234

The model in Figure 7.16 yields χ^2 (80) = 137.179, p = 0.000 and Bollen-Stine p-value = 0.062, which is not significant at the level of 0.05. This indicates that the model fits the data very well. After the deletion of the five items, all of the standardised residual co-variances were less than two in magnitude (see Table 3 in Appendix II – Part D).

Furthermore, the examination of all implied moments (see Table 4 in Appendix II – Part D) also shows that the pattern and structure coefficients are confirmed, and that the five constructs in the measurement model are empirically distinguishable. In addition, the maximum correlation (between TRST and DFAIR) is 0.79 (see Table 8.10), hence discriminant validity of the five latent constructs is said to occur in the model.

7.6 Summary

In this chapter, the steps undertaken in preliminary analysis for the study were described. First, the constructs of the research model in the present study were explained. Second, the discussion of the construct reliability was presented. Third, the measure of model fit was outlined. Fourth, the discriminant validity of the constructs was addressed. In this stage, a single-factor congeneric model for each of the construct was examined along with the fit measure of the model. The single-factor congeneric model was tested to measure a construct's uni-dimensionality. Furthermore, four measurement models (i.e., PFAIR – MPD; PFAIR – MPS; DFAIR – MPD; and DFAIR – MPS) were examined using the CAF. This analysis was used to assess the measurement models in terms of their goodness-of-fit to the data. In the next chapter, the full SEM for hypothesis testing will be discussed.

Chapter 8 Fairness Perception Model

8.1 Introduction

In Chapter 7, the preliminary analysis prior to testing the full SEM was discussed. The preliminary analysis included the assessment of a single-factor congeneric model for each of the main constructs and the examination of CFA. The current chapter will investigate the effects fairness perception has on the performance measurement in the balanced scorecard (BSC) environment. In order to answer the question, a proposed framework model (see Chapter 4) will be tested. Consequently, a specific model of the effects of fairness perception that best fit the data will be generated.

This chapter is organised as follows. First, the model estimation is examined. This includes the discussion of standardised and unstandardised structural (path) coefficients and squared multiple correlations (SMC). Second, the proposed research model and the entire hypotheses are presented. Third, a full structural model is examined. In this part, the four fairness perception models are discussed along with the rejection/support of the hypotheses. Finally, a summary of the chapter is presented.

8.2 Model Estimation

8.2.1 Standardised and Unstandardised Structural (Path) Coefficients

In the present study, both standardised and unstandardised structural (path) coefficient estimates are reported. Both of the estimates are generated by AMOS. Standardised structural (path) coefficient estimates are based on standardised data that include correlation matrices (Garson, 2008). In AMOS, the standardised structural coefficients are labelled as "standardised regression weights". Regression weights represent the influence of one or more variables on another variable (Byrne, 2006). According to Garson (2008), standardised estimates are employed when a researcher wants to compare the importance of predictor variables within a single sample.

On the other hand, unstandardised structural (path) coefficient estimates are based on raw data or covariance matrices (Garson, 2008). Furthermore, Garson (2008) states that it is preferable to examine the unstandardised estimates when comparing the groups of models that have difference variances. This is because a researcher usually wants to compare the absolute effects when comparing the same effect across different groups with different variances. Therefore, the current research will report both the standardised and unstandardised estimates.

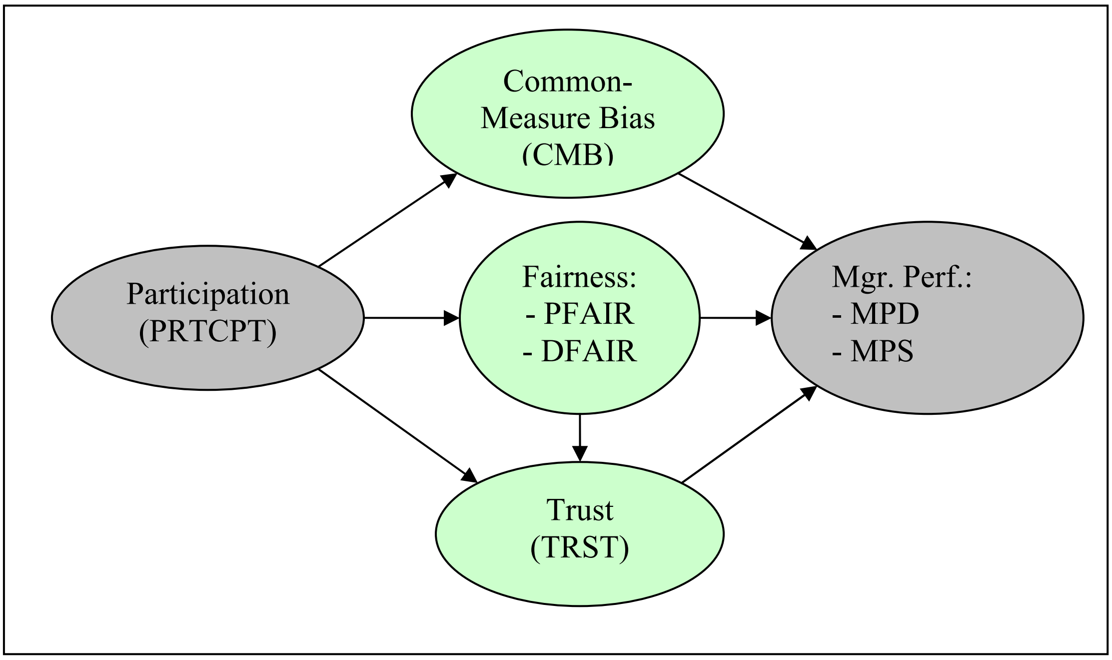
8.2.2 Squared Multiple Correlations (SMC)

Fit measures provide information about how well data fit the specified model. They do not provide any information about the strength of the structural paths in the model. This is determined by its SMC. Squared multiple correlations refer to values representing the proportion of variance that is explained by the predictors of the variable in question (Byrne, 2001). From a measurement perspective, it represents how well an item measures a construct (Hair et al., 2006). The SMC is a useful statistic that is independent of all units of measurement (Byrne, 2001). It is important for the present research to consider the SMC of each dependent variable together with fit measures in order to best describe the structural model (Arbuckle, 2006a). According to Sharma (1996), the interpretation of SMC is analogous to the coefficient of determination (R^2) in multiple regression analysis. There are no specific rules for interpreting these values (Hair et al., 2006), however, *ceteris paribus*, better prediction implies higher R^2 values (Bentler and Raykov, 2000). Additionally, a larger value of R^2 implies a good fit of the regression line; consequently a smaller value implies a poor fit of the regression line (Jain, 1994). However, Jain (1994) added that there are no values of R^2 that can be considered as a good or a poor fit in all situations, since it all depends on each particular situation and the nature of the available data.

8.3 The Proposed Research Model

In the current research, the proposed research framework (model) has been discussed in Chapter 4. The model is presented again in Figure 8.1, with modifications for exogenous and endogenous variables.

Figure 8.1: The proposed research model



The model presents the possible influence of one latent construct (exogenous variable) of division managers' participation (PRTCPT) towards managerial performance (MPD and MPS) (endogenous variable) through three latent constructs (endogenous variables) of common-measure bias (CMB), fairness (PFAIR and DFAIR), and trust (TRST). As discussed previously in Section 7.2, endogenous variables (dependent variables) depend on other variables. In Figure 8.1, they have single-headed arrows pointing to them. On the other hand, the exogenous variable (independent variable) does not depend on other variables. Consequently, in Figure 8.1, it does not have any single-headed arrows pointing to it. Two steps of data analysis are conducted in the present research regarding the proposed research model testing.

1. Testing the research model by investigating SEM path analysis based on four models developed using two types of fairness (PFAIR and DFAIR) and two types of managerial performance (MPD and MPS).
2. Conducting frequency testing and a chi-square test for goodness of fit to test the differences in frequencies between financial and non-financial measures.

In the first step of data analysis, the hypotheses that are tested for the proposed research model are divided into two groups of fairness perception: procedural fairness and distributive fairness.

1) Procedural fairness

H1: The higher the level of participation in developing the performance measures (PRTCPT), the lower the common-measure bias (CMB).

H2a: The higher the level of participation in developing the performance measures (PRTCPT), the greater the procedural fairness perception of the performance measures (PFAIR).

H4: The higher the level of participation in developing the performance measures (PRTCPT), the stronger the trust between parties involved in the evaluation process (TRST).

H5a: The lower the common-measure bias (CMB), the better the managerial performance of the divisional/unit managers (division manager's self-assessment) (MPD).

H5b: The lower the common-measure bias (CMB), the better the managerial performance based on division manager's view of senior manager's perception of performance (MPS).

H6a: The higher the procedural fairness perception of performance measures by divisional/unit managers (PFAIR), the better the managerial performance of the divisional/unit managers (division manager's self-assessment) (MPD).

H6b: The higher the procedural fairness perception of performance measures by divisional/unit managers (PFAIR), the better the managerial performance based on division manager's view of senior manager's perception of performance (MPS).

H7a: The stronger the level of trust between parties involved in the performance evaluation process (TRST), the better the managerial performance of the divisional/unit managers (division manager's self-assessment) (MPD).

H7b: The stronger the level of trust between parties involved in the performance evaluation process (TRST), the better the managerial performance based on division manager's view of senior manager's perception of performance (MPS).

H8a: The higher the procedural fairness perception of performance measures by divisional/unit managers (PFAIR), the stronger the trust between parties involved in the evaluation process (TRST).

2) Distributive Fairness

H1: The higher the level of participation in developing the performance measures (PRTCPT), the lower the common-measure bias (CMB).

H2b: The higher the level of participation in developing the performance measures (PRTCPT), the greater the distributive fairness perception of the performance measures (DFAIR).

H4: The higher the level of participation in developing the performance measures (PRTCPT), the stronger the trust between parties involved in the evaluation process (TRST).

H5a: The lower the common-measure bias (CMB), the better the managerial performance of the divisional/unit managers (division manager's self-assessment) (MPD).

H5b: The lower the common-measure bias (CMB), the better the managerial performance based on division manager's view of senior manager's perception of performance (MPS).

H6c: The higher the distributive fairness perception of performance measures by divisional/unit managers (DFAIR), the better the managerial performance of the divisional/unit managers (division manager's self-assessment) (MPD).

H6d: The higher the distributive fairness perception of performance measures by divisional/unit managers (DFAIR), the better the managerial performance based on division manager's view of senior manager's perception of performance (MPS).

H7a: The stronger the level of trust between parties involved in the performance evaluation process (TRST), the better the managerial performance of the divisional/unit managers (division manager's self-assessment) (MPD).

H7b: The stronger the level of trust between parties involved in the performance evaluation process (TRST), the better the managerial performance based on division manager's view of senior manager's perception of performance (MPS).

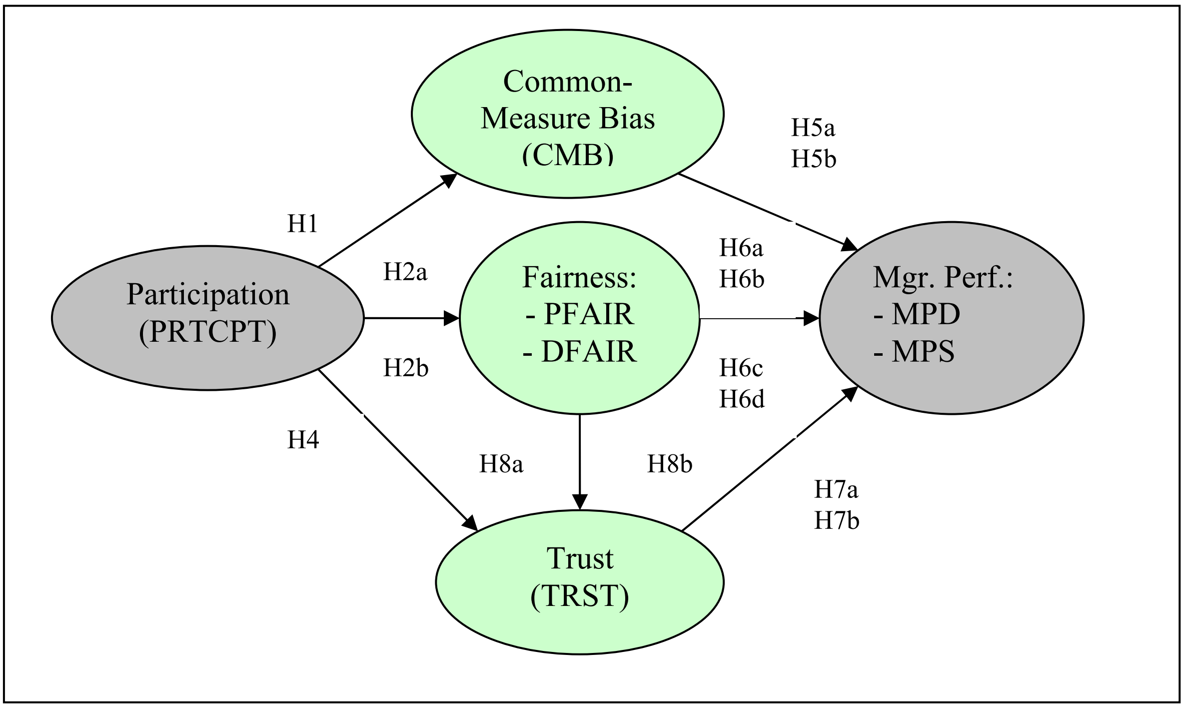
H8b: The higher the distributive fairness perception of performance measures by divisional/unit managers (DFAIR), the stronger the trust between parties involved in the evaluation process (TRST).

In the second step of data analysis, the hypothesis that is tested for the proposed research model is H3, which is:

H3: Non-financial measures are perceived to be more fair than financial measures.

All of the hypotheses (except of H3) are put together in the proposed research model, which is presented in Figure 8.2.

Figure 8.2: The proposed research model with hypotheses



8.4 A Full Structural Model

In Chapter 7 (Section 7.5.2), four measurement models have been tested in terms of their goodness-of-fit to the data using CFA. A measurement model is a model that represents underlying constructs with non-causal or co-relational relationships among them (Hair et al., 2006; Cunningham, 2008). The measurement model tests the relationship of indicator variables of the latent construct (Hair et al., 2006). The goodness-of-fit of the model to the data is examined with CFA. In addition, CFA provides evidence of the discriminant validity of each indicator based on the overall fit of the model to the data. Therefore, although the measurement model does not assess the causal relationship among the latent construct, it provides foundation for all further theory testing (Hair et al., 2006).

The measurement model that has been tested with CFA is then transformed into a full structural model based on the nature of the causal relationships among latent constructs in order to test the hypotheses. A structural model is an expression of structural theory that represents the relationships between constructs. It also refers to a causal model (Hair et al., 2006). If the measurement model does fit the data well and is sufficiently valid, then it can be transformed into a full structural model using a theoretical basis. The structural model can be tested using SEM analysis. The SEM basically combines path analysis and measurement model. Path analysis assesses the relationships between observed variables or indicators of latent constructs; SEM examines the relationships among latent constructs (Cunningham, 2008).

In SEM, the full structural model that comprised the hypothesised causal relationships among latent constructs is specified a priori (Hair et al., 2006; Cunningham, 2008; Byrne, 2001). Then, SEM techniques are used to test the goodness-of-fit of the model to the data, meaning that there is no difference between the theoretical model and the data. Therefore, this provides evidence to support the theoretical model (Cunningham, 2008).

As mentioned in the proposed research model, the present study hypothesises that participation in the development of performance measures (PRTCPT) has positive effect on: the use of performance measure (CMB) fairness perception of the performance measures (procedural fairness (PFAIR) and distributive fairness (DFAIR)); and trust between parties involved in the performance evaluation process (TRST). In addition, the positive effects will eventually have a positive effect on managerial performance (division manager's self-assessment (MPD) and division manager's view of senior manager's perception of perception (MPS)).

Therefore based on the proposed research model and using the measurement models, two main full structural models: procedural fairness model; and distributive fairness model are developed. Each of the structural models is divided into two models based on the managerial performance. Hence, there are four full structural models (i.e., PFAIR – MPD; PFAIR – MPS; DFAIR – MPD; and DFAIR – MPS). With the full structural models, the causal relationships among the latent constructs can be investigated (Hair et al., 2006; Byrne, 2001; Cunningham, 2008). The full structural fairness models are examined in the next sections.

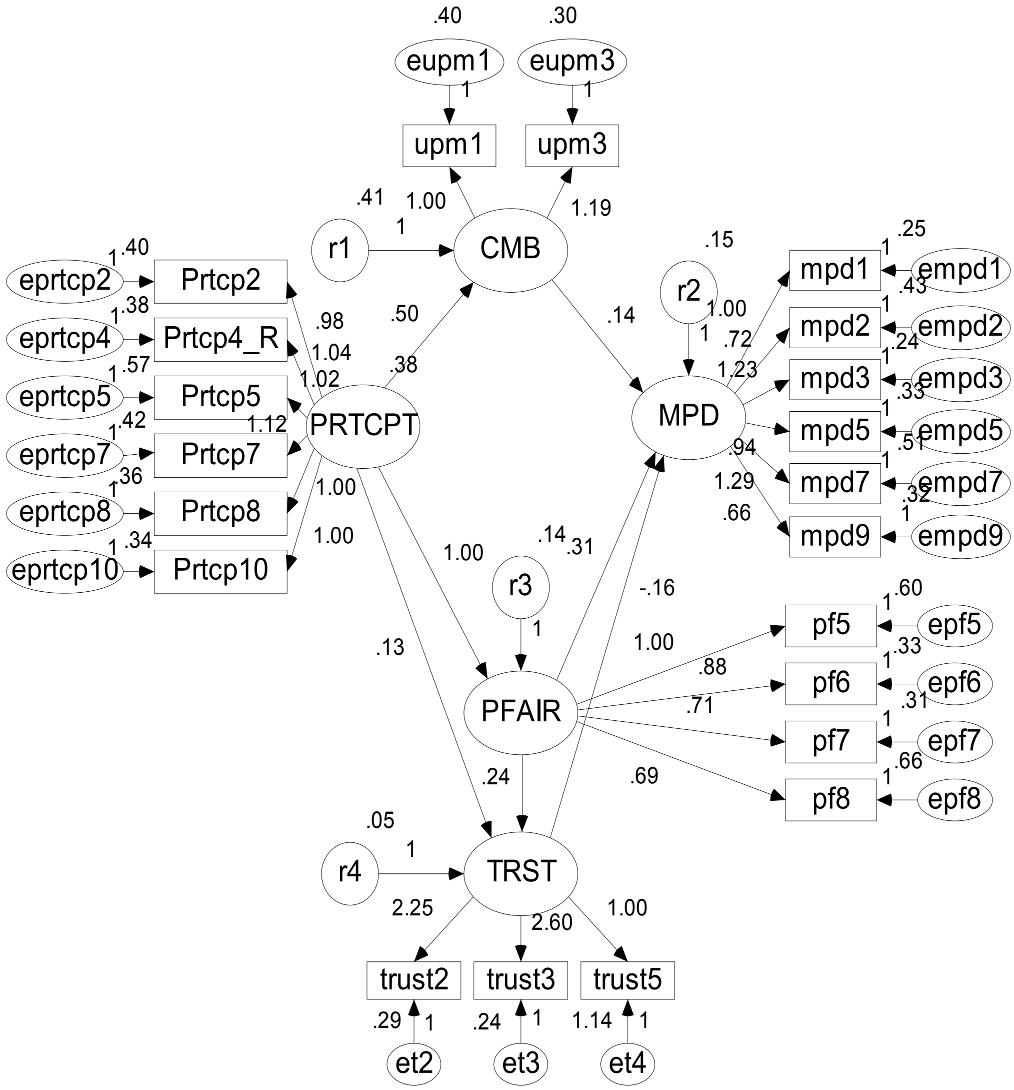
8.5 Procedural Fairness Model

The investigation of the procedural fairness model using SEM's path data analysis is divided into two models: (1) PFAIR – MPD; and (2) PFAIR – MPS. They are discussed below.

8.5.1 Procedural Fairness (PFAIR) – MPD Model

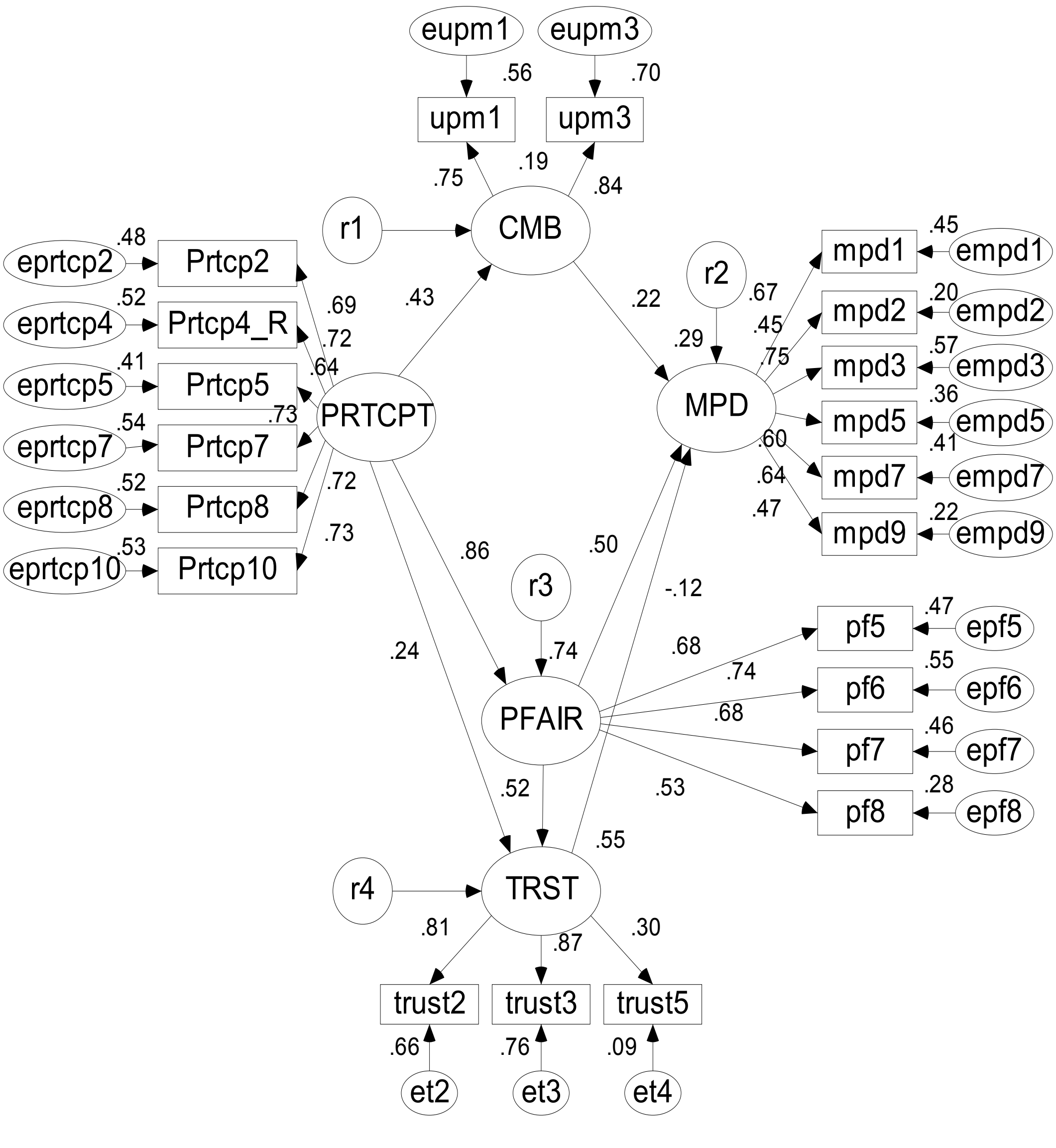
The initial PFAIR – MPD model, prior to any modification, comprising of unstandardised estimates presented in Figure 8.3, while the standardised estimates are in Figure 8.4.

Figure 8.3: Initial PFAIR – MPD model with unstandardised estimates



Unstandardised Estimates
Chi-square = 292.105; df = 182; p value = .000;
Bollen-Stine p-value = .026;
GFI = .857; SRMR = .0644;
RMSEA = .061; CFI = .913; TLI = .899

Figure 8.4: Initial PFAIR – MPD model with standardised estimates



Standardised Estimates
Chi-square = 292.105; df = 182; p value = .000;
Bollen-Stine p-value = .026;
GFI = .857; SRMR = .0644;
RMSEA = .061; CFI = .913; TLI = .899

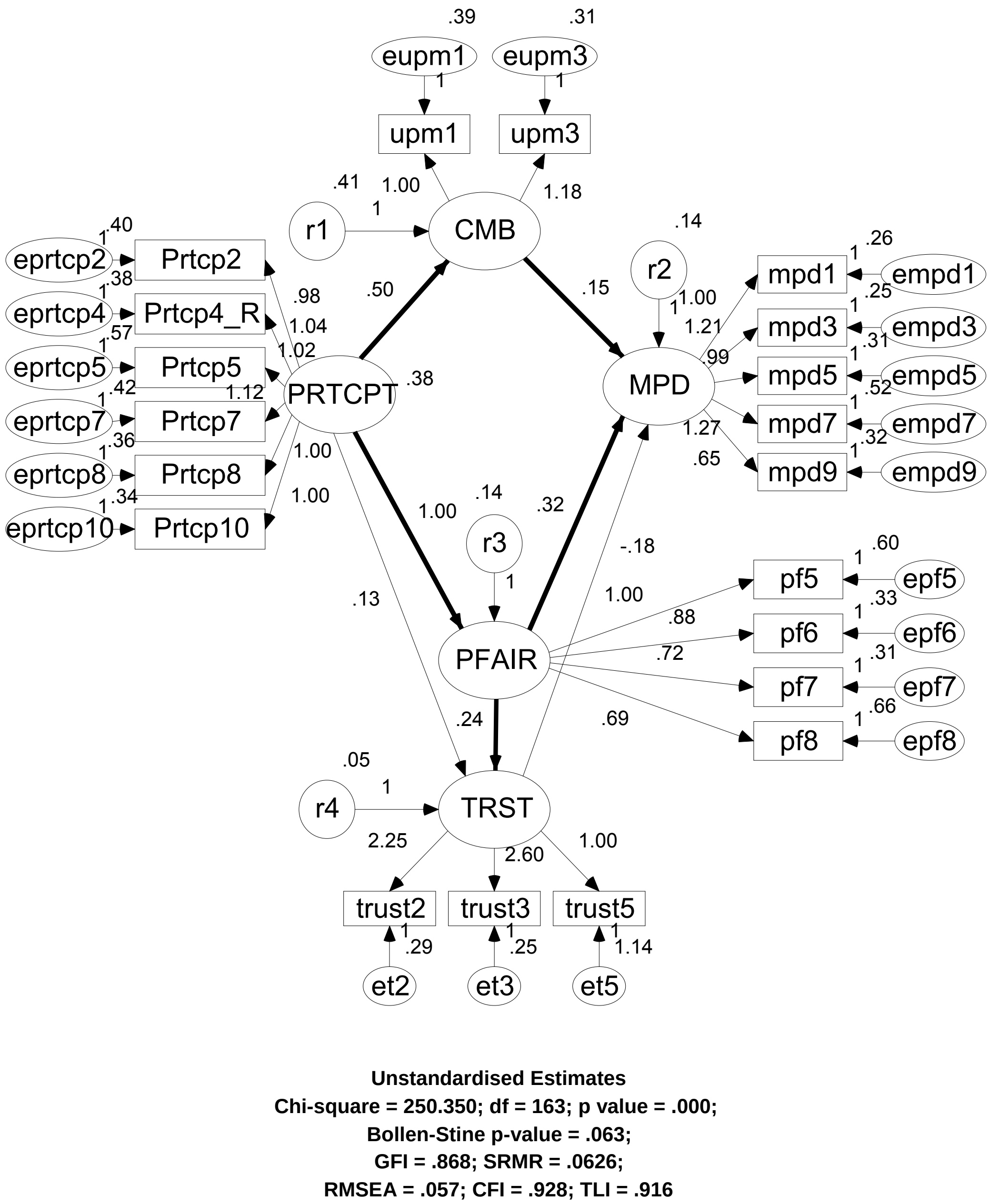
It is clear that the initial model (Figures 8.3 and 8.4) does not fit well as indicated by the significant chi-square fit, $\chi 2$ (182) = 292.105, *p*-value = 0.000 and Bollen-Stine *p*-value = 0.026 (see Figure 8.3 and 8.4). With structural modelling of data, the requirement is that the data and the model being tested are not significantly different or have a *p*-value greater than 0.05. Furthermore, due to the multi-variate non-normality data, Bollen-Stine *p*-value will be used. This Bollen-Stine *p*-value should be greater than 0.05 in order to accept the model (Byrne, 2001).

Therefore, the initial model needs to be re-specified to fit better with the data. This can be done by examining the standardised residual covariance matrix (SRMC) and modification indices (MIs). After the examination of the SRMC and MIs (see Table 1 and 2 in Appendix III – Part A), it is found that there are five pairs (i.e., upm1 – trust2, upm3 – trust3, upm1 – trust3, upm1 – pf7 and prtcp5 – mpd2) of indicators that have an absolute value of standardised residual covariance greater than 2. Standardised residual covariance greater than 2 in absolute value indicates that a particular covariance is not well reproduced by the hypothesised model (Cunningham, 2008). Hence, one or all of the items should be dropped.

The information obtained from the inspection of the MIs is consistent with that obtained from the inspection of the SRMC. For example, the MIs indicate that deleting item mpd2 would result in a decrease of the χ^2 statistic of at least 6.719 and 7.453 for a reduction of df of 1. Given that, it seems reasonable to drop item mpd2. This process would be repeated until the model represents a good fit to the data. After deleting item mpd2, the model fits the data very well (see Figures 8.5 and 8.6).

Figure 8.5 is the PFAIR – MPD model after re-specification with the unstandardised estimates. The unstandardised estimates model demonstrates regression weights and variances.

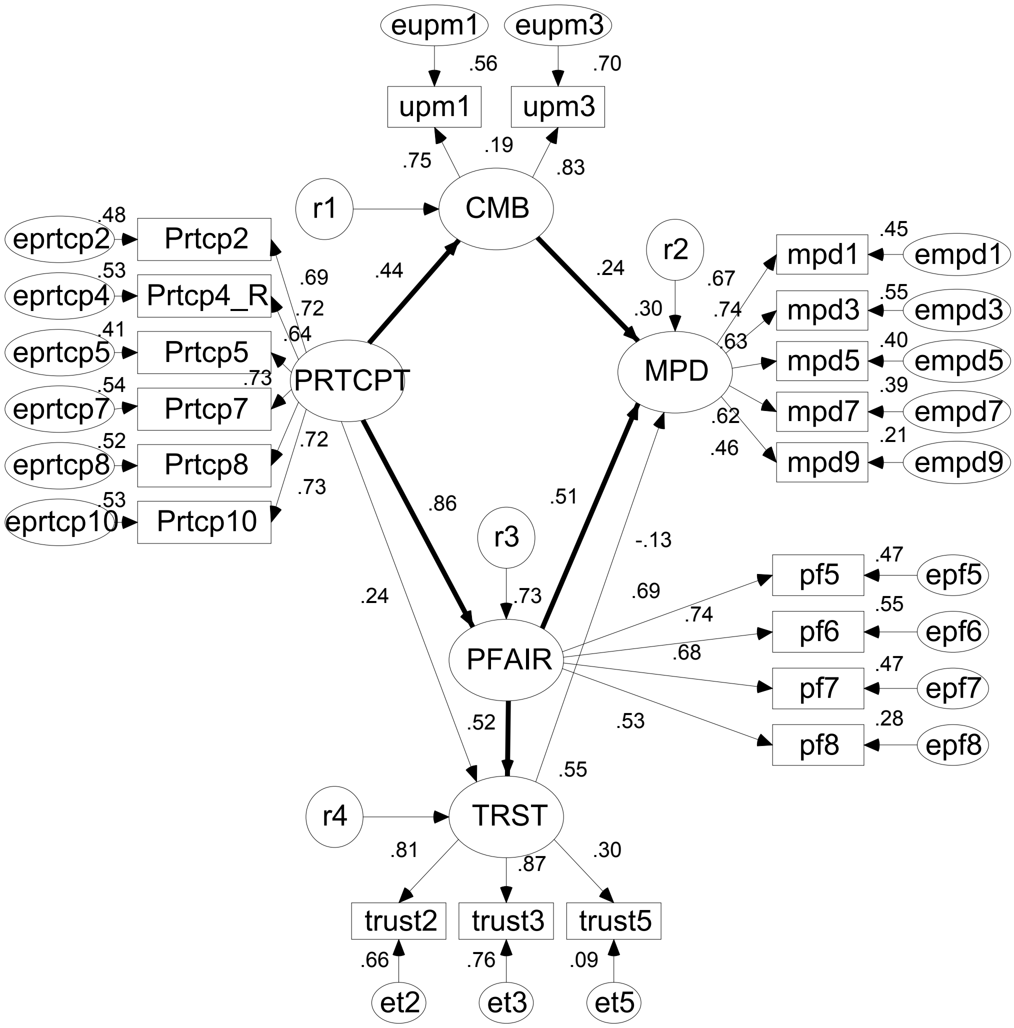
Figure 8.5: PFAIR – MPD model with unstandardised estimates



Note: The thick bold arrows show the statistically significant paths.

Figure 8.6 is the PFAIR – MPD model with standardised estimates. The standardised estimates model demonstrates standardised regression weights and square multiple correlations (SMC).

Figure 8.6: PFAIR – MPD model with standardised estimates



Standardised Estimates
Chi-square = 250.350; df = 163; p value = .000;
Bollen-Stine p-value = .063;
GFI = .868; SRMR = .0626;
RMSEA = .057; CFI = .928; TLI = .916

Note: The thick bold arrows show the statistically significant paths.

The final modified PFAIR – MPD model in Figure 8.5 and 8.6 yields a χ^2 (163) = 250.350, p-value = 0.000 and Bollen-Stine *p*-value = 0.063 which is not significant at the level of 0.05. This is an indication that the model fits the data very well. After the deletion of item mpd2, there are still four pairs of indicators (i.e., upm1 – trust2, upm3 – trust3, upm1 – trust3 and upm1 – pf7) that have an absolute value of standardised residual covariance greater than 2 (see Table 3 in Appendix III – Part A). This suggests the existence of multi-collinearity. Thus, one or all of those items should be deleted. However, since the model fits the data well as indicated by the non-significant Bollen-Stine *p*-value, those items are maintained in this model.

The chi-square test (χ^2) and the associated *p*-value is the most common and basic measures to evaluate a model's fit (Cunningham, 2008; Kline, 2005). However, it alone should not be used as a test of validity of a model (Hair, Anderson, Tatham, Black, 1998) since it loses validity for large samples. Since, no single measure is proven as the best measure; the present thesis also reporting the other measures. From Figures 8.5 and 8.6, it can be seen that the other fit measures also indicate the goodness of fit of the model to the data (GFI = 0.868, SRMR = 0.0626, RMSEA = 0.057, CFI = 0.928 and TLI = 0.916) (see Table 7.2 Chapter 7 for the reference of the fit measures).

The final modified model shows all paths; however, only five paths between the exogenous variable and the endogenous variables are statistically significant at the 0.01 and 0.05 level of significance (see regression weights estimates of significant paths in Table 8.1).

Table 8.1
Regression weights for PFAIR – MPD model

Ho Number				Estimate	S.E.	C.R.	*p*-value
H2a	PFAIR	<---	PRTCPT	1.004	.136	7.387	***
H4	TRST	<---	PRTCPT	.132	.118	1.118	.264
H8a	TRST	<---	PFAIR	.242	.120	2.015	.044**
H1	CMB	<---	PRTCPT	.500	.124	4.049	***
H5a	MPD	<---	CMB	.150	.067	2.255	.024**
H6a	MPD	<---	PFAIR	.317	.109	2.892	.004***
H7a	MPD	<---	TRST	-.175	.216	-.813	.416

Note: *** *p*-value is statistically significant at the 0.01 level (two-tailed)
** *p*-value is statistically significant at the 0.05 level (two-tailed)

The final modified model also indicates that there are varying explanations for the dependent variables. The square multiple correlations of a variable show the proportion of its variance that is accounted for by its predictors (determinants) (Arbuckle, 2006a). As illustrates in Table 8.2, determinant participation (PRTCPT) accounts for the variance of dependent variables, with a high degree of explanation for procedural fairness (PFAIR) and trust (TRST), and a reasonable explanation for use of performance measure (CMB) and managerial performance (MPD). Specifically, the determinant accounts for:

- 73.5% of the variance of PFAIR;
- 54.9% of the variance of TRST;
- 18.9% of the variance of CMB; and
- 30.4% of the variance of MPD.

Table 8.2
Squared multiple correlations (SMC) for PFAIR – MPD model

	Estimate
PFAIR	.735
TRST	.549
CMB	.189
MPD	.304

The standardised regression weights are also used since they allow the direct comparison of the relative effect of each independent variable on the dependent variable (Hair et al., 2006).

Five research hypotheses between the determinant and dependent variables in the PFAIR – MPD model are accepted. They are: H1; H2a; H5a; H6a; and H8a, while H4 and H7a are rejected. This suggests that PRTCPT → PFAIR, PRTCPT → CMB, PFAIR → TRST, PFAIR → MPD, and CMB → MPD. Hence, it can be said that participation in the development of performance measures significantly influences procedural fairness and common-measure bias. Concurrently, procedural fairness significantly influences trust between parties in the performance evaluation process and division's managerial performance. Furthermore, common-measure bias significantly influences a division's managerial performance. However, the results also suggest that participation in the development of performance measures does not directly significantly influences the trust between parties involved in the performance evaluation process. Additionally, trust does not appear to influence significantly division managerial performance.

The relative effect (standardised regression weights) between independent and dependent variables shows stronger paths (with statistical significance) between PRTCPT and PFAIR (0.857), PFAIR and TRST (0.522), PFAIR and MPD (0.507), PRTCPT and CMB (0.435) and CMB and MPD (0.236). The rest are rather weaker with non-statistical significance (see Table 8.3).

Table 8.3
Standardised regression weights for PFAIR – MPD model

			Estimate
PFAIR	<---	PRTCPT	.857
TRST	<---	PRTCPT	.243
TRST	<---	PFAIR	.522
CMB	<---	PRTCPT	.435
MPD	<---	CMB	.236
MPD	<---	PFAIR	.507
MPD	<---	TRST	-.130

This may suggest that the higher the level of participation in developing the performance measures, the greater the procedural fairness perception of the performance measures and the lower the common-measure bias. Moreover, this also suggests that the greater the procedural fairness perception of the performance measures, the stronger the trust between parties involved in the evaluation process. Finally, a significant positive influence on division managerial performance occurs when procedural fairness level is high and the common-measure bias is low.

Furthermore, from the paths diagram (see Figures 8.5 and 8.6), it can be seen that the participation in developing the performance measures does not have a significant direct impact on the trust between parties involved in the evaluation process. However, participation significantly influences the trust via procedural fairness. This suggests that procedural fairness mediates the relationship between the participation in developing the performance measures and the trust between parties involved in the performance evaluation process.

A mediator variable is a third variable that influences the relationship between the independent and dependent variable. It does this in such way that the direct relationship between the independent and dependent variable is no longer significant after its introduction (Baron and Kenny, 1986; Holmbeck, 1997). The relationship between the participation in developing the performance measures (PRTCPT) and the trust between parties involved in the performance evaluation process (TRST) is no longer significant when the relationship has been controlled with the procedural fairness variable (PFAIR). Therefore, procedural fairness is acting as a mediator variable. The complete examination of the mediator variable is presented in the sub-section 8.5.1.1.

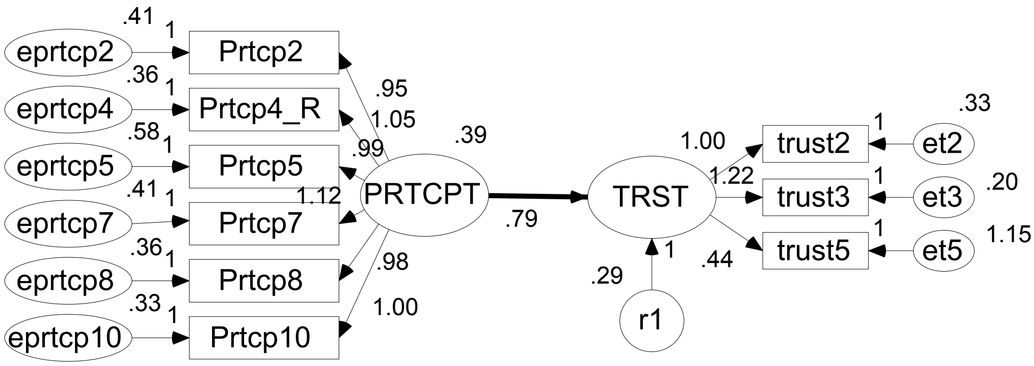
8.5.1.1 Mediator Variable

A mediator variable is a third variable that accounts for the relationship between the independent variable and dependent variable (Baron and Kenny, 1986; Holmbeck, 1997). To test a potential mediator variable, assume B is the hypothesised mediator between A and C. There are four conditions that must be satisfied (Cunningham, 2008), as follows.

1. A is significantly associated with C;
2. A is significantly associated with B;
3. B is significantly associated with C; and
4. The direct impact of A on C is reduced (i.e., no longer significant) after controlling for the mediator B.

To test whether procedural fairness (PFAIR) mediates the relationship between participation in the developing performance measures (PRTCPT) and trust between parties involved in the performance evaluation process (TRST), the paths analysis of the three variables are examined. The initial model that illustrated the direct relations between PRTCPT and TRST, with the unstandardised and standardised estimates, is presented in Figures 8.7 and 8.8 respectively.

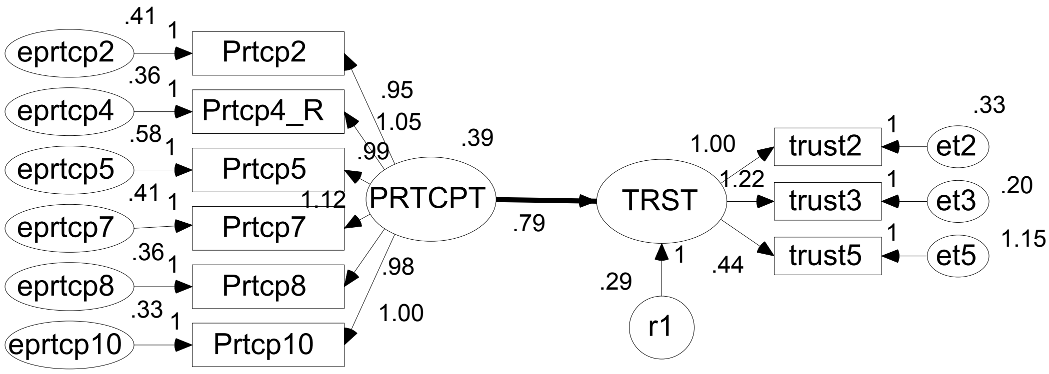
Figure 8.7: Unstandardised initial model of PRTCPT and TRST



Unstandardised Estimates
Chi-square = 49.183; df = 26; p value = .004;
Bollen-Stine p-value = .090;
GFI = .934; SRMR = .0467;
RMSEA = .074; CFI = .959; TLI = .944

Note: The thick bold arrows show the statistically significant paths.

Figure 8.8: Standardised initial model of PRTCPT and TRST



Standardised Estimates
Chi-square = 49.183; df = 26; p value = .004;
Bollen-Stine p-value = .090;
GFI = .934; SRMR = .0467;
RMSEA = .074; CFI = .959; TLI = .944

Note: The thick bold arrows show the statistically significant paths.

The initial PRTCPT - TRST model in Figures 8.7 and 8.8 yields a χ^2 (26) = 49.183, *p*-value = 0.004, and Bollen-Stine *p*-value = 0.090 which is not significant at the level of 0.05. This is an indication that the model fits the data very well. The other fit measures also indicate the goodness of fit of the model to the data (GFI = 0.934, SRMR = 0.0467, RMSEA = 0.074, CFI = 0.959, TLI = 0.944) (see Table 7.2 Chapter 7 for the reference of the fit measures).

The initial model shows the path between PRTCPT and TRST is statistically significant at the 0.01 level of significance (see regression weights estimates of significant path in Table 8.4). Table 8.5 shows that determinant (PRTCPT) accounts for the variance of TRST with a high degree of explanation (45.5%). The standardised regression weights (see Table 8.6) show the strong effect between PRTCPT and TRST (0.675). This suggests that participation in developing performance measures directly impacts trust the between parties involved in the performance evaluation process.

Table 8.4
Regression weights of initial model of PRTCPT – TRST

	Estimate	S.E.	C.R.	p-value
TRST <--- PRTCPT	.792	.122	6.475	***

Note: *** *p*-value is statistically significant at the 0.01 level (two-tailed)

Table 8.5
Squared multiple correlations of initial model of PRTCPT - TRST

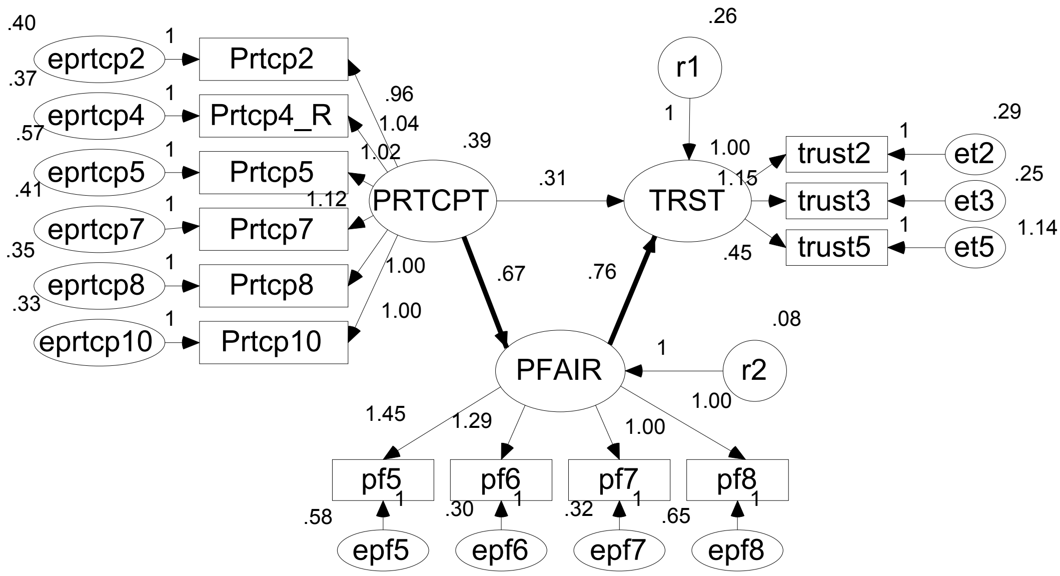
	Estimate
TRST	.455

Table 8.6
Standardised regression weights of initial model of PRTCPT - TRST

			Estimate
TRST	<---	PRTCPT	.675

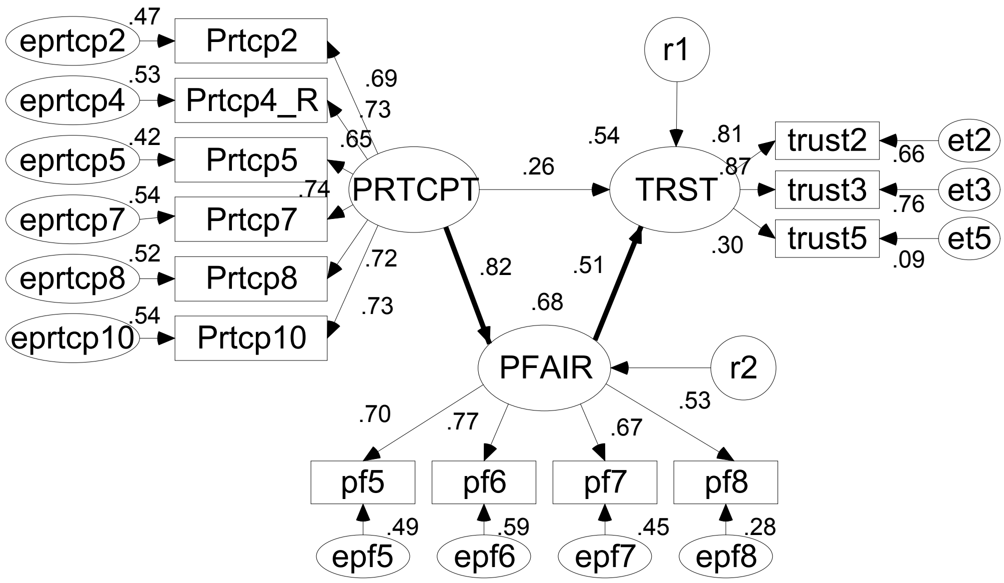
The paths diagram, when introducing the procedural fairness (PFAIR) variable, is presented below with unstandardised estimates and standardised estimates in Figures 8.9 and 8.10 respectively.

Figure 8.9: Unstandardised mediating model of PRTCPT - TRST



Note: The thick bold arrows show the statistically significant paths.

Figure 8.10: Standardised mediating model of PRTCPT – TRST



Note: The thick bold arrows show the statistically significant paths.

The mediating PRTCPT - TRST model in Figures 8.9 and 8.10 yields a χ^2 (62) = 97.208, *p*-value = 0.003, and Bollen-Stine *p*-value = 0.160 which is not significant at the level of 0.05. This is an indication that the model fits the data very well. The other fit measures also indicate the goodness of fit of the model to the data (GFI = 0.916, SRMR = 0.0474, RMSEA = 0.059, CFI = 0.959, TLI = 0.948) (see Table 7.2 Chapter 7 for the reference of the fit measures).

The mediating model shows that the path between PRTCPT and PFAIR is statistically significant at the 0.01 level of significance. The path between PFAIR and TRST is also statistically significant at the 0.05 level of significance. However, the path between PRTCPT and TRST is no longer statistically significant (see regression weights estimates of significant path in Table 8.7).

Table 8.8 shows that the determinant (PRTCPT) accounts for the variance of dependent variables with a high degree of explanation for PFAIR and TRST. The determinant accounts for:

- 67.6% of the variance of PFAIR; and
- 54.0% of the variance of TRST

Table 8.7
Regression weights of mediating model of PRTCPT – TRST

			Estimate	S.E.	C.R.	*p*-value
PFAIR	<---	PRTCPT	.671	.116	5.807	***
TRST	<---	PFAIR	.757	.288	2.630	.009***
TRST	<---	PRTCPT	.312	.213	1.463	.143

Note: *** *p*-value is statistically significant at the 0.01 level (two-tailed)

Table 8.8
Squared multiple correlations of mediating model of PRTCPT - TRST

	Estimate
PFAIR	.676
TRST	.540

Table 8.9
Standardised regression weights of mediating model of PRTCPT - TRST

			Estimate
PFAIR	<---	PRTCPT	.822
TRST	<---	PFAIR	.509
TRST	<---	PRTCPT	.257

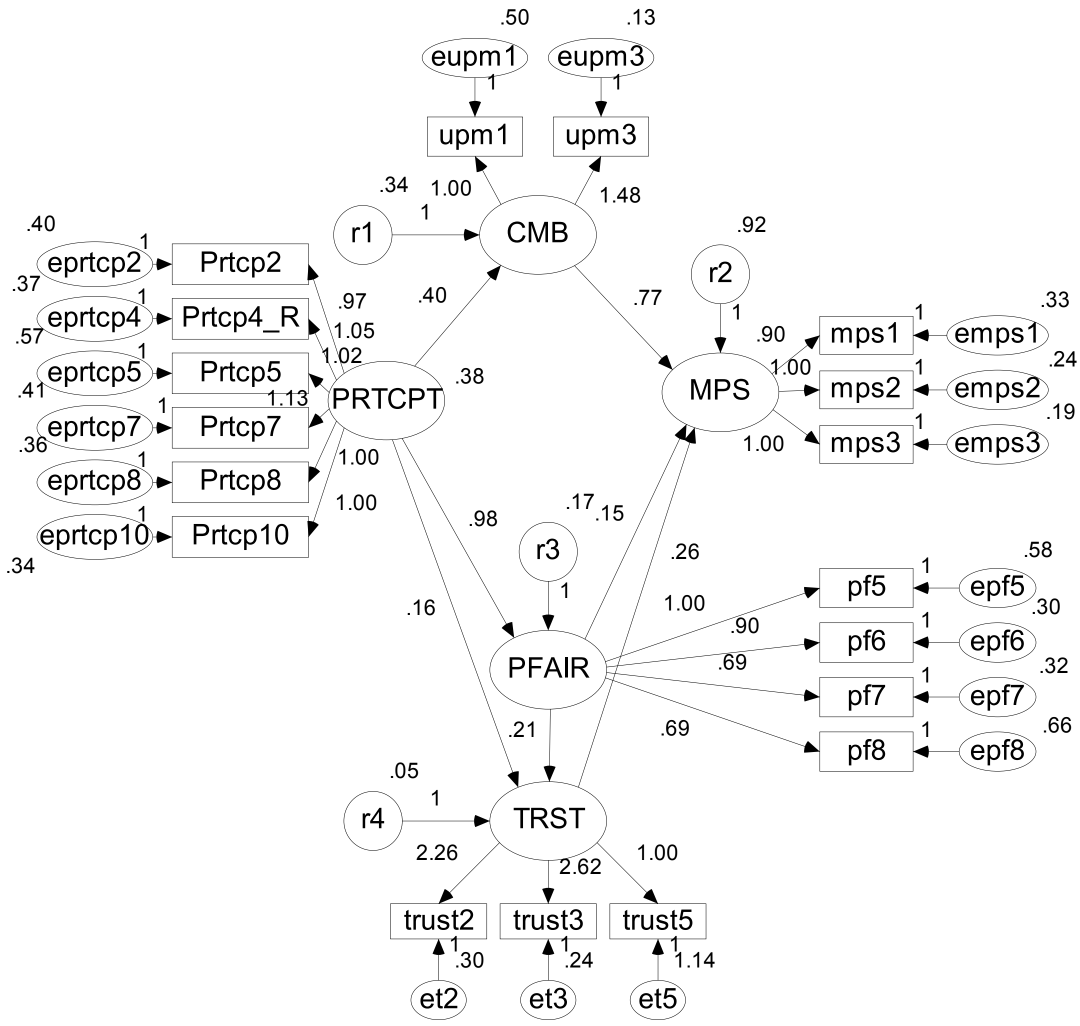
The relative effect (standardised regression weights) between independent and dependent variables shows stronger paths (with statistical significance) between PRTCPT and PFAIR (0.822) and PFAIR and TRST (0.509). The path between PRTCPT and TRST is rather weaker with no-statistical significance (see Table 8.9).

From the analysis of the initial and mediating model above, it can be inferred that PFAIR mediates the relationship between PRTCPT and TRST, since the four conditions for a mediator variable have been satisfied. This suggests that participation in developing performance measures impacts the trust between the parties involved in the performance evaluation process, via procedural fairness of the development of the performance measures.

8.5.2 Procedural Fairness (PFAIR) – MPS Model

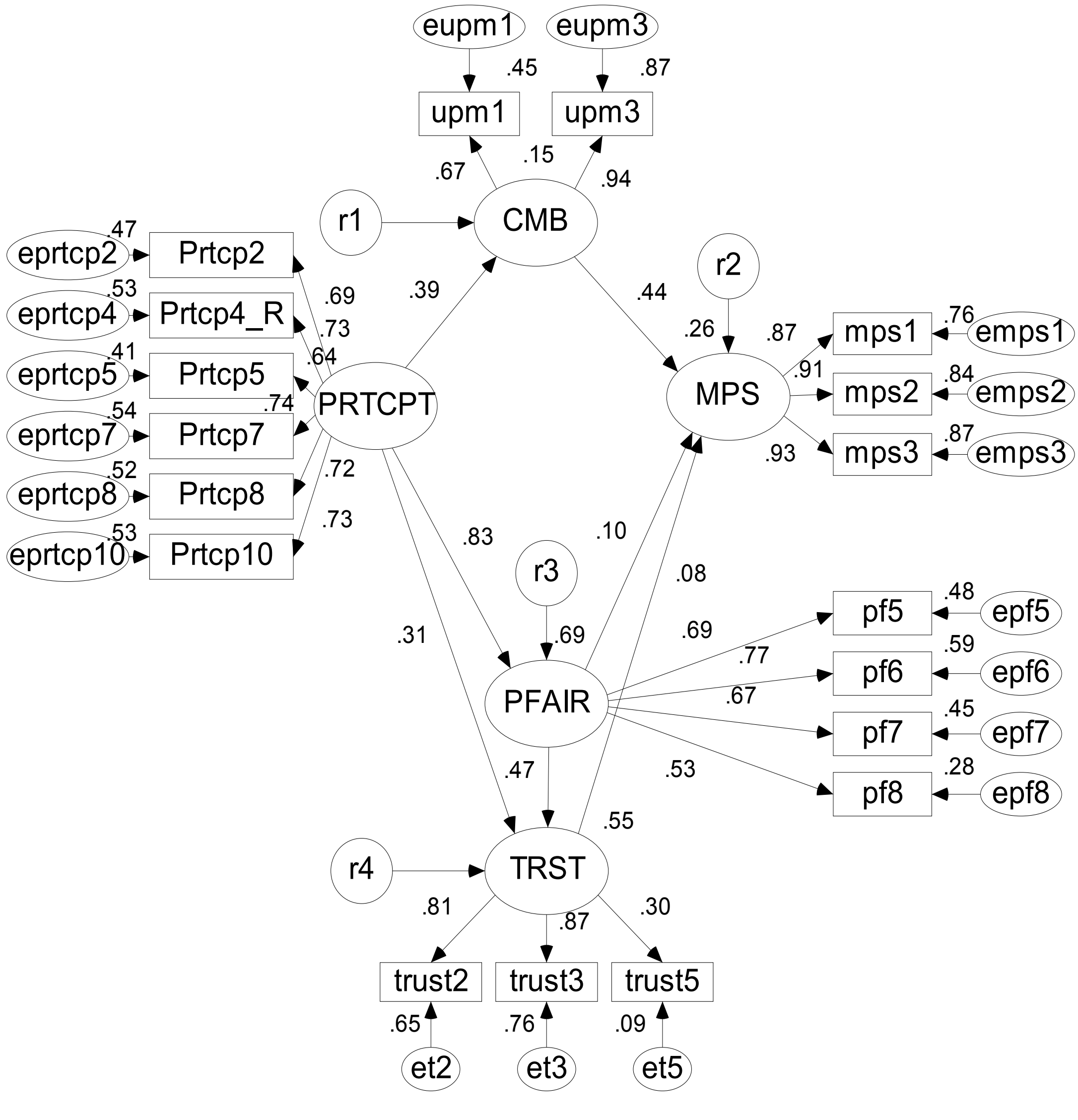
The initial PFAIR – MPS model, prior to any modification, comprises unstandardised estimates and is presented in Figure 8.11 while the standardised estimates are in Figure 8.12.

Figure 8.11: Initial PFAIR – MPS model with unstandardised estimates



Unstandardised Estimates
Chi-square = 220.163; df = 128; p value = .000;
Bollen-Stine p-value = .042;
GFI = .867; SRMR = .0623;
RMSEA = .066; CFI = .936; TLI = .924

Figure 8.12: Initial PFAIR – MPS model with standardised estimates



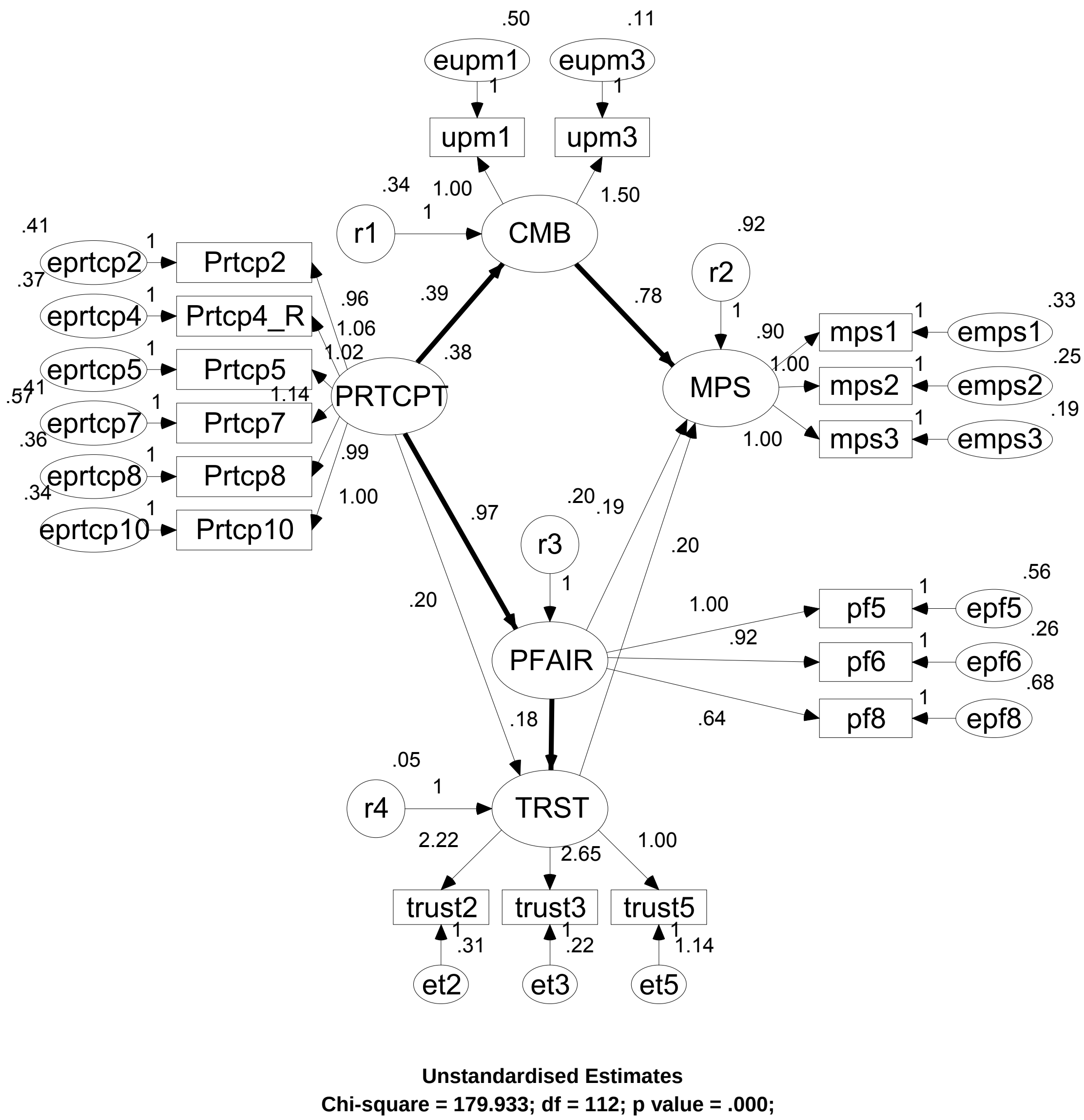
Standardised Estimates
Chi-square = 220.163; df = 128; p value = .000;
Bollen-Stine p-value = .042;
GFI = .867; SRMR = .0623;
RMSEA = .066; CFI = .936; TLI = .924

From Figures 8.11 and 8.12 above, it can be seen that the initial PFAIR – MPS model does not fit the data well as indicated by the significant chi-square fit, χ^2 (128) = 220.163, *p*-value = 0.000 and Bollen-Stine *p*-value = 0.042. The structural modelling of data requires that the data and the model being tested are not significantly different or p-value is greater than 0.05. Additionally, with the multi-variate non-normality data, the Bollen-Stine *p*-value will be applied. In order to accept the model, the Bollen-Stine *p*-value should be greater than 0.05. Hence, the model needs to be re-specified to better fit the data. The process of re-specifying the model is conducted by an examination of the standardised residual covariance matrix (SRMC) and modification indices (MIs). In the examination of the SRMC and MIs (see Table 1 and 2 in Appendix III – Part B), it is found that there are four pairs (i.e., upm1 – trust2, upm3 – trust3, upm1 – trust3 and upm1 – pf7) of indicators that have an absolute value of standardised residual covariance greater than 2. This indicates that this particular covariance is not well reproduced by the hypothesised model (Cunningham, 2008). Therefore, one or all of the items should be deleted.

The information obtained from the assessment of the MIs is consistent with that obtained from the assessment of the SRMC. The MIs indicate that deleting item pf7 would result in a decrease of the χ^2 statistic of at least 9.156 for a reduction of df of 1. After this deletion, the model fits the data very well (see Figure 8.13 and 8.14).

Figure 8.13 is the PFAIR – MPS model after re-specification with the unstandardised estimates. The unstandardised estimates model demonstrates regression weights and variances.

Figure 8.13: PFAIR – MPS model with unstandardised estimates

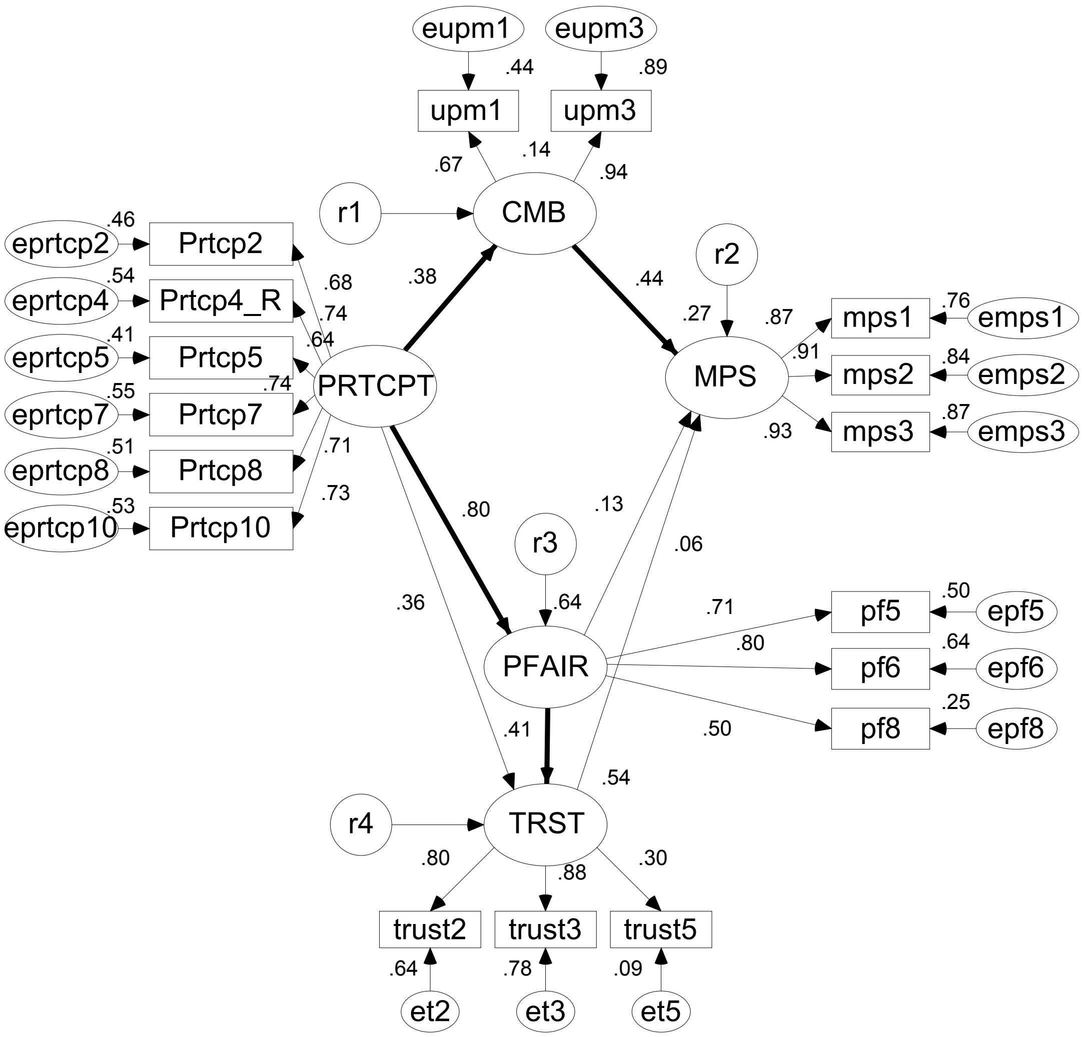


Unstandardised Estimates
Chi-square = 179.933; df = 112; p value = .000;
Bollen-Stine p-value = .092;
GFI = .883; SRMR = .0591;
RMSEA = .061; CFI = .950; TLI = .939

Note: The thick bold arrows show the statistically significant paths.

Figure 8.14 is the PFAIR – MPS model with standardised estimates. The standardised estimates model illustrates standardised regression weights and square multiple correlations (SMC).

Figure 8.14: PFAIR – MPS model with standardised estimates



Standardised Estimates
Chi-square = 179.933; df = 112; p value = .000;
Bollen-Stine p-value = .092;
GFI = .883; SRMR = .0591;
RMSEA = .061; CFI = .950; TLI = .939

Note: The thick bold arrows show the statistically significant paths.

The modified PFAIR – MPS model in Figures 8.13 and 8.14 yields a $\chi 2$ (112) = 179.933, *p*-value = 0.000 and Bollen-Stine *p*-value = 0.092 which is not significant at the level of 0.05. This is an indication that the model fits the data very well. This suggests that there is no difference between the model and the data.

However, after the deletion of item pf7, the three pairs (i.e., upm1 – trust2, upm3 – trust3 and upm1 – trust3) of indicators still have an absolute value of standardised residual covariance greater than 2 (see Table 3 in Appendix III – Part B). Additionally, the standardised residual covariance of items upm1 – pf8 is also greater than 2. This is an indication of the existence of multi-collinearity. Therefore, one or all of the items should be dropped. However, since the model fits the data well, that is, that there is no difference between the model and the data, those items are maintained in this model.

Based on the non-significant Bollen-Stine *p*-value of 0.092 at a level of 0.05, it can be seen that the model fits the data well; however it is necessary to check the other fit measurements, since no single measure has proven to be the best measure. Fortunately, based on Figures 8.13 and 8.14, the other fit measures also indicate the satisfactory fit of the model to the data (GFI = 0.883, SRMR = 0.0591, RMSEA = 0.061, and CFI = 0.950, TLI = 0.939) (see Table 7.2 Chapter 7 for the reference of the fit measures).

The modified model shows all paths, however, only four paths between the exogenous variable and endogenous variables are significant at the 0.01 and 0.05 level of significance (see regression weights estimates of significant paths in Table 8.10).

Table 8.10
Regression weights for PFAIR – MPS model

Ho Number				Estimate	S.E.	C.R.	*p*-value
H2a	PFAIR	<---	PRTCPT	.968	.138	7.026	***
H8a	TRST	<---	PFAIR	.184	.092	2.007	.045**
H1	CMB	<---	PRTCPT	.385	.108	3.563	***
H4	TRST	<---	PRTCPT	.195	.103	1.889	.059
H6b	MPS	<---	PFAIR	.192	.204	.944	.345
H5b	MPS	<---	CMB	.775	.160	4.854	***
H7b	MPS	<---	TRST	.201	.435	.461	.645

Note: *** *p*-value is statistically significant at the 0.01 level (two-tailed)
** *p*-value is statistically significant at the 0.05 level (two-tailed)

The new modified model also indicates that there are varying explanations for the dependent variables. Table 8.11 demonstrates that determinant (PRTCPT) accounts for the variance of dependent variables with a high degree of explanation for procedural fairness (PFAIR) and trust (TRST), and a reasonable explanation for the use of performance measures (CMB) and managerial performance based on division manager's view of senior manager's perception of performance (MPS). Specifically, the determinant accounts for:

- 64.3% of the variance of PFAIR;
- 53.9% of the variance of TRST;
- 14.2% of the variance of CMB; and
- 26.9% of the variance of MPS.

Table 8.11
Squared multiple correlations (SMC) for PFAIR – MPS model

	Estimate
PFAIR	.643
TRST	.539
CMB	.142
MPS	.269

In the PFAIR – MPS model, one research hypothesis between independent and dependent variable is accepted, which is H5b, while H6b and H7b are rejected. This suggests that CMB → MPS. Hence, it can be said that common-measure bias significantly influences division's managerial performance based on a division manager's view of senior manager's perception of performance. However, it also found that procedural fairness in the development of performance measures does not significantly influence the division's managerial performance based on division manager's view of senior manager's perception. Likewise with trust, which also does not significantly influence the division's managerial performance (senior manager's self-assessment).

The relative effect (standardised regression weights) between independent and dependent variables shows stronger paths (with statistical significance) between PRTCPT and PFAIR (0.802), CMB and MPS (0.437), PFAIR and TRST (0.412), PRTCPT and CMB (0.377) and PRTCPT and TRST (0.361). The rest are rather weaker and not statistically significant (see Table 8.12).

Table 8.12
Standardised regression weights for PFAIR – MPS model

			Estimate
PFAIR	<---	PRTCPT	.802
TRST	<---	PFAIR	.412
CMB	<---	PRTCPT	.377
TRST	<---	PRTCPT	.361
MPS	<---	PFAIR	.128
MPS	<---	CMB	.437
MPS	<---	TRST	.060

This may suggest that the higher the level of participation in developing the performance measures, the greater the procedural fairness perception of the performance measures and the lower the common-measure bias. Moreover, this also suggests that the greater the procedural fairness perception of the performance measures, the stronger the trust between parties involved in the performance evaluation process. Finally, a significant positive influence on division's managerial performance, based on division manager's view of senior manager's perception of performance, occurs when common-measure bias level is low.

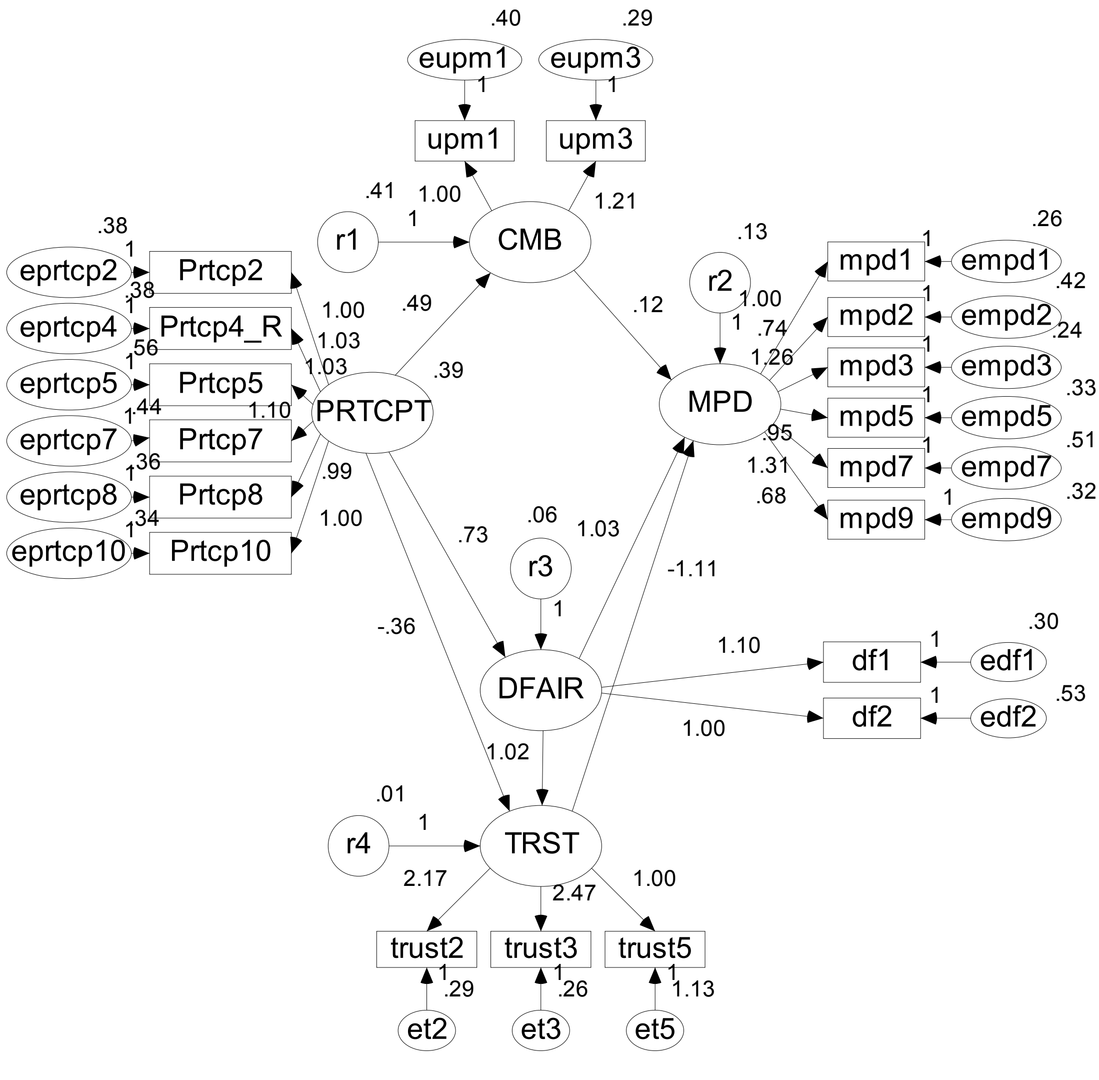
8.6 Distributive Fairness Model

With the investigation of the procedural fairness model, the examination of the distributive fairness model using SEM's path data analysis are also divided into two models, which are DFAIR – MPD and DFAIR – MPS model.

8.6.1 Distributive Fairness (DFAIR) – MPD Model

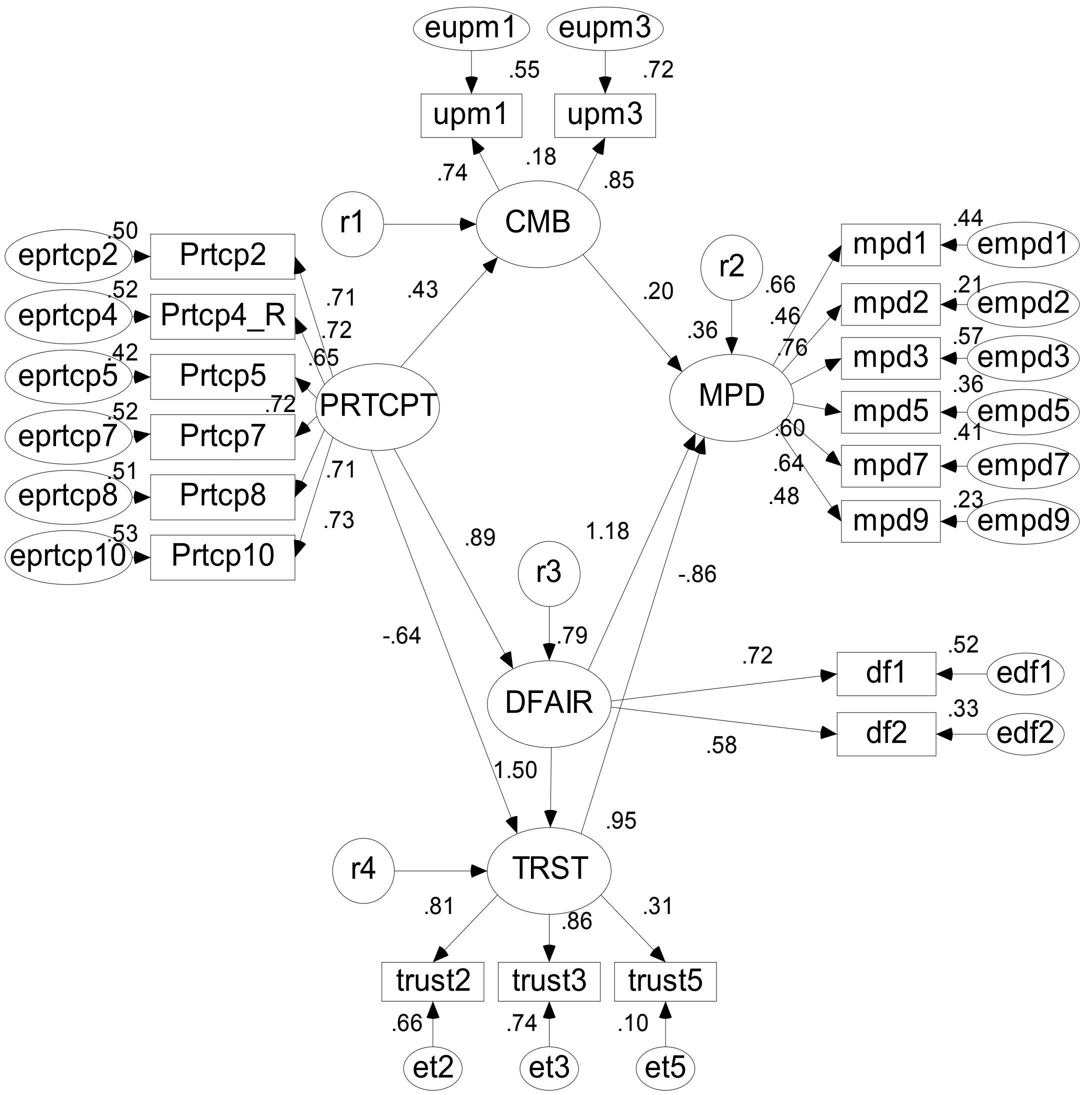
The initial DFAIR – MPD model, prior to any modification, comprises of unstandardised estimates and is presented in Figure 8.15, while the standardised estimates are in Figure 8.16.

Figure 8.15: Initial DFAIR – MPD model with unstandardised estimates



Unstandardised Estimates
Chi-square = 242.768; df = 145; p value = .000;
Bollen-Stine p-value = .008;
GFI = .868; SRMR = .0630;
RMSEA = .064; CFI = .914; TLI = .898

Figure 8.16: Initial DFAIR – MPD model with standardised estimates



Standardised Estimates
Chi-square = 242.768; df = 145; p value = .000;
Bollen-Stine p-value = .008;
GFI = .868; SRMR = .0630;
RMSEA = .064; CFI = .914; TLI = .898

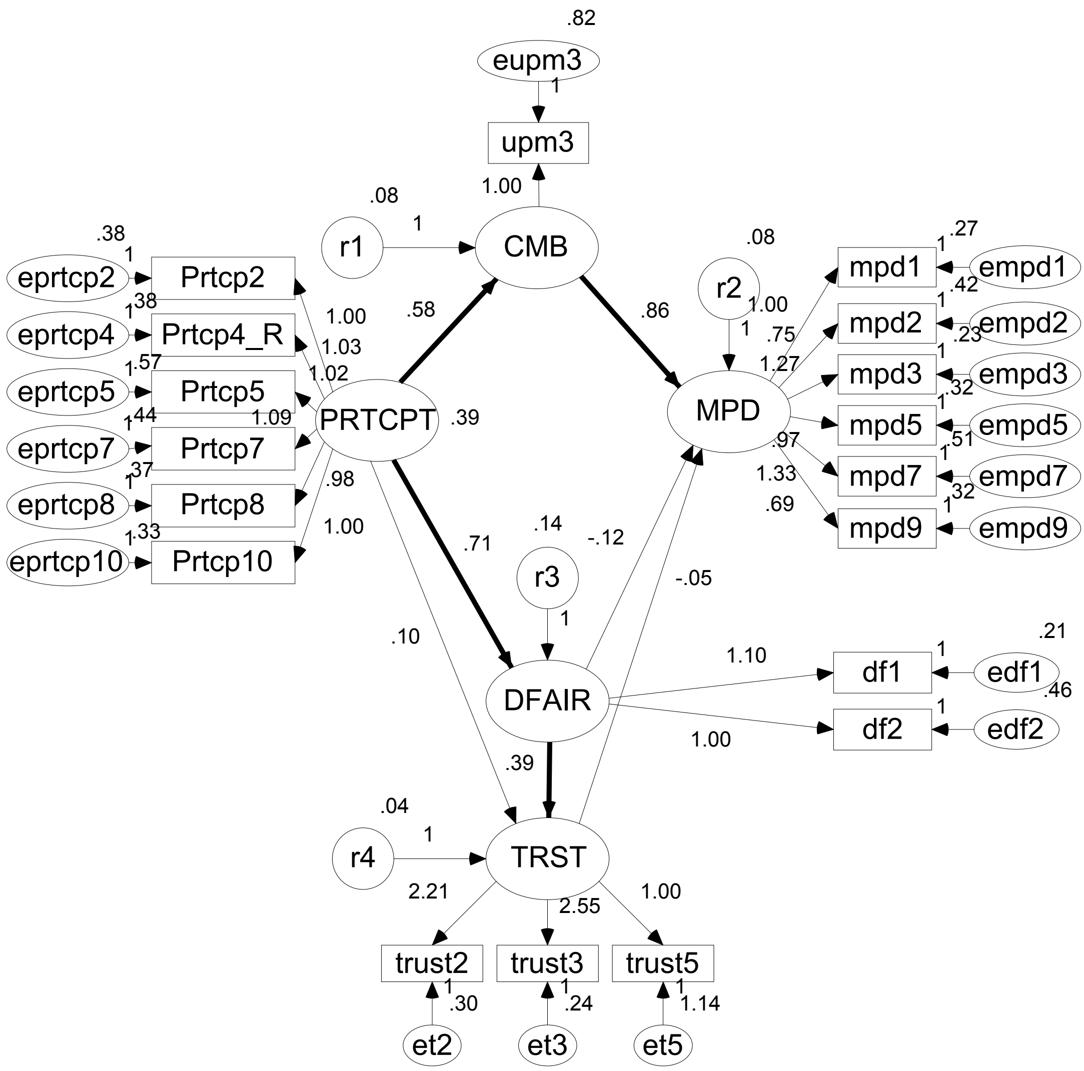
It can be seen in Figures 8.15 and 8.16 above, that the initial model does not fit well with the data, since the chi-square fit, χ^2 (145) = 242.768, *p*-value = 0.000 and Bollen-Stine *p*-value = 0.008 which is significant at 0.05 level of significance. Since the structural modelling requires that the data, and the model being tested, are not significantly different or have a *p*-value that is greater than 0.05, the model needs to be re-specified to fit better. Furthermore, given that there are multi-variate non-normality data, the Bollen-Stine *p*-value will be used.

This Bollen-Stine *p*-value should be greater than 0.05 in order to accept the model. The re-specification of the model will be done by the examination of the standardised residual covariance (SRMC) and modification indices (MIs). The assessment of the SRMC and MIs (see Table 1 and 2 in Appendix III – Part C), found that three pairs (i.e., upm1 – trust2, upm3 – trust3 and upm1 – trust3) of indicators have an absolute value of standardised residual covariance greater than 2. This suggests that a particular covariance is not well reproduced by the hypothesised model (Cunningham, 2008). Therefore, one or all of the indicators should be deleted.

The inspection of the MIs is also providing consistent results with those obtained from the inspection of the SRMC. For example, the MIs indicate that deleting item upm1 would result in a decrease of the $\chi 2$ statistic of at least 5.681 for a reduction in df of 1. Given that, it seems reasonable to delete item upm1. This process would be repeated until the model represents a good fit to the data. After this deletion, the model fits the data very well (see Figures 8.17 and 8.18).

Figure 8.17 is the DFAIR – MPD model after re-specification with the unstandardised estimates. The unstandardised estimates model shows regression weights and variances.

Figure 8.17: DFAIR – MPD model with unstandardised estimates

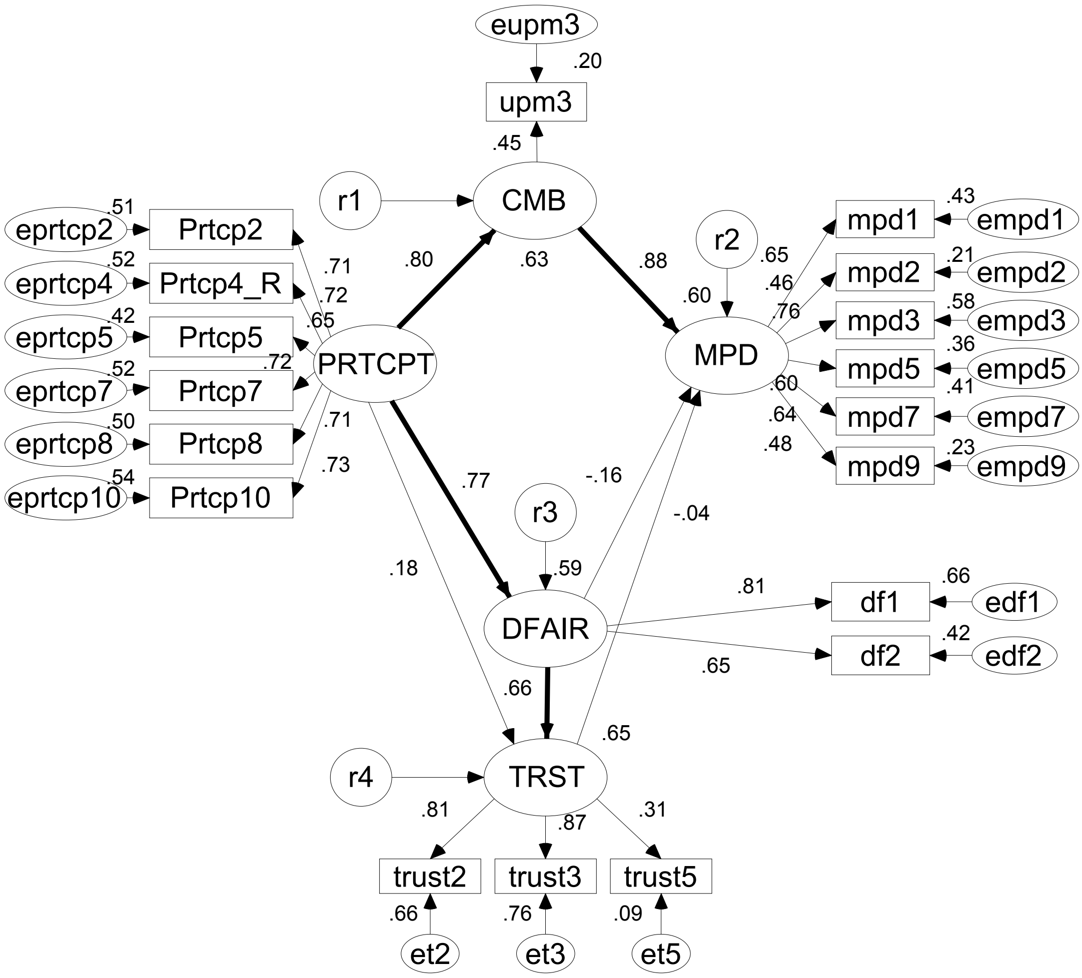


Unstandardised Estimates
Chi-square = 192.805; df = 128; p value = .000;
Bollen-Stine p-value = .076;
GFI = .886; SRMR = .0572;
RMSEA = .056; CFI = .937; TLI = .925

Note: The thick bold arrows show the statistically significant paths.

Figure 8.18 is the DFAIR – MPD model with standardised estimates. The standardised estimates model demonstrates standardised regression weights and SMC.

Figure 8.18: DFAIR – MPD model with standardised estimates



Standardised Estimates
Chi-square = 192.805; df = 128; p value = .000;
Bollen-Stine p-value = .076;
GFI = .886; SRMR = .0572;
RMSEA = .056; CFI = .937; TLI = .925

Note: The thick bold arrows show the statistically significant paths.

The final modified DFAIR – MPD model in Figures 8.17 and 8.18 yields a $\chi2$ (128) = 192.805, p-value = 0.000 and Bollen-Stine p-value = 0.076 which is not significant at the level of 0.05. This is an indication that the model fits the data very well. After the deletion of item upm1, there is still one pair of indicators which is upm3 – trust3 that have an absolute value of standardised residual covariance greater than 2 (see Table 3 in Appendix III – Part C). This is an indication of the existence of multi-collinearity. Therefore, one or both, of those items should be deleted. However since the model fits the data well, as indicated by the not significant Bollen-Stine p-value, those items are maintained in this model.

As can be seen in Figures 8.17 and 8.18, the non-significant Bollen-Stine *p*-value of 0.076 at a level of 0.05 indicates that the model fits the data well. However, since no single measure is the best measure of fit, it is necessary to examine other model fit measures. Based on Figures 8.17 and 8.18, the other fit measures also indicate the satisfactory fits of the model to the data (GFI = 0.886, SRMR = 0.0572, RMSEA = 0.056, CFI = 0.937 and TLI = 0.925) (see Table 7.2 Chapter 7 for the reference of the fit measures).

The final modified model shows all paths, however, only four paths between the exogenous variable and endogenous variables are statistically significant at the 0.01 level of significance. This is shown in the regression weights estimates of significance in Table 8.13.

Table 8.13
Regression weights for DFAIR – MPD model

Ho Number				Estimate	S.E.	C.R.	*p*-value
H2b	DFAIR	<---	PRTCPT	.715	.113	6.315	***
H4	TRST	<---	PRTCPT	.098	.096	1.026	.305
H8b	TRST	<---	DFAIR	.390	.151	2.583	.010***
H1	CMB	<---	PRTCPT	.577	.135	4.291	***
H5a	MPD	<---	CMB	.861	.282	3.051	.002***
H6c	MPD	<---	DFAIR	-.119	.192	-.621	.534
H7a	MPD	<---	TRST	-.051	.245	-.208	.835

Note: *** *p*-value is statistically significant at the 0.01 level (two-tailed)

The final modified model also indicates that there are varying explanations for the dependent variables. Table 8.14 shows that determinant (PRTCPT) accounts for the variance of the dependent variables with a high degree of explanation for DFAIR, CMB, TRST and MPD. Specifically, the determinant accounts for:

- 59.5% of the variance of DFAIR;
- 63.4% of the variance of CMB;

- 64.9% of the variance of TRST; and
- 60.0% of the variance of MPD.

Table 8.14
Squared multiple correlations (SMC) for DFAIR – MPD model

	Estimate
DFAIR	.595
CMB	.634
TRST	.649
MPD	.600

The results indicate that four research hypotheses between the determinant and dependent variables in the DFAIR – MPD model are accepted. They are: H1; H2b; H5a; and H8b, while H4, H6c and H7a are rejected. This suggests that PRTCPT → DFAIR, PRTCPT → CMB, DFAIR → TRST, and CMB → MPD. It can be said that participation significantly influences distributive fairness and common-measure bias. Simultaneously, distributive fairness significantly influences trust between the parties involved in the performance evaluation process. In addition, common-measure bias significantly influences the division's managerial performance. However, the results also suggest that participation in the development of performance measures does not directly significantly influence the trust between parties involved in the performance evaluation process. Furthermore, both trust and distributive fairness did not significantly influence the division's managerial performance.

The relative effect (standardised regression weights) between independent and dependent variables shows stronger paths (with statistical significance) between PRTCPT and DFAIR (0.771), DFAIR and TRST (0.659), PRTCPT and CMB (0.796) and CMB and MPD (0.877). The rest are rather weaker with non-statistical significance (see Table 8.15).

Table 8.15
Standardised regression weights for DFAIR – MPD model

			Estimate
DFAIR	<---	PRTCPT	.771
TRST	<---	PRTCPT	.179
TRST	<---	DFAIR	.659
CMB	<---	PRTCPT	.796
MPD	<---	CMB	.877
MPD	<---	DFAIR	-.155
MPD	<---	TRST	-.039

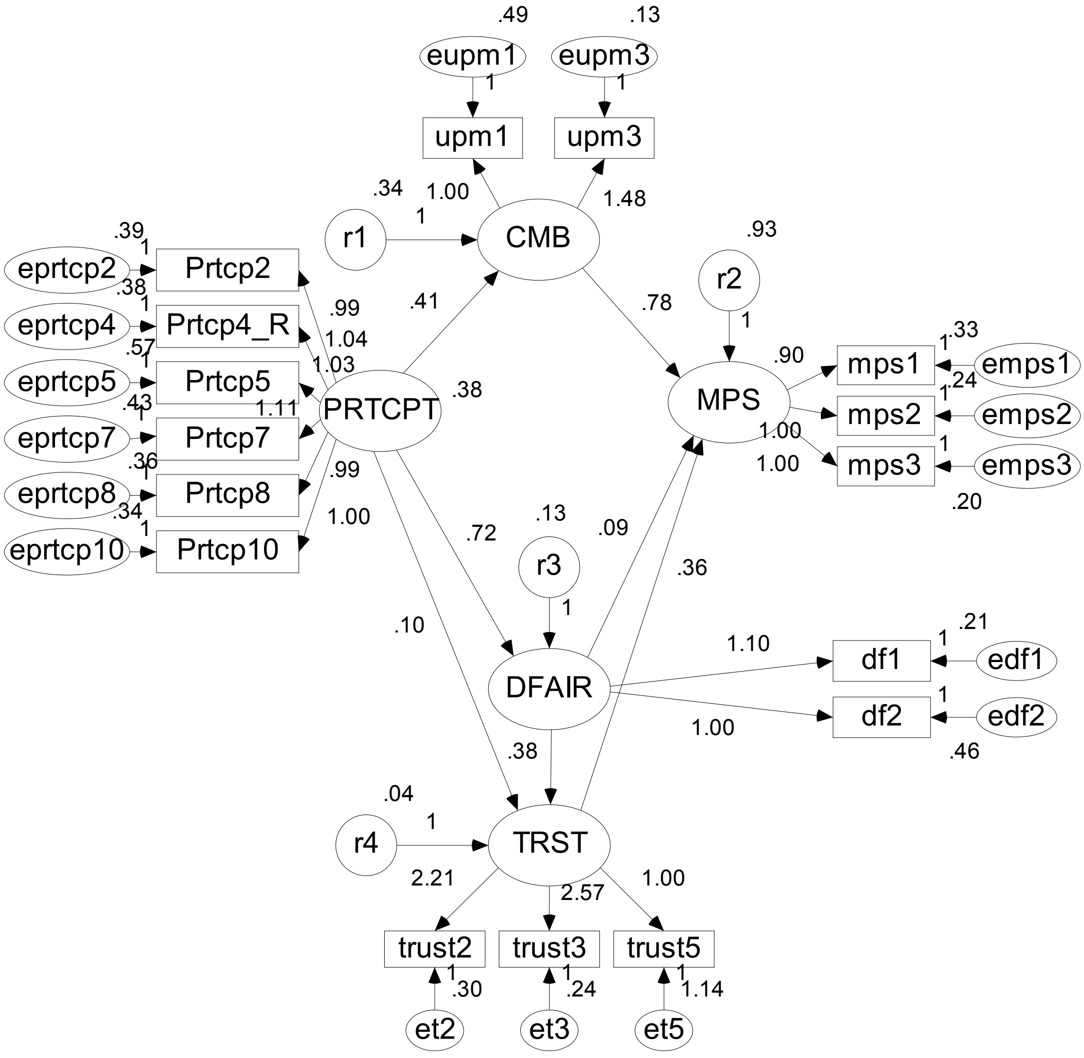
This suggests that the higher the level of participation in developing the performance measures, the greater the distributive fairness perception of the performance measures and the lower the common-measure bias. Moreover, this also suggests that the greater the distributive fairness perception of the performance measures, the stronger the trust between parties involved in the performance evaluation process. Finally, the lower the common-measure bias, the better the division's managerial performance.

Additionally, from the paths diagram (see Figure 8.17 and 8.18), it can be seen that participation in developing the performance measures does not have a significant direct impact in the trust between parties involved in the evaluation process. However, participation significantly influences the trust via distributive fairness. This implies that distributive fairness mediates the relationship between the participation in developing the performance measures, and the trust between parties involved in the performance evaluation process.

8.6.2 Distributive Fairness (DFAIR) – MPS Model

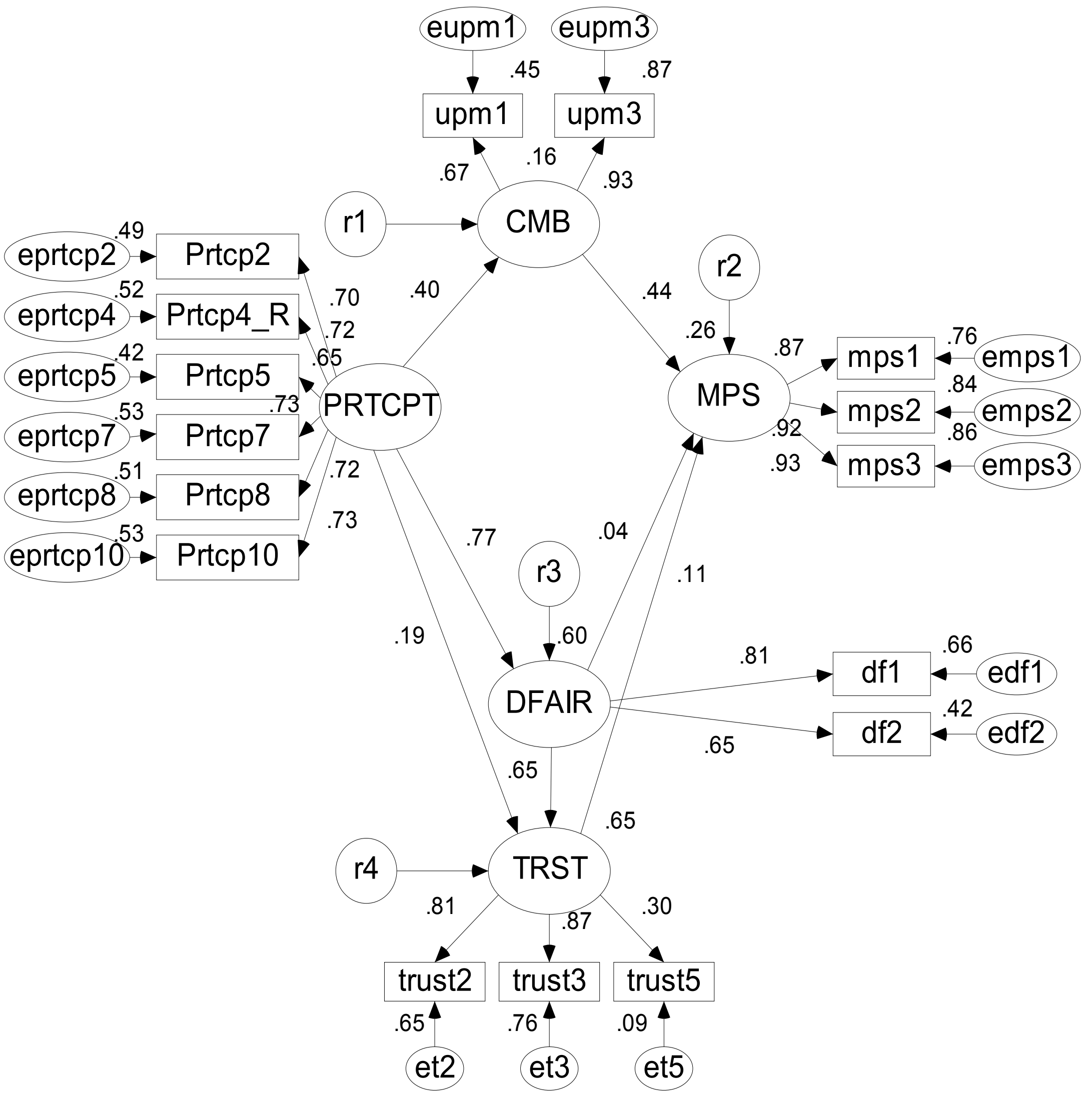
The initial DFAIR – MPS model, prior to any modification, is presented in Figure 8.19 with unstandardised estimates and in Figure 8.20 with standardised estimates.

Figure 8.19: Initial DFAIR – MPS model with unstandardised estimates



Unstandardised Estimates
Chi-square = 188.925; df = 97; p value = .000;
Bollen-Stine p-value = .015;
GFI = .874; SRMR = .0627;
RMSEA = .076; CFI = .931; TLI = .915

Figure 8.20: Initial DFAIR – MPS model with standardised estimates



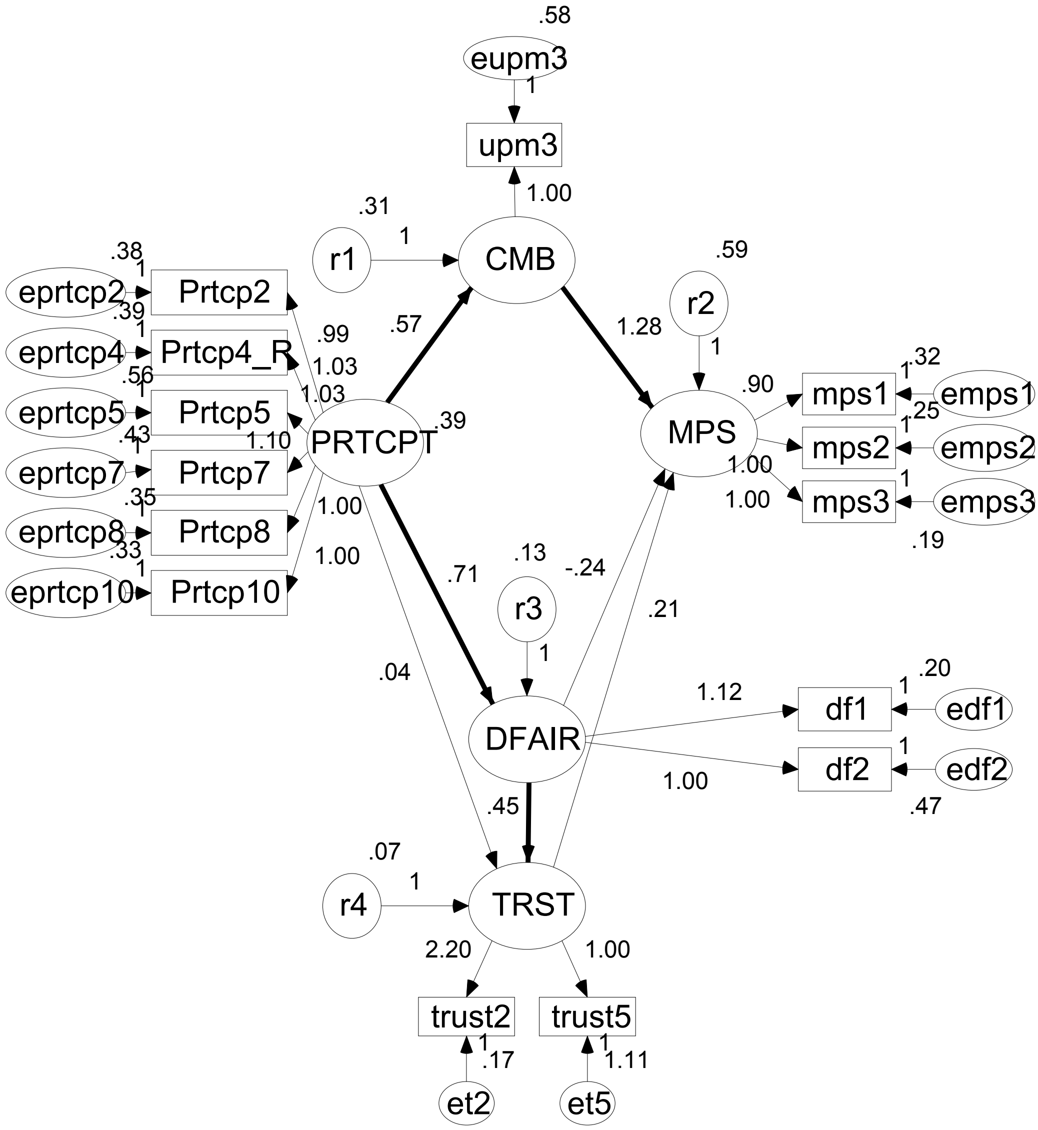
Standardised Estimates
Chi-square = 188.925; df = 97; p value = .000;
Bollen-Stine p-value = .015;
GFI = .874; SRMR = .0627;
RMSEA = .076; CFI = .931; TLI = .915

From Figures 8.19 and 8.20 above, it can be seen that the initial DFAIR – MPS model does not fit the data well as indicated by the significant chi-square fit, $\chi 2$ (97) = 188.925, *p*-value = 0.000 and Bollen-Stine *p*-value = 0.015. The structural modelling of data requires that the data and the model being tested are not significantly different or have a *p*-value that is greater than 0.05. In addition, the Bollen-Stine *p*-value will be used because of the multi-variate non-normality of the data. This needs to have value greater than 0.05 as well.

Given that, the initial model needs to be re-specified to fit better. This process is conducted via an examination of the standardised residual covariance matrix (SRMC) and modification indices (MIs). The examination of SRMC and MIs (see Table 1 and 2 in Appendix III – Part D) found two pairs (i.e., upm1 – trust2 and upm1 – trust3) of indicators that have an absolute value of standardised residual covariance greater than 2. This suggests that a particular covariance is not well reproduced by the hypothesised model (Cunningham, 2008). Therefore, one or all, of the indicators should be dropped. The inspections of the MIs also confirmed this result. Based on the information, items upm1 and trust3 have to be deleted to arrive at a good fit model. Following this deletion, the model fits the data very well (see Figure 8.21 and 8.22).

Figure 8.21 is the DFAIR – MPS model after re-specification with the unstandardised estimates. The unstandardised estimates model illustrates regression weights and variances.

Figure 8.21: DFAIR – MPS model with unstandardised estimates

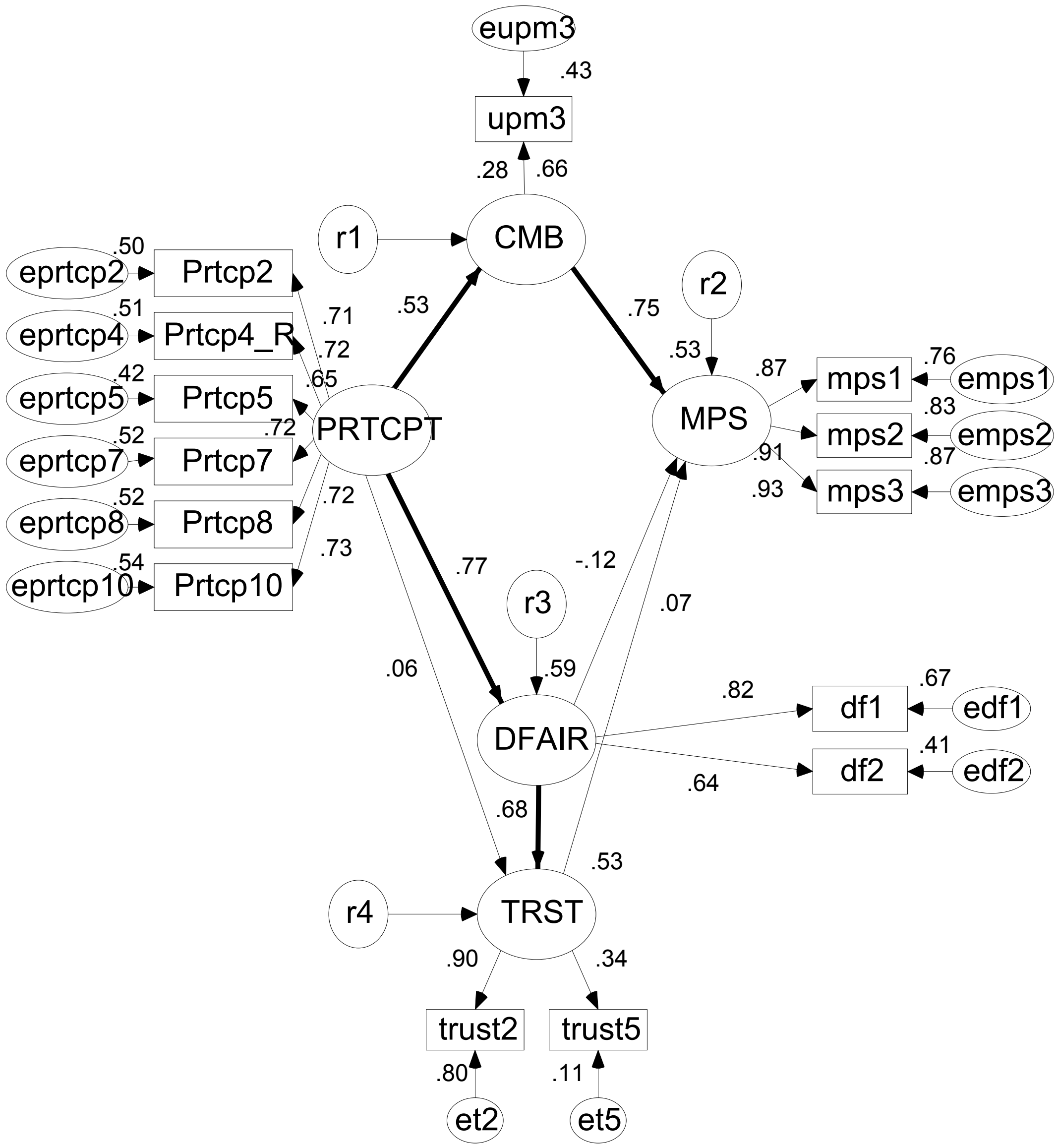


Unstandardised Estimates
Chi-square = 111.486; df = 70; p value = .001;
Bollen-Stine p-value = .149;
GFI = .912; SRMR = .0492;
RMSEA = .060; CFI = .961; TLI = .950

Note: The thick bold arrows show the statistically significant paths.

Figure 8.22 is the DFAIR – MPS model with standardised estimates. The standardised estimates model shows standardised regression weights and SMC.

Figure 8.22: DFAIR – MPS Model with standardised estimates



Standardised Estimates
Chi-square = 111.486; df = 70; p value = .001;
Bollen-Stine p-value = .149;
GFI = .912; SRMR = .0492;
RMSEA = .060; CFI = .961; TLI = .950

Note: The thick bold arrows show the statistically significant paths.

The modified DFAIR – MPS model in Figure 8.21 and 8.22 yields a $\chi 2$ (70) = 111.486, *p*-value = 0.001 and Bollen-Stine *p*-value = 0.149 which is not significant at the level of 0.05. This is an indication that the model fits the data very well. After the deletion of the two items, all of the standardised residual co-variances were less than two in magnitude (see Table 3 in Appendix III – Part D).

Due to the absence of a single best measure of fit, the present thesis also reports the other model fit measures. From Figures 8.21 and 8.22, it can be seen that the other fit measures also demonstrate the goodness of fit of the model to the data (GFI = 0.912, SRMR = 0.0492, RMSEA = 0.060, CFI = 0.961 and TLI = 0.950) (see Table 7.2 chapter 7 for the reference of the fit measures).

The modified model shows all paths, however, only four paths between the exogenous variable and endogenous variables are significant at the 0.01 and 0.05 levels of significances (see regression weights estimates of significant paths in Table 8.16).

Table 8.16
Regression weights for DFAIR – MPS model

Ho Number				Estimate	S.E.	C.R.	*p*-value
H2b	DFAIR	<---	PRTCPT	.709	.114	6.194	***
H4	TRST	<---	PRTCPT	.036	.112	.320	.749
H8b	TRST	<---	DFAIR	.450	.199	2.263	.024**
H1	CMB	<---	PRTCPT	.565	.135	4.178	***
H5b	MPS	<---	CMB	1.284	.526	2.439	.015**
H6d	MPS	<---	DFAIR	-.243	.421	-.577	.564
H7b	MPS	<---	TRST	.214	.431	.496	.620

Note: *** *p*-value is statistically significant at the 0.01 level (two-tailed)
** *p*-value is statistically significant at the 0.05 level (two-tailed)

The new modified model also indicates that there are varying explanations for the dependent variables. Table 8.17 shows that the determinant (PRTCPT) accounts for the variance of dependent variables with a high degree of explanation for distributive fairness (DFAIR), trust (TRST) and managerial performance based on the division manager's view of senior manager's perception of performance (MPS) and a reasonable explanation for the use of performance measures (CMB).

Table 8.17
Squared multiple correlations (SMC) for DFAIR – MPS model

	Estimate
DFAIR	.591
TRST	.531
CMB	.282
MPS	.533

Specifically, the determinant accounts for:

- 59.1% of the variance of DFAIR;
- 53.1% of the variance of TRST;
- 53.3% of the variance of MPS; and
- 28.2% of the variance of CMB.

In the DFAIR – MPS model, one research hypothesis between the independent and dependent variable is accepted, which is H5b, while H6d and H7b are rejected. This suggests that CMB → MPS. Hence, it can be said that common-measure bias significantly influences the division's managerial performance based on the division manager's view of senior manager's perception of performance. However, the results also showed that distributive fairness of performance measures does not significantly influence division managerial performance. Similarly, trust between parties involved in the performance evaluation process does not significantly influence division managerial performance based on the division manager's view of senior manager's perception of performance.

From Table 8.18, it can be seen that the relative effect (standardised regression weights) between independent and dependent variables shows stronger paths (with statistical significance) between PRTCPT and DFAIR (0.769), DFAIR and TRST (0.682), CMB and MPS (0.754) and PRTCPT and CMB (0.531). The rest are rather weaker and not statistically significant (see Table 8.18).

Table 8.18
Standardised regression weights for DFAIR – MPS model

			Estimate
DFAIR	<---	PRTCPT	.769
TRST	<---	PRTCPT	.059
TRST	<---	DFAIR	.682
CMB	<---	PRTCPT	.531
MPS	<---	CMB	.754
MPS	<---	DFAIR	-.123
MPS	<---	TRST	.072

This may suggest that the higher the level of participation in developing the performance measures, the greater the distributive fairness perception of the performance measures and the lower the common-measure bias. Moreover, this also suggests that the greater the distributive fairness perception of the performance measures, the stronger the trust between parties involved in the performance evaluation process. In addition, the lower the common-measure bias the better the division's managerial performance based on the division manager's view of senior manager's perception of performance.

Furthermore, from the paths diagram (see Figure 8.21 and 8.22), it can be seen that the participation in developing the performance measures significantly influences the trust between parties involved in the performance evaluation process via distributive fairness perception of the performance measures. This implies that distributive fairness perception of the performance measures mediates the relationship between the participation in the development of the performance measures, and the trust between parties involved in the performance evaluation process.

In summary, it can be said that the determinant/predictor significantly explained some of the dependent variables. Additionally, its capabilities in explaining the variance of fairness perception (PFAIR and DFAIR) and trust between parties in the performance evaluation process (TRST) are stronger than the common-measure bias (CMB) and the division's managerial performance (MPD and MPS) in all of the models. The only exception was the DFAIR – MPD model, where PRTCPT explained the four dependent variables almost equally.

The next step, after examining the entire fairness model, is testing hypothesis H3. The test will be done using SPSS software to conduct frequency testing and a chi-square test for goodness of fit. This will test the differences in frequencies between financial and non-financial measures. The examination is presented below.

8.7 Fairness of Financial vs. Non-financial Measures

In the proposed research model, H3 is formulated as:

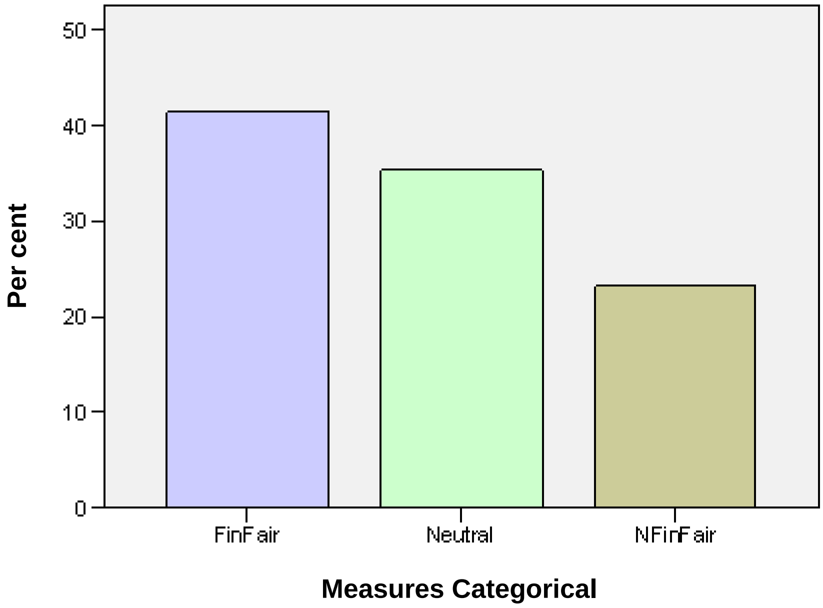
H3 : Non-financial measures are perceived to be more fair than financial measures.

This hypothesis basically tests the divisional manager's perceptions of financial and non-financial performance measures that have been used to assess their managerial performance, in terms of their fairness perception. Table 8.19 illustrates the frequencies of the measures category and Figure 8.23 shows the bar chart of the measures category.

Table 8.19
Frequencies of the measures category

		Frequency	Valid Percent	Cumulative Percent
Valid	FinFair	68	41.5	41.5
	Neutral	58	35.4	76.8
	NFinFair	38	23.2	100.0
	Total	164	100.0	

Figure 8.23: The bar chart of the measures category



From Table 8.19 and Figure 8.23, it can be seen that 41.5% of the respondents perceived that financial measures are fairer than non-financial measures, while only 23.2% perceived that non-financial measures are fairer than financial measures. The rest of the respondents (35.4%) did not perceive any differences between the two measures. The bar chart also shows the same pattern. Therefore, it can be concluded that H3 – non-financial measures are perceived to be more fair than financial measures – is rejected since a high proportion of the respondents perceived financial measures as being fairer than the non-financial measures.

However, further tests are required to determine if differences in frequencies exists across response categories. A chi-square test for goodness of fit is conducted to test the differences. The result from the test is presented in Tables 8.20 and 8.21.

Table 8.20
Result output of the type of measures

	Observed N	Expected N	Residual
FinFair	68	54.7	13.3
Neutral	58	54.7	3.3
NFinFair	38	54.7	-16.7
Total	164		

Table 8.21
Result output of the test statistics of the type of measures

	Type of measures
Chi-Square(a)	8.537
df	2
Asymp. Sig.	.014

a 0 cells (.0%) have expected frequencies less than 5.
The minimum expected cell frequency is 54.7.

From Tables 8.20 and 8.21, it can be seen that the chi-square value is significant ($p < 0.05$). Hence, it can be concluded that there are significant differences in the frequencies of the division manager's perception of the fairness of performance measures between financial measures and non-financial measures, χ^2 (2, N = 164) = 8.537, $p < 0.05$. This result further supports the conclusion that H3 is rejected, since the divisional managers perceived that financial performance measures are fairer than non-financial performance measures.

8.8 Summary

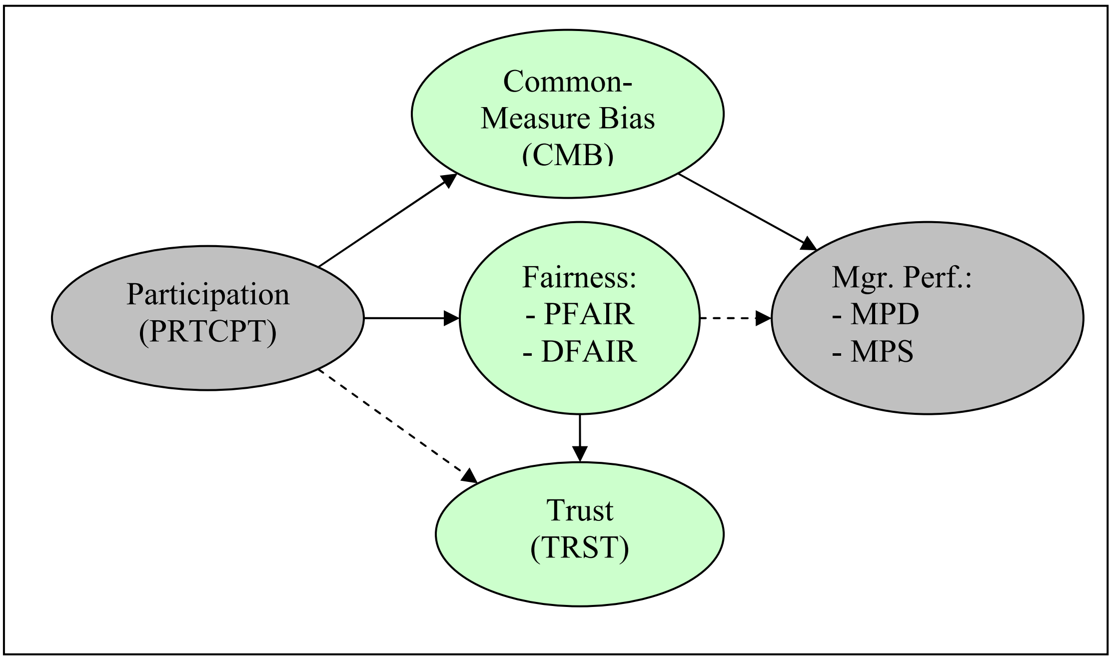
First, this chapter began with the examination of the model estimation which included the discussion of standardised and unstandardised structural (path) coefficient squared multiple correlations (SMC). Second, the proposed research model with all the hypotheses being tested was outlined. Third, an introduction to the full structural model was discussed. Finally, two steps of data analysis were presented and discussed along with the results of the hypotheses testing.

The first step involved testing the research model by investigating the SEM path analysis based on four full structural models. These four structural models comprised of two types of fairness: procedural fairness (PFAIR); and distributive fairness (DFAIR); and two types of managerial performance: division manager's self-assessment (MPD); and the division manager's performance based on the division manager's view of senior manager's perception of performance (MPS). The second step was to conduct frequencies testing and a chi-square test for goodness of fit. This assessed differences in frequencies between financial and non-financial measures in terms of their perceived fairness.

From the hypotheses testing in step one, the present research found that not all of the hypotheses proposed in the current research were supported. The hypotheses that were accepted in the present study were H1, H2a, H2b, H5a, H5b, H6a, H8a and H8b. This suggests that participation in developing the performance measures significantly influences the use of the performance measure as the common-measure bias decreases. Moreover, participation was seen to influence significantly the fairness perception of the performance measures, both in procedural and distributive fairness. Furthermore, the increase of the fairness perception, both in procedural and distributive fairness, had a significant positive effect on trust between parties involved in the performance evaluation process. In addition, procedural fairness perception of the performance measures was found to influence significantly division managerial performance.

However, the results of the testing in step one also rejected hypotheses H6b, H6c, H6d, H7a and H7b. This suggests that distributive fairness perception of the performance measures does not significantly influence the division's managerial performance. Similarly, the trust between parties involved in the performance evaluation process was seen not to influence significantly the division's managerial performance. Additionally, H4 was also rejected although it was supported in the PPFAIR – MPS model. This implies that participating in the development of the performance measures does not significantly influence the trust between parties involved in the performance evaluation process. However, participation does indirectly influence the trust via the fairness perception of the performance measures. The results of the fairness model are summarised in Figure 8.24.

Figure 8.24: The fairness perception model



From the hypotheses testing in step 2, H3 was rejected. This suggests that divisional managers perceive financial measures as being fairer than non-financial measures. In the next chapter, the conclusion and suggestions in the present research will be discussed.

Chapter 9 Discussions, Conclusions and Suggestions

9.1 Introduction

While the previous chapter analysed the results of the study, the objective of the final chapter is to summarise the findings of the study with emphasis on the fairness perception model. The current chapter will also assess the implications of the present research as well as outlining the limitations of the study and suggestions for further research.

9.2 Key Findings of Demographic Characteristics

The demographic characteristics findings comprise of the companies and divisions, the division's output, the division managers and their general perceptions relating to the performance measures. Those key findings are briefly summarised below.

9.2.1 The Companies and the Divisions

The companies and divisions data revealed that the agricultural/mining/ construction industry had the largest proportion of respondents (28.0%). This was followed by the real estate industry (17.1%) and then the manufacturing industry (14.0%). The company divisions showed a similar pattern, where the largest proportional participation occurred in the agricultural/mining/construction industry (22.6%), the real estate industry (14.0%), followed by the banking/finance/insurance industry (12.2%). Furthermore, according to the data, most of the division output is for external consumers (39.6%), although there are divisions that transfer their output internally (17.1%). This suggests that some of the divisions are structured specifically to provide products to support other divisions in the company.

9.2.2 The Division Managers

The data show that almost all of the division managers were males (94.5%). Also, a high proportion of division managers were in the 41-50 age group

(47.6%), while 25% were in the 51-60 age group. This suggests that division managers were most likely to be between 41 and 60 years of age and male. The evidence also highlights that the largest group of the managers (37.8%) had held their position for less than 2 years, while another 34.1% had held the position between 3-5 years. However, the amount of time they have been employed by the company is spread almost equally in each period group ranging from less than 2 years to more than 11 years. Moreover, in terms of the number of employees under the responsibility of the division managers, many of them (45.1%) have less than 100 employees. This increased gradually to 100-200 employees (22.0%) and 200-500 employees (18.9%). There were 23 division managers (14.0%) who have more than 500 employees. Hence, in terms of the number of employees under the division manager's responsibility, the divisions participating in this study were quite diverse ranging from relatively small divisions (less than 100) to large divisions (more than 500).

9.2.3 Divisional Managers' General Perceptions Regarding Performance Measures

The data revealed that, on average, the divisions did not use different performance measures to evaluate the division manager as an individual or the division as an entity. Furthermore, on average (3.1), the respondents agreed that performance measures affected their motivation while appropriate performance measures positively influenced their performance. They also strongly agreed that appropriate performance measures mean they were more likely to try their best to reach the target being set for the performance measures. From these results, it is clear that appropriate performance measures are important since they affect the performance and motivation of managers to achieve their targets.

9.2.4 The Performance Measures

The data show that divisions (business units) involved in the current study had diverse performance measures both in financial and non-financial performance measures. The financial performance measures that have been more commonly applied in the divisions comprised of: profit (%); ROI (%); revenue/total assets (%); and others (e.g., budget performance-cost; EBIT/sales (%); working capital

(%); EBIT). For non-financial performance measures, market share (%) is used to a great extent by the divisions to measure customer performance. Other customer performance measures are also applied, such as, delivered in-full on-time (DIFOT), product lines/customer, number of customers. To measure internal business process performance, the most common measure used by the divisions was the inventory turnover ratio (%). Other measures that have been used are: stakeholder management, product quality, TIFR (time injury frequency rates), LTIFR (lost time injury frequency rates), etc. To ascertain learning and growth performances, measures such as the number of satisfied employee index, cost reduction from quality product improvement and investment in new product support ($) are used by divisions. Other performance measures, such as development training and employee turnover, are also employed by the divisions.

The diversity of performance measures, either financial or non-financial, reflects the diversity of the divisions (business units) in the current study. Hence, performance measures applied in each division (business unit) may depend on the nature, characteristic and function of the division. This finding is consistent with Kaplan and Norton (1993, 2001) who argued that each division (business unit) develops unique measures that best capture their strategy.

9.3 The Fairness Perception Model

As mentioned in Chapters 1 and 4, there are five research objectives that underpin the current thesis. They are as follows.

1 To evaluate the relationship between *participation* and *fairness perception* regarding the divisional/unit performance measures used in a balanced scorecard (BSC) environment.

2 To examine whether financial or non-financial measures are perceived to be more fair in a BSC environment.

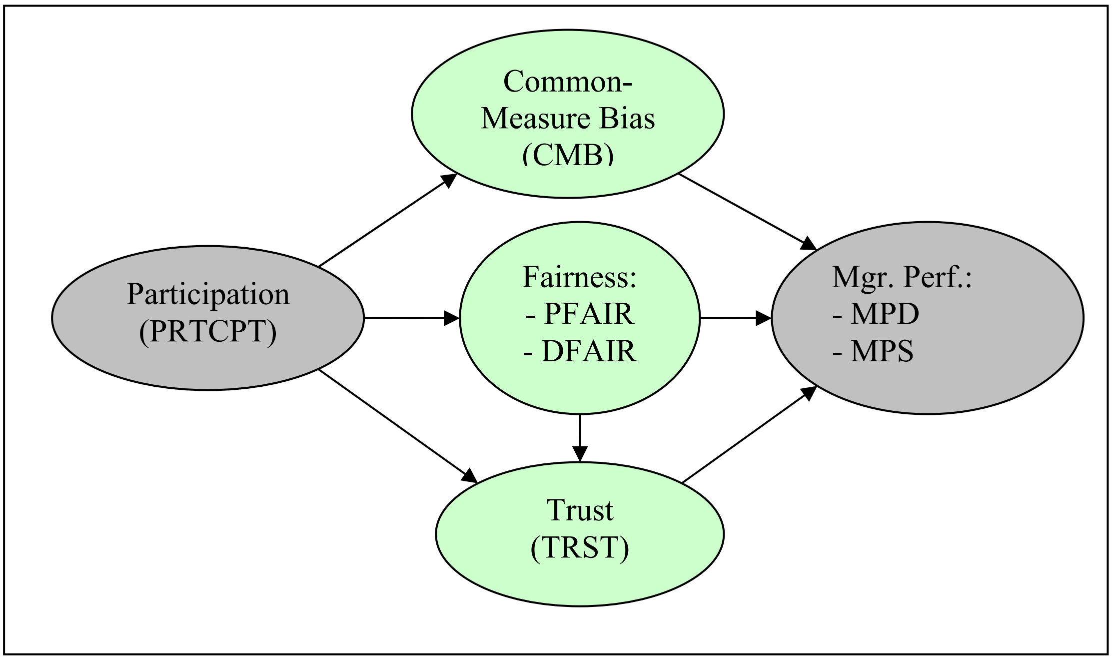
3 To examine the effect of *participation* on the development of the performance measures and the use of performance measures in the performance evaluation process.

4 To examine the relationship between *participation* and *interpersonal trust* between parties involved in the performance evaluation process in a BSC environment.

5 To investigate the effect of *participation*, *fairness perception*, and *interpersonal trust* in the development of performance measures, on divisional/unit managerial performance in a BSC environment.

To achieve the research objectives, a fairness perception model was developed to guide the present research. This was discussed in Chapter 4. The re-presentation of the model in a path diagram is again illustrated in Figure 9.1.

Figure 9.1: The proposed research model



Two steps were conducted in order to reach the objectives:

1 investigating the SEM path analysis to fulfil the research objectives, except for research objective 2; and

2 investigating the frequencies differences between financial and non-financial measures and the chi-square test for goodness of fit to fulfil research objective 2.

9.3.1 Results of Hypotheses Testing with the Procedural Fairness Model

For procedural fairness, two models were examined: PFAIR – MPD model and PFAIR – MPS model. It was found that six hypotheses were accepted which were H1, H2a, H5a, H5b, H6a and H8a, while, H4, H6b, H7a and H7b were rejected. The summary of the results is presented in Table 9.1.

From Table 9.1, it can be seen that the current research supports the hypothesis that the higher the level of participation in developing the performance measures the lower the common-measure bias (H1). This suggests that the common-measure bias problem, found by Lipe and Salterio (2000) in the BSC environment, can be potentially overcome by allowing the parties involved in the performance evaluation process (i.e., division manager and senior manager) to participate in developing the performance measures that will be used in the performance evaluation process. The findings of the present research provide further evidence to support hypothesis 1 (H1). Additionally, this finding enriches previous methods such as: the divide and conquer strategy (Lipe and Salterio, 2002); justice and assurance (Lipe et al., 2004); disaggregated BSC (Roberts et al., 2004); linked to strategy (Banker et al., 2004); and introducing training (Dilla and Steinbart, 2005) in reducing the common-measure bias problem in the BSC environment.

The acceptance of hypotheses H5a and H5b from the current research provides evidence that the lower the common-measure bias problem, due to participation in the development of the performance measures, leads to a better managerial performance of the divisional/business unit managers (division manager's self-assessment), as well as a better managerial performance based on the division manager's view of senior manager's perception of performance.

Furthermore, as presented in Table 9.1, hypothesis H2a is supported. This suggests that the procedural fairness perception of the performance measure is positively impacted when there is a higher level of participation in developing the performance measures. This finding is consistent with prior research (see, for

Table 9.1
Summary of the significant influence of determinants on the procedural fairness model

Ho Number	Hypotheses	Exogenous Latent Variable	Endogenous Latent Variables	Hypotheses' Result	Explanation
H1	The higher the level of participation in developing the performance measures, the lower the common-measure bias	PRTCPT	CMB	**Accepted**	Participation significantly influenced the use of performance measures (reducing common-measure bias problem)
H2a	The higher the level of participation in developing the performance measures, the greater the procedural fairness perception of the performance measures	PRTCPT	PFAIR	**Accepted**	Participation significantly influenced procedural fairness
H4	The higher the level of participation in developing the performance measures, the stronger the trust between parties involved in the evaluation process	PRTCPT	TRST	**Rejected**	Participation did not significantly influence trust
H5a	The lower the common-measure bias, the better the managerial performance of the divisional/unit managers (division manager's self-assessment)	CMB	MPD	**Accepted**	Reducing common-measure bias significantly influenced division's managerial performance
H5b	The lower the common-measure bias, the better the managerial performance based on division manager's view of senior manager's perception of performance	CMB	MPS	**Accepted**	Reducing common-measure bias significantly influenced division's managerial performance based on division manager's view of senior manager's perception
H6a	The higher the procedural fairness perception of performance measures by divisional/unit managers, the better the managerial performance of the divisional/unit managers (division manager's self-assessment)	PFAIR	MPD	**Accepted**	Procedural fairness significantly influenced division's managerial performance
H6b	The higher the procedural fairness perception of performance measures by divisional/unit managers, the better the managerial performance based on division manager's view of senior manager's perception of performance	PFAIR	MPS	**Rejected**	Procedural fairness did not significantly influence division's managerial performance based on division manager's view of senior manager's perception
H7a	The stronger the level of trust between parties involved in the performance evaluation process, the better the managerial performance of the divisional/unit managers (division manager's self-assessment)	TRST	MPD	**Rejected**	Trust did not significantly influence division's managerial performance

Table 9.1
Summary of the significant influence of determinants on the procedural fairness model (continued)

Ho Number	Hypotheses	Exogenous Latent Variable	Endogenous Latent Variables	Hypotheses' Result	Explanation
H7b	The stronger the level of trust between parties involved in the performance evaluation process, the better the managerial performance based on division manager's view of senior manager's perception of performance	TRST	MPS	**Rejected**	Trust did not significantly influence division's managerial performance based on division manager's view of senior manager's perception
H8a	The higher the procedural fairness perception of performance measures by divisional/unit managers, the stronger the trust between parties involved in the evaluation process	PFAIR	TRST	**Accepted**	Procedural fairness significantly influenced trust

example, Thibaut and Walker, 1975; Folger, 1977; Greenberg, 1986a, Kanfer et al., 1987; Paese et al., 1988; Lind and Tyler, 1988; Greenberg, 1990b; Lind et al., 1990; Tyler, 1990; Tyler and Lind, 1992; Organ and Moorman, 1993; Shapiro, 1993; Korsgaard and Roberson, 1995; Muhammad, 2004) that found that participation is one of the drivers of procedural fairness perception of the decision process (i.e., in the current study this refers to the performance evaluation process). This result leads to a better managerial performance of the divisional/business unit managers (division manager's self-assessment). This finding is also in line with prior research (see, for example, Brownell, 1982; Dunk, 1989; Folger and Konovsky, 1989; Moorman, 1991; Ross, 1994; Korsgaard and Roberson, 1995; Lau et al., 1995; Lau and Tan, 1998; Lau and Lim, 2002a) which found that procedural fairness perception of the decision-making process results in more positive behaviour in relation to organisational citizenship behaviour, job attitudes, organisational commitment, low job-related tension and managerial performance.

However, unlike the managerial performance of the divisional/business unit manager's (based on division manager's self-assessment), which was positively impacted by the procedural fairness perception of performance measures, the managerial performance based on division manager's view of senior manager's perception of performance is not positively influenced by the procedural fairness perception of the performance measures (H6b). This result confirms that there are complex, rather than simple, relationships that exist between procedural fairness and performance (Lau and Lim, 2002a). The other explanation of this result is probably due to the limitation of the current study which only collected the data from divisional/business unit managers. Hence, an opportunity for further research may focus on explaining this issue based on the senior manager's viewpoint.

Moreover, this current research also found that the higher the procedural fairness perception of performance measures by divisional/unit managers, due to their participation in developing the performance measures, the stronger the trust between parties involved in the evaluation process (H8a). This finding is also consistent with prior research (i.e., Folger and Konovsky, 1989; Lau and Sholihin, 2005) which found that procedural fairness perception in the decision-making process has a positive impact on trust in management.

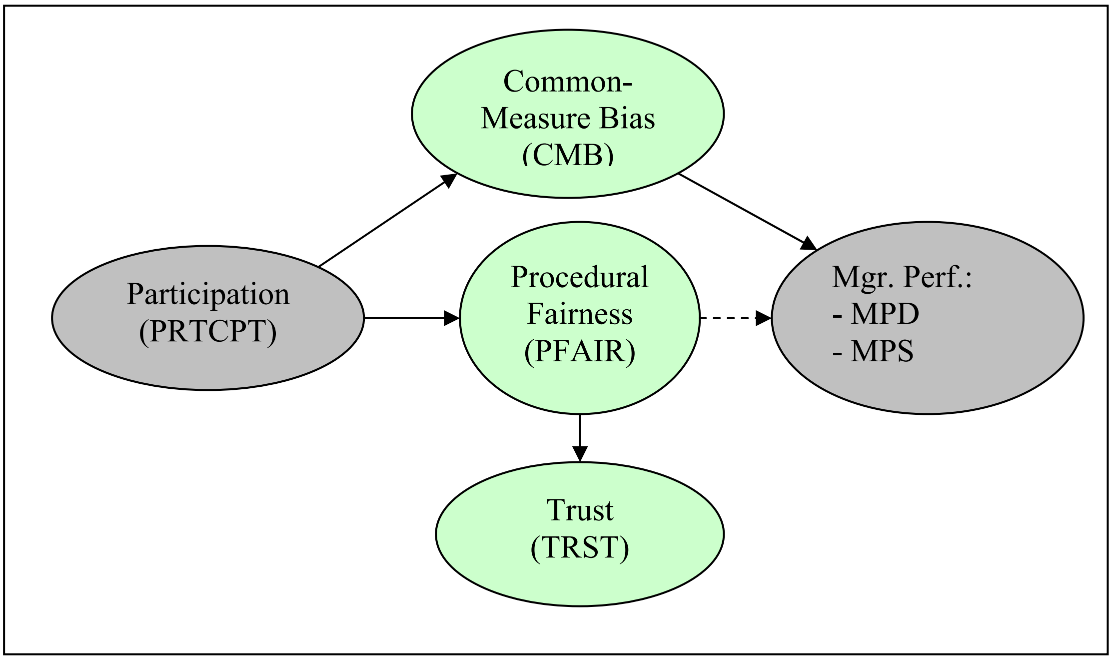
Furthermore, it can be seen in Table 9.1 that hypothesis H4 was rejected in the current research. This suggests that participation in developing the performance measures does not directly strengthen the trust between parties involved in the performance evaluation process. However, it also can be seen from Table 9.1 that the participation in the development of the performance measures has a positive effect on trust through higher levels of procedural fairness of the performance measures, due to the participation in developing the performance measures (H8a). Thus, in this case, the relationship between participation in developing the performance measures and the trust between the parties involved in the performance evaluation process was mediated by the procedural fairness of the performance measures.

The current research also failed to support hypotheses H7a and H7b. This implies that the trust between the parties involved in the performance evaluation process does not positively impact on managerial performance of the divisional/business unit managers. This was based on the division manager's self-assessment, as well as from the division manager's view of the senior manager's perception of performance. Again, this finding is not consistent with prior research which found a positive relationship between trust and performance (see, for example, Earley, 1986; Deluga, 1995; Podsakoff et al., 1996; Rich, 1997; Pettit et al., 1997); or that trust is an important factor in the performance evaluation process via job-related tension (Ross, 1994); job-satisfaction (Lau and Sholihin, 2005); and organisational citizenship behaviour (Pearce, 1993; Pillai et al., 1999; Wagner and Rush, 2000; Korsgaard et al., 2002). Importantly for the present research, however, is that the findings in the current study are consistent with previous research (see, for example, Konovsky and Cropanzano, 1991; MacKenzie et al., 2001; Dirks and Ferrin, 2002; Mayer and Gavin, 2005) which indicated no relationship between trust and performance.

This inconsistent finding suggests that although trust is an important factor in the organisation and performance evaluation process, it is unclear how trust affects managerial performance. As Mayer and Gavin (2005) posit, the relationship between trust and performance most likely operates through other factors such as the ability to focus. Another explanation is that constructs such as job satisfaction; job-related tension; and organisational citizenship behaviours, act as different constructs in nature with managerial performance since these constructs relate more to the employee's characteristics or attitudes (Konovsky and Cropanzano, 1991), while managerial performance is something that is formed or required by an organisation. Additionally, this inconsistent finding suggests that further research is needed to investigate how trust affects managerial performance.

To sum up, the procedural fairness model provided strong evidence for some of the arguments in the proposed research model. The procedural fairness model is illustrated in Figure 9.2.

Figure 9.2: The procedural fairness model



9.3.2 Results of Hypotheses Testing with the Distributive Fairness Model

Similar to the procedural fairness model, two models with distributive fairness were examined: DFAIR – MPD model and DFAIR – MPS model. It was found that five hypotheses (H1, H2b, H5a, H5b and H8b) were accepted, while five hypotheses (H4, H6c, H6d, H7a and H7b) were rejected. The summary of the results is presented in Table 9.2.

From Table 9.2 it can be seen that, similar to the result of the procedural fairness model, hypotheses H5a and H5b were accepted. This suggests that the distributive fairness model also supports the hypothesis that the higher the level of participation in developing the performance measures, the lower the common-measure bias (H1). Thus, greater participation leads to better managerial performance of the divisional/business unit managers (division manager's self-assessment), as well as improved managerial performance based on the division manager's view of senior manager's perception of performance. This result indicates that participation in the development of the performance measures is an effective method to overcome the common-measure bias problem that exists in the BSC environment as found by Lipe and Salterio (2000).

Furthermore, as presented in Table 9.2, hypothesis H2b is supported. This implies that higher levels of participation in developing the performance measures positively impact on the distributive fairness perception of the performance measures. As prior studies have found (see, for example, Laventhal, 1980; Folger and Greenberg, 1985; Lind and Tyler, 1988; Greenberg, 1990b; Tyler and Bies, 1990; Korsgaard and Roberson, 1995), procedural fairness can enhance distributive fairness, hence, the finding from this current research is consistent with those prior studies. The result of the distributive fairness model showed that participation in developing performance measures positively impacts the distributive fairness perception of the performance measures. This was similar to the results obtained from the procedural fairness model.

Table 9.2
Summary of the significant influence of determinants on the distributive fairness model

Ho Number	Hypotheses	Exogenous Latent Variable	Endogenous Latent Variables	Hypotheses' Result	Explanation
H1	The higher the level of participation in developing the performance measures, the lower the common-measure bias	PRTCPT	CMB	**Accepted**	Participation significantly influenced the use of performance measures (reducing common-measure bias problem)
H2b	The higher the level of participation in developing the performance measures, the greater the distributive fairness perception of the performance measures	PRTCPT	DFAIR	**Accepted**	Participation significantly influenced distributive fairness
H4	The higher the level of participation in developing the performance measures, the stronger the trust between parties involved in the evaluation process	PRTCPT	TRST	**Rejected**	Participation did not significantly influence trust
H5a	The lower the common-measure bias, the better the managerial performance of the divisional/unit managers (division manager's self-assessment)	CMB	MPD	**Accepted**	Reducing common-measure bias significantly influenced division's managerial performance
H5b	The lower the common-measure bias, the better the managerial performance based on division manager's view of senior manager's perception of performance	CMB	MPS	**Accepted**	Reducing common-measure bias significantly influenced division's managerial performance based on division manager's view of senior manager's perception
H6c	The higher the distributive fairness perception of performance measures by divisional/unit managers, the better the managerial performance of the divisional/unit managers (division manager's self-assessment)	DFAIR	MPD	**Rejected**	Distributive fairness did not significantly influence division's managerial performance
H6d	The higher the distributive fairness perception of performance measures by divisional/unit managers, the better the managerial performance based on division manager's view of senior manager's perception of performance	DFAIR	MPS	**Rejected**	Distributive fairness did not significantly influence division's managerial performance based on division manager's view of senior manager's perception
H7a	The stronger the level of trust between parties involved in the performance evaluation process, the better the managerial performance of the divisional/unit managers (division manager's self-assessment)	TRST	MPD	**Rejected**	Trust did not significantly influence division's managerial performance

Table 9.2
Summary of the significant influence of determinants on the distributive fairness model (continued)

Ho Number	Hypotheses	Exogenous Latent Variable	Endogenous Latent Variables	Hypotheses' Result	Explanation
H7b	The stronger the level of trust between parties involved in the performance evaluation process, the better the managerial performance based on division manager's view of senior manager's perception of performance	TRST	MPS	**Rejected**	Trust did not significantly influence division's managerial performance based on division manager's view of senior manager's perception
H8b	The higher the distributive fairness perception of performance measures by divisional/unit managers, the stronger the trust between parties involved in the evaluation process	DFAIR	TRST	**Accepted**	Distributive fairness significantly influenced trust

The aforementioned results are in keeping with the current study's definition of both procedural fairness, which is defined as the fairness of the process to develop performance measures – *financial* and *non-financial* measures – that are finally used in the performance evaluation process; and distributive fairness, which is defined as the fairness of the outcome of the process of the development of performance measures – *financial* and *non-financial* measures – that are eventually used in the performance evaluation process. Hence, given that participation in developing the performance measures has a positive effect on procedural fairness; one would expect that the participation in developing the performance measures would also have a positive effect on the distributive fairness of the outcome of the process. Not surprisingly, the present study supports this expectation.

However as Table 9.2 shows, hypotheses H6c and H6d are rejected. This suggests that the positive impact attained from participating in the development of the performance measures on distributive fairness does not lead to better managerial performance of the divisional/business unit managers (neither from a division manager's self assessment nor from a division manager's view of senior manager's perception of performance). These results are consistent with prior studies (see, for example, Folger and Konovsky, 1989; Moorman, 1991; Niehoff and Moorman, 1993) which found that distributive fairness had independent effects that are different from procedural fairness. For example, procedural fairness predicted citizenship whereas distributive fairness did not (Moorman, 1991); procedural fairness was related to job attitudes, organisational commitment and trust in management, while distributive fairness was only related to pay satisfaction (Folger and Konovsky, 1989). Hence, these findings confirm that both types of fairness – procedural and distributive – can have different effects on behaviour. Although, procedural fairness can lead to distributive fairness.

The distributive fairness model showed similar results to the procedural fairness model insofar as the higher the distributive fairness perception of performance measures by divisional/unit managers - due to their participation in developing the performance measures - the stronger the trust between parties involved in the evaluation process. This result contradicts Folger and Konovsky's (1989) finding which showed that distributive fairness was not related to trust in management; rather only procedural fairness was related to trust in management.

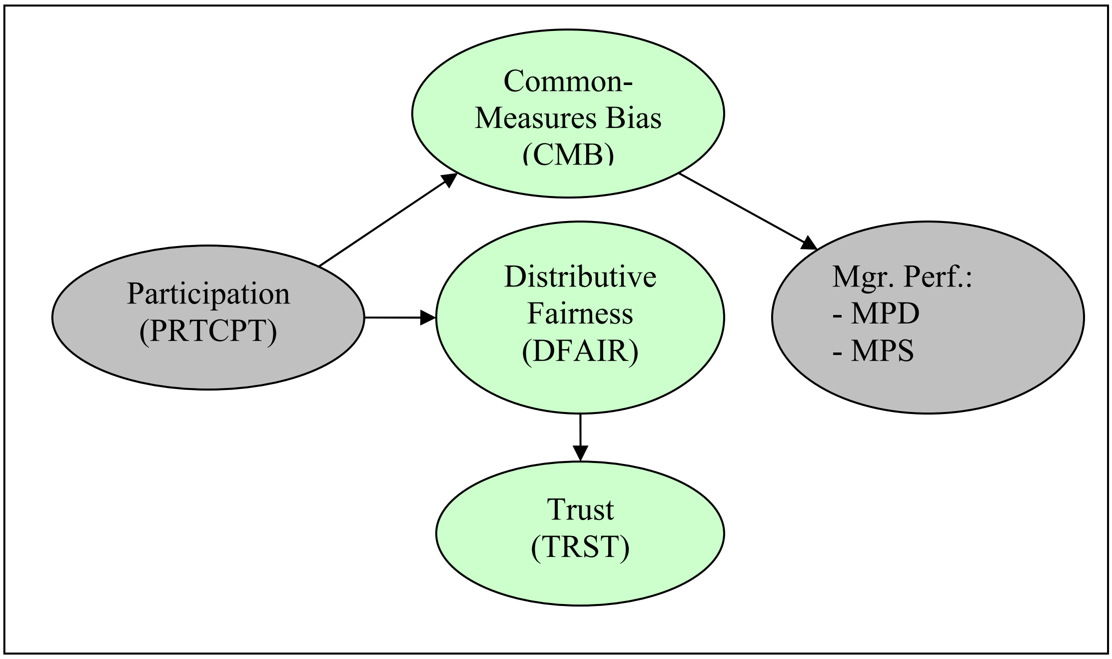
One possible explanation for this inconsistent result could be that the current study's construct of distributive fairness differed from the one employed in Folger and Konovsky's (1989) study, which used employees' compensation/payment to investigate distributive fairness. Folger and Konovsky (1989) argue that when an employees' compensation/payment has been paid for by the organisation they work with, there is no reason for employees to put any further trust or commitment towards that organisation. This is why they concluded that only procedural fairness was related to trust, while distributive fairness was related to pay satisfaction. Unlike Folger and Konovsky (1989), distributive fairness in this current research refers to the fairness of the outcome of the process of the development of performance measures that were eventually used in the performance evaluation process. Hence, when the divisional/business unit managers perceived that the performance measures - as the outcome of the process of development to be used in the performance evaluation process - are fair, it is not surprising when it has a positive effect on trust between the parties involved in the performance evaluation process. A proposition the current research finding supports.

In line with the procedural fairness model, the distributive fairness model in this current study also fails to support hypothesis H4. This suggests that the participation in the development of performance measures does not directly impact the trust between parties involved in the performance evaluation process. However, this participation has a positive effect on trust via a higher distributive fairness in the performance measures due to participation. This means that the relationship between participation in developing performance measures, and the trust between parties involved in the performance evaluation process, was mediated by the distributive fairness of the performance measures.

Furthermore, similar to the procedural fairness model, the distributive fairness model in the current research also fails to support hypotheses H7a and H7b. This suggests that trust between parties involved in the performance evaluation process does not have a positive impact on managerial performance of the divisional/business unit managers. This is based on the division manager's self-assessment as well as from the division manager's view of senior manager's perception of performance. This finding is consistent with prior research (see, for example, Konovsky and Cropanzano, 1991; MacKenzie et al., 2001; Dirks and Ferrin, 2002; Mayer and Gavin, 2005) which found that there is no relationship between trust and performance as explained in Section 9.3.1.

In summary, the distributive fairness model provided strong evidence for some of the arguments in the proposed research model. The distributive fairness model is illustrated in Figure 9.3.

Figure 9.3: The distributive fairness model



9.3.3 Financial vs. Non-financial Fairness

From the hypotheses testing H3 was rejected. This suggests that divisional managers perceive financial measures as being fairer in comparison to the non-financial measures. This result is different to the results of Lau and Sholihin (2005) who found that there were no differences between financial and non-financial measures in terms of their importance in affecting job satisfaction. Additionally, although Kaplan and Norton (1993, 2001) argue that non-financial measures are one of the important strengths of the BSC, in the present study; divisional managers perceived that financial measures were fairer than non-financial measures. This might be because of the subjectivity of non-financial measures (Ittner et al., 2003).

9.3.4 Summary of the Hypotheses Testing Findings

The findings of the current research can be summarised as follows.

1. **Participation (PRTCPT)**

   Participation in the development of performance measures positively influences the common-measure bias as well as the fairness perception for both procedural fairness and distributive fairness. Moreover, participation did not have a positive effect on trust between parties involved in the performance evaluation process.

2. **Common-Measure Bias (CMB)**

   The positive effect of participation in the development of performance measures reduces the common-measure bias problem, which leads to a positive effect on managerial performance.

3. **Fairness Perception (PFAIR and DFAIR)**

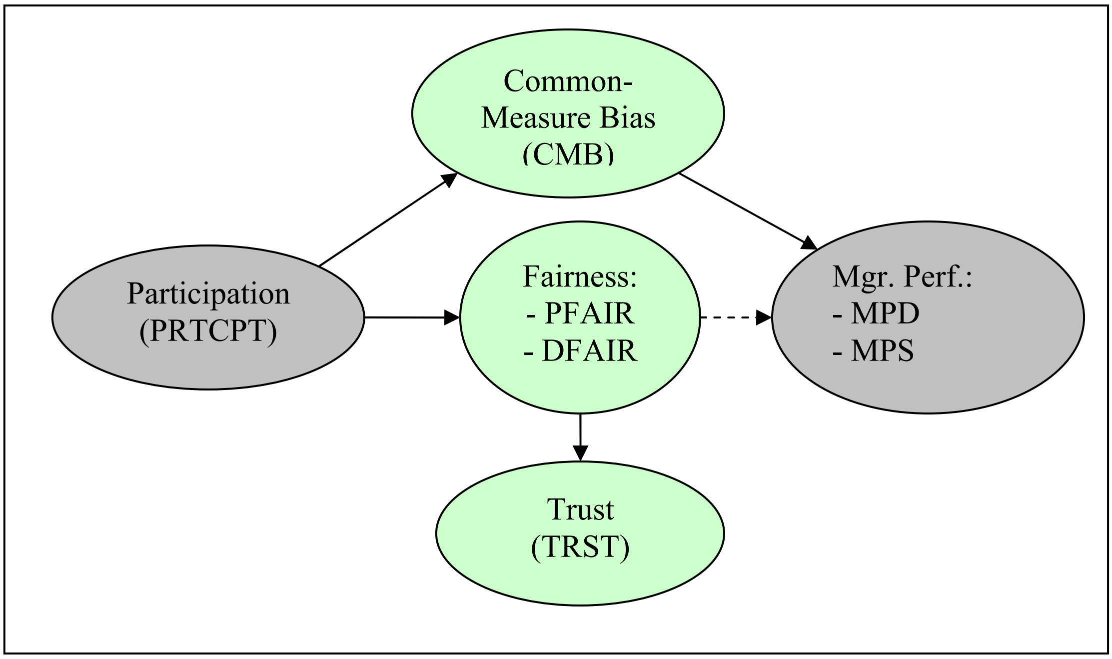
   Fairness perception of the performance measures, for both procedural fairness and distributive fairness, positively affects the trust between parties involved in the performance evaluation process. Additionally, fairness perception mediates the relationship between participation and trust. However, only procedural fairness perception has a positive influence on managerial performance.

4. **Trust (TRST)**

   In the present study, trust between parties involved in the performance evaluation process does not have a positive impact on managerial performance.

The results of the fairness model is summarised in Figure 9.4.

Figure 9.4: The fairness perception model



9.4 Research Implications

This study has several important implications which include: (1) theoretical implications; (2) methodological implications; and (3) practical implications. The implications will be discussed as follows.

9.4.1 Theoretical Implications

From a theoretical perspective, the fairness perception model provides an understanding of the relationship between determinants (i.e., participation in the development of performance measures; the use of performance measures; fairness perception – procedural and distributive – of performance measures; and trust between parties involved in the performance evaluation process) and managerial performance. Specifically, it provides an understanding about how participation in the development of performance measures positively influences the use of performance measures by reducing the common-measure bias problem found in Lipe and Salterio's (2000) study. The decrease in common-measure bias leads to a positive effect on managerial performance. This implies that participation in the development of performance measures is an effective method to reduce the common-measure bias problem found in the BSC environment.

Furthermore, participation in the development of performance measures also influences the fairness (i.e., procedural and distributive) perception of the performance measures, which ultimately influences the trust between parties involved in the performance evaluation process. This implication is in accordance with prior research (see, for example, Thibaut and Walker, 1975; Folger, 1977; Greenberg, 1986b, Kanfer et al., 1987; Paese et al., 1988; Lind and Tyler, 1988; Greenberg, 1990a; Lind et al., 1990; Tyler, 1990; Tyler and Lind, 1992; Organ and Moorman, 1993; Shapiro, 1993; Korsgaard and Roberson, 1995; Muhammad, 2004) which demonstrated that participation was one of the drivers of procedural fairness. Additionally, this current study showed that procedural fairness can enhance distributive fairness, which is also consistent with prior studies (see, for example, Laventhal, 1980; Folger and Greenberg, 1985; Lind and Tyler, 1988; Greenberg, 1990b; Tyler and Bies, 1990; Korsgaard and Roberson, 1995). Furthermore, both types of fairness perception (i.e., procedural and distributive) were found to have similar effects on trust. This result contradicts Folger and Konovsky's (1989) finding which showed that only procedural fairness is related to trust in management.

Another theoretical implication was that participation in the development of performance measures does not directly influence the trust between parties involved in the performance evaluation process. Rather, this participation influences the trust via the fairness perception of either procedural fairness or distributive fairness. Consequently, fairness perception mediates the relationship between participation and trust.

Additionally, only procedural fairness was demonstrated to have a positive influence on managerial performance. This finding implies that although procedural fairness can lead to distributive fairness, both types of fairness perception (procedural and distributive) can have different effects on behaviour. This finding is consistent with prior studies (see, for example, Folger and Konovsky, 1989; Moorman, 1991; Niehoff and Moorman, 1993) which found that distributive fairness had independent effects that are different to procedural fairness.

9.4.2 Methodological Implications

The methodology used in this current research provides guidelines for further research in this area of study, specifically, in the case of studying performance measures for Australian companies. The guidelines include: the approach to survey managers who hold very high positions; questionnaire design; data collection procedures including survey mail-out and follow-up; and the method used to analyse the data. These guidelines are reviewed below.

1. To reduce the response bias from a mail questionnaire survey, it is very important to design the questionnaire carefully. Initial contact should be made by telephone and/or e-mail to make sure that the correct address of respondents is obtained. Furthermore, conducting a pilot test is recommended prior to undertaking the actual survey. Additionally, to increase the response rate, a follow-up procedure is crucial.
2. It is important to test the reliability and the validity of the data both in the pilot testing data and in the final data.
3. Data analysis with SEM, using AMOS, to test the hypotheses proposed is recommended for theory testing where the proposed research model has been decided prior to the collection of the data. This is because the SEM method has many advantages over the multi-variate method (Byrne, 2001).
4. In the case of a non-normal data distribution, the Boolen-Stine *p*-value approach is recommended as a bootstrapping method.

9.4.3 Practical Implications

The key findings provide significant practical implications not only for divisional (business unit) managers within Australian public companies, but also to all of the decision-makers that are involved in the performance evaluation process, as well as for academics. Incorporating the findings presented in Chapters 7 and 8, a number of practical implications can be derived. They are, the implications of using the fairness perception model, which provides an understanding about the relationship between participation in developing performance measures; the use of performance measures (reducing common-measure bias problem); fairness perception (procedural and distributive fairness) of the performance measures; trust between parties involved in the performance evaluation process; and managerial performance.

1. Managers or decision-makers who are involved in the performance evaluation process should consider participation in the development of the performance measures to be used. This is important since participation has a significant positive effect in reducing the common-measure bias problem and increasing managerial performance. Participation also has a significant influence on the fairness perception (procedural and distributive) of the performance measures, which increases the trust between parties in the performance evaluation process.
2. Managers or decision-makers should consider the importance of procedural fairness perception of the performance measures, since it has a positive effect on managerial performance. For instance, procedural fairness studies (see, for example, Brownell, 1982; Dunk, 1989; Folger and Konovsky, 1989; Moorman, 1991; Ross, 1994; Korsgaard and Roberson, 1995; Lau et al., 1995; Lau and Tan, 1998; Lau and Lim, 2002a) have found that a procedural fairness perception of the decision-making process will result in more positive behaviour, including better managerial performance.
3. Performance measures, either financial or non-financial, should be chosen carefully in order to capture accurately the division (business unit) strategies and its capabilities.

9.5 Limitations of the Study

As with other empirical studies, the present research also has some limitations. The limitations associated with this current study are as follows.

1. There are limitations associated with the survey questionnaire method. Although care was taken to reduce the limitation of the method, possible response biases may still exist.
2. The sample in this current study was selected from the top 300 companies listed in ASX based on their equity value. Therefore, it is unclear if the

results are generalisable to smaller-sized companies as well as non-listed companies. Although t-tests were performed that supported the generalisability of the data and its results, generalising the results should still be made with caution.

3. The current study only used divisional/business unit managers as the respondent. Thus, data relating to questions about the agreement of the senior managers about the divisional/business unit manager's performance was based on the divisional/business unit manager's view of the senior manager's perception of performance. The result may have been different had data also been obtained from the senior managers.
4. Finally, the relatively small amount of sample data reduces the power of the statistical tests.

9.6 Suggestions for Further Research

Apart from the limitations of the current study, the present research provides the opportunity for future research, as follows.

1. Examine the fairness perception in terms of each type of the measurement perspective in the BSC environment, ranging from the most financial measures to the most non-financial measures (i.e., from financial, consumer, internal business process, and learning and growth perspectives).
2. The findings in the present research that are inconsistent with theoretical expectations suggest that future research is still required to examine issues in this area.
3. The findings in the present study suggested that a diversity of performance measures is applied in each of the divisions. This provides an opportunity to examine whether the performance measures chosen really captures the strategy of the division and/or whether the performance measures lead to the achievement of the organisation objectives.
4. The use of in-depth interviews for further studies exploring the fairness perception of performance measure issue.

5. The use of motivation and communication theories can provide the basis for future research in examining issues in the area of trust and managerial performance.
6. Referring to limitation number 3, the findings provide opportunity for further study which can incorporate both divisional/business unit managers and senior managers as the respondent.

9.7 Summary

This chapter summarised the key findings in the current study, the demographic characteristic findings as well as the hypotheses testing in accordance with the present research's objectives. It also provided the theoretical, methodological and practical implications for those who are interested in investigating the effect of fairness perception of performance measures. Finally, the limitations of the present research were acknowledged along with the opportunity for further research.

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APPENDIX I

PART A

QUESTIONNAIRE SURVEY

QUESTIONNAIRE SURVEY
A Covering Letter

School of Accounting and Finance
Faculty of Business and Law
Footscray Park Campus
Ballarat Road, Footscray
Victoria University, Melbourne
Victoria 8001, Australia

Date: -------------

Dear Divisional Manager,

I am conducting a survey of divisional/unit managers of the top 300 largest companies listed on the Australian Stock Exchange (ASX), as measured by market value of equity as of June 30, 2006 as part of my PhD program.

The aim of this research project is to promote a greater understanding of the role of *participation* in enhancing the *fairness perception* of measurement, and interpersonal trust between parties in the performance evaluation process. The project has approval of the University Human Research Ethics Committee.

The selection of divisional/unit managers to be asked to participate in this study was chosen from information contained in the Annual Report of the top 300 largest companies.

Your response will greatly appreciated, and assist in ensuring the research results are representative and meaningful. I hope this research will be of interest to you, and to the wide academic and professional community.

At your earliest convenience could you place the completed questionnaire in the reply paid envelope, and return it to me, preferably by 7 December, 2007. I assure you that all responses will be confidential. The data will be summarized and only the summarized data, with no identifying features, will be reported in the report and any subsequent publications.

Should you have any queries about this research please contact my principal supervisor Dr. Albie Brooks, or myself on the details of which are below.

Thank you very much for your participation.

Yours Sincerely,

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SURVEY

Effects of Participation on Fairness Perception of Performance Measures

Overview

This survey investigates the role of ***participation*** in enhancing the ***fairness perception*** of performance measures, and interpersonal trust between parties in the performance evaluation process. This is the first national study of its kind that aims to bring insight to organizations relating to performance measures and the performance evaluation process.

Definitions

Performance Measures: All performance measures (***financial*** and ***non-financial***) that are commonly used in the performance evaluation process to evaluate divisional (unit) manager performance.

Procedural Fairness: The fairness of the process to develop performance measures – ***financial*** and ***non-financial*** measures – that are finally used in the performance evaluation process.

Distributive Fairness: The fairness of the outcome of the process of the development of performance measures – ***financial*** and ***non-financial*** measures – that are used in the performance evaluation process (i.e. the actual measures).

Instructions for Completing this Survey

1. Please answer all the survey questions to the best of your ability.
2. We welcome any additional comments in the space provided at the end of the survey.
3. Please place the completed survey in the enclosed reply-paid envelope and return it at your earliest convenience.

Thank you for supporting this research project

Part 1: Participation in Performance Measures Development

The following statements relate to managers' ***participation*** in the determination of ***financial*** and ***non-financial*** (e.g. customer satisfaction, administrative expense/total revenue (%), employee satisfaction) measures of performance; and the weighting of each measure of performance. Please circle a number for each statement to indicate the extent of your agreement.

		No Basis For Answering	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1.	I am allowed **a high degree** of influence in the determination of ***financial*** measures used to measure performance of my division (unit).	0	1	2	3	4	5
2.	I am allowed **a high degree** of influence in the determination of ***non-financial*** measures used to measure performance of my division (unit).	0	1	2	3	4	5
3.	I am allowed **a high degree** of influence in the determination of the weighting of the performance measures for which I am accountable in my division (unit).	0	1	2	3	4	5
4.	I really have **little voice** in the formulation of the performance measures of my division (unit)	0	1	2	3	4	5
5.	The setting of the performance measures of my division (unit) is pretty much under my control.	0	1	2	3	4	5
6.	My senior manager asks for my opinions and thoughts when determining my division (unit) performance measures.	0	1	2	3	4	5
7.	My division (unit) performance measures are not finalized until I am satisfied with it.	0	1	2	3	4	5
8.	The division's (unit) performance measures that are finally used in the performance evaluation process are based on the division's (unit) manager input.	0	1	2	3	4	5
9.	I am allowed **a high degree** of influence in the determination of the ***target*** of each of the ***financial*** measure used to measure performance of my division (unit).	0	1	2	3	4	5
10.	I am allowed **a high degree** of influence in the determination of the ***target*** of each of the ***non-financial*** measure used to measure performance of my division (unit).	0	1	2	3	4	5

Part 2: Fairness of Performance Measures

The following propositions relate to the perceived *fairness* of the development of the performance measures. Please circle a number for each statement to indicate the extent of your agreement.

Part 2.1: Procedural Fairness

		No Basis For Answering	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1.	The procedure for preparing the ***financial*** measures to evaluate divisional (unit) performance is applied consistently among the divisions (units).	0	1	2	3	4	5
2.	All units are treated similarly by respectively considering the ***non-financial*** measures of **each** division (unit).	0	1	2	3	4	5
3.	The procedures for preparing the ***financial*** measures include provisions for an appeal process.	0	1	2	3	4	5
4.	The procedures for preparing the ***non-financial*** measures include provisions for an appeal process.	0	1	2	3	4	5
5.	The procedure for determining divisional (unit) ***financial*** performance measures provides sufficient opportunity for divisions (units) managers to present views and opinions before the performance measures are finalized.	0	1	2	3	4	5
6.	The procedure for determining divisional (unit) ***non-financial*** performance measures provides sufficient opportunity for divisions (units) managers to present views and opinions before the performance measures are finalized.	0	1	2	3	4	5
7.	The divisional (unit) performance measures are based on accurate information and informed opinion.	0	1	2	3	4	5
8.	The division (unit) performance measures are determined by the senior manager in an unbiased manner.	0	1	2	3	4	5

Part 2.2: Distributive Fairness

		No Basis For Answering	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1.	The performance measures that have been used in the performance evaluation process are fair.	0	1	2	3	4	5
2.	The performance measures that have been used in the performance evaluation process fairly measure my past year's performance.	0	1	2	3	4	5

Part 2.3: Fairness of Financial vs Non-Financial

		No Basis For Answering	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1.	In my opinion the ***non-financial*** measures are fairer than the ***financial*** measures in the performance evaluation process of each division (unit).	0	1	2	3	4	5
2.	In my opinion the ***non-financial*** measures are more realistic than the ***financial*** measures to evaluate each division (unit)'s performance.	0	1	2	3	4	5

Part 3: Interpersonal trust measures

The following questions relate to *interpersonal trust* between parties in the performance evaluation process. Please circle a number for each statement to indicate the extent of your agreement.

		No Basis For Answering	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1.	My senior manager takes advantage of opportunities that come up to further my interest by his/her actions and decisions.	0	1	2	3	4	5
2.	I feel free to discuss with my senior manager the problems and difficulties I have in my job without jeopardizing my position or having it 'held against' me later on.	0	1	2	3	4	5
3.	I feel confident that my senior manager keeps me fully and frankly informed about things that might concern me.	0	1	2	3	4	5
4.	Senior managers at times must make decisions which seem to be against the interests of their division/unit managers.	0	1	2	3	4	5
5.	When this happened to me as a division/unit manager, I believe that my senior manager's decision is justified by other considerations.	0	1	2	3	4	5

Part 4: Managerial Performance

Your Perception

The following is a list of eight functions of ***managerial performance*** and ***overall effectiveness*** of the functions. Please rate your performance as division (unit) manager in the following functions by circling the number indicating the **perception of your performance**.

		No Basis For Answering	Extremely Poor	Below Average	Average	Above Average	Excellent
1.	***Planning*** (i.e. determining goals, policies, and courses of action) function in my division (unit) is	0	1	2	3	4	5
2.	***Investigating*** (i.e. collecting and preparing information, usually in the form of records, reports and accounts) function in my division (unit) is	0	1	2	3	4	5
3.	***Coordinating*** (i.e. exchanging information with people in the organization other than subordinates in order to relate and adjust programs) function in my division (unit) is	0	1	2	3	4	5
4.	***Evaluating*** (i.e. assessment and appraisal of proposals or of reported or observed performance) function in my division (unit) is	0	1	2	3	4	5
5.	***Supervising*** (i.e. directing, leading and developing subordinates) function in my division (unit) is	0	1	2	3	4	5
6.	***Staffing*** (i.e. maintaining the work force of a unit or of several units) function in my division (unit) is	0	1	2	3	4	5
7.	***Negotiating*** (i.e. purchasing, selling, or contracting for goods or services) function in my division (unit) is	0	1	2	3	4	5
8.	***Representing*** (i.e. advancing general organizational interests through speeches, consultation, and contacts with individuals or groups outside the organization) function in my division (unit) is	0	1	2	3	4	5
9.	Overall, my performance in my division (unit) is	0	1	2	3	4	5

Part 5: (1) Use of Performance Measures.

The following statements have been made about the ***use of performance measures*** in divisional (unit) performance evaluation. Please circle a number for each statement to indicate the extent of your agreement.

		No Basis For Answering	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1.	My senior manager uses all of the performance measures (***financial*** and ***non-financial***) to evaluate my individual performance.	0	1	2	3	4	5
2.	My senior manager uses all of the performance measures (***financial*** and ***non-financial***) to evaluate my performance when comparing it with other divisional/unit managers.	0	1	2	3	4	5
3.	My senior manager uses all of the performance measures (***financial*** and ***non-financial***) to evaluate my performance as divisional (unit) manager as well as the divisional (unit) performance.	0	1	2	3	4	5
4.	My senior manager places more weight on ***financial*** measures to evaluate my performance.	0	1	2	3	4	5
5.	My senior manager places more weight on ***non-financial*** measures to evaluate my performance.	0	1	2	3	4	5

Part 5: (2) General Perceptions Relating to Performance Measures.

Please circle a number for each statement to indicate the extent of your agreement.

		No Basis For Answering	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1.	My performance as a divisional (unit) manager and the performance of the division are one and the same thing.	0	1	2	3	4	5
2.	My motivation is affected by the performance measures chosen to assess my performance.	0	1	2	3	4	5
3.	The uses of performance measures I perceive as being inappropriate negatively affect my performance.	0	1	2	3	4	5
4.	The uses of performance measures I perceive as being appropriate positively affect my performance.	0	1	2	3	4	5
5.	I try my best to reach the targets set by the performance measures.	0	1	2	3	4	5

Part 6: Financial and Non-financial Measures

The following are lists of *financial* and *non-financial* (*i.e. customer; internal process; and learning and growth*) measures commonly used to evaluate managerial and divisional (business unit) performance.
Please indicate the extent of your company use of each performance measures across the four perspectives to evaluate managerial and divisional (business unit) performance by circling a number.

No	Performance measures	No Basis For Answering	Not at all	Very Little	Little	Somewhat	To a great extent
1.	***Financial Measures Perspective***						
a.	Net profit ($)	0	1	2	3	4	5
b.	Revenues/total assets (%)	0	1	2	3	4	5
c.	Return on investment (%)	0	1	2	3	4	5
d.	Total expenses ($)	0	1	2	3	4	5
e.	Sales growth	0	1	2	3	4	5
f.	Other, please specify:						
g.	………………………………………………………..	0	1	2	3	4	5
h.	………………………………………………………..	0	1	2	3	4	5
i.	………………………………………………………..	0	1	2	3	4	5
j.	………………………………………………………..	0	1	2	3	4	5
k.	………………………………………………………..	0	1	2	3	4	5
2.	***Customer Measures Perspective***						
a.	Number of customers complaints (No.)	0	1	2	3	4	5
b.	Market share (%)	0	1	2	3	4	5
c.	Annual sales/customer ($)	0	1	2	3	4	5
d.	Customer satisfaction: survey ratings (%)	0	1	2	3	4	5
e.	Customer response time	0	1	2	3	4	5
f.	Other, please specify:						
g.	………………………………………………………..	0	1	2	3	4	5
h.	………………………………………………………..	0	1	2	3	4	5
i.	………………………………………………………..	0	1	2	3	4	5
j.	………………………………………………………..	0	1	2	3	4	5
k.	………………………………………………………..	0	1	2	3	4	5

No	Performance measures	No Basis For Answering	Not at all	Very Little	Little	Somewhat	To a great extent
3.	***Internal Business Process Perspective***						
a.	Administrative expense/total revenue (%)	0	1	2	3	4	5
b.	Length of time from order delivery	0	1	2	3	4	5
c.	Inventory turnover ratio (%)	0	1	2	3	4	5
d.	Rate of production capacity or resources used	0	1	2	3	4	5
e.	Labour efficiency variance	0	1	2	3	4	5
f.	Other, please specify:						
g.	……………………………………………………….	0	1	2	3	4	5
h.	……………………………………………………….	0	1	2	3	4	5
i.	……………………………………………………….	0	1	2	3	4	5
j.	……………………………………………………….	0	1	2	3	4	5
k.	……………………………………………………….	0	1	2	3	4	5
4.	***Learning and Growth Perspective***						
a.	R&D expense/total expense (%)	0	1	2	3	4	5
b.	Cost reduction resulting from quality product improvement	0	1	2	3	4	5
c.	Investment in new product support and training ($)	0	1	2	3	4	5
d.	Satisfied-employee index (No.)	0	1	2	3	4	5
e.	Training expenses/total expense (%)	0	1	2	3	4	5
f.	Other, please specify:						
g.	……………………………………………………….	0	1	2	3	4	5
h.	……………………………………………………….	0	1	2	3	4	5
i.	……………………………………………………….	0	1	2	3	4	5
j.	……………………………………………………….	0	1	2	3	4	5
k.	……………………………………………………….	0	1	2	3	4	5

Part 7: Your Senior Manager's Perception

The following is the statement about your senior managers' rating of your managerial performance. Please rate your agreement to the statement by circling the number indicates which best your performance.

		No Basis For Answering	Extremely Poor	Below Average	Average	Above Average	Excellent
1.	In my most recent performance evaluation my senior manager rated my managerial performance as:	0	1	2	3	4	5

The following are the statements of your agreement of your senior managers' rating above. Please circle a number for each statement to indicate the extent of your agreement.

		No Basis For Answering	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1.	I agree with the way my senior manager rated my managerial performance	0	1	2	3	4	5
2.	I agree with my final rating	0	1	2	3	4	5

Part 8: General Questions (Demography)

Please tick in the appropriate answer.

1. Gender?

□ Male □ Female

2. Which of the following groups represents you?

□ Less than 30 years □ 30-40 years □ 41-50 years
□ 51-60 years □ More than 60 years

3. In which industry is your company involved?

□ Agricultural/mining/construction
□ Consulting/professional service
□ Government
□ Hospitality/travel/tourism
□ Media/entertainment/publishing
□ Retail/wholesale/distribution
□ Transportation/logistics
□ Banking/Finance/Insurance
□ Education/research
□ Health care
□ Manufacturing
□ Real Estate
□ Telecommunications
□ Others (*Please specify*) ....

4. a) At what main activity is your division/unit involved?

□ Agricultural/mining/construction	□ Banking/Finance/Insurance
□ Consulting/professional service	□ Education/research
□ Government	□ Health care
□ Hospitality/travel/tourism	□ Manufacturing
□ Media/entertainment/publishing	□ Real Estate
□ Retail/wholesale/distribution	□ Telecommunications
□ Transportation/logistics	□ Others (*Please specify*) ………

b) What proportion of your division's output is transferred internally?

□ 0%	□ 1 – 25%	□ 26 – 50%
□ 51 – 75%	□ > 75%	

5. How long have you held your current position in this company?

□ Less than 2 years	□ 3-5 years	□ 6-8 years
□ 9-11 years	□ More than 11 years	

6. How long have you worked for this company?

□ Less than 2 years	□ 3-5 years	□ 6-8 years
□ 9-11 years	□ More than 11 years	

7. How many employees are you responsible for?

□ Less than 100 employees	□ 100-200 employees
□ 200-500 employees	□ More than 500 employees

8. Would you be agreed to be interviewed as part of a follow-up study?

□ Yes □ No

9. If yes, please fill in the form below or just attach your business card.

Name:
Postal Address:
Email:
Telephone:

10. Would you like to receive a copy of the summary report of the study?

□ Yes □ No

→ Address: ……………………………………………………..
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Thank you very much for taking the time to complete this questionnaire. Your help in providing this information is greatly appreciated. If there is anything else you would like to tell us about, please do so in the space provided below.

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Thank you for your cooperation in completing this questionnaire.

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Feedback Questionnaire Evaluation Form

Please comment on each of the following:

1	**Length of questionnaire**	
2	**Readability / difficulty of questions**	
3	**Were there any questions you would omit?**	
4	**Are there questions you would suggest should be included?**	
5	**Any additional comments?**	

APPENDIX I

PART B

A CODING SHEET

A CODING SHEET
(All in numeric except specifically defined)

Code	Quest. No.	Description	Values	Measure
Number		Case number	1-1500	Scale
Prtcp1	P1.1	Allowed a **high degree** of influence in determining **financial** measures	5-point	Scale
Prtcp2	P1.2	Allowed a **high degree** of influence in determining **non-financial** measures	5-point	Scale
Prtcp3	P1.3	Allowed a **high degree** of influence in determining weighting of performance measures	5-point	Scale
Prtcp4	P1.4	Have **little voice** in the formulation of the performance measure	5-point	Scale
Prtcp5	P1.5	The setting of the performance measures of my division is pretty much under my control	5-point	Scale
Prtcp6	P1.6	My senior manager asks for my opinions and thoughts	5-point	Scale
Prtcp7	P1.7	My division performance measures are not finalise until I am satisfied	5-point	Scale
Prtcp8	P1.8	The final division performance measures are based on the division's manager input	5-point	Scale
Prtcp9	P1.9	Allowed a **high degree** of influence in determining the **target** of each of **financial** measures used	5-point	Scale
Prtcp10	P1.10	Allowed a **high degree** of influence in determining the **target** of each of **non-financial** measures used	5-point	Scale
pf1	P2.1.1	The procedure for preparing the **financial** measures is applied **consistently** among divisions	5-point	Scale
pf2	P2.1.2	All units are treated similarly by respectively considering **non-financial** measures of **each** division	5-point	Scale
pf3	P2.1.3	The procedure for preparing the **financial** measures include provisions for an **appeal** process	5-point	Scale
pf4	P2.1.4	The procedure for preparing the **non-financial** measures include provisions for an **appeal** process	5-point	Scale
pf5	P2.1.5	The procedure to determining division **financial** performance measures provides opportunity to present views and opinions	5-point	Scale
pf6	P2.1.6	The procedure to determining division non-**financial** performance measures provides opportunity to present views and opinions	5-point	Scale
pf7	P2.1.7	The division performance measures are based on accurate information and informed opinion	5-point	Scale
pf8	P2.1.8	The division performance measures are determined by the senior manager in an unbiased manner	5-point	Scale
df1	P2.2.1	The performance measures are fair	5-point	Scale
df2	P2.2.2	The performance measures fairly measure my past year's performance	5-point	Scale
FFvsNF1	P2.3.1	In my opinion non-financial measures are fairer than financial measures	5-point	Scale
FFvsNF2	P2.3.2	In my opinion non-financial measures are more realistic than financial measures to evaluate each division	5-point	Scale
Trust1	P3.1	My senior manager takes advantage of opportunities that come up to further my interest by his/her actions and decisions.	5-point	Scale
Trust2	P3.2	I feel free to discuss with my senior manager the problems and difficulties I have in my job without jeopardizing my position or having it 'held against' me later on.	5-point	Scale

Trust3	P3.3	I feel confident that my senior manager keeps me fully and frankly informed about things that might concern me.	5-point	Scale
Trust4	P3.4	Senior managers at times must make decisions which seem to be against the interests of their division/unit managers.	5-point	Scale
Trust5	P3.5	When this happened to me as a division/unit manager, I believe that my senior manager's decision is justified by other considerations.	5-point	Scale
mpd1	P4.1	Planning	5-point	Scale
mpd2	P4.2	Investigating	5-point	Scale
mpd3	P4.3	Coordinating	5-point	Scale
mpd4	P4.4	Evaluating	5-point	Scale
mpd5	P4.5	Supervising	5-point	Scale
mpd6	P4.6	Staffing	5-point	Scale
mpd7	P4.7	Negotiating	5-point	Scale
mpd8	P4.8	Representing	5-point	Scale
mpd9	P4.9	Overall	5-point	Scale
upm1	P5.1.1	Senior manager uses financial and non-financial measures to evaluate individual performance	5-point	Scale
upm2	P5.1.2	Senior manager uses financial and non-financial measures in comparing among division managers	5-point	Scale
upm3	P5.1.3	Senior manager uses financial and non-financial measures to evaluate manager as well as division	5-point	Scale
upm4	P5.1.4	Senior manager places more weight on financial measures to evaluate performance	5-point	Scale
upm5	P5.1.5	Senior manager places more weight on non-financial measures to evaluate performance	5-point	Scale
GenPercpPM1	P5.2.1	Performance of divisional manager is the same of division	5-point	Scale
GenPercpPM2	P5.2.2	Motivation is affected by performance measures	5-point	Scale
GenPercpPM3	P5.2.3	Performance measures perceived inappropriate negatively affect performance	5-point	Scale
GenPercpPM4	P5.2.4	Performance measures perceived appropriate positively affect performance	5-point	Scale
GenPercpPM5	P5.2.5	I try my best to reach the targets set by the performance measures	5-point	Scale
FMa	P6.1.a	Net profit ($)	5-point	Scale
FMb	P6.1.b	Revenues/total assets (%)	5-point	Scale
FMc	P6.1.c	Return on investment (%)	5-point	Scale
FMd	P6.1.d	Total expenses ($)	5-point	Scale
FMe	P6.1.e	Sales growth	5-point	Scale
FMf	P6.1.f	Other, please specify: (string)		
CMa	P6.2.a	Number of customers complaints (No.)	5-point	Scale
CMb	P6.2.b	Market share (%)	5-point	Scale
CMc	P6.2.c	Annual sales/customer ($)	5-point	Scale
CMd	P6.2.d	Customer satisfaction: survey ratings (%)	5-point	Scale
CMe	P6.2.e	Customer response time	5-point	Scale
CMf	P6.2.f	Other, please specify: (string)		
IBPa	P6.3.a	Administrative expense/total revenue (%)	5-point	Scale
IBPb	P6.3.b	Length of time from order delivery	5-point	Scale
IBPc	P6.3.c	Inventory turnover ratio (%)	5-point	Scale
IBPd	P6.3.d	Rate of production capacity or resource used	5-point	Scale
IBPe	P6.3.e	Labour efficiency variance	5-point	Scale
IBPf	P6.3.f	Other, please specify: (string)		
LandGa	P6.4.a	R&D expense/total expense (%)	5-point	Scale
LandGb	P6.4.b	Cost reduction resulting from quality product improvement	5-point	Scale

LandGc	P6.4.c	Investment in new product support and training ($)	5-point	Scale
LandGd	P6.4.d	Satisfied-employee index (No.)	5-point	Scale
LandGe	P6.4.e	Training expenses/total expense (%)	5-point	Scale
LandGf	P6.4.f	Other, please specify: (string)		
mps1	P7.1.1	In my most recent performance evaluation my senior manager rated my managerial performance as:	5-point	Scale
mps2	P7.2.1	I agree with the way my senior manager rated my managerial performance	5-point	Scale
mps3	P7.2.2	I agree with my final rating	5-point	Scale
Gender	P8.1	Gender	2 options	Nominal
Age	P8.2	Age	5 opts	Nominal
Company	P8.3	Company industry	13 opts	Nominal
Divisi	P8.4a	Divisi main activity	13 opts	Nominal
Output	P8.4b	Proportion of division's output transferred internally	5 opts	Nominal
Tenure-mgr	P8.5	Period held current position in the company	5 opts	Nominal
Tenure-com	P8.6	Period worked for this company	5 opts	Nominal
Employees	P8.7	How many employees are you responsible for?	4 opts	Nominal
Interviewed	P8.8	Agreed to be interviewed as follow-up study	2 opts	Nominal
Address	P8.9	If agreed to be interviewed, provide address		
Summary	P8.10	Would you like to receive a copy of summary report of the study?	2 opts	Nominal

APPENDIX I

PART C

DESCRIPTIVE STATISTICS

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Prtcp1	164	.00	5.00	3.4451	1.12011	-.789	.190	.120	.377
Prtcp2	164	1.00	5.00	3.8171	.87400	-.639	.190	.157	.377
Prtcp3	164	1.00	5.00	3.4451	1.01675	-.487	.190	-.500	.377
Prtcp4	164	1.00	5.00	1.7866	.89144	1.065	.190	.704	.377
Prtcp5	164	1.00	5.00	3.1238	.98560	-.311	.190	-.821	.377
Prtcp6	164	1.00	5.00	3.6768	.89261	-.992	.190	.925	.377
Prtcp7	164	1.00	5.00	3.5244	.94934	-.746	.190	.116	.377
Prtcp8	164	1.00	5.00	3.5366	.86080	-.874	.190	.357	.377
Prtcp9	164	.00	5.00	3.4451	.94806	-1.087	.190	1.292	.377
Prtcp10	164	1.00	5.00	3.6829	.84908	-.862	.190	.932	.377
PF1	164	.00	5.00	3.7124	.94468	-1.647	.190	3.917	.377
PF2	164	.00	5.00	3.5122	1.04199	-1.087	.190	1.349	.377
PF3	164	.00	5.00	2.8171	1.19434	-.362	.190	-.546	.377
PF4	164	.00	5.00	2.9085	1.18691	-.334	.190	-.649	.377
PF5	164	.00	5.00	3.5244	1.05929	-1.021	.190	.946	.377
PF6	164	1.00	5.00	3.6829	.85627	-.881	.190	.890	.377
PF7	164	1.00	5.00	3.8171	.76147	-.944	.190	1.407	.377
PF8	164	.00	5.00	3.6220	.95468	-1.275	.190	1.902	.377
DF1	164	1.00	5.00	3.7317	.78402	-1.265	.190	2.175	.377
DF2	164	.00	5.00	3.5915	.89178	-1.777	.190	3.375	.377
FFvsNF1	164	.00	5.00	2.9146	.90264	-.489	.190	1.090	.377
FFvsNF2	164	.00	5.00	2.7439	.91760	-.047	.190	.745	.377
Trust1	164	.00	5.00	3.3354	1.03484	-.879	.190	.848	.377
Trust2	164	1.00	5.00	3.8354	.93518	-.622	.190	-.178	.377
Trust3	164	1.00	5.00	3.5793	1.00297	-.885	.190	.263	.377
Trust4	164	1.00	5.00	3.6280	.75255	-.926	.190	.768	.377
Trust5	164	.00	5.00	3.3049	1.12079	-1.552	.190	2.436	.377
MPD1	164	2.00	5.00	3.6890	.67896	-.595	.190	.436	.377
MPD2	164	2.00	5.00	3.6585	.73006	-.518	.190	.140	.377
MPD3	164	2.00	5.00	3.6768	.74254	-.308	.190	-.070	.377
MPD4	164	1.00	5.00	3.6646	.71167	-.547	.190	.830	.377
MPD5	164	1.00	5.00	3.7256	.71209	-.474	.190	.867	.377
MPD6	164	2.00	5.00	3.6098	.68742	-.116	.190	-.139	.377
MPD7	164	.00	5.00	3.6037	.92424	-.969	.190	2.722	.377
MPD8	164	.00	5.00	3.4146	.96505	-.916	.190	1.511	.377
MPD9	164	2.00	5.00	3.5427	.63970	-.660	.190	-.043	.377
UPM1	164	1.00	5.00	3.4817	.94948	-.578	.190	-.008	.377
UPM2	164	.00	5.00	3.1829	1.31651	-.931	.190	.354	.377
UPM3	164	.00	5.00	3.5671	1.00996	-1.289	.190	2.194	.377
UPM4	164	.00	5.00	3.5732	1.05703	-.652	.190	.063	.377
UPM5	164	.00	5.00	2.6402	.91937	-.037	.190	-.218	.377
MPS1	164	.00	5.00	3.7622	1.16104	-2.167	.190	4.953	.377
MPS2	164	.00	5.00	3.4634	1.23044	-1.525	.190	2.077	.377
MPS3	164	.00	5.00	3.5305	1.21051	-1.700	.190	2.740	.377
Valid N (listwise)	164								

APPENDIX I

PART D

MISSING DATA ANALYSIS

MISSING DATA ANALYSIS

UNIVARIATE STATISTICS

	N	Mean	Std. Deviation	Missing		No. of Extremes(a,b)	
				Count	Percent	Low	High
Part1.1	164	3.2988	1.28311	0	.0	0	0
Part1.2	164	3.9085	.90543	0	.0	0	0
Part1.3	164	3.4207	1.11864	0	.0	0	0
Part1.4	164	1.9756	1.03290	0	.0	0	0
Part1.5	163	3.0736	1.03374	1	.6	0	0
Part1.6	164	3.6098	1.03623	0	.0	9	0
Part1.7	164	3.3902	1.11053	0	.0	0	0
Part1.8	164	3.5549	.92181	0	.0	6	0
Part1.9	164	3.4085	1.06139	0	.0	8	0
Part1.10	164	3.6220	1.04077	0	.0	8	0
Part2.1.1	163	3.8712	.98850	1	.6	.	.
Part2.1.2	164	3.4756	1.16414	0	.0	12	0
Part2.1.3	164	2.6524	1.24139	0	.0	0	0
Part2.1.4	164	2.7805	1.25834	0	.0	0	0
Part2.1.5	164	3.5305	1.14272	0	.0	10	0
Part2.1.6	164	3.7622	.97113	0	.0	4	0
Part2.1.7	164	3.8659	.80279	0	.0	.	.
Part2.1.8	164	3.5793	1.02715	0	.0	9	0
Part2.2.1	164	3.7500	.82429	0	.0	.	.
Part2.2.2	164	3.6220	.98005	0	.0	.	.
Part2.3.1	164	2.7317	.87989	0	.0	3	4
Part2.3.2	164	2.5976	.93808	0	.0	3	5
Part3.1	164	3.3171	1.08394	0	.0	11	0
Part3.2	164	3.8841	1.02364	0	.0	0	0
Part3.3	164	3.4695	1.08206	0	.0	10	0
Part3.4	164	3.6280	.81516	0	.0	2	0
Part3.5	164	3.2744	1.19983	0	.0	15	0
Part4.1.1	164	3.6646	.71167	0	.0	0	0
Part4.1.2	164	3.6463	.76539	0	.0	0	0
Part4.1.3	164	3.6707	.76029	0	.0	0	0
Part4.1.4	164	3.6707	.76029	0	.0	2	0
Part4.1.5	164	3.6585	.74668	0	.0	2	0
Part4.1.6	164	3.6463	.69832	0	.0	0	0
Part4.1.7	164	3.5122	1.13228	0	.0	7	0
Part4.1.8	164	3.3780	1.04665	0	.0	6	0
Part4.1.9	164	3.7439	.64229	0	.0	1	0
Part5.1.1	164	3.6646	1.06407	0	.0	7	0
Part5.1.2	164	3.0976	1.36215	0	.0	0	0
Part5.1.3	164	3.6037	1.09443	0	.0	10	0
Part5.1.4	164	3.5610	1.11979	0	.0	6	0
Part5.1.5	164	2.4695	.86814	0	.0	0	2
Part5.2.1	164	3.1524	1.19094	0	.0	0	0
Part5.2.2	164	3.1402	1.13444	0	.0	0	0
Part5.2.3	164	2.7500	1.13708	0	.0	0	0

Part5.2.4	164	3.7988	.85930	0	.0	0	0
Part5.2.5	164	4.2744	.66762	0	.0	4	0
Part7.1.1	164	3.7317	1.28749	0	.0	.	.
Part7.2.1	164	3.4573	1.36274	0	.0	19	0
Part7.2.2	164	3.4817	1.32680	0	.0	19	0

a Number of cases outside the range (Q1 - 1.5*IQR, Q3 + 1.5*IQR).
b . indicates that the inter-quartile range (IQR) is zero.

EM Missing Data Analysis

	Part1 .1	Part1 .2	Part1 .3	Part1 .4	Part1 .5	Part1 .6	Part1 .7	Part1 .8	Part1 .9	Part1 .10	Part2 .1.1	Part2 .1.2	Part2 .1.3	Part2 .1.4	Part2 .1.5	Part2 .1.6	Part2 .1.7	Part2 .1.8	Part2 .2.1	Part2 .2.2	Part2 .3.1	Part2 .3.2	Part3 .1	P
Part1 .1	1																							
Part1 .2	.536	1																						
Part1 .3	.698	.608	1																					
Part1 .4	-.494	-.717	-.660	1																				
Part1 .5	.371	.402	.461	-.539	1																			
Part1 .6	.208	.491	.275	-.565	.326	1																		
Part1 .7	.421	.383	.494	-.537	.529	.496	1																	
Part1 .8	.455	.488	.552	-.701	.526	.427	.680	1																
Part1 .9	.761	.543	.702	-.539	.509	.296	.369	.507	1															
Part1 .10	.430	.777	.643	-.773	.563	.539	.489	.668	.613	1														
Part2 .1.1	.245	.275	.140	-.087	.088	.168	.031	-.028	.321	.067	1													
Part2 .1.2	.311	.181	.208	-.154	.188	.318	.273	.096	.264	.099	.423	1												
Part2 .1.3	.308	.108	.172	-.107	.245	-.063	.019	.180	.420	.111	.302	.242	1											
Part2 .1.4	.254	.208	.262	-.283	.273	-.005	.057	.285	.334	.288	.267	.088	.815	1										
Part2 .1.5	.690	.427	.544	-.514	.483	.311	.440	.493	.716	.453	.356	.326	.295	.265	1									
Part2 .1.6	.343	.554	.460	-.624	.517	.578	.547	.546	.440	.621	.270	.198	.018	.183	.689	1								

Part2 .1.7	.426	.498	.500	-.522	.377	.497	.451	.507	.432	.592	.265	.312	.187	.226	.493	.557	1						
Part2 .1.8	.357	.447	.422	-.357	.389	.346	.242	.255	.412	.436	.390	.302	.197	.203	.395	.428	.511	1					
Part2 .2.1	.355	.619	.494	-.569	.533	.359	.429	.515	.447	.633	.414	.310	.196	.290	.474	.600	.617	.650	1				
Part2 .2.2	.447	.500	.420	-.397	.494	.361	.277	.274	.509	.418	.414	.438	.285	.256	.421	.498	.403	.652	.604	1			
Part2 .3.1	-.075	.085	-.103	.114	-.055	.073	-.143	-.095	.006	.002	.018	.233	.032	-.009	-.163	-.089	-.234	-.044	-.042	.081	1		
Part2 .3.2	-.057	-.094	-.060	.066	.119	.115	.028	.061	.012	-.037	-.002	.221	.121	.039	.040	.069	-.113	.027	-.012	.174	.641	1	
Part3 .1	.161	.530	.228	-.388	.130	.411	.182	.314	.233	.466	.241	.259	.005	.020	.294	.393	.486	.385	.515	.339	.000	-.043	1
Part3 .2	.279	.551	.455	-.554	.289	.489	.294	.355	.298	.534	.271	.330	-.008	.099	.410	.484	.541	.408	.613	.372	-.028	-.106	.570
Part3 .3	.389	.520	.540	-.588	.437	.515	.546	.500	.409	.583	.242	.396	.040	.099	.517	.551	.546	.444	.662	.423	-.009	.072	.594
Part3 .4	.001	-.080	-.056	.091	-.016	.016	-.089	-.018	-.064	-.116	-.096	-.142	.023	-.092	-.037	-.043	.223	-.034	.053	.007	-.131	-.053	.051
Part3 .5	.126	.170	.183	-.188	.113	.274	.016	.155	.128	.118	.177	.187	.003	.032	.206	.262	.102	.259	.306	.282	.152	.115	.112
Part4 .1.1	.238	.219	.194	-.195	.144	.088	.182	.220	.239	.225	.106	.090	.166	.274	.280	.212	.361	.200	.222	.081	-.105	-.066	.067
Part4 .1.2	.271	.201	.247	-.166	.326	-.020	.264	.210	.292	.185	.079	.128	.199	.244	.146	.150	.172	.044	.238	.262	-.087	.057	.047
Part4 .1.3	.441	.402	.460	-.323	.265	.241	.349	.367	.312	.400	-.015	.074	.073	.155	.294	.234	.410	.309	.289	.194	-.124	-.118	.269
Part4 .1.4	.183	.179	.279	-.307	.288	.272	.306	.376	.206	.369	-.015	-.009	-.076	.039	.209	.251	.269	.230	.299	.137	-.124	-.118	.150
Part4 .1.5	.299	.208	.254	-.329	.249	.144	.287	.250	.239	.330	-.038	.096	.143	.194	.257	.124	.373	.243	.279	.074	-.187	-.224	.233
Part4 .1.6	.119	.036	.090	-.140	.182	.105	.187	.135	.146	.161	.091	.004	-.015	-.019	.229	.174	.145	.039	.048	.001	-.175	-.041	.190
Part4 .1.7	.304	.399	.299	-.351	.176	.192	.201	.302	.187	.275	.044	.084	.058	.239	.315	.284	.279	.107	.263	.115	-.046	-.024	.197
Part4 .1.8	.231	.179	.141	-.054	.016	.182	.131	.144	.153	.115	.055	.083	.073	.073	.144	.119	.192	.200	.096	.152	.064	.075	.197
Part4 .1.9	.280	.287	.279	-.231	.334	.190	.236	.221	.343	.258	.162	.106	.149	.203	.211	.148	.135	.273	.168	.196	.182	.093	.153

Part5 .1.1	.177	.369	.253	-.303	.191	.509	.361	.310	.220	.311	.334	.382	.074	.096	.329	.498	.557	.302	.484	.378	.087	.030	.609
Part5 .1.2	.145	.311	.202	-.190	.118	.340	.250	.157	.189	.217	.372	.485	.107	.048	.187	.250	.399	.323	.366	.294	.176	.165	.606
Part5 .1.3	.159	.366	.237	-.318	.178	.452	.320	.304	.167	.331	.164	.313	.042	.048	.218	.367	.519	.266	.393	.283	.055	.017	.727
Part5 .1.4	.169	-.088	-.028	.054	.033	-.080	-.133	-.232	.080	-.112	.083	-.041	.141	.153	.226	.044	.118	.180	.033	.049	-.263	-.269	-.173
Part5 .1.5	-.110	-.054	-.141	.163	.064	.028	.216	-.036	-.243	-.088	-.017	.166	-.030	-.113	-.166	-.005	.038	-.004	.036	.080	.126	.181	-.029
Part5 .2.1	.159	.218	.205	-.271	.338	.044	.150	.163	.149	.200	.027	.049	.140	.276	.188	.265	.028	.273	.252	.307	.033	.094	.100
Part5 .2.2	-.046	-.035	-.018	.129	.007	-.157	-.131	-.004	-.007	-.100	.038	-.102	.179	.155	-.124	-.053	-.269	.025	.031	.142	.235	.232	-.066
Part5 .2.3	-.045	-.314	-.105	.434	-.140	-.151	-.151	-.259	-.093	-.417	.122	.081	.073	-.060	-.110	-.221	-.239	-.117	-.322	-.025	.098	.216	-.294
Part5 .2.4	.122	.031	.050	-.089	-.030	.111	.006	.095	.192	.065	.086	-.069	.124	.175	.147	.156	-.208	-.097	-.089	.171	.050	.059	.029
Part5 .2.5	.133	.326	.083	-.284	.176	.280	-.087	.090	.135	.371	.062	.084	-.069	.036	.130	.300	.218	.151	.192	.272	-.010	-.048	.252
Part7 .1.1	.138	.263	.164	-.254	.187	.248	.254	.183	.153	.263	.285	.155	-.040	.005	.110	.258	.321	.183	.277	.250	-.107	-.054	.532
Part7 .2.1	.142	.327	.183	-.249	.227	.297	.254	.187	.226	.287	.280	.253	.026	-.038	.194	.287	.370	.252	.326	.360	.067	.044	.611
Part7 .2.2	.203	.323	.181	-.291	.233	.263	.267	.272	.286	.288	.255	.204	.106	.012	.231	.304	.361	.190	.318	.292	.064	.083	.554

a Little's MCAR test: Chi-Square = 83.086, DF = 96, Sig. = .823

APPENDIX II

PART A

STANDARDISED RESIDUAL COVARIANCE AND IMPLIED CORRELATIONS FOR INVESTIGATING DISCRIMINANT VALIDITY FOR PFAIR – MPD MODEL

Table 1: Standarised Residual Covariance before deleting any items (indicators) for Measurement model PFAIR-MPD

Standardized Residual Covariances (Group number 1 - Default model)

	mpd9	mpd8	mpd7	trust5	pf8	pf7	upm3	Prtcp10	Prtcp8	mpd1	mpd2	mpd3	mpd4
mpd9	0.000												
mpd8	-0.175	0.000											
mpd7	0.014	0.573	0.000										
trust5	-1.279	-1.235	0.123	0.000									
pf8	-0.485	0.638	-0.745	1.183	0.000								
pf7	-0.763	0.098	0.431	-1.440	0.763	0.000							
upm3	-0.760	1.226	0.003	-1.334	0.085	1.087	0.000						
prtcp10	-0.166	-0.734	0.442	-1.377	-0.126	0.249	-0.123	0.000					
prtcp8	-0.400	-0.962	0.157	0.387	-0.697	0.955	-0.544	-0.161	0.000				
mpd1	0.049	0.043	0.339	-0.200	0.036	1.312	-1.253	-1.195	-0.535	0.000			
mpd2	0.816	0.372	0.997	-1.440	-1.645	-0.333	-0.615	0.532	-0.566	0.171	0.000		
mpd3	0.557	-1.005	-0.667	-0.868	-0.256	1.850	-0.228	0.914	0.054	0.234	0.574	0.000	
mpd4	-0.942	-0.928	-0.429	1.258	0.570	1.312	0.745	**2.183**	1.192	-0.105	0.302	0.788	0.000
mpd5	-0.444	0.801	0.321	-1.241	0.320	1.158	0.602	0.143	-1.119	-0.015	-1.964	0.155	-1.077
mpd6	0.366	1.423	-0.786	**-2.102**	-0.464	0.739	0.601	-0.462	-0.592	-0.109	-1.221	-0.549	0.485
trust1	0.676	1.333	0.806	-1.081	1.131	0.409	**3.897**	0.855	-0.347	-0.579	-0.694	0.957	-0.289
trust2	-1.039	**-2.191**	-0.757	1.031	0.349	0.634	-0.824	-0.471	-0.028	-1.063	0.000	0.490	0.847
trust3	-0.967	0.301	-0.190	-0.064	0.357	-0.389	-0.645	-0.170	-0.422	-0.896	-0.266	1.015	0.612
pf1	1.002	-0.696	-1.138	0.667	1.604	-0.198	-0.321	**-2.791**	-1.287	0.118	0.429	-1.244	-1.165
pf3	-0.628	1.316	0.586	0.811	1.544	-0.238	-1.175	-0.549	-0.242	1.199	0.882	-0.332	-1.176
pf5	-0.121	-0.307	0.648	0.632	-0.877	-0.505	-1.889	-0.985	-0.048	-0.339	-0.562	-0.264	0.562
pf6	-0.205	-0.494	0.196	0.599	-0.294	-0.357	-0.508	0.328	0.257	-1.179	-0.340	-0.629	1.087
upm1	-1.523	-0.081	-1.124	-0.518	1.006	**2.360**	0.024	-0.822	0.507	0.313	-1.739	-0.490	-0.827
upm2	0.331	1.723	**2.190**	0.073	**2.143**	1.078	0.118	-0.40	-0.873	0.409	0.352	0.778	0.623
prtcp1	-0.478	-0.289	0.613	0.317	0.360	0.298	-1.027	-0.753	-0.456	-0.643	0.512	0.954	0.422
prtcp2	0.830	0.387	0.898	-1.461	-0.513	1.049	1.072	1.338	-0.190	0.119	-0.010	0.814	0.584
prtcp4_R	-0.984	-0.751	0.944	0.108	-0.777	-0.877	0.209	0.359	-0.070	-0.552	-1.186	0.013	1.482
prtcp5	0.824	-1.615	-0.741	-0.428	0.775	0.274	-0.295	-0.545	0.928	-0.961	1.807	0.412	0.803
prtcp6	-0.585	0.040	-0.390	0.426	0.391	0.657	2.032	0.126	-0.138	-0.492	-1.015	-0.499	0.941
prtcp7	-0.276	-1.558	-0.949	-0.931	-1.218	-0.101	-0.230	-0.389	0.364	-1.691	-0.104	0.141	0.890

Table 1: Standarised Residual Covariance before deleting any items (indicators) for Measurement model PFAIR-MPD (Continued)

Standardized Residual Covariances (Group number 1 - Default model)

	mpd5	mpd6	trust1	trust2	trust3	pf1	pf3	pf5	pf6	upm1	upm2	prtcp1	prtcp2
mpd9													
mpd8													
mpd7													
trust5													
pf8													
pf7													
upm3													
prtcp10													
prtcp8													
mpd1													
mpd2													
mpd3													
mpd4													
mpd5	0.000												
mpd6	1.072	0.000											
trust1	0.628	1.290	0.000										
trust2	-0.749	-0.432	-0.521	0.000									
trust3	1.062	0.550	-0.312	0.248	0.000								
pf1	**-2.352**	0.988	0.297	1.124	0.219	0.000							
pf3	0.887	-0.640	-0.497	**-2.307**	-0.472	1.574	0.000						
pf5	0.103	1.101	-1.239	-0.332	-0.103	1.343	1.910	0.000					
pf6	-1.356	-0.589	-0.454	0.172	0.025	-0.494	-1.574	0.426	0.000				
upm1	-0.334	0.720	**2.500**	-0.031	0.412	1.423	-1.263	-0.767	0.072	0.000			
upm2	0.660	0.048	**2.954**	**-2.151**	-0.763	1.438	1.995	-0.675	-0.701	-0.261	0.000		
prtcp1	1.184	-0.432	-1.357	0.056	0.090	0.725	2.266	**3.720**	-0.658	-1.180	-0.922	0.000	
prtcp2	0.289	0.028	0.830	-0.177	-0.602	-0.254	-0.893	-0.420	-0.319	-0.189	-0.307	0.496	0.000
prtcp4_R	1.036	-0.572	0.034	0.081	0.826	**-3.256**	0.045	-0.180	0.191	-0.279	-0.758	0.397	-0.201
prtcp5	0.019	-0.359	-1.377	0.132	0.563	-0.531	0.478	0.583	0.986	-0.243	-0.326	-0.595	-0.694
prtcp6	-0.322	0.211	0.546	0.981	0.087	-1.319	**-2.736**	-1.091	1.289	2.709	0.598	-1.249	0.079
prtcp7	0.430	-0.354	-1.825	-0.673	0.924	-1.751	-1.206	0.160	0.645	0.789	-0.207	0.051	-0.801

Table 1: Standarised Residual Covariance before deleting any items (indicators) for Measurement model PFAIR-MPD (Continued)

Standardized Residual Covariances (Group number 1 - Default model)

	prtcp4_R	prtcp5	prtcp6	prtcp7
mpd9				
mpd8				
mpd7				
trust5				
pf8				
pf7				
upm3				
prtcp10				
prtcp8				
mpd1				
mpd2				
mpd3				
mpd4				
mpd5				
mpd6				
trust1				
trust2				
trust3				
pf1				
pf3				
pf5				
pf6				
upm1				
upm2				
prtcp1				
prtcp2				
prtcp4_R	0.000			
prtcp5	-0.428	0.000		
prtcp6	0.134	-0.735	0.000	
prtcp7	0.075	0.819	1.012	0.000

Table 2: Modification Indices (MIs) of Regression Weights before deleting any Indicators for measurement model of PFAIR-MPD

Regression Weights: (Group number 1 - Default model)

			M.I.	Par Change
mpd8	<---	trust2	4.885	-.159
mpd7	<---	upm2	4.494	.095
trust5	<---	mpd6	5.125	-.279
pf8	<---	pf1	4.156	.138
pf8	<---	upm2	6.964	.129
pf7	<---	MPD	4.152	.319
pf7	<---	CMB	5.786	.145
pf7	<---	trust5	4.773	-.091
pf7	<---	upm3	4.028	.093
pf7	<---	mpd1	5.767	.166
pf7	<---	mpd3	6.329	.159
pf7	<---	upm1	8.609	.145
upm3	<---	trust1	10.244	.172
prtcp10	<---	pf1	7.137	-.136
prtcp10	<---	prtcp2	5.412	.128
mpd2	<---	mpd5	5.286	-.169
mpd2	<---	prtcp5	4.511	.113
mpd4	<---	trust5	4.504	.093
mpd4	<---	prtcp10	6.298	.146
mpd5	<---	mpd2	7.366	-.172
mpd5	<---	pf1	5.280	-.112
trust1	<---	CMB	21.761	.398
trust1	<---	mpd8	4.227	.142
trust1	<---	upm3	29.847	.360
trust1	<---	upm1	8.604	.206
trust1	<---	upm2	20.307	.228
trust1	<---	prtcp7	6.217	-.175
trust2	<---	mpd8	12.571	-.185
trust2	<---	pf3	8.084	-.120
trust2	<---	upm2	10.420	-.124
trust3	<---	prtcp7	6.510	.135
pf1	<---	prtcp10	8.827	-.243
pf1	<---	mpd5	6.488	-.248
pf1	<---	prtcp4_R	12.001	-.269
pf3	<---	trust2	5.715	-.236
pf3	<---	upm2	4.087	.141
pf3	<---	prtcp1	4.600	.176
pf3	<---	prtcp6	8.121	-.293
pf5	<---	CMB	5.175	-.183

Table 2: Modification Indices (MIs) of Regression Weights before deleting any Indicators for measurement model of PFAIR-MPD (continued)

Regression Weights: (Group number 1 - Default model)

			M.I.	Par Change
pf5	<---	upm3	6.901	-0.163
pf5	<---	pf1	4.789	0.145
pf5	<---	pf3	9.215	0.159
pf5	<---	prtcp1	27.554	0.294
pf5	<---	prtcp6	4.166	-0.143
pf6	<---	mpd5	4.892	-0.154
pf6	<---	pf3	6.949	-0.109
pf6	<---	prtcp1	4.775	-0.097
pf6	<---	prtcp6	4.085	0.112
upm1	<---	mpd7	4.063	-0.121
upm1	<---	pf7	4.73	0.159
upm1	<---	prtcp6	4.93	0.138
upm2	<---	mpd7	9.362	0.277
upm2	<---	pf8	5.211	0.2
upm2	<---	trust2	5.507	-0.211
upm2	<---	pf3	11.359	0.236
prtcp1	<---	pf1	4.575	0.163
prtcp1	<---	pf3	10.55	0.196
prtcp1	<---	pf5	24.752	0.339
prtcp2	<---	prtcp10	4.92	0.134
prtcp4_R	<---	pf1	11.734	-0.183
prtcp5	<---	mpd2	6.42	0.216
prtcp6	<---	CMB	7.201	0.199
prtcp6	<---	upm3	6.887	0.15
prtcp6	<---	pf3	10.114	-0.154
prtcp6	<---	upm1	11.16	0.203
prtcp7	<---	trust1	6.349	-0.13

Table 3: Standarised Residual Covariance after deleting nine items (indicators) for Measurement model PFAIR-MPD

Standardized Residual Covariances (Group number 1 – Default model)

	mpd1	mpd2	mpd3	mpd5	mpd7	mpd9	trust2	trust3	trust5	pf5	pf6	pf7
mpd1	0.000											
mpd2	0.064	0.000										
mpd3	0.047	0.361	0.000									
mpd5	0.114	-1.938	0.179	0.000								
mpd7	0.329	0.922	-0.798	0.487	0.000							
mpd9	-0.091	0.668	0.303	-0.444	-0.091	0.000						
trust2	-0.946	0.050	0.564	-0.558	-0.625	-1.001	0.000					
trust3	-0.787	-0.224	1.075	1.258	-0.062	-0.938	-0.030	0.000				
trust5	-0.177	-1.435	-0.863	-1.189	0.153	-1.279	0.879	-0.248	0.000			
pf5	-0.161	-0.474	-0.128	0.358	0.844	-0.043	-0.147	0.062	0.663	0.000		
pf6	-1.178	-0.375	-0.696	-1.262	0.219	-0.256	0.019	-0.177	0.497	0.611	0.000	
pf7	1.345	-0.343	1.824	1.277	0.483	-0.787	0.552	-0.510	-1.508	-0.270	-0.507	0.000
pf8	0.161	-1.587	-0.167	0.506	-0.610	-0.435	0.470	0.459	1.197	-0.462	-0.184	0.925
upm1	0.661	-1.540	-0.168	0.073	-0.776	-1.329	-0.168	0.227	-0.606	-1.046	-0.454	1.900
upm3	-0.433	-0.081	0.645	1.477	0.832	-0.219	-0.153	0.050	-1.117	-1.614	-0.435	1.195
Prtcp2	0.187	-0.004	0.811	0.462	0.991	0.818	-0.096	-0.550	-1.468	-0.207	-0.439	0.996
Prtcp4_R	-0.499	-1.192	-0.009	1.203	1.024	-1.008	0.141	0.855	0.091	0.016	0.037	-0.954
Prtcp5	-1.026	1.723	0.264	0.057	-0.781	0.721	0.019	0.407	-0.504	0.584	0.658	0.034
Prtcp7	-1.636	-0.107	0.123	0.599	-0.868	-0.298	-0.609	0.959	-0.946	0.365	0.494	-0.175
Prtcp8	-0.549	-0.617	-0.043	-1.024	0.169	-0.471	-0.067	-0.498	0.334	0.043	-0.002	0.774
Prtcp10	-1.202	0.483	0.821	0.251	0.462	-0.234	-0.499	-0.237	-1.427	-0.883	0.073	0.078

Table 3: Standarised Residual Covariance after deleting nine items (indicators) for Measurement model PFAIR-MPD (Continued)

Standardized Residual Covariances (Group number 1 - Default model)

pf8	upm1	upm3	Prtcp2	Prtcp4_R	Prtcp5	Prtcp7	Prtcp8	Prtcp10
0.000								
0.760	0.000							
0.292	0.000	0.000						
-0.371	-0.334	1.420	0.000					
-0.651	-0.444	0.553	-0.078	0.000				
0.749	-0.482	-0.093	-0.787	-0.553	0.000			
-1.089	0.624	0.116	-0.672	0.180	0.695	0.000		
-0.654	0.287	-0.270	-0.188	-0.098	0.687	0.341	0.000	
-0.073	-1.037	0.168	1.354	0.343	-0.768	-0.398	-0.300	0.000

Table 4: Implied (for all variables) Correlations for Measurement model PFAIR - MPD

Implied (for all variables) Correlations (Group number 1 - Default model)

	MPD	TRST	PFAIR	CMB	PRTCPT	mpd1	mpd2	mpd3	mpd5	mpd7	mpd9	trust5	trust3
MPD	1												
TRST	0.348	1											
PFAIR	0.436	0.718	1										
CMB	0.350	0.562	0.458	1									
PRTCPT	0.544	0.675	0.823	0.376	1								
mpd1	**0.662**	0.230	0.288	0.232	0.36	1							
mpd2	**0.452**	0.157	0.197	0.158	0.246	0.299	1						
mpd3	**0.757**	0.264	0.330	0.265	0.412	0.501	0.342	1					
mpd5	**0.599**	0.209	0.261	0.210	0.326	0.397	0.271	0.454	1				
mpd7	**0.634**	0.221	0.277	0.222	0.345	0.420	0.287	0.481	0.380	1			
mpd9	**0.474**	0.165	0.207	0.166	0.258	0.314	0.214	0.359	0.284	0.301	1		
trust5	0.101	**0.289**	0.208	0.163	0.195	0.067	0.046	0.076	0.060	0.064	0.048	1	
trust3	0.307	**0.881**	0.632	0.495	0.595	0.203	0.139	0.232	0.184	0.195	0.145	0.255	1
trust2	0.280	**0.803**	0.576	0.451	0.542	0.185	0.126	0.212	0.168	0.177	0.133	0.232	0.707
pf5	0.300	0.493	**0.688**	0.315	0.566	0.198	0.136	0.227	0.180	0.190	0.142	0.143	0.435
pf6	0.332	0.546	**0.760**	0.348	0.626	0.219	0.150	0.251	0.199	0.210	0.157	0.158	0.481
pf7	0.298	0.491	**0.684**	0.313	0.563	0.197	0.135	0.226	0.179	0.189	0.141	0.142	0.432
pf8	0.234	0.385	**0.537**	0.246	0.442	0.155	0.106	0.177	0.140	0.149	0.111	0.112	0.340
upm3	0.267	0.429	0.349	**0.764**	0.287	0.177	0.121	0.203	0.160	0.170	0.127	0.124	0.378
upm1	0.288	0.463	0.377	**0.823**	0.309	0.191	0.130	0.218	0.173	0.183	0.137	0.134	0.408
Prtcp2	0.378	0.469	0.572	0.261	**0.695**	0.250	0.171	0.287	0.227	0.240	0.179	0.136	0.413
Prtcp4_R	0.396	0.491	0.599	0.274	**0.728**	0.262	0.179	0.300	0.238	0.251	0.188	0.142	0.433
Prtcp5	0.351	0.435	0.530	0.242	**0.644**	0.232	0.159	0.266	0.210	0.223	0.166	0.126	0.383
Prtcp7	0.398	0.493	0.602	0.275	**0.731**	0.263	0.180	0.301	0.239	0.252	0.189	0.143	0.435
Prtcp8	0.390	0.484	0.590	0.269	**0.717**	0.258	0.176	0.296	0.234	0.248	0.185	0.140	0.426
Prtcp10	0.402	0.498	0.608	0.277	**0.738**	0.266	0.182	0.304	0.241	0.255	0.191	0.144	0.439

Table 4: Implied (for all variables) Correlations for Measurement model PFAIR – MPD (continued)

trust2	pf5	pf6	pf7	pf8	upm3	upm1	Prtcp2	Prtcp4_R	Prtcp5	Prtcp7	Prtcp8	Prtcp10
1												
0.396	1											
0.438	0.523	1										
0.394	0.470	0.520	1									
0.310	0.369	0.408	0.367	1								
0.345	0.240	0.266	0.239	0.188	1							
0.371	0.259	0.286	0.257	0.202	0.628	1						
0.377	0.393	0.435	0.391	0.307	0.199	0.215	1					
0.395	0.412	0.456	0.410	0.322	0.209	0.225	0.506	1				
0.349	0.365	0.403	0.363	0.285	0.185	0.199	0.448	0.469	1			
0.396	0.414	0.458	0.411	0.323	0.210	0.226	0.508	0.532	0.471	1		
0.389	0.406	0.449	0.404	0.317	0.206	0.222	0.498	0.522	0.462	0.524	1	
0.400	0.418	0.462	0.416	0.326	0.212	0.228	0.513	0.538	0.476	0.540	0.529	1

APPENDIX II

PART B

STANDARDISED RESIDUAL COVARIANCE AND IMPLIED CORRELATIONS FOR INVESTIGATING DISCRIMINANT VALIDITY FOR PFAIR – MPS MODEL

Table 1: Standardised Residual Covariance before deleting any items (indicators) for Measurement model PFAIR-MPS

Standardized Residual Covariances (Group number 1 - Default model)

	mps1	mps2	mps3	trust5	pf8	pf7	upm3	Prtcp10	Prtcp8	trust1	trust2	trust3	pf1
mps1	0.000												
mps2	-0.085	0.000											
mps3	0.094	-0.014	0.000										
trust5	**-2.231**	-0.100	-0.692	0.000									
pf8	-0.979	-0.615	-1.146	1.194	0.000								
pf7	0.230	0.492	0.256	-1.414	0.750	0.000							
upm3	0.346	0.923	-0.071	-1.362	0.074	1.099	0.000						
Prtcp10	0.019	-0.459	-0.199	-1.342	-0.118	0.299	-0.190	0.000					
Prtcp8	-0.330	-0.215	0.311	0.399	-0.740	0.942	-0.647	-0.155	0.000				
trust1	**3.457**	**3.747**	**3.043**	-1.092	1.044	0.338	**3.683**	0.799	-0.449	0.000			
trust2	-1.458	-0.466	-0.736	1.088	0.342	0.665	-0.939	-0.418	-0.036	-0.598	0.000		
trust3	-1.378	0.367	-0.741	-0.006	0.345	-0.361	-0.773	-0.117	-0.436	-0.400	0.327	0.000	
pf1	-0.039	0.167	-0.009	0.679	1.589	-0.188	-0.318	**-2.770**	-1.302	0.250	1.135	0.228	0.000
pf3	**-2.118**	-1.322	-0.800	0.817	1.532	-0.236	-1.176	-0.541	-0.253	-0.526	**-2.304**	-0.470	1.572
pf5	-1.068	-0.492	0.182	0.657	-0.899	-0.484	-1.883	-0.944	-0.071	-1.319	-0.309	-0.083	1.347
pf6	0.220	0.509	1.006	0.621	-0.324	-0.344	-0.506	0.364	0.226	-0.545	0.188	0.038	-0.496
upm1	-1.592	0.271	-1.470	-0.448	1.133	**2.540**	-0.039	-0.726	0.569	**2.537**	0.123	0.575	1.518
upm2	0.191	0.357	-0.287	0.133	**2.254**	1.229	0.055	-0.318	-0.822	**2.984**	**-2.026**	-0.627	1.520
Prtcp1	-0.585	-0.803	0.049	0.352	0.380	0.356	-1.073	-0.663	-0.432	-1.389	0.117	0.151	0.752
Prtcp2	-0.158	-0.569	-0.713	-1.419	-0.486	1.122	1.021	1.455	-0.155	0.795	-0.103	-0.527	-0.220
Prtcp4_R	0.432	0.144	0.483	0.133	-0.792	-0.856	0.124	0.411	-0.097	-0.043	0.108	0.851	**-3.251**
Prtcp5	-0.244	0.092	0.097	-0.412	0.748	0.276	-0.378	-0.522	0.881	-1.455	0.139	0.566	-0.536
Prtcp6	0.544	0.349	0.116	0.429	0.335	0.623	1.927	0.104	-0.226	0.440	0.952	0.051	-1.344
Prtcp7	0.548	0.523	0.157	-0.928	-1.283	-0.140	-0.353	-0.414	0.260	-1.946	-0.705	0.883	-1.781

Table 1: Standardised Residual Covariance before deleting any items (indicators) for Measurement model PFAIR-MPS (Continued)

Standardized Residual Covariances (Group number 1 - Default model)

pf3	pf5	pf6	upm1	upm2	Prtcp1	Prtcp2	Prtcp4_R	Prtcp5	Prtcp6	Prtcp7
0.000										
1.907	0.000									
-1.580	0.428	0.000								
-1.212	-0.591	0.253	0.000							
2.039	-0.523	-0.548	0.013	0.000						
2.278	**3.777**	-0.611	-1.092	-0.847	0.000					
-0.877	-0.355	-0.260	-0.082	-0.217	0.612	0.000				
0.044	-0.167	0.197	-0.196	-0.689	0.461	-0.123	0.000			
0.472	0.577	0.973	-0.181	-0.274	-0.558	-0.647	-0.435	0.000		
-2.753	-1.133	1.236	**2.751**	0.632	-1.251	0.082	0.081	-0.797	0.000	
-1.227	0.109	0.584	0.841	-0.165	0.050	-0.795	0.015	0.742	0.890	0.000

Table 2: Modification Indices (MIs) of Regression Weights before deleting any Indicators for measurement model of PFAIR-MPS

Regression Weights: (Group number 1 - Default model)

			M.I.	Par Change
mps1	<---	trust5	11.204	-0.149
mps1	<---	trust3	4.941	-0.11
mps1	<---	pf3	4.678	-0.09
mps2	<---	TRST	4.069	0.118
mps2	<---	CMB	5.941	0.149
mps2	<---	trust5	4.514	0.089
mps2	<---	trust3	6.979	0.123
mps2	<---	upm1	11.91	0.17
mps3	<---	upm1	5.844	-0.114
trust5	<---	mps1	4.554	-0.156
pf8	<---	pf1	4.107	0.137
pf8	<---	upm2	7.2	0.131
pf7	<---	CMB	5.241	0.14
pf7	<---	trust5	4.838	-0.092
pf7	<---	upm3	4.274	0.096
pf7	<---	upm1	8.69	0.146
upm3	<---	trust1	5.674	0.124
upm3	<---	pf1	4.682	-0.124
upm3	<---	pf5	4.507	-0.108
Prtcp10	<---	pf1	7.051	-0.137
Prtcp10	<---	Prtcp2	6.253	0.139
trust1	<---	MPS	24.742	0.301
trust1	<---	CMB	25.273	0.432
trust1	<---	mps1	28.264	0.302
trust1	<---	mps2	21.442	0.248
trust1	<---	mps3	18.662	0.235
trust1	<---	upm3	28.669	0.349
trust1	<---	upm1	8.466	0.202
trust1	<---	upm2	19.724	0.222
trust1	<---	Prtcp5	4.426	-0.141
trust1	<---	Prtcp7	6.921	-0.183
trust2	<---	trust5	4.063	0.091
trust2	<---	pf3	7.763	-0.118
trust2	<---	upm2	10.61	-0.126
trust3	<---	mps1	4.253	-0.09
trust3	<---	Prtcp7	6.671	0.138
pf1	<---	Prtcp10	8.801	-0.242
pf1	<---	Prtcp4_R	11.971	-0.269
pf3	<---	mps1	4.286	-0.164
pf3	<---	trust2	5.758	-0.237

Table 2: Modification Indices (MIs) of Regression Weights before deleting any Indicators for measurement model of PFAIR-MPS (Continued)

Regression Weights: (Group number 1 - Default model)

			M.I.	Par Change
pf3	<---	upm2	4.144	0.142
pf3	<---	Prtcp1	4.606	0.176
pf3	<---	Prtcp6	8.167	-0.294
pf5	<---	CMB	5.234	-0.187
pf5	<---	upm3	6.529	-0.159
pf5	<---	pf1	4.803	0.146
pf5	<---	pf3	9.169	0.159
pf5	<---	Prtcp1	27.796	0.295
pf5	<---	Prtcp6	4.229	-0.145
pf6	<---	pf3	7.011	-0.11
pf6	<---	Prtcp1	4.699	-0.096
upm1	<---	mps1	5.578	-0.114
upm1	<---	pf7	6.014	0.18
upm1	<---	Prtcp6	5.024	0.141
upm2	<---	pf8	6.324	0.222
upm2	<---	trust2	4.369	-0.189
upm2	<---	pf3	12.06	0.245
Prtcp1	<---	pf1	4.534	0.164
Prtcp1	<---	pf3	10.938	0.201
Prtcp1	<---	pf5	25.33	0.345
Prtcp2	<---	Prtcp10	5.632	0.145
Prtcp4_R	<---	pf1	11.88	-0.185
Prtcp6	<---	CMB	7.091	0.199
Prtcp6	<---	upm3	6.654	0.147
Prtcp6	<---	pf3	9.965	-0.152
Prtcp6	<---	upm1	10.789	0.199
Prtcp7	<---	trust1	7.424	-0.14

Table 3: Standarised Residual Covariance after deleting six items (indicators) for Measurement model PFAIR-MPS

Standardized Residual Covariances (Group number 1 - Default model)

	mps3	mps1	mps2	trust2	trust3	trust5	pf5	pf6	pf7	pf8	upm1	upm3
mps3	0.000											
mps1	0.085	0.000										
mps2	-0.013	-0.079	0.000									
trust2	-0.114	-0.878	0.159	0.000								
trust3	-0.087	-0.768	1.036	-0.031	0.000							
trust5	-0.500	**-2.052**	0.093	0.882	-0.244	0.000						
pf5	0.166	-1.081	-0.503	-0.164	0.045	0.659	0.000					
pf6	0.815	0.045	0.327	-0.008	-0.204	0.489	0.553	0.000				
pf7	0.141	0.124	0.383	0.600	-0.458	-1.488	-0.238	-0.482	0.000			
pf8	-1.151	-0.983	-0.617	0.476	0.466	1.201	-0.475	-0.206	0.974	0.000		
upm1	-1.491	-1.610	0.257	0.485	0.946	-0.359	-0.516	0.131	**2.494**	1.202	0.000	
upm3	0.007	0.423	1.011	-0.437	-0.258	-1.222	-1.733	-0.574	1.113	0.207	0.000	0.000
Prtcp2	-0.670	-0.115	-0.521	-0.029	-0.476	-1.440	-0.148	-0.382	1.122	-0.305	-0.034	1.139
Prtcp4_R	0.498	0.447	0.164	0.134	0.850	0.091	-0.001	0.010	-0.906	-0.645	-0.173	0.215
Prtcp5	0.015	-0.319	0.016	0.005	0.392	-0.507	0.558	0.622	0.069	0.746	-0.245	-0.397
Prtcp7	0.177	0.568	0.548	-0.672	0.890	-0.968	0.287	0.400	-0.185	-1.131	0.870	-0.257
Prtcp8	0.263	-0.372	-0.256	-0.111	-0.544	0.319	-0.015	-0.072	0.784	-0.680	0.538	-0.622
Prtcp10	-0.231	-0.009	-0.485	-0.468	-0.201	-1.412	-0.863	0.089	0.167	-0.036	-0.744	-0.149

Table 3: Standarised Residual Covariance after deleting six items (indicators) for Measurement model PFAIR-MPS (Continued)

Standardized Residual Covariances (Group number 1 - Default model)

Prtcp2	Prtcp4_R	Prtcp5	Prtcp7	Prtcp8	Prtcp10
0.000					
0.018	0.000				
-0.714	-0.563	0.000			
-0.647	0.108	0.616	0.000		
-0.140	-0.146	0.631	0.219	0.000	
1.504	0.394	-0.736	-0.422	-0.300	0.000

Table 4: Implied (for all variables) Correlations for Measurement model PFAIR - MPS

Implied (for all variables) Correlations (Group number 1 - Default model)

	MPS	TRST	PFAIR	CMB	PRTCPT	mps1	mps2	mps3	trust5	trust3	trust2	pf5	pf6
MPS	1.000												
TRST	0.339	1.000											
PFAIR	0.288	0.717	1.000										
CMB	0.509	0.537	0.425	1.000									
PRTCPT	0.339	0.676	0.823	0.379	1.000								
mps1	**0.871**	0.295	0.251	0.443	0.295	1.000							
mps2	**0.916**	0.311	0.264	0.466	0.311	0.798	1.000						
mps3	**0.930**	0.315	0.268	0.473	0.315	0.811	0.853	1.000					
trust5	0.098	**0.289**	0.207	0.155	0.195	0.085	0.090	0.091	1.000				
trust3	0.299	**0.881**	0.632	0.473	0.595	0.260	0.274	0.278	0.255	1.000			
trust2	0.272	**0.803**	0.576	0.432	0.543	0.237	0.250	0.253	0.232	0.708	1.000		
pf5	0.199	0.495	**0.690**	0.293	0.568	0.173	0.182	0.185	0.143	0.436	0.398	1.000	
pf6	0.220	0.548	**0.765**	0.325	0.629	0.192	0.202	0.205	0.158	0.483	0.440	0.528	1.000
pf7	0.195	0.485	**0.677**	0.287	0.557	0.170	0.178	0.181	0.140	0.428	0.390	0.467	0.518
pf8	0.154	0.385	**0.537**	0.228	0.442	0.134	0.141	0.144	0.111	0.339	0.309	0.370	0.410
upm3	0.434	0.459	0.362	**0.854**	0.324	0.379	0.398	0.404	0.133	0.404	0.368	0.250	0.277
upm1	0.374	0.395	0.312	**0.736**	0.279	0.326	0.343	0.348	0.114	0.348	0.318	0.216	0.239
Prtcp2	0.232	0.462	0.563	0.259	**0.684**	0.202	0.212	0.216	0.134	0.407	0.371	0.388	0.430
Prtcp4_R	0.247	0.492	0.599	0.276	**0.728**	0.215	0.226	0.230	0.142	0.433	0.395	0.414	0.458
Prtcp5	0.219	0.436	0.531	0.245	**0.646**	0.191	0.201	0.204	0.126	0.384	0.350	0.367	0.406
Prtcp7	0.251	0.500	0.609	0.281	**0.740**	0.219	0.230	0.233	0.145	0.440	0.402	0.420	0.466
Prtcp8	0.245	0.488	0.595	0.274	**0.723**	0.213	0.225	0.228	0.141	0.430	0.392	0.411	0.455
Prtcp10	0.248	0.495	0.603	0.278	**0.732**	0.216	0.227	0.231	0.143	0.436	0.397	0.416	0.461

Table 4: Implied (for all variables) Correlations for Measurement model PFAIR – MPS (Continued)

Implied (for all variables) Correlations (Group number 1 - Default model)

pf7	pf8	upm3	upm1	Prtcp2	Prtcp4_R	Prtcp5	Prtcp7	Prtcp8	Prtcp10
1.000									
0.363	1.000								
0.245	0.195	1.000							
0.211	0.168	0.628	1.000						
0.381	0.302	0.221	0.191	1.000					
0.406	0.322	0.236	0.203	0.498	1.000				
0.360	0.285	0.209	0.180	0.441	0.470	1.000			
0.412	0.327	0.240	0.207	0.506	0.539	0.478	1.000		
0.403	0.319	0.234	0.202	0.494	0.526	0.467	0.535	1.000	
0.408	0.323	0.237	0.204	0.501	0.533	0.473	0.542	0.529	1.000

APPENDIX II

PART C

STANDARDISED RESIDUAL COVARIANCE AND IMPLIED CORRELATIONS FOR INVESTIGATING DISCRIMINANT VALIDITY FOR DFAIR – MPD MODEL

Table 1: Standardised Residual Covariance before deleting any items (indicators) for Measurement model DFAIR-MPD

Standardized Residual Covariances (Group number 1 - Default model)

	df1	df2	mpd9	mpd8	mpd7	trust5	upm3	Prtcp10	Prtcp8	mpd1	mpd2	mpd3	mpd4
df1	0.000												
df2	0.000	0.000											
mpd9	-0.458	-0.079	0.000										
mpd8	-0.257	0.950	-0.170	0.000									
mpd7	0.410	-1.355	0.015	0.583	0.000								
trust5	0.592	0.604	-1.291	-1.246	0.107	0.000							
upm3	-0.141	-0.362	-0.767	1.223	-0.005	-1.379	0.000						
Prtcp10	-0.290	-0.611	-0.186	-0.751	0.417	-1.418	-0.156	0.000					
Prtcp8	0.431	-0.385	-0.404	-0.962	0.153	0.358	-0.557	-0.205	0.000				
mpd1	-0.382	-1.204	0.056	0.058	0.352	-0.215	-1.256	-1.215	-0.534	0.000			
mpd2	0.133	0.970	0.814	0.375	0.995	-1.451	-0.623	0.510	-0.571	0.175	0.000		
mpd3	0.747	-0.588	0.550	-1.004	-0.673	-0.888	-0.244	0.876	0.042	0.237	0.564	0.000	
mpd4	1.598	0.604	-0.943	-0.923	-0.428	1.245	0.737	**2.160**	1.187	-0.097	0.299	0.780	0.000
mpd5	0.294	-1.806	-0.450	0.802	0.317	-1.257	0.589	0.112	-1.129	-0.012	-1.972	0.139	-1.084
mpd6	-0.619	0.471	0.369	1.434	-0.779	**-2.113**	0.598	-0.479	-0.593	-0.095	-1.220	-0.550	0.489
trust1	0.149	-0.444	0.658	1.317	0.783	-1.139	**3.815**	0.787	-0.387	-0.599	-0.712	0.926	-0.308
trust2	0.179	-0.118	-1.039	**-2.187**	-0.755	0.992	-0.853	-0.491	-0.017	-1.057	-0.001	0.487	0.848
trust3	-0.061	-0.150	-0.964	0.309	-0.183	-0.101	-0.667	-0.183	-0.402	-0.885	-0.264	1.016	0.617
upm1	0.255	0.922	-1.516	-0.069	-1.113	-0.547	0.015	-0.833	0.513	0.330	-1.734	-0.483	-0.819
upm2	-0.343	0.178	0.337	1.734	**2.201**	0.047	0.110	-0.410	-0.867	0.423	0.357	0.785	0.630
Prtcp1	0.042	0.951	-0.426	-0.227	0.687	0.336	-0.969	-0.644	-0.316	-0.563	0.561	1.033	0.481
Prtcp2	0.539	0.724	0.790	0.348	0.845	-1.516	1.013	1.196	-0.282	0.071	-0.049	0.746	0.540
Prtcp4_R	-0.795	-0.646	-0.992	-0.755	0.934	0.075	0.191	0.304	-0.084	-0.556	-1.195	-0.006	1.472
Prtcp5	1.246	1.851	0.810	-1.626	-0.758	-0.461	-0.319	-0.610	0.897	-0.974	1.792	0.385	0.787
Prtcp6	-1.087	0.790	-0.567	0.064	-0.363	0.419	**2.050**	0.148	-0.084	-0.460	-0.999	-0.474	0.962
Prtcp7	-0.411	-0.355	-0.267	-1.542	-0.933	-0.950	-0.226	-0.398	0.396	-1.671	-0.096	0.151	0.901

Table 1: Standardised Residual Covariance before deleting any items (indicators) for Measurement model DFAIR-MPD (Continued)

Standardized Residual Covariances (Group number 1 - Default model)

mpd5	mpd6	trust1	trust2	trust3	upm1	upm2	Prtcp1	Prtcp2	Prtcp4_R	Prtcp5	Prtcp6	Prtcp7
0.000												
1.072	0.000											
0.602	1.274	0.000										
-0.751	-0.428	-0.564	0.000									
1.064	0.557	-0.347	0.299	0.000								
-0.328	0.731	**2.455**	-0.027	0.424	0.000							
0.666	0.057	**2.916**	**-2.147**	-0.752	-0.229	0.000						
1.252	-0.375	-1.300	0.181	0.232	-1.112	-0.863	0.000					
0.232	-0.009	0.731	-0.237	-0.658	-0.222	-0.336	0.562	0.000				
1.021	-0.576	-0.013	0.084	0.839	-0.277	-0.756	0.537	-0.306	0.000			
-0.003	-0.370	-1.428	0.121	0.558	-0.249	-0.331	-0.491	-0.802	-0.467	0.000		
-0.301	0.234	0.549	1.037	0.153	**2.740**	0.625	-1.083	0.056	0.182	-0.709	0.000	
0.438	-0.340	-1.842	-0.634	0.978	0.813	-0.187	0.230	-0.859	0.098	0.820	1.102	0.000

Table 2: Modification Indices (MIs) of Regression Weights before deleting any Indicators for measurement model of DFAIR-MPD

Regression Weights: (Group number 1 - Default model)

			M.I.	Par Change
df1	<---	Prtcp6	5.193	-0.113
df2	<---	mpd5	6.294	-0.2
mpd8	<---	trust2	4.856	-0.159
mpd7	<---	upm2	4.558	0.096
trust5	<---	mpd6	5.088	-0.278
upm3	<---	trust1	9.874	0.168
Prtcp10	<---	Prtcp2	4.482	0.116
mpd2	<---	mpd5	5.334	-0.17
mpd2	<---	Prtcp5	4.531	0.113
mpd4	<---	trust5	4.544	0.094
mpd4	<---	Prtcp10	6.246	0.145
mpd5	<---	mpd2	7.447	-0.172
trust1	<---	CMB	21.34	0.392
trust1	<---	mpd8	4.01	0.137
trust1	<---	upm3	28.96	0.352
trust1	<---	upm1	8.395	0.202
trust1	<---	upm2	20.336	0.226
trust1	<---	Prtcp5	4.68	-0.145
trust1	<---	Prtcp7	6.29	-0.175
trust2	<---	mpd8	12.861	-0.187
trust2	<---	upm2	9.972	-0.121
trust3	<---	mpd5	4.062	0.142
trust3	<---	Prtcp7	7.16	0.141
upm1	<---	Prtcp6	5.034	0.14
upm2	<---	mpd7	9.417	0.278
upm2	<---	trust2	5.396	-0.209
Prtcp2	<---	Prtcp10	4.15	0.122
Prtcp5	<---	df2	6.259	0.175
Prtcp5	<---	mpd2	5.908	0.207
Prtcp6	<---	CMB	7.228	0.201
Prtcp6	<---	upm3	6.696	0.149
Prtcp6	<---	upm1	11.522	0.208
Prtcp7	<---	trust1	6.445	-0.132

Table 3: Standarised Residual Covariance after deleting seven items (indicators) for Measurement model DFAIR-MPD

Standardized Residual Covariances (Group number 1 - Default model)

	df1	df2	mpd1	mpd2	mpd3	mpd5	mpd7	mpd9	trust2	trust3	trust5	upm1
df1	0.000											
df2	0.000	0.000										
mpd1	-0.249	-1.082	0.000									
mpd2	0.192	1.029	0.073	0.000								
mpd3	0.834	-0.501	0.057	0.355	0.000							
mpd5	0.505	-1.625	0.118	-1.946	0.162	0.000						
mpd7	0.561	-1.221	0.348	0.924	-0.799	0.482	0.000					
mpd9	-0.412	-0.031	-0.081	0.667	0.298	-0.451	-0.087	0.000				
trust2	0.192	-0.072	-0.942	0.048	0.559	-0.564	-0.625	-1.002	0.000			
trust3	-0.088	-0.135	-0.777	-0.222	1.075	1.256	-0.057	-0.936	-0.020	0.000		
trust5	0.541	0.577	-0.193	-1.447	-0.885	-1.207	0.136	-1.292	0.815	-0.310	0.000	
upm1	-0.192	0.573	0.672	-1.537	-0.166	0.073	-0.769	-1.325	-0.103	0.309	-0.616	0.000
upm3	0.006	-0.219	-0.495	-0.130	0.562	1.408	0.767	-0.269	-0.227	-0.021	-1.179	0.000
Prtcp2	0.539	0.756	0.128	-0.052	0.729	0.394	0.928	0.768	-0.175	-0.624	-1.534	-0.364
Prtcp4_R	-0.769	-0.593	-0.482	-1.186	-0.004	1.205	1.035	-1.002	0.173	0.901	0.065	-0.409
Prtcp5	1.033	1.702	-1.048	1.701	0.225	0.023	-0.807	0.699	-0.007	0.387	-0.548	-0.482
Prtcp7	-0.381	-0.299	-1.596	-0.085	0.155	0.622	-0.834	-0.275	-0.544	1.044	-0.958	0.681
Prtcp8	0.323	-0.442	-0.543	-0.619	-0.050	-1.032	0.170	-0.473	-0.050	-0.470	0.303	0.314
Prtcp10	-0.364	-0.641	-1.203	0.475	0.805	0.235	0.455	-0.242	-0.494	-0.220	-1.462	-1.017

Table 3: Standarised Residual Covariance after deleting seven items (indicators) for Measurement model DFAIR-MPD (Continued)

Standardized Residual Covariances (Group number 1 - Default model)

upm3	Prtcp2	Prtcp4_R	Prtcp5	Prtcp7	Prtcp8	Prtcp10
0.000						
1.306	0.000					
0.500	-0.148	0.000				
-0.171	-0.917	-0.559	0.000			
0.083	-0.700	0.297	0.730	0.000		
-0.329	-0.276	-0.047	0.663	0.437	0.000	
0.099	1.244	0.382	-0.804	-0.317	-0.282	0.000

Table 4: Implied (for all variables) Correlations for Measurement model DFAIR - MPD

Implied (for all variables) Correlations (Group number 1 - Default model)

	DFAIR	MPD	TRST	CMB	PRTCPT	df1	df2	mpd1	mpd2	mpd3	mpd5	mpd7	mpd9
DFAIR	1.000												
MPD	0.368	1.000											
TRST	0.796	0.348	1.000										
CMB	0.493	0.355	0.563	1.000									
PRTCPT	0.764	0.546	0.674	0.379	1.000								
df1	**0.808**	0.298	0.643	0.398	0.617	1.000							
df2	**0.652**	0.240	0.519	0.321	0.498	0.527	1.000						
mpd1	0.243	**0.660**	0.230	0.234	0.360	0.196	0.158	1.000					
mpd2	0.167	**0.452**	0.158	0.161	0.247	0.135	0.109	0.298	1.000				
mpd3	0.279	**0.758**	0.264	0.269	0.414	0.226	0.182	0.500	0.343	1.000			
mpd5	0.221	**0.601**	0.209	0.213	0.328	0.179	0.144	0.396	0.272	0.455	1.000		
mpd7	0.233	**0.634**	0.221	0.225	0.346	0.189	0.152	0.418	0.287	0.481	0.381	1.000	
mpd9	0.175	**0.474**	0.165	0.168	0.259	0.141	0.114	0.313	0.214	0.360	0.285	0.301	1.000
trust5	0.235	0.103	**0.296**	0.166	0.199	0.190	0.153	0.068	0.047	0.078	0.062	0.065	0.049
trust3	0.700	0.306	**0.879**	0.495	0.593	0.566	0.456	0.202	0.139	0.232	0.184	0.194	0.145
trust2	0.639	0.280	**0.803**	0.452	0.542	0.517	0.417	0.185	0.127	0.212	0.168	0.177	0.133
upm3	0.382	0.276	0.437	**0.776**	0.294	0.309	0.249	0.182	0.125	0.209	0.166	0.175	0.131
upm1	0.399	0.288	0.456	**0.810**	0.307	0.322	0.260	0.190	0.130	0.218	0.173	0.182	0.136
Prtcp2	0.541	0.387	0.477	0.268	**0.708**	0.437	0.352	0.255	0.175	0.293	0.232	0.245	0.183
Prtcp4_R	0.553	0.395	0.488	0.275	**0.724**	0.447	0.360	0.261	0.179	0.300	0.237	0.251	0.187
Prtcp5	0.496	0.355	0.438	0.246	**0.649**	0.401	0.323	0.234	0.160	0.269	0.213	0.225	0.168
Prtcp7	0.551	0.394	0.486	0.274	**0.721**	0.445	0.359	0.260	0.178	0.299	0.237	0.250	0.187
Prtcp8	0.546	0.391	0.482	0.271	**0.715**	0.441	0.356	0.258	0.177	0.296	0.235	0.248	0.185
Prtcp10	0.564	0.403	0.498	0.280	**0.738**	0.456	0.367	0.266	0.182	0.306	0.242	0.255	0.191

Table 4: Implied (for all variables) Correlations for Measurement model DFAIR – MPD (Continued)

Implied (for all variables) Correlations (Group number 1 - Default model)

trust5	trust3	trust2	upm3	upm1	Prtcp2	Prtcp4_R	Prtcp5	Prtcp7	Prtcp8	Prtcp10
1.000										
0.260	1.000									
0.237	0.706	1.000								
0.129	0.384	0.351	1.000							
0.135	0.401	0.366	0.628	1.000						
0.141	0.420	0.383	0.208	0.217	1.000					
0.144	0.429	0.392	0.213	0.222	0.512	1.000				
0.129	0.385	0.351	0.191	0.199	0.459	0.470	1.000			
0.144	0.428	0.391	0.212	0.222	0.511	0.522	0.468	1.000		
0.142	0.424	0.387	0.211	0.220	0.506	0.518	0.464	0.516	1.000	
0.147	0.438	0.400	0.217	0.227	0.522	0.534	0.479	0.532	0.528	1.000

APPENDIX II

PART D

STANDARDISED RESIDUAL COVARIANCE AND IMPLIED CORRELATIONS FOR INVESTIGATING DISCRIMINANT VALIDITY FOR DFAIR – MPS MODEL

Table 1: Standardised Residual Covariance before deleting any items (indicators) for Measurement model DFAIR-MPS

Standardized Residual Covariances (Group number 1 - Default model)

	df1	df2	mps1	mps2	mps3	trust5	upm3	Prtcp10	Prtcp8	trust1	trust2	trust3	upm1
df1	0.000												
df2	0.000	0.000											
mps1	-0.339	0.009	0.000										
mps2	-0.445	1.194	-0.082	0.000									
mps3	-0.045	0.253	0.096	-0.016	0.000								
trust5	0.611	0.644	**-2.265**	-0.137	-0.729	0.000							
upm3	-0.205	-0.373	0.318	0.891	-0.103	-1.412	0.000						
Prtcp10	-0.264	-0.534	0.005	-0.475	-0.216	-1.383	-0.226	0.000					
Prtcp8	0.386	-0.368	-0.327	-0.214	0.311	0.368	-0.664	-0.205	0.000				
trust1	0.001	-0.513	**3.383**	**3.667**	**2.963**	-1.157	**3.573**	0.716	-0.506	0.000			
trust2	0.179	-0.056	-1.481	-0.492	-0.763	1.054	-0.975	-0.436	-0.026	-0.653	0.000		
trust3	-0.062	-0.084	-1.393	0.348	-0.760	-0.036	-0.799	-0.124	-0.412	-0.444	0.400	0.000	
upm1	0.419	1.094	-1.576	0.287	-1.456	-0.474	-0.049	-0.730	0.581	**2.484**	0.135	0.599	0.000
upm2	-0.204	0.324	0.207	0.372	-0.272	0.110	0.048	-0.321	-0.812	**2.938**	**-2.015**	-0.605	0.062
Prtcp1	0.092	1.039	-0.512	-0.727	0.126	0.373	-1.008	-0.543	-0.284	-1.335	0.253	0.309	-1.017
Prtcp2	0.593	0.825	-0.193	-0.606	-0.752	-1.473	0.961	1.315	-0.251	0.682	-0.157	-0.574	-0.107
Prtcp4_R	-0.801	-0.596	0.430	0.141	0.480	0.099	0.102	0.350	-0.120	-0.108	0.111	0.868	-0.189
Prtcp5	1.226	1.885	-0.251	0.084	0.088	-0.445	-0.403	-0.586	0.847	-1.517	0.132	0.569	-0.180
Prtcp6	-1.147	0.786	0.572	0.378	0.145	0.420	1.943	0.121	-0.179	0.429	1.009	0.122	**2.787**
Prtcp7	-0.483	-0.360	0.567	0.542	0.175	-0.949	-0.353	-0.429	0.282	-1.980	-0.666	0.940	0.869

Table 1: Standardised Residual Covariance before deleting any items (indicators) for Measurement model DFAIR-MPS (Continued)

Standardized Residual Covariances (Group number 1 - Default model)

upm2	Prtcp1	Prtcp2	Prtcp4_R	Prtcp5	Prtcp6	Prtcp7
0.000						
-0.780	0.000					
-0.237	0.691	0.000				
-0.682	0.610	-0.229	0.000			
-0.272	-0.443	-0.751	-0.476	0.000		
0.663	-1.077	0.057	0.123	-0.773	0.000	
-0.141	0.238	-0.857	0.029	0.741	0.973	0.000

Table 2: Modification Indices (MIs) of Regression Weights before deleting any Indicators for measurement model of DFAIR-MPS

Regression Weights: (Group number 1 - Default model)

			M.I.	Par Change
df1	<---	Prtcp6	5.472	-0.116
mps1	<---	trust5	11.153	-0.148
mps1	<---	trust3	4.924	-0.11
mps2	<---	CMB	5.848	0.148
mps2	<---	df2	4.639	0.113
mps2	<---	trust5	4.516	0.089
mps2	<---	trust3	6.944	0.123
mps2	<---	upm1	11.892	0.17
mps3	<---	upm1	5.904	-0.115
trust5	<---	mps1	4.779	-0.16
upm3	<---	trust1	5.259	0.119
Prtcp10	<---	Prtcp2	5.295	0.128
trust1	<---	MPS	24.072	0.294
trust1	<---	CMB	24.588	0.423
trust1	<---	mps1	27.372	0.294
trust1	<---	mps2	20.995	0.243
trust1	<---	mps3	18.24	0.231
trust1	<---	upm3	27.547	0.34
trust1	<---	upm1	8.204	0.197
trust1	<---	upm2	19.757	0.221
trust1	<---	Prtcp5	5.432	-0.155
trust1	<---	Prtcp7	7.143	-0.184
trust2	<---	upm2	10.054	-0.122
trust3	<---	mps1	4.595	-0.093
trust3	<---	Prtcp7	7.3	0.144
upm1	<---	mps1	5.45	-0.113
upm1	<---	Prtcp6	5.155	0.143
upm2	<---	trust2	4.192	-0.186
Prtcp2	<---	Prtcp10	4.844	0.133
Prtcp5	<---	df2	5.98	0.171
Prtcp6	<---	CMB	7.092	0.201
Prtcp6	<---	upm3	6.486	0.146
Prtcp6	<---	upm1	11.186	0.204
Prtcp7	<---	trust1	7.52	-0.142

Table 3: Standarised Residual Covariance after deleting five items (indicators) for Measurement model DFAIR-MPS

Standardized Residual Covariances (Group number 1 - Default model)

	df1	df2	mps2	mps3	trust2	trust3	trust5	upm1	upm3	Prtcp2	Prtcp4_R
df1	0.000										
df2	0.000	0.000									
mps2	-0.340	1.342	0.000								
mps3	0.665	0.875	0.000	0.000							
trust2	0.199	0.108	-0.460	0.140	0.000						
trust3	-0.174	-0.018	0.297	0.149	-0.015	0.000					
trust5	0.530	0.637	-0.176	-0.436	0.844	-0.326	0.000				
upm1	0.062	0.892	-0.612	-1.197	0.263	0.644	-0.484	0.000			
upm3	-0.195	-0.269	0.393	0.671	-0.366	-0.242	-1.242	0.000	0.000		
Prtcp2	0.577	0.940	-0.297	0.139	-0.074	-0.587	-1.505	-0.198	1.154	0.000	
Prtcp4_R	-0.807	-0.472	0.472	1.427	0.209	0.865	0.069	-0.277	0.305	-0.053	0.000
Prtcp5	0.983	1.807	0.258	0.811	0.014	0.342	-0.549	-0.371	-0.352	-0.847	-0.564
Prtcp7	-0.491	-0.236	0.877	1.127	-0.572	0.935	-0.980	0.776	-0.150	-0.686	0.224
Prtcp8	0.234	-0.362	0.036	1.173	-0.059	-0.553	0.289	0.420	-0.547	-0.237	-0.093
Prtcp10	-0.368	-0.490	-0.197	0.678	-0.428	-0.223	-1.447	-0.868	-0.079	1.385	0.433

Table 3: Standarised Residual Covariance after deleting five items (indicators) for Measurement model DFAIR-MPS (Continued)

Standardized Residual Covariances (Group number 1 - Default model)

Prtcp5	Prtcp7	Prtcp8	Prtcp10
0.000			
0.646	0.000		
0.604	0.307	0.000	
-0.775	-0.351	-0.290	0.000

Table 4: Implied (for all variables) Correlations for Measurement model DFAIR - MPS

Implied (for all variables) Correlations (Group number 1 - Default model)

	DFAIR	MPS	TRST	CMB	PRTCPT	df1	df2	mps2	mps3	trust5	trust3	trust2	upm3
DFAIR	1.000												
MPS	0.234	1.000											
TRST	0.787	0.359	1.000										
CMB	0.480	0.521	0.552	1.000									
PRTCPT	0.756	0.266	0.675	0.384	1.000								
df1	**0.823**	0.192	0.648	0.395	0.622	1.000							
df2	**0.640**	0.150	0.504	0.307	0.484	0.527	1.000						
mps2	0.245	**1.047**	0.376	0.546	0.279	0.201	0.157	1.000					
mps3	0.190	**0.813**	0.292	0.424	0.216	0.156	0.122	0.851	1.000				
trust5	0.232	0.106	**0.295**	0.163	0.199	0.191	0.149	0.111	0.086	1.000			
trust3	0.697	0.318	**0.886**	0.489	0.598	0.573	0.446	0.333	0.259	0.261	1.000		
trust2	0.627	0.287	**0.797**	0.440	0.538	0.516	0.402	0.300	0.233	0.235	0.706	1.000	
upm3	0.396	0.429	0.455	**0.824**	0.316	0.326	0.253	0.450	0.349	0.134	0.403	0.363	1.000
upm1	0.366	0.398	0.421	**0.763**	0.293	0.301	0.235	0.416	0.323	0.124	0.373	0.336	0.628
Prtcp2	0.527	0.186	0.470	0.267	**0.697**	0.434	0.337	0.194	0.151	0.139	0.416	0.375	0.220
Prtcp4_R	0.547	0.193	0.488	0.278	**0.723**	0.450	0.350	0.202	0.157	0.144	0.432	0.389	0.229
Prtcp5	0.492	0.173	0.439	0.250	**0.650**	0.405	0.315	0.181	0.141	0.129	0.389	0.350	0.206
Prtcp7	0.553	0.195	0.493	0.281	**0.731**	0.455	0.354	0.204	0.158	0.145	0.437	0.393	0.231
Prtcp8	0.546	0.192	0.487	0.277	**0.721**	0.449	0.349	0.201	0.156	0.144	0.431	0.388	0.228
Prtcp10	0.554	0.195	0.494	0.281	**0.733**	0.456	0.355	0.204	0.159	0.146	0.438	0.394	0.232

Table 4: Implied (for all variables) Correlations for Measurement model DFAIR – MPS (Continued)

Implied (for all variables) Correlations (Group number 1 - Default model)

upm1	Prtcp2	Prtcp4_R	Prtcp5	Prtcp7	Prtcp8	Prtcp10
1.000						
0.204	1.000					
0.212	0.504	1.000				
0.190	0.453	0.470	1.000			
0.214	0.509	0.529	0.475	1.000		
0.211	0.503	0.522	0.469	0.527	1.000	
0.214	0.511	0.530	0.476	0.536	0.529	1.000

APPENDIX III

PART A

STANDARDISED RESIDUAL COVARIANCE AND IMPLIED CORRELATIONS FOR MODEL ANALYSIS FOR PFAIR – MPD MODEL

Table 1: Standardised Residual Covariance before deleting any items (indicators) for Model Analysis for PFAIR-MPD Model

Standardized Residual Covariances (Group number 1 - Default model)

	mpd9	trust2	trust3	trust5	pf8	pf7	pf6	pf5	mpd7	mpd5	mpd3	mpd2	mpd1
mpd9	0.004												
trust2	-0.832	0.000											
trust3	-0.714	-0.026	0.000										
trust5	-1.230	0.741	-0.318	0.000									
pf8	-0.577	0.435	0.520	1.150	0.000								
pf7	-0.998	0.429	-0.517	-1.595	1.034	0.000							
pf6	-0.451	-0.016	-0.082	0.437	0.020	-0.353	0.000						
pf5	-0.257	-0.268	0.054	0.573	-0.357	-0.227	0.771	0.000					
mpd7	-0.079	-0.418	0.219	0.212	-0.817	0.174	-0.066	0.532	0.007				
mpd5	-0.414	-0.352	1.540	-1.130	0.318	0.995	-1.512	0.078	0.483	0.006			
mpd3	0.362	0.840	1.443	-0.784	-0.389	1.484	-0.993	-0.460	-0.776	0.231	0.010		
mpd2	0.710	0.218	-0.003	-1.386	-1.717	-0.539	-0.554	-0.671	0.945	-1.901	0.432	0.004	
mpd1	-0.111	-0.749	-0.516	-0.122	-0.075	0.997	-1.493	-0.504	0.257	0.072	0.025	0.057	0.008
upm3	-0.468	1.599	**2.041**	-0.500	0.587	1.530	-0.020	-1.294	0.474	1.148	0.252	-0.314	-0.820
upm1	-1.252	**2.206**	**2.908**	0.242	1.474	**2.783**	0.535	-0.202	-0.693	0.164	-0.042	-1.462	0.730
Prtcp2	1.274	-0.231	-0.577	-1.559	-0.432	0.838	-0.508	-0.360	1.578	1.025	1.537	0.433	0.769
Prtcp4_R	-0.540	0.002	0.829	-0.005	-0.712	-1.106	-0.033	-0.141	1.640	1.801	0.738	-0.740	0.103
Prtcp5	1.141	-0.115	0.372	-0.592	0.684	-0.117	0.582	0.428	-0.256	0.572	0.927	**2.133**	-0.501
Prtcp7	0.158	-0.788	0.885	-1.058	-1.185	-0.377	0.373	0.159	-0.293	1.170	0.848	0.336	-1.069
Prtcp8	-0.020	-0.234	-0.556	0.227	-0.740	0.582	-0.106	-0.146	0.749	-0.472	0.674	-0.181	0.025
Prtcp10	0.257	-0.607	-0.230	-1.510	-0.109	-0.048	0.037	-1.007	1.097	0.863	1.612	0.962	-0.584

Table 1: Standardised Residual Covariance before deleting any items (indicators) for Model Analysis for PFAIR-MPD Model (Continued)

Standardized Residual Covariances (Group number 1 - Default model)

upm3	upm1	Prtcp2	Prtcp4_R	Prtcp5	Prtcp7	Prtcp8	Prtcp10
0.000							
0.018	0.000						
0.756	-0.448	0.000					
-0.129	-0.562	-0.018	0.000				
-0.701	-0.593	-0.746	-0.507	0.000			
-0.593	0.476	-0.665	0.191	0.691	0.000		
-0.953	0.151	-0.167	-0.073	0.697	0.312	0.000	
-0.498	-1.137	1.456	0.449	-0.688	-0.349	-0.238	0.000

Table 2: Modification Indices (MIs) of Regression Weights before deleting any Indicators for Analysis Model of PFAIR-MPD

Regression Weights: (Group number 1 - Default model)

			M.I.	Par Change
TRST	<---	CMB	8.998	0.105
CMB	<---	TRST	5.71	0.449
trust3	<---	CMB	5.639	0.194
trust3	<---	mpd5	6.456	0.185
trust3	<---	upm1	5.968	0.133
trust3	<---	Prtcp7	5.228	0.125
pf7	<---	CMB	6.499	0.188
pf7	<---	trust5	4.188	-0.085
pf7	<---	upm1	9.421	0.151
pf6	<---	MPD	4.522	-0.258
pf6	<---	mpd5	8.445	-0.202
pf6	<---	mpd3	5.266	-0.153
pf5	<---	CMB	4.078	-0.207
pf5	<---	upm3	4.867	-0.141
mpd5	<---	mpd2	6.719	-0.168
mpd2	<---	mpd5	5.065	-0.166
mpd2	<---	Prtcp5	4.583	0.114
upm1	<---	TRST	4.061	0.372
upm1	<---	trust3	4.752	0.125
upm1	<---	pf7	5.857	0.182
Prtcp2	<---	Prtcp10	5.612	0.146
Prtcp5	<---	mpd2	7.453	0.23
Prtcp10	<---	Prtcp2	6.438	0.141

Table 3: Standardised Residual Covariance after deleting one item (indicator) for Model Analysis for PFAIR-MPD Model

Standardized Residual Covariances (Group number 1 - Default model)

	trust2	trust3	trust5	pf8	pf7	pf6	pf5	mpd9	mpd7	mpd5	mpd3	mpd1
trust2	0.000											
trust3	-0.026	0.000										
trust5	0.737	-0.318	0.000									
pf8	0.420	0.509	1.145	0.000								
pf7	0.418	-0.523	-1.600	1.012	0.000							
pf6	-0.010	-0.070	0.439	0.013	-0.352	0.000						
pf5	-0.274	0.054	0.571	-0.374	-0.239	0.778	0.000					
mpd9	-0.796	-0.674	-1.216	-0.564	-0.979	-0.423	-0.235	0.003				
mpd7	-0.381	0.261	0.226	-0.812	0.185	-0.045	0.546	0.080	0.006			
mpd5	-0.455	1.431	-1.168	0.178	0.818	-1.687	-0.094	-0.508	0.333	0.006		
mpd3	0.872	1.481	-0.772	-0.395	1.480	-0.985	-0.459	0.528	-0.596	0.030	0.008	
mpd1	-0.747	-0.511	-0.121	-0.108	0.958	-1.522	-0.538	-0.009	0.364	-0.170	0.118	0.007
upm3	1.603	**2.049**	-0.498	0.587	1.534	-0.006	-1.287	-0.488	0.434	0.932	0.189	-0.908
upm1	**2.187**	**2.890**	0.235	1.456	**2.763**	0.523	-0.219	-1.285	-0.750	-0.048	-0.123	0.626
Prtcp2	-0.234	-0.575	-1.560	-0.440	0.835	-0.494	-0.358	1.293	1.589	0.865	1.535	0.735
Prtcp4_R	-0.005	0.828	-0.007	-0.723	-1.113	-0.022	-0.143	-0.523	1.650	1.630	0.735	0.067
Prtcp5	-0.112	0.381	-0.591	0.681	-0.115	0.602	0.436	1.160	-0.242	0.428	0.929	-0.528
Prtcp7	-0.790	0.889	-1.059	-1.193	-0.379	0.389	0.162	0.178	-0.281	1.001	0.847	-1.102
Prtcp8	-0.237	-0.554	0.225	-0.749	0.579	-0.092	-0.144	-0.001	0.761	-0.634	0.672	-0.009
Prtcp10	-0.608	-0.225	-1.510	-0.117	-0.050	0.054	-1.003	0.277	1.110	0.696	1.612	-0.617

Table 3: Standardised Residual Covariance after deleting one item (indicator) for Model Analysis for PFAIR-MPD Model (Continued)

Standardized Residual Covariances (Group number 1 - Default model)

upm3	upm1	Prtcp2	Prtcp4_R	Prtcp5	Prtcp7	Prtcp8	Prtcp10
0.000							
0.019	0.000						
0.763	-0.469	0.000					
-0.125	-0.586	-0.024	0.000				
-0.692	-0.609	-0.741	-0.505	0.000			
-0.586	0.455	-0.666	0.187	0.699	0.000		
-0.947	0.129	-0.168	-0.079	0.703	0.312	0.000	
-0.490	-1.157	1.457	0.446	-0.681	-0.347	-0.237	0.000

APPENDIX III

PART B

STANDARDISED RESIDUAL COVARIANCE AND IMPLIED CORRELATIONS FOR MODEL ANALYSIS FOR PFAIR – MPS MODEL

Table 1: Standardised Residual Covariance before deleting any items (indicators) for Model Analysis for PFAIR-MPS Model

Standardized Residual Covariances (Group number 1 - Default model)

	trust2	trust3	trust5	pf8	pf7	pf6	pf5	mps3	mps2	mps1	upm3	upm1
trust2	0.000											
trust3	-0.018	0.000										
trust5	0.771	-0.311	0.000									
pf8	0.483	0.539	1.171	0.000								
pf7	0.601	-0.379	-1.528	1.069	0.000							
pf6	-0.087	-0.201	0.411	-0.177	-0.458	0.000						
pf5	-0.233	0.051	0.590	-0.447	-0.213	0.488	0.000					
mps3	0.567	0.701	-0.274	-1.170	0.122	0.756	0.111	0.095				
mps2	0.837	1.837	0.320	-0.631	0.368	0.270	-0.557	0.086	0.092			
mps1	-0.249	-0.038	-1.849	-0.998	0.107	-0.011	-1.135	0.179	0.023	0.083		
upm3	1.602	**2.022**	-0.497	0.638	1.658	-0.024	-1.243	-0.228	0.783	0.205	0.000	
upm1	**2.666**	**3.389**	0.409	1.877	**3.357**	1.040	0.300	-0.978	0.799	-1.123	0.009	0.000
Prtcp2	-0.201	-0.584	-1.545	-0.320	1.094	-0.489	-0.243	-0.411	-0.261	0.135	0.765	0.101
Prtcp4_R	-0.004	0.780	-0.005	-0.626	-0.891	-0.055	-0.057	0.809	0.470	0.741	-0.145	-0.008
Prtcp5	-0.103	0.348	-0.586	0.778	0.100	0.582	0.523	0.297	0.296	-0.055	-0.704	-0.091
Prtcp7	-0.791	0.840	-1.057	-1.096	-0.150	0.354	0.248	0.499	0.873	0.877	-0.607	1.049
Prtcp8	-0.222	-0.583	0.234	-0.640	0.826	-0.107	-0.044	0.584	0.058	-0.075	-0.957	0.716
Prtcp10	-0.598	-0.261	-1.504	-0.010	0.190	0.032	-0.910	0.078	-0.180	0.286	-0.504	-0.577

Table 1: Standardised Residual Covariance before deleting any items (indicators) for Model Analysis for PFAIR-MPS Model (Continued)

Standardized Residual Covariances (Group number 1 - Default model)

Prtcp2	Prtcp4_R	Prtcp5	Prtcp7	Prtcp8	Prtcp10
0.000					
-0.018	0.000				
-0.726	-0.527	0.000			
-0.661	0.149	0.675	0.000		
-0.145	-0.096	0.698	0.293	0.000	
1.475	0.421	-0.691	-0.372	-0.242	0.000

Table 2: Modification Indices (MIs) of Regression Weights before deleting any Indicators for Analysis Model of PFAIR-MPS

Regression Weights: (Group number 1 - Default model)

			M.I.	Par Change
TRST	<---	CMB	8.110	.104
CMB	<---	TRST	4.453	.339
trust3	<---	CMB	4.610	.184
trust3	<---	mps2	4.320	.088
trust3	<---	upm1	6.349	.137
trust3	<---	Prtcp7	4.610	.117
pf7	<---	CMB	5.401	.183
pf7	<---	trust5	4.236	-.087
pf7	<---	upm3	4.653	.101
pf7	<---	upm1	10.127	.159
pf5	<---	CMB	4.512	-.228
pf5	<---	upm3	4.742	-.139
mps3	<---	upm1	5.574	-.111
mps2	<---	CMB	4.299	.162
mps2	<---	trust3	7.672	.130
mps2	<---	trust5	4.621	.090
mps2	<---	upm1	12.409	.174
mps1	<---	TRST	4.025	-.322
mps1	<---	trust3	4.482	-.105
mps1	<---	trust5	10.951	-.147
upm1	<---	PFAIR	4.777	.187
upm1	<---	TRST	7.042	.495
upm1	<---	trust2	4.761	.135
upm1	<---	trust3	7.521	.158
upm1	<---	pf7	9.156	.230
Prtcp2	<---	Prtcp10	5.713	.147
Prtcp10	<---	Prtcp2	6.632	.144

Table 3: Standardised Residual Covariance after deleting one item (indicator) for Model Analysis for PFAIR-MPS Model

Standardized Residual Covariances (Group number 1 - Default model)

	trust2	trust3	trust5	pf8	pf6	pf5	mps3	mps2	mps1	upm3	upm1	Prtcp2
trust2	0.000											
trust3	-0.009	0.000										
trust5	0.804	-0.352	0.000									
pf8	0.836	0.829	1.286	0.000								
pf6	-0.105	-0.351	0.374	-0.079	0.000							
pf5	-0.141	0.032	0.600	-0.259	0.138	0.000						
mps3	0.615	0.689	-0.269	-1.109	0.571	0.004	0.068					
mps2	0.886	1.826	0.325	-0.569	0.093	-0.658	0.057	0.065				
mps1	-0.202	-0.047	-1.842	-0.940	-0.180	-1.231	0.147	0.000	0.059			
upm3	1.699	**2.062**	-0.475	0.868	0.031	-1.135	-0.286	0.728	0.151	0.000		
upm1	**2.764**	**3.449**	0.435	**2.064**	1.112	0.407	-0.965	0.814	-1.109	0.007	0.000	
Prtcp2	-0.099	-0.588	-1.529	0.048	-0.467	-0.116	-0.419	-0.267	0.128	0.877	0.213	0.000
Prtcp4_R	0.001	0.662	-0.029	-0.318	-0.147	-0.027	0.742	0.408	0.680	-0.099	0.061	-0.021
Prtcp5	-0.057	0.288	-0.591	1.092	0.545	0.593	0.261	0.263	-0.088	-0.636	-0.010	-0.680
Prtcp7	-0.762	0.746	-1.072	-0.771	0.287	0.303	0.445	0.821	0.827	-0.545	1.131	-0.636
Prtcp8	-0.136	-0.609	0.242	-0.276	-0.107	0.068	0.563	0.041	-0.092	-0.859	0.823	-0.052
Prtcp10	-0.534	-0.313	-1.505	0.348	0.006	-0.822	0.045	-0.209	0.255	-0.418	-0.480	1.546

Table 3: Standardised Residual Covariance after deleting one item (indicator) for Model Analysis for PFAIR-MPS Model (Continued)

Standardized Residual Covariances (Group number 1 - Default model)

Prtcp4_R	Prtcp5	Prtcp7	Prtcp8	Prtcp10
0.000				
-0.593	0.000			
0.044	0.633	0.000		
-0.126	0.723	0.292	0.000	
0.362	-0.693	-0.402	-0.199	0.000

APPENDIX III

PART C

STANDARDISED RESIDUAL COVARIANCE AND IMPLIED CORRELATIONS FOR MODEL ANALYSIS FOR DFAIR – MPD MODEL

Table 1: Standardised Residual Covariance before deleting any items (indicators) for Model Analysis for DFAIR-MPD Model

Standardized Residual Covariances (Group number 1 - Default model)

	mpd9	trust2	trust3	trust5	df2	df1	mpd7	mpd5	mpd3	mpd2	mpd1	upm3
mpd9	-0.015											
trust2	-0.776	0.000										
trust3	-0.636	0.071	0.000									
trust5	-1.229	0.626	-0.398	0.000								
df2	-0.170	-0.289	-0.186	0.408	0.000							
df1	-0.593	-0.101	-0.182	0.319	1.336	0.000						
mpd7	-0.138	-0.321	0.348	0.220	-1.398	0.320	-0.027					
mpd5	-0.479	-0.266	1.656	-1.122	-1.781	0.290	0.449	-0.024				
mpd3	0.257	0.935	1.574	-0.779	-0.703	0.561	-0.838	0.150	-0.039			
mpd2	0.613	0.260	0.060	-1.389	0.888	0.009	0.857	-1.982	0.298	-0.014		
mpd1	-0.119	-0.619	-0.351	-0.102	-1.258	-0.484	0.305	0.103	0.034	0.021	-0.029	
upm3	-0.609	1.599	**2.075**	-0.536	0.574	0.969	0.313	0.987	0.040	-0.463	-0.946	0.000
upm1	-1.352	**2.239**	**2.973**	0.221	1.804	1.290	-0.801	0.053	-0.193	-1.569	0.646	0.001
Prtcp2	0.782	-0.361	-0.654	-1.679	0.624	0.352	0.951	0.432	0.773	-0.047	0.165	0.678
Prtcp4_R	-0.963	0.028	0.920	-0.067	-0.680	-0.901	1.089	1.272	0.077	-1.159	-0.413	-0.100
Prtcp5	0.719	-0.165	0.375	-0.677	1.592	0.875	-0.775	0.068	0.278	1.711	-1.003	-0.724
Prtcp7	-0.244	-0.700	1.046	-1.095	-0.400	-0.531	-0.789	0.680	0.224	-0.065	-1.537	-0.521
Prtcp8	-0.441	-0.205	-0.466	0.166	-0.540	0.174	0.215	-0.972	0.021	-0.598	-0.483	-0.923
Prtcp10	-0.195	-0.623	-0.186	-1.589	-0.715	-0.482	0.521	0.314	0.899	0.510	-1.123	-0.497

Table 1: Standardised Residual Covariance before deleting any items (indicators) for Model Analysis for DFAIR-MPD Model (Continued)

Standardized Residual Covariances (Group number 1 - Default model)

upm1	Prtcp2	Prtcp4_R	Prtcp5	Prtcp7	Prtcp8	Prtcp10
0.000						
-0.478	0.000					
-0.497	-0.129	0.000				
-0.578	-0.932	-0.522	0.000			
0.582	-0.699	0.356	0.750	0.000		
0.218	-0.272	0.014	0.686	0.480	0.000	
-1.097	1.284	0.482	-0.750	-0.239	-0.202	0.000

Table 2: Modification Indices (MIs) of Regression Weights before deleting any Indicators for Analysis Model of DFAIR-MPD

Regression Weights: (Group number 1 - Default model)

			M.I.	Par Change
TRST	<---	CMB	4.995	.065
CMB	<---	TRST	5.887	.435
trust3	<---	CMB	5.169	.185
trust3	<---	mpd5	8.676	.212
trust3	<---	upm1	5.681	.129
trust3	<---	Prtcp7	6.583	.139
df2	<---	mpd5	6.643	-.212
df1	<---	df2	4.754	.110
mpd5	<---	mpd2	7.111	-.172
mpd2	<---	mpd5	5.412	-.170
mpd2	<---	Prtcp5	4.021	.106
upm1	<---	TRST	4.094	.359
upm1	<---	trust3	4.908	.127
upm1	<---	df2	4.005	.129
Prtcp2	<---	Prtcp10	4.725	.131
Prtcp5	<---	df2	5.423	.160
Prtcp5	<---	mpd2	5.553	.198
Prtcp10	<---	Prtcp2	5.117	.126

Table 3: Standardised Residual Covariance after deleting one item (indicator) for Model Analysis for DFAIR-MPD Model

Standardized Residual Covariances (Group number 1 - Default model)

	mpd9	trust2	trust3	trust5	df2	df1	mpd7	mpd5	mpd3	mpd2	mpd1	upm3
mpd9	-0.012											
trust2	-0.875	0.000										
trust3	-0.765	-0.009	0.000									
trust5	-1.258	0.690	-0.380	0.000								
df2	0.031	-0.098	-0.062	0.520	0.000							
df1	-0.352	0.100	-0.065	0.446	0.000	0.000						
mpd7	-0.142	-0.460	0.167	0.179	-1.141	0.635	-0.022					
mpd5	-0.496	-0.405	1.475	-1.164	-1.546	0.579	0.412	-0.019				
mpd3	0.259	0.771	1.361	-0.826	-0.393	0.940	-0.855	0.114	-0.030			
mpd2	0.622	0.165	-0.064	-1.416	1.084	0.243	0.858	-1.995	0.304	-0.011		
mpd1	-0.070	-0.734	-0.506	-0.133	-0.966	-0.130	0.352	0.130	0.096	0.071	-0.023	
upm3	-0.669	1.669	**2.109**	-0.494	0.669	1.073	0.223	0.891	-0.061	-0.519	-0.999	0.000
Prtcp2	0.718	-0.328	-0.692	-1.635	0.716	0.438	0.855	0.331	0.665	-0.106	0.111	0.733
Prtcp4_R	-1.036	0.044	0.860	-0.029	-0.606	-0.836	0.980	1.157	-0.045	-1.227	-0.479	-0.058
Prtcp5	0.673	-0.108	0.368	-0.625	1.705	0.986	-0.843	-0.008	0.201	1.669	-1.034	-0.658
Prtcp7	-0.304	-0.656	1.018	-1.046	-0.299	-0.434	-0.877	0.584	0.125	-0.120	-1.583	-0.460
Prtcp8	-0.496	-0.153	-0.484	0.219	-0.433	0.281	0.133	-1.060	-0.071	-0.648	-0.524	-0.857
Prtcp10	-0.271	-0.608	-0.246	-1.551	-0.641	-0.418	0.410	0.197	0.773	0.439	-1.191	-0.455

Table 3: Standardised Residual Covariance after deleting one item (indicator) for Model Analysis for DFAIR-MPD Model (Continued)

Standardized Residual Covariances (Group number 1 - Default model)

Prtcp2	Prtcp4_R	Prtcp5	Prtcp7	Prtcp8	Prtcp10
0.000					
-0.168	0.000				
-0.915	-0.525	0.000			
-0.703	0.329	0.781	0.000		
-0.267	-0.002	0.726	0.500	0.000	
1.241	0.416	-0.754	-0.267	-0.220	0.000

APPENDIX III

PART D

STANDARDISED RESIDUAL COVARIANCE AND IMPLIED CORRELATIONS FOR MODEL ANALYSIS FOR DFAIR – MPS MODEL

Table 1: Standardised Residual Covariance before deleting any items (indicators) for Model Analysis for DFAIR-MPS Model

Standardized Residual Covariances (Group number 1 - Default model)

	trust2	trust3	trust5	df2	df1	mps3	mps2	mps1	upm3	upm1	Prtcp2	Prtcp4_R
trust2	0.000											
trust3	-0.006	0.000										
trust5	0.717	-0.370	0.000									
df2	-0.085	-0.079	0.531	0.000								
df1	0.134	-0.066	0.467	0.018	0.000							
mps3	0.553	0.684	-0.300	0.370	0.093	0.125						
mps2	0.820	1.818	0.295	1.320	-0.309	0.118	0.121					
mps1	-0.265	-0.057	-1.876	0.117	-0.211	0.218	0.048	0.110				
Upm3	1.555	1.969	-0.534	0.565	0.952	-0.186	0.820	0.243	0.000			
Upm1	**2.624**	**3.342**	0.380	2.176	1.747	-0.962	0.812	-1.112	0.015	0.000		
Prtcp2	-0.283	-0.673	-1.613	0.755	0.500	-0.310	-0.165	0.230	0.648	0.007	0.000	
Prtcp4_R	0.026	0.810	-0.031	-0.625	-0.844	0.980	0.633	0.899	-0.185	-0.047	-0.086	0.000
Prtcp5	-0.129	0.317	-0.630	1.681	0.972	0.419	0.413	0.057	-0.776	-0.152	-0.850	-0.528
Prtcp7	-0.725	0.911	-1.069	-0.366	-0.499	0.689	1.058	1.055	-0.622	1.028	-0.686	0.269
Prtcp8	-0.209	-0.573	0.201	-0.487	0.229	0.743	0.209	0.070	-1.008	0.668	-0.233	-0.046
Prtcp10	-0.594	-0.260	-1.541	-0.631	-0.390	0.233	-0.032	0.429	-0.562	-0.629	1.369	0.462

Table 1: Standardised Residual Covariance before deleting any items (indicators) for Model Analysis for DFAIR-MPS Model (Continued)

Standardized Residual Covariances (Group number 1 - Default model)

Prtcp5	Prtcp7	Prtcp8	Prtcp10
0.000			
0.717	0.000		
0.677	0.390	0.000	
-0.722	-0.288	-0.224	0.000

Table 2: Modification Indices (MIs) of Regression Weights before deleting any Indicators for Analysis Model of DFAIR-MPS

Regression Weights: (Group number 1 - Default model)

			M.I.	Par Change
TRST	<---	CMB	6.099	0.088
CMB	<---	TRST	4.495	0.333
trust3	<---	mps2	4	0.083
trust3	<---	upm1	6.086	0.132
trust3	<---	Prtcp7	5.442	0.125
mps3	<---	upm1	5.533	-0.111
mps2	<---	CMB	4.257	0.161
mps2	<---	trust3	7.647	0.129
mps2	<---	trust5	4.631	0.09
mps2	<---	df2	4.49	0.111
mps2	<---	upm1	12.4	0.174
mps1	<---	trust3	4.527	-0.106
mps1	<---	trust5	11.005	-0.147
upm3	<---	Prtcp8	4.345	-0.138
upm1	<---	DFAIR	4.471	0.233
upm1	<---	TRST	6.67	0.472
upm1	<---	trust2	4.713	0.135
upm1	<---	trust3	7.438	0.157
upm1	<---	df2	5.424	0.151
Prtcp2	<---	Prtcp10	5.204	0.139
Prtcp5	<---	df2	5.794	0.166
Prtcp10	<---	Prtcp2	5.79	0.135

Table 3: Standardised Residual Covariance after deleting two items (indicators) for Model Analysis for DFAIR-MPS Model

Standardized Residual Covariances (Group number 1 - Default model)

	trust2	trust5	df2	df1	mps3	mps2	mps1	upm3	Prtcp2	Prtcp4_R	Prtcp5	Prtcp7	Prtcp8	Prtcp10
trust2	0.000													
trust5	0.000	0.000												
df2	-0.107	0.515	0.000											
df1	-0.002	0.401	0.000	0.000										
mps3	0.805	-0.204	0.616	0.359	-0.003									
mps2	1.078	0.389	1.567	-0.035	-0.005	-0.003								
mps1	-0.027	-1.778	0.348	0.038	0.054	-0.074	-0.003							
upm3	1.883	-0.416	0.746	1.127	-0.449	0.570	-0.015	0.000						
Prtcp2	-0.014	-1.513	0.789	0.446	-0.835	-0.672	-0.273	0.825	0.000					
Prtcp4_R	0.374	0.101	-0.527	-0.820	0.464	0.143	0.415	0.040	-0.092	0.000				
Prtcp5	0.147	-0.527	1.737	0.950	-0.061	-0.048	-0.391	-0.600	-0.902	-0.502	0.000			
Prtcp7	-0.373	-0.934	-0.258	-0.463	0.182	0.566	0.573	-0.391	-0.678	0.367	0.756	0.000		
Prtcp8	0.063	0.303	-0.457	0.170	0.189	-0.316	-0.442	-0.836	-0.329	-0.056	0.617	0.393	0.000	
Prtcp10	-0.300	-1.430	-0.581	-0.425	-0.309	-0.550	-0.084	-0.371	1.294	0.479	-0.756	-0.257	-0.301	0.000