TOWARDS AN EFFECTIVE DESIGN OF MANAGEMENT CONTROL SYSTEMS: A CONTINGENCY APPROACH

MOHAMMED ABDUL RAHIM AL-DAHIYAT

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ABSTRACT

Towards an Effective Design of Management Control Systems: A Contingency Approach

In an attempt to provide a better understanding of MCS design, this study has utilised the contingency theory approach to investigate the contingent relationships between perceived environmental uncertainty (PEU), business strategy, organisational structure and various attributes of MCS simultaneously. This study has also investigated the mediating effect of two structural dimensions (centralisation and formalisation) on the relationship between PEU, business strategy and MCS design. In addition, this study has investigated the implications of fit, internal consistency or coalignment between the contextual variables and MCS attributes on organisational effectiveness, thus adopting a systems approach to fit recommended in the contingency literature. This study also builds on the works of Simons (1987) and Chenhall and Morris (1986) in terms of developing a wider and comprehensive view of MCS design. Seven MCS attributes have been investigated in this study including budgetary control system practices, budgetary control system usage, cost control systems, broad scope information, managerial evaluation and rewards system, aggregation and timeliness of information.

A cross-sectional survey employing a questionnaire method of data collection was adopted. A total of 274 usable responses were received representing a response rate of 28%. For purposes of analysis, the research utilised structural equation modeling (SEM) multivariate statistical technique enabled by EQS 5.7 version software (Bentler, 1995). Thus, this study is one of the first studies in MC contingency literature to utilise SEM for validating the research constructs, controlling measurement error and for testing the structural relationships between the constructs simultaneously.

The results of this study confirmed the multi-dimensional nature of PEU, business strategy and organisational structure and the differential effects each dimension has on MCS design. Also the results indicated that the different approaches to fit (i.e., bivariate and systems approaches) utilized in this research resulted in insightful findings relating the contingent relationships between the contextual variables and MCS attributes. In addition, the structural dimension of formalisation was found to have significant positive relationships with many of the MCS attributes and also mediated the relationship between differentiation strategy and MCS attributes of budgetary importance, cost control systems and non-financial performance measures.

The results of this study also raise several implications for future MC contingency researchers and fill some gaps in the existing MC contingency literature. This study also contributes to the body of knowledge by providing guidance for future MC contingency researchers to implement the SEM method. SEM has a greater potential for testing theories, controlling measurement error, validating research constructs and testing structural relationships among multiple contextual variables and multiple MCS attributes simultaneously.

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"Who does not thank people does not thank Allah" (Prophet Mohammed peace be upon him).

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CHAPTER 1

INTRODUCTION

CHAPTER 1

Introduction

This chapter consists of five sections. The first section discusses the research area of interest and the motivation for undertaking this study. Section 1.2 provides an overview of the management control contingency approach and the limitations of earlier studies, while section 1.3 outlines the research aims and objectives. Section 1.4 highlights the contribution of the current research to the extant literature of MC contingency approach, and the concluding section describes the structure of the thesis.

1.1 Research area of interest

Since the early days of management study, the importance of control as a key element in the process of management has been emphasised. All organisations are concerned with channelling and integrating human efforts towards the attainment of organisational objectives. Control is the process of getting members of the organisation to work towards achieving the goals of the organisation. Without proper control, managers may make detrimental firm decisions that would negatively affect organisational effectiveness. Thus, management control (MC) is considered as a key activity for every business organisation and organisational survival and success can be greatly affected by the manner in which control is carried out (Camillus, 1986; Fisher, 1998).

Management accounting has a major role to play towards achieving competitive advantage and organisational success. The role of management accounting can be enhanced by management accountants or controllers designing effective management control systems (MCS) that provide relevant and timely information to assist managers in co-ordinating and controlling their business activities and meeting the challenges of their business environment. Also MCS assists in control by helping align the interest of members of the organisation with the goals of the organisation and by encouraging managers to make decisions that will accomplish the organisational objectives (Drury, 2000; Fisher, 1998; Morse and Zimmerman, 1997; Camillus, 1986). In addition, Drury (2000) argues that proper design of MCS is expected to minimise harmful and negative side effects of control such as job-related tensions, conflicts and deterioration in relationships with managers.

Despite the importance of MCS to the success of organisations, this topical area has been relatively less developed, understood or researched in management literature in general and management accounting literature in particular. The lack of development and research in this topical area has been criticised in Johnson and Kaplan's (1987, p.205) publication "Relevance Lost". They maintain that today's management control systems are not suited to business operations, which are seeking to compete successfully. They stated that:

> Given the radical changes in the competitive environment... it is unlikely that cost accounting and management control systems devised for the 1925 environment can still be useful sixty years later.

Many recent papers in leading management accounting journals have emphasised the need for undertaking theoretically informed studies on both the use and design of management control systems (Dent, 1990; Fisher, 1995 and 1998; Langfield-Smith, 1997; Chapman, 1997; Otley, 1999; Ittner and Larcker, 2001; Kald *et al.*, 2000; Smith and Langfield-Smith, 2002; Chenhall, 2003). More specifically, these papers called for utilising the contingency approach for its potential to advance knowledge and understanding of effective MCS design under various organisational settings. For instance, Fisher (1995 and 1998) argued that the contingency approach enables researchers to develop generalisations about MCS relative to business and organisational settings, thus, offering the potential for advancing our knowledge of control in complex organisations. Moreover, Chastain (1979) argued that the contingency approach enables management accountants to expand their role in management control and to maintain their expertise as controllers.

The lack of development and knowledge on MCS design and the need for systematic empirical research on this topical area have provided a major motivation for undertaking the current study. Thus in an effort to provide better understanding of MCS design, this study utilises the contingency approach for studying MCS design.

1.2 MC contingency research: General overview and limitations

Different approaches have been followed by management accounting and control researchers towards studying MCS design (a detailed review of these approaches and the justification for adopting the contingency approach in this study is provided in Chapter 2). However, the contingency approach, adopted in this study, has become the dominant approach for studying MCS design (Dent, 1990; Chapman, 1997; Fisher, 1998). Prior to the emergence of the MC contingency approach, a universalistic approach was more or less assumed based on the assumption that an optimal MCS design is applicable to some degree in all organisations. In contrast, the contingency approach assumes that the appropriateness of different management control systems depends on the settings or context of the organisation, and failure to match MCS with the context of the organisation is likely to lead to organisational decline in the long run. Simply stated, the contingency approach maintains that organisational performance or effectiveness depends on the level of fit or alignment between MCS and contextual factors. Thus, 'organisational effectiveness' and 'fit' are two key notions or concepts that need to be emphasised and considered by researchers adopting the contingency approach in order to produce concrete research findings (a detailed review of the rationale and development of contingency theory is provided in Chapter 3).

Unfortunately, the results of earlier MC research adopting a contingency approach (a detailed review of MC contingency studies is given in Chapter 4) do not provide concrete conclusions about the appropriate design of MCS under various contextual factors. Several academics and researchers have argued that MC contingency studies have not been conducted in a systematic fashion (e.g., Otley, 1989 and 1999; Dent, 1990; Chapman, 1997; Langfield-Smith, 1997; Ittner and Larcker, 2001; Chenhall, 2003). Consequently, the contradictory and weak results of MC contingency studies may be attributable to several limitations in their research design and models rather than to the contingency approach it self (a detailed review of the limitations of earlier MC contingency research is given in Chapter 5). The above researchers concluded that addressing the limitations of earlier MC contingency research in future research would provide more concrete and clear conclusions about the appropriateness of MCS under various organisational settings and, thus, advance the current knowledge of this topical area. This has provided a further motivation for the researcher to undertake the current study.

One of the major limitations of earlier MC contingency studies relates to the insufficient attention given by these studies to the concept of organisational effectiveness which is considered as one of the key notions of the contingency approach (Otley, 1980; Miller, 1981; Drazin and Van de Ven, 1985; Pennings, 1992; Dent, 1990; Fisher, 1998). Unfortunately, many of MC contingency studies have either not explicitly considered organisational effectiveness in their models (e.g., Bruns and Waterhouse, 1975; Gordon and Narayanan, 1984; Chenhall and Morris, 1986; Sim and Teoh, 1997) or have measured effectiveness in a questionable way. For instance, some studies (Gul, 1991; Gul and Chia, 1994) have preferred to use the notion of managerial effectiveness rather than organisational effectiveness. It has been argued that such a partial construct does not provide a satisfactory criterion for the appropriateness of MCS design or reflect the effectiveness of the organisation as a whole (Lowe and Chua, 1983). Other studies (e.g., Simons, 1987) have used only financial measures (e.g., profits) to measure effectiveness. However, relying only on financial measures has been widely criticised as a proxy measure of effectiveness because they tend to be short-term and adopt a narrow focus (Miller, 1981; Langfield-Smith, 1997). Various researchers have emphasised the importance of using a multiplicity of dimensions (financial and non-financial measures) rather than any single dimension to measure organisational effectiveness (e.g., Govindarajan, 1984; Govindarajan and Fisher, 1990; Langfield-Smith, 1997).

Another key limitation of MC contingency research relates to the tendency of researchers to use simple bivariate models to study the relationship between a single contingent variable and a single control attribute (e.g., Govindarajan and Gupta, 1985; Simons, 1987; Gul, 1991). These under-specified models and the 'piecemeal way' in which MC contingency research has been undertaken has been criticised by several writers as one of the major weaknesses that has caused such unrewarding results (e.g., Otley, 1980; Dent, 1990; Govindarajan and Fisher, 1990; Langfield-Smith, 1997; Fisher, 1998; Chenhall, 2003). Fisher (1995 and 1998), among many others, argues that the effects of some variables that are significant in a bivariate analysis might fail to show significance in systematic multivariate analysis. Fisher further contends that much of the richness and complexity of MCS design may not be uncovered if multiple contingent factors are not examined simultaneously. Thus, the purpose of this multivariate approach to fit is to test whether the bivariate relationships continue to be significant in the presence of other intervening variables.

Moreover, several writers have criticised previous MC contingency studies for their focus on narrow definitions of MCS (Dent, 1990; Otley, 1999; Fisher, 1998; Langfield-Smith, 1997). These writers argue that the recognition of a wider definition of MCS would usefully address the issues of choice between alternative control subsystems and assist in the interpretation of some earlier findings. Unfortunately, the wide and different control attributes that have been investigated individually in MC contingency research has resulted in difficulties in comparing, contrasting and integrating the findings of these studies. For instance, several MC contingency studies have examined accounting control systems in isolation and without consideration for the existence of other organisational aspects contributing to the overall organisational control such as organisational structure and culture (e.g., Simons, 1987; Sim and Teoh, 1997). Other studies have focused on only a single aspect or attribute of accounting control systems. For example, Gordon and Narayanan (1984) studied the dimension of scope of information (i.e., non-financial, external and future information). Others have investigated incentive bonus schemes (e.g., Govindarajan and Gupta, 1985), budget evaluation style (e.g., Govindarajan, 1984 and 1988), output vs. behavioural controls (e.g., Govindarajan and Fisher, 1990) and financial controls (e.g., Simons, 1987). Such variations in the attributes that have been researched and measured have resulted in difficulties in developing a coherent body of knowledge that provides a comprehensive view of MCS design (Merchant and Simons, 1986; Fisher, 1995; Langfield-Smith, 1997; Otley, 1999; Chenhall, 2003). Unfortunately, the literature lacks a coherent and consistent classification for MCS, and few attempts have been made towards achieving this task (Merchant and Simons, 1986; Fisher, 1995; Langfield-Smith, 1997; Otley, 1999; Chenhall, 2003). Otley (1999) argues that studies addressing aspects of MCS have been part of this literature for many years. However, the integration of these studies to provide a description of the overall management control systems is relatively novel.

Finally, a further key limitation of earlier MC contingency studies that has contributed to such unrewarding results relates to the way researchers defined and measured the variables used in their studies. Many of the variables used in MC contingency studies are abstract or theoretical constructs that are not capable of direct measurement such as MCS, environment uncertainty, competitive strategy, organisational structure and organisational effectiveness constructs (Ittner and Larcker, 2001; Sharma, 2001). Chenhall (2003, p.4) for instance argues that:

> It is unfortunate that it is not part of MCS research tradition to spend more time on developing robust measures of the elements of MCS, particularly when there is ambiguity in the meaning of constructs.

In addition, these theoretical constructs are subject to measurement error and this has negative implications on the significance and validity of results found (further details on this point are provided in Chapter 7 which deals with the validity and reliability of the constructs used in this research).

Unfortunately, none of the earlier MC contingency studies reviewed has controlled for measurement error prior to conducting their analysis. In addition, many studies in management accounting in general and MC in particular have not systematically demonstrated the validity of the constructs used in their studies (Ittner and Larcker 2001; Sharma, 2002; Smith and Langfield-Smith, 2002; Chenhall, 2003). Many of these studies simply conduct a reliability analysis without verifying statistically the validity of these constructs prior to aggregating the items into a single scale. Sharma (2002) for instance argues that various aspects of these theoretical constructs (e.g., PEU) may be more important under different economic and industrial conditions. Thus, researchers are required to develop and refine constructs used in their studies in order to unravel some of the contradictory results found in MC contingency research (a detailed discussion on the validity and reliability of the current research constructs is provided in Chapter 7).

Several recent papers in leading management accounting journals have called for greater methodological rigour in instrument validation and model testing in management accounting research in general and MC contingency research in particular (e.g., Hartmann and Moers, 1999; Sharma, 2002; Smith and Langfield-Smith, 2002; Ittner and Larcker, 2001; Chenhall 2003). More specifically, these papers have called for making greater use of structural equation modeling (SEM) method in management accounting research in order to control for measurement error and to provide simultaneous tests of measurement validity, reliability and structural relations (further details on SEM are provided in Chapters 6, 7 and 8).

Given the above limitations of earlier MC contingency research, it is imperative to reiterate that addressing these limitations in future research has the potential to advance the current knowledge and understanding of MCS design by providing clearer and more concrete conclusions (Dent, 1990; Chapman, 1997; Langfield-Smith, 1997; Otley, 1999; Ittner and Larcker, 2001; Smith and Langfield-Smith, 2002; Chenhall, 2003).

1.3 Research Aim and Objectives

Based on the above discussion, the general aim of this research is to advance the current knowledge of the influence of various contextual variables on the design of effective MCS. This is achieved by extending earlier MC contingency research and addressing its major limitations by:

1. Incorporating organisational effectiveness as a variable within the research model (presented in Chapter 5) and measuring effectiveness using multidimensional (financial and non-financial) measures;
2. Adopting a multivariate approach of fit by examining the relationship between multiple contingent variables and multiple control variables simultaneously;
3. Developing and adopting a wider and comprehensive definition of MCS; and
4. Providing greater methodological rigour in constructs validation and model testing through utilising structural equation modeling (SEM).

More specifically, the current research aims to achieve the following research objectives:

1. To examine the direct relationships between the three contextual/contingent variables of: a) environmental uncertainty, b) business strategy, and c) organisational structure and various attributes of MCS simultaneously;
2. To examine the indirect relationship between the two contextual variables of: a) business strategy, and b) environmental uncertainty, acting through organisational structure, on various attributes of MCS; and
3. To examine whether a fit or coallignment between the contextual variables and MCS attributes is associated with greater organisational effectiveness.

1.4 Research significance and contribution

The significance and contribution of this study to MC contingency research is implicit in the earlier discussions. However, the following is a more explicit discussion of the major contributions of this research to the extant MC contingency literature. The significance and major contributions of the current study are fourfold.

First, this study responds to many calls from recent papers in leading management accounting journals to investigate the impact of business strategy, environmental uncertainty and organisational structure simultaneously on MCS design (Dent, 1990; Langfield-Smith, 1997; Chapman, 1997; Fisher, 1998; Otley, 1999; Kald *et al.*, 2000; Smith and Langfield-Smith, 2002; Chenhall, 2003). Surprisingly, none of the earlier MC contingency studies has examined the impact of environment, strategy and structure at the same time on MCS design (Smith and Langfield-Smith 2002; Chenhall 2003). The benefit of examining the impact of these contextual variables together, rather than individually, as has been the case in most previous research, is that these contextual variables tend to be related. Consequently, when looked at individually, the relations between particular contextual variables and MCS design are difficult to interpret. These relations could reflect a causal connection between a particular contextual variable and MCS attribute, or alternatively, they could be spurious and merely reflect mutual relations with other contextual variables. Thus, additional insights and greater confidence can be gained by considering these contextual variables together.

In addition, the contingency literature of MCS (reviewed in Chapter 4) indicates that the limited empirical research conducted to date has not yielded any concrete results about the nature of the most appropriate connections between strategy and controls (Otley, 1999; Chenhall, 2003). Also the limited empirical studies that have considered the effect of business environment and strategy together on MCS design (e.g., Chong and Chong, 1997; Sim and Teoh, 1997) are subject to the limitations discussed earlier such as not incorporating organisational effectiveness in their models and/or focusing on only limited aspects of MCS. Previous research has also mostly studied accounting controls in isolation of organisational structure and therefore there is only a limited understanding of the possible relationships between MCS and organisational structure. Thus, there is a need for research that examines the relationship between organisational structure and MCS and to determine whether organisational structure has a mediating effect on the relationship between the contextual variables of environmental uncertainty and business strategy and MCS design (Waterhouse and Tiessen, 1978; Otley, 1980; Solieri, 2000; Chenhall, 2003).

Second, this study contributes to extant MC contingency research by providing greater methodological rigour in validating the research constructs, controlling measurement error and testing the structural relationships simultaneously through utilising structural equation modeling (SEM). In contrast to previous work that used multiple regression and other multivariate statistical techneques, SEM is most appropriate for testing complex models that include unobservable latent constructs such as business strategy, environmental uncertainty, organisational structure, MCS and organisational effectiveness. In addition, SEM method has a unique ability to control for spurious relations between variables and, thus, confidence in any significant relations found between specific contextual variable and MCS attributes is increased. Despite the recent calls for utilising SEM in management accounting research (Ittner and Larcker, 2001; Smith and Langfield-Smith, 2002, Chenhall, 2003), very few studies in MC contingency literature have utilised SEM (e.g., Chong and Chong, 1997). Thus, more confidence may apply to the findings of this study.

Third, this study answers the recent calls from several academics to develop and adopt a wider and comprehensive definition of MCS (Dent, 1990; Fisher, 1995; Otley, 1999; Ittner and Larcker, 2001; Chenhall, 2003) rather than the narrow and partial definitions considered in earlier MC contingency studies. The recognition of a wider definition of MCS adopted in this study (a detailed discussion on MCS dimensions and the logic for considering them is provided in Chapter 5, Section 5.6) is expected to provide a description of the overall MCS and assist in the interpretation of some of the earlier findings. In addition, as discussed earlier in section 1.2, MC contingency literature lacks a coherent and consistent classification of MCS. Thus, this study contributes to this literature by developing a more comprehensive classification of MCS.

Finally, the fourth contribution of this study relates to the fact that most of the MC contingency studies, as evidenced from the literature reviewed in Chapter 4, have been undertaken in North America, while little research has been undertaken in the UK. Taking into consideration that differences in research findings across countries may exist (Dent, 1990 and 2002), it is of interest to ascertain whether the findings of previous studies also apply to the UK.

1.5 Structure of the thesis

In addition to this first chapter, the thesis comprises eight further chapters. Chapter 2 introduces the subject of MCS and demonstrates its conceptual complexity by listing the various definitions used throughout the management and accounting literature and the notions and boundaries of the term as it is used in this thesis. An overview of the various approaches followed by researchers towards studying MCS is provided together with a justification for adopting the contingency approach in this thesis.

The MC contingency research has followed the contingency theory of organisation structure research and much of the confusion in MC contingency findings was related to the way researchers understood and implemented the contingency approach (Otley *et al.*, 1995). Thus, the major aim of Chapter 3 is to provide better understanding of the main themes and arguments of the contingency theory and to set the foundation for undertaking a critical evaluation of the management control contingency studies. Thus, Chapter 3 reviews the development, themes and criticisms of the contingency theory of organisational structure. It starts by reviewing the pioneering studies that contributed to the development of contingency theory, and then presents the main themes and tenets of the contingency approach.

Chapter 4 is mainly concerned with reviewing the relevant management control contingency empirical studies. The chapter starts with an overview of management accounting and control contingency theory and reviews the pioneering early MC contingency studies that contributed to its development. It then introduces the contingent variables used in MC contingency studies and provides a detailed review of the relevant MC contingency empirical research.

Chapter 5 develops the research model and formulates the hypotheses and questions that will be tested in the study. It starts by discussing the limitations and gaps of MC contingency studies reviewed in Chapter 4. It then presents a conceptual framework for developing a comprehensive view of MCS and the attributes to be considered in this research. Finally, the research hypotheses and questions that will be investigated in this study are developed.

Chapter 6 describes the research methodology and the data collection method employed to achieve the research objectives. It starts with an overview of the research paradigm and methodology, followed by detailed discussion of the research population and sampling procedure. It then provides a detailed description of the stages of the data collection including questionnaire construction and pre-testing, features of the covering letter, the respondents, survey administration and response profile. Finally the chapter ends with a description of the non-response bias tests and a justification for the statistical methods used for data analysis.

Chapter 7 is concerned with the first stage of data analysis, which describes the operationalisation of the research constructs and their validity and reliability assessments. More specifically, this chapter provides a detailed discussion of the results of the measurement model analysis in structural equation modeling (SEM). It also presents the procedures undertaken to establish construct validity and reliability and to control for measurement error.

Chapter 8 presents the second stage of analysis, which describes the structural model analysis procedures in SEM and reports and interprets the results of this analysis pertaining to research questions and hypotheses. The final chapter (Chapter 9) provides a summary and discussion of the major findings of the study, its limitations and directions for future research.

CHAPTER 2

MANAGEMENT CONTROL SYSTEMS

CHAPTER 2

Management Control Systems

2.1 Introduction

Although control is one of the key functions of management, the term has no consistent or commonly accepted definition. A review of the literature indicates that the many definitions of control have led different scholars to adopt different interpretations and follow different approaches in their studies, thus causing difficulties in comparing, integrating and classifying these studies (Merchant and Simons, 1986; Fisher, 1998). The purpose of this chapter is to demonstrate the conceptual complexity of management control system (MCS) by discussing the various definitions used throughout the management and accounting literature and the boundaries of the term used in this thesis. Another purpose for this chapter is to demonstrate the density of management control literature by providing an overview of the different approaches followed by researchers toward studying MCS and the justification for adopting the contingency approach in this thesis.

This Chapter is structured as follows: Section 2.2 discusses various definitions of management control and section 2.3 discusses the types of management controls used throughout the management and accounting literature. The notions and boundaries of MCS as used in this thesis are presented in Section 2.4. The final section (Section 2.5) discusses the development of management control research and the different approaches used by researchers for studying MCS in complex organisations and presents the approach which will be used in this research.

2.2 Management control: Definitions and themes

The definition of control ranges from specific and narrow notions to broad and vague ideas. From a narrow perspective, control is viewed as correcting something that has gone wrong. It is considered as a behavioural process that involves measurement and evaluation of the actual performance of organisational units, the identification of deviations from the required performance and taking proper corrective actions to bring the activity into line (Camillus, 1986). This control process is cybernetic[1]. Cybernetic control implies that (1) a standard has been set (2) the standard is monitored and (3) a corrective action is taken if the deviation from the standard is deemed significant (Jawarski, 1988). The existence of standards implies that the manager has an implicit or explicit model of how the organisation functions when transforming inputs into outputs. If outputs are within standards, the system is considered in control. If not, the manager should take corrective actions (Tricker and Boland, 1982). The monitoring process involves measurement and evaluation of the actual performance. However, the cybernetic definition does not explicitly indicate the mechanisms and performance measures that comprise a control system, but rather defines the formal control process (Fisher, 1998).

The monitoring process involves the use of performance measures that may include financial measures such as net income, revenues and expense targets, as well as non-financial measures such as head count, cycle time, on time delivery and scrap. Rewards (including incentive compensation schemes) and punishments (e.g. demotion) are often linked to performance measures attainment and are considered as a key part of the feedback process of the control system (Fisher, 1998).

On the other hand, and from a broader perspective, control is seen as a process intended to increase the probability of achieving the organisation's planned objectives. Tannenbaum (1962) defined control as:

> Any process in which a person or group of persons or organisation of persons determines i.e. intentionally affects, what another person or group or organisation will do (cited in Das, 1989, p. 460).

Under this broad definition, control would include everything that helps ensure that the people in the organisation are acting towards achieving the goals of the organisation. According to Parker (1986, p. 277):

> The conceptual approach to control in both management and accounting literatures has moved well beyond mere definition...the conceptual complexity of control is poorly served by simple definitional statements. Rather control has come to be represented as a multi-model framework.

[1] Cybernetic is defined as a system in which standards of performance are determined, measuring systems gauge performance, comparisons are made between the standards and actual performance and feed back provides information on the variances (Otley *et al*, 1995).

Different control mechanisms are available for organisations to cope with the problem of organisational control, including personal supervision, job descriptions, standard operating procedures, budgets and performance measurements. Broadly conceived, these mechanisms and processes comprise the tangible components of an organisational control system (Flamholtz, 1983).

2.3 Types of management controls[2]

Given the breadth of scope, and the many definitions of management control, a vast number of management control measures exist. Three different types or categories of controls have been identified in the literature, action or behavioural controls, personnel or cultural controls, and results or output controls. Different authors have also used different terms even though these terms imply the same meaning. For example, the terms output control (Ouchi, 1979), results control (Merchant, 1985) and core systems (Flamholtz, 1983) are widely used terms in the literature to refer to management accounting control systems. Behavioural controls (Ouchi, 1979), action controls (Merchant, 1998) and administration controls (Child, 1977) have been used mainly to refer to controls exerted over employees' actions through organisational structure such as establishing work roles and procedures and determining authority and responsibility.

2.3.1 Action, behavioural or administration controls

These types of controls are related to organisational structure and apply to those situations where the actions and behaviour of individuals as they go about their work are the focus of control. Fisher (1995) argues that organisation structure contributes to organisational control through establishing roles and responsibilities that guide people's actions. Structuring of activities[3] and concentration of authority[4] are two related dimensions of organisational structure identified in organisation theory literature as important behavioural controls within organisations (Child, 1972; Bruns and Waterhouse, 1975; Mintzberg, 1979).

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[2] Drucker (1964) distinguishes between control and controls. Control is seen as a management function that makes sure that the work is done to achieve organisations objectives, while controls encompass all the methods and procedures that direct employees toward achieving these objectives (Drury, 2000).

[3] Structuring of activities concerns the degree of formal regulation of the intended activities of the employees. Subsumed in this concept are formalisation, the extent to which procedures are committed to writing, and standardisation, the extent to which rules apply invariably (Child, 1972).

[4] Concentration of authority concerns the extent to which authority for making decisions lies at higher levels within or outside the organisation. Subsumed in this concept are centralisation and lack of autonomy (Child, 1972).

Administration controls can also be classified as a form of behavioural control. Child (1977) states that strategies of administrative control are expected to reduce the amount of discretion in roles and in consequence the amount of innovative and non-conforming behaviour. Child identified two strategies of administrative control, that managers appear to have a choice between, the bureaucratic strategy of control and the centralising strategy of control. Child (1972) further argues that managers may attempt to control the behaviour of employees indirectly by relying upon procedures or methods for limiting discretion and for monitoring activities within limits imposed by such indirect controls. Alternatively, managers may attempt to maintain control directly over employees' behaviour by confining decisions to fairly senior levels in the hierarchy. Action or behavioural controls are most appropriate when managers know what actions are desirable, and are able to ensure that the desired actions are taken (Drury, 2000).

2.3.2 Personnel or cultural controls

According to Maslow's hierarchy of needs, any decision made by an individual within an organisation will be influenced by the personal desires of that individual. Since managers and employees have personal goals, the control problem is to motivate them to act so that when they seek their personal goals, they are also achieving organisational goals (Anthony, 1988). This category of control is based on strengthening the sense of commitment toward achieving organisational goals, so that people can become immersed in the interests of the organisation. Ouchi (1979) termed this type of control as 'clan control'. Ouchi (1979) states that in organisations where task performance is ambiguous and teamwork is common, precise evaluation of individual contribution is impossible. In such cases control can be achieved by a period of socialisation during which employees are subjected to skill training and value training, or indoctrination. Clan control can be viewed as corporate culture or social control such as the selection of people who have been socialised into adopting norms and patterns of behaviour that conform to organisational objectives. Clan control is viewed as the highest degree of employee discipline attained through dedication of each individual to the interest of the whole.

2.3.3 Results, output or core controls

The traditional management control system (MCS) is output oriented (Jowarski, 1988). It views output controls as a simple cybernetic system, and involves collecting and reporting information about the outcomes of the work efforts. Under this type of control, management sets desired output level, monitors the extent of attainment and take corrective actions when deviations from the desired level have been identified.

Management accounting control systems (MACS) are considered as a form of output controls. They are mostly defined in monetary terms based on inputs (costs) outputs (revenues) and/ or inputs to outputs ratio (profits and ROI). MACS often incorporate non-monetary measures, besides monetary measures. However, as Tricker and Boland (1982) argue, non-monetary measures (e.g. number of defective units) are never totally adequate since cost measures and cash flow measures of performance are always needed to manage the flow of funds in all responsibility centres,[5] irrespective of their level of autonomy or their overall objectives.

2.4 Notions and boundaries of management control systems

The earlier literature tended to adopt a narrow view of control. For example, Anthony (1965) put forward a framework for analysis of planning and control activities. Anthony suggested that control involved three categories: strategic planning, management control and operational control. Strategic planning is the process of deciding on the goals of the organisation and strategies for attaining these goals. It involves setting and modifying the organisation's objectives, determining the resources that will be committed to accomplishing these objectives, and defining organisation's policies regarding using these resources. Management control (MC) is the process by which organisational objectives are achieved and the use of resources is made efficient and effective.[6] Finally, operational or task control is the process of ensuring that specific tasks are done efficiently and effectively.

Anthony's framework views MC as mediating between task control and strategic planning in the sense that task control takes place according to decisions arrived at in management control, while management control exists to achieve the goals and strategies determined by

[5] A responsibility centre is an organisation unit headed by a manager who is responsible for its activities. It can be classified as an expense centre if only their costs are measured, as a profit centre if both costs and revenues are measured and as an investment centre if both profits and investment used to generate these profits are measured (Anthony, 1988).

[6] Anthony (1988, p.34) redefined management control as "the process by which managers influence other members of the organisation to implement the organisation strategies." This definition has the same idea, but with an emphasis on the implementation of strategies as the direct purpose for MC rather than the attainment of resources, which is, as Anthony argues, more indirect purpose of MC.

the strategic planning process. Thus, MC is viewed as being essentially a cybernetic process operating mainly through management accounting systems (Anthony, 1965). Anthony's framework was considered as a novel view towards understanding the complexity of MC in the 1960s. However, it has been extensively criticised for being limited and narrowing the scope of MC (Emmanuel, Otley and Merchant, 1990; Tricker and Boland, 1982; Machin, 1983).

For instance, Otley *et al.* (1995) reviewed the development of research on management control and argued that one of the unintended consequences of Anthony's 1965 work is that management control has primarily been developed within an accounting based framework. They view MC as a general management function, with a broad set of control mechanisms, concerned with achieving organisational objectives. In contrast, accounting controls comprise just one aspect (i.e. output controls) within the wider practice of management control.

Similarly, Tricker and Boland (1982) criticised Anthony's view on MC on the bases that it focuses on only one subset of control activities, the management accounting systems, and that it excludes many of the important ideas inherent in MC. They argue that the notion of MC cannot be separated from ideas about values, authority, responsibility and power, and the study of MC must transcend these areas. Furthermore, Mintzberg (1979, p.148) has questioned the separation of planning and control by Anthony on the basis that:

> Planning and control go together like the proverbial horse and carriage: there can be no control without prior planning, and plans lose their influence without follow-up controls.

Mintzberg further argues that the purpose of planning is to specify a desired output, a standard, at some future time. And the purpose of control is to assess whether or not that standard has been achieved. Mintzberg further distinguishes between two types of planning and control systems, one that focuses on the regulation of overall performance, and is concerned with 'after-the-fact' monitoring of results; this is called as performance control. The other seeks to regulate specific actions and is oriented to specifying activities that will take place; this is called action planning. In other words, the organisation can regulate outputs in two ways. It can use performance control to measure results of a whole series of actions, and use this information to make decisions. Alternatively it can use action planning to determine in advance what specific decisions or actions are required. According to Mintzberg (1979) performance control is a pure means of standardisation of outputs while action planning, because it specifies particular actions, resembles in some ways the design parameters of formalisation of behaviour or structuring of activities.

Machin (1983) criticised Anthony for focusing only on formal control systems, neglecting the informal systems. Machin (1983, p.22) describes MCS as "formal and informal systems which help an individual to control what he does with himself and other resources". Lorange and Morton (1974) point out that control in organisations, practically, is synonymous with financial control or MACS. However, they argue that increased pressure from outside the organisation requires the modification of such narrow view of control systems if organisations are to continue to run effectively. Similarly, Birnberg (1998) stated that the uncertainty, which characterises the business environment, leads to a more integrated view of organisational control subsystems, and explains the shift in emphasis from managerial control to organisational control.

In the accounting area, the role of management accounting systems in organisational control traditionally has been studied in isolation from other non-accounting control systems (Flamholtz, 1983). This narrow view has resulted in limiting our understanding of how the MAS functions within the overall organisational control system. Drury (2000) suggests that a wider view of MCS's is required so that the role of MACS within the overall control process can be better understood. It is also believed that a broad perspective on control would clarify some of the limitations of accounting control tools (i.e., variance analyses, standard costing, performance measures) by highlighting the substitutability of various controls within MCS (Merchant, 1988). Tiessen and Waterhouse (1983) have also stressed the importance of not separating the effect of accounting information systems[7] from other controls, as they act as a package and must be assessed jointly.

From the above discussion, it can be concluded that a broader view of MCS would provide more knowledge and a better understanding about control within business organisations, and would solve some of the complexities of this crucial concept. Thus the recognition of a wider

[7] Accounting information systems related to the organisation are used by different parties and for different purposes. Management accounting information system is to provide internal managers with accounting information (i.e. measures input and outputs) to assist in planning and control. Financial accounting information systems provide information for creditors and investors for making investment and credit decisions. Tax information systems is used for tax purposes to report to government taxing authorities. In this work, we are concerned with MAIS that assist in planning and control of the organisation (Morse and Zimmerman, 1997).

definition of MCS is required (Langfield-Smith, 1997; Dent, 1990). However, there are practical limitations to the number of controls that can be included in the research (Camillus, 1986; Merchant, 1988; Langfield-Smith, 1997; Fisher, 1998). For instance, Fisher (1998) points out the limitations of data collection methods and research time for empirical studies. He argues that if the definition is too broad, the study may become unmanageable and intractable. At the same time, if the definition is too narrow, possible relationships and trade-offs with other control mechanisms may be ignored. Thus, according to Camillus (1986), we need definitions of MCS that are relevant in the context of management of organisations, that are comprehensive in scope, yet limited enough to permit focused managerial effort and that offer guidance to the designers of MCS's. Similarly, Merchant (1988) points out that researchers must limit their scope of study by directing attention to some aspects of the control problem.

Anthony (1988) suggests that researchers should focus attention first on formal controls[8] because by definition, managers do not design informal systems; they develop without being designed, but he acknowledges that managers can nurture and influence them. Following Anthony's line of argument, Merchant (1988) suggests that the presence of informal controls should be considered like other environmental variables when managers design their control systems. Moreover, Langfield-Smith (1997) argues that designing instruments to measure accurately the incidence or use of informal and clan controls is problematic and difficult.

Based on the above arguments, this study views MCS as those formalised procedures and systems that serve or attempt to regulate human behaviour in a manner consistent with attainment of organisational objectives. Therefore, the research will focus on output controls (MACS) and behavioural controls (organisational structure), rather than informal system, such as social and cultural controls (further discussion on the conceptualisation of MCS will be given in Chapter 5).

2.5 Developments in the management control literature

Control-related literature is voluminous but disparate and MC researchers have followed different approaches for studying control in organisations (Merchant and Simons, 1986).

[8] Anthony (1988, p.23) defines formal systems as "those whose structure is visible and whose operation has explicit authorisation".

Each approach provides different insights towards understanding control in complex organisations. Furthermore, the arguments in favour of one or the other of these approaches are validated in the organisational and control literature (Strati, 2000). However, the divergent approaches toward studying the subject of control have yielded an image of the complexity and density of MC literature, and have resulted in difficulties in comparing, contrasting and integrating these studies (Merchant and Simons, 1986; Fisher, 1998).

Merchant and Simons (1986) suggest different reasons for these difficulties: first, the choice of problem scope can vary significantly among studies; for example, some researchers may consider planning as a component of control while others do not. Second, control is discussed at different levels of analysis, including control of individuals, departments or organisations. Third, control systems are discussed at different levels of aggregation; some researchers have focused on specific control techniques (e.g., variance analysis) or control system characteristics (e.g. degree of scope), while others have focused on control system archetypes (e.g. administrative controls, output controls).

The purpose of this section is to demonstrate the depth and breadth of the subject of management control (MC), by providing an overview of the various approaches followed by researchers towards understanding control in organisations. The review builds on earlier reviews of management control literature (e.g. Giglioni and Bedeian, 1974; Parker, 1986; Merchant and Simons, 1986; Otley *et al.*, 1995), as well as organisational theory literature reviews (e.g. Strati, 2000; Scott, 1992).

The developments in MC literature have followed and lagged behind developments in management and organisational literature by approximately 20 years or more (Parker 1986; Otley *et al.*, 1995). Thus, MC literature, similar to organisational literature, resembles a fragmented 'adhocracy' where paradigm shifts and breaks have occurred in this literature (Strati, 2000). According to Reed (1992) this literature represent a configuration which merges scholars and experts into 'ad hoc' groups operating within an area of study marked by a low degree of co-ordination of research strategies.

Different scholars have attempted to review the development of research in MC, and attempted to organise the types of work under various categories. For instance, Watson (1975) suggested a framework shown in figure 2.1 to organise management accounting research. Watson argues that nearly all technical accounting studies fall within L11, where emphasis is on efficiency of accounting systems, so that organisations perform better technically.

		Consequent System	
		Accounting	Organisation
Antecedent System	Accounting	L11	L12
	Organisation	L21	L22

Where L indicates some potentially lawful connection, the subscript 1 refers to the accounting system and the subscript 2 refers to the organisation.

Figure 2.1 Watson's view of accounting research
(Source: Watson, 1975, p.65).

Alternatively, if the research is behaviourally oriented it will generally fall into L12 where researchers use accounting systems as an independent variable and observe the effects on some behavioural (dependent) variable. Management accounting contingency research falls under L21 where the transactional interdependencies flow from the organisation to the accounting system, while L22 refers to the area of interdependencies that belong within the organisation itself.

Flamholtz, Das and Tsui (1985) suggested another way to organise the control literature along three main perspectives, which have dominated the study of organisations: sociological, administrative and psychological perspectives. Flamholtz *et al.* argue that the three traditions or perspectives differ from each other in terms of control mechanisms employed and the level of analysis. The sociological perspective tends to focus on the entire organisation and view control as accomplished through structural mechanisms of rules, policies and hierarchy of authority. The administrative perspective tends to focus on the individuals or departments within organisations, with little or no concern for comparative studies across organisations. The control mechanisms that are frequently employed by administrative theorists are plans, measurement, supervision, evaluation and feedback. Lastly, the psychological approaches tend to rely on mechanisms of goal and standard setting, extrinsic or intrinsic rewards, feedback or interpersonal influence. The focus is primarily on the individual.

Strati (2000) provided an excellent review of the various ways to reconstruct and reorder the organisational literature, which can be also applied to MC literature. One of the main ways is to divide it into schools of thought (e.g. scientific management school, administrative school, bureaucratic school, human relations school, etc.). Another way is to organise the literature around the criterion of perspective (rational, natural and open systems). This criterion has been employed by Scott (1992) to distinguish three distinct routes followed by the study of organisations during the 20th century and was also adopted by Otley *et al.* (1995) to review the development of MC literature. The three perspectives, as Scott (1992, p. 27) suggests, serve as an 'umbrella under which we may gather the related views' and approaches 'which bear a strong family resemblance' but which are also partially in conflict, partially overlapping and partially complementing one another.

In order to understand and organise the development of MC-related literature, it is appropriate first to provide a brief overview on the development of organisational literature since, as mentioned earlier, the developments in MC are seen to have followed developments in management and organisation theory. Thus tracing MCS literature in terms of its organisational theory roots allows us to understand the evolution of research in MC. The review will be based on the classification put forward by Scott (1992) as a framework to summarise the development of the organisational theory. This will be followed by an examination of the MC literature to ascertain how MC literature falls into this classification.

Scott (1992) provides a summary of the major developments in organisation theory using two dimensions as shown in figure 2.2. First he distinguished between rational and natural systems models. The rational systems model views organisations as purposefully designed for achieving specific objectives whereas the natural systems perspective emphasises the importance of informal systems. Second, he noted the transition from closed to open system models. Prior to 1960s, organisations were viewed as closed systems, which could be understood apart from their environments. Important processes were internal to the organisation. However, as the complexity and uncertainty of the business environment have increased, incorporating the organisational context in research models became crucial for understanding complex organisations and this has led to the development of open systems perspective.

	Closed system models	Open system models
Rational models	**1900-1930** **Scientific and Adminstrative Machines**	**1960-1970?** **Systems and Cybernetic Concept**
Natural models	**1930-1960** **Human Relations Forum**	**1970-** **Ambiguous and Complex phenomena**

Figure 2.2 A historical imagery of organisation theory
(Source: adapted from Scott, 1992).

2.5.1 The closed-rational systems perspective

This first perspective is based on the classical organisation theory and comprises Taylor's scientific management, Fayol's administrative theory, Weber's theory of bureaucracy and Simons' theory of administrative behaviour (Strati, 2000). This work assumes that organisations are deliberately designed to achieve specific goals and emphasises the formal aspects of the organisation, with little or no concern given to informal, social relationships and psychological aspects of work. Classical research in MC has examined control as a formal system governed by standardised rules and procedures and view optimal control system design to sustain, to some degree, in all settings and firms (Sisaye, 1998). The classical organisation control systems theory has adopted the functional view of organisations, which focuses on the roles of formal organisational systems. The objective of control systems is to maximise firm profitability through facilitating the flow of information in the organisation and guide employees' behaviour to be consistent with management goals.

According to Birnberg (1998), several critical assumptions are incorporated in the classical view of organisation control systems: the external environment is stable; tasks are routinised at managerial and operational levels; and the object of MCS is to control individuals and co-ordinate activities. Birnberg concludes that classical MC research is usually traced back to Anthony (1965) work, which, as argued by Otley *et al.* (1995), has resulted in the development of MC research in an accounting–based framework. However, given that MC research under this perspective is weak in terms of reliability of support for conclusions (Merchant and Simons, 1986), and the empirical evidence of contingency relationships, most academics and researchers have been reluctant to employ this perspective (Fisher, 1998).

2.5.2 The closed-natural systems perspective

This second perspective comprises the human relation's school, Barnard's (1938) co-operative system, and Parsons' (1951) social system (Strati, 2000). This perspective has developed in reaction to the rational system perspective, and stressed on the importance of informal culture, which developed spontaneously from the natural interaction of people working together. It assumed that patterns of behaviour depend on values and the natural interactions of people, not on formal rules or policies. Thus this perspective was partly a rejection of prior theories of organisation and management (Hrebiniak, 1978). Chester Barnard's co-operative system is crucial to this perspective. For Barnard, as Strati (2000, p.41) states:

> Organisations depend on peoples willingness to co-operate, and their efforts should be directed toward a common purpose by the persuasive encouragement of the leading management.

The basic principle of this perspective is the belief that participation has great potential for solving many of our organisational problems. Participating individuals appreciate the responsibility entrusted to them; morale is high and motivation is increased (Macintosh, 1991).

This perspective gave birth to the field of behavioural accounting research, in which management control is considered as the main area of research[9]. Caplan (1978, p.39) argues that:

> Many management accounting techniques intended to control costs such as budgeting fail because they create feelings of frustration, suspicion and hostility. The techniques cannot motivate effectively because the accountants fail to consider the broad spectrum of needs and drives of the participants.

Behavioural accounting research has applied the classical-functional approach to explain managers' use of formal control systems for incentives and performance evaluation, and to influence the behaviour of subordinates consistent with management goals (Sisaye, 1998). In

[9] Macintosh (1991, Ch. 2) provides an excellent review for research in this area.

general, the behavioural research on accounting has mainly focused on the effects of budgeting on managerial attitudes and behaviour. "It had moved away from the formal, authority-based approach to control characteristic of the classical control model, to take account of individual and group-based control as well as dysfunctional aspects of formal control" (Parker 1986, p.270).

Research in this area has followed the pioneering study by Argyris (1952) entitled "The impact of budgets on people" (Waterhouse and Tiessen, 1978; Macintosh, 1991; Otley *et al.*, 1995). Argyris' study showed that budgets were viewed differently by accountants, supervisors and workers, and that imposed budgets created management pressure and led to dysfunctional consequences, including increased tension, frustration and mistrust. The study concluded that participation within the budget process would have an important impact on organisational success.

Hofstede (1968) conducted another milestone study of the association of human relations variables and budgets[10] (Waterhouse and Tiessen, 1978; Merchant and Simons, 1986; Macintosh, 1991). Hofstede investigated the budget-related behaviour in six large manufacturing firms, and attempted to discover the precise conditions that led to successful and positive attitudes to budgets. The main findings of this study are that participation in budget setting by itself is not enough to motivate managers. The key ingredient was the 'game spirit' which managers relied on to 'play the budget game'. Different managers played the budget game in different ways. Some ignored the budget; others used budgets excessively; while others treated it in a positive way. The study also concluded that a good company will align its control systems to the demands of external circumstances since external and impersonal causes are more important than internal and personal ones (Macintosh, 1991).

The early studies in behavioural effects of budgets indicate that managers engage in dysfunctional behaviour as a response to the way superiors use budgets to evaluate their performance. Thus, in the early 1970s, a behavioural perspective on the theme of managerial performance evaluation began to emerge (Otley *et al.*, 1995). Hopwood (1972) conducted a

[10] Hofstede (1968) study was classified by Otley *et al.* (1995) under the rational-closed perceptive for adapting an 'implicit universalistic orientation'.

leading study in this area. The study rested on the assumption that the impact of budgets on job-related behaviour depends more on the style[11] in which it is used rather than on the technical design. According to Macintosh (1991), Hopwood's study placed the issue of participation in a wider setting than previous approaches, including the evaluation manner of superiors, leadership styles and situational needs.

In a related study, Otley (1978) attempted to replicate Hopwood's study and found results which differed markedly. Otley found that different evaluation styles did not seem to affect job-related behaviour, or explain differences in performance. According to Macintosh (1991), Otley related the contrary results between his and Hopwood's study to differences in research sites, and assumed that the managers, in his sample, might have matched their evaluation style to the 'prevailing circumstances'. However, as Macintosh (1994, p.216) contends:

> These studies did not produce any grand human relations' theories of management accounting and control. Instead they seemed merely to confirm the contradictory findings which appeared earlier in the organisational behaviour literature.

Subsequently, these conflicting results have initiated a stream of research, which was reviewed by Briers and Hirst (1990). Scholars expanded the field of behavioural accounting and included the social-psychological aspects of accounting and MC systems (Macintosh 1991, Chapter 3, provides a good review for this literature). They "dug deep into the literature on cognitive psychology and personal traits to construct models of how individuals process accounting information" (Macintosh, 1994, p. ix). This line of research according to Macintosh (1991, p.39):

> Proved helpful in reconciling this discrepancy. We learned, for example, that personal attributes, such as emotional stability and locus of control, had a lot to say about reactions to, and use of, these systems.

Macintosh (1991, p.39) further contends that this research enabled us to realise that:

> Many of the generally accepted management accounting principles, such as the idea that budgets should include only items that are within the budgeted manager's control, do not square with the realities of organisational life nor with research findings.

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[11] Hopwood defined three distinct styles of evaluation: the budget constrained style, where the evaluation of a manager is based on meeting the budget on short-term basis; the profit conscious style, where the manager's performance is evaluated on his ability to increase general effectiveness of his unit in relation to long-term to organisational goals; the non-accounting style where budgets play an unimportant role in evaluating performance (Macintosh, 1991).

However a major weakness of the psychological research in control, according to Merchant and Simons (1986, p.190), is related to the fact that:

> Much of this research is framed around improving individual decision accuracy or improving feelings of worker satisfaction, while there is little evidence to date that these conditions necessarily improve organisational performance.

Thus, this perspective suffers from difficulties in linking behavioural conditions with organisational objectives.

2.5.3 The open-rational systems perspective

The emergence of an open systems approach was accompanied by a return to more rational approaches and relative neglect of the natural approaches (Otley *et al.*, 1995). The third perspective comprises group of organisational analysts oriented toward systems design (e.g. Khandwalla, 1977; Mintzberg, 1979), and the contingency theory is viewed as a derivation of the systems design approach, which has been influential in organisation theory (Strati, 2000). The emergence of the open systems approach in general, and the contingency theory in particular was a reaction against the idea that organisations were 'closed systems' employed by the classical organisation theory and behavioural school of thought. The previous perspectives, which employed closed-system logic, were viewed as too narrow and restricted the design of organisations and their systems to 'technical, context free phenomena' (Macintosh, 1991; Laughlin and Lowe, 1990). Their main concern was intra-organisational, and viewed organisations as closed systems not disturbed internally by any external shifts in the environment. An open system however, is assumed to be open to and affected by the environment. The insight is that organisations need to change in response to changes in the environment (Tricker and Boland, 1982).

The contingency theory of organisation structure, derived from empirical work of Burns and Stalker (1961), Woodward (1965) and Lawrence and Lorsch (1967) has shifted research emphasis away from attempts to determine a one best way to a broader systems view. It is based on the premise that the best way to organise is contingent in its nature, in the sense that it depends on the environment in which the organisation operates. Different environments make different demands on the organisation. Consequently, if the internal features of the organisation match the requirements of the environment, it will adapt better and survive longer (Strati, 2000).

The movement away from universalistic approaches toward a contingency approach in MC literature occurred in the late 1970s, partly to explain the contradictory findings of prior research and partly in response to the prior development of the contingency theory of organisations (Otley, 1980). In the view of contingency theorists, the design of accounting information and control systems is based upon specific characteristics of an organisation and its environment. Different organisations behave in different ways for all sorts of reasons, thus their accounting and control systems are expected to be different. According to Otley *et al.* (1995, p.37) the early contingent work in accounting based control systems has a 'clear closed systems flavour', similar to developments in organisation theory which had concentrated on internal factors such as technology and did not adopt an open systems approach until late 1970s.

In late 1970s, there was a shift in MC literature, particularly from a theoretical perspective, towards open systems perspectives (e.g. Gordon and Miller, 1976; Amigoni, 1978; Waterhouse and Tiessen, 1978). Theoretical formulations that have developed from a contingency perspective have attempted to relate the design of accounting information systems (AIS) to several contextual variables. Gordon and Miller (1976) argue that AIS should be designed contingent upon organisational environment, structure and managerial decision making style. Waterhouse and Tiessen (1978) also contend that the nature of control is dependent on the type of organisational structure, which in turn is contingent on technology and environment. Moreover, empirically, the development of the contingency theory of management accounting control systems (summarised by Otley, 1980) was a significant development in MC literature and has enabled researchers to develop generalisations about control systems relative to business and organisational settings (Fisher, 1998). A stream of empirical research in MCS design adopted the contingency approach and attempted to uncover direct relationships between different contextual variables (e.g. technology, the environment faced by the organisation, structure) and accounting information and control systems design. However, as Otley *et al.* (1995, p.37) argue, it is the 'impact of the external environment in general and of external uncertainty in particular' on MCS design, 'that most clearly indicated the adoption of an open systems perspective'. They conclude that 'it is this feature that marks the divergence of the study of management accounting systems' and the study of the wider area of management control systems'. Since the mid-1980s there has been increasing interest in including business strategy as a contingent variable for MCS design (e.g. Govindarajan and Gupta, 1985; Simons, 1987), though this research is still considered small and needs to be expanded (Dent, 1990; Chenhall, 2003). Merchant and Simons (1986) used the classification of 'Large data base sociological research' to refer to MC literature under this perspective. They argue that contingency research appears to offer the potential for an increase of our knowledge of control in complex organisations.

2.5.4 The open–natural systems perspective

By the end of 1970s, organisation contingency theory was subject to critique[12] mainly on the basis that it yields an overly rational image of the way that organisations function (Strati, 2000). Thus a return to more natural approaches in organisation literature favouring the cultural and political issues characterise this final fourth perspective. The new approaches or 'emergent strands'[13] arose as a result of the breakdown of contingency theory's dominance in organisation studies that have influenced MC literature. These approaches, according to Strati (2000), have mainly emphasised: the 'loosely coupling relations' and the notion of 'enacted environment'; the creation and management of cultures and symbols in organisations; and the institutional context (such as public institutions and professional associations) within which the organisation determines its courses of action.

The MC literature under this perspective is well illustrated by the collection of readings published in Chua *et al.* (1989) monograph 'critical perspectives in management control' (Otley *et al.*, 1995). Most contributors in this monograph argue for conducting a broader based research in MCS to inform policy makers in the management accounting field. They assume that accounting and MC should not be viewed merely as technical aspects, and that understanding the societal, cultural and political context is important for development of accounting and control systems. Furthermore, they argue for the importance of using the grounded theory approach in MC research in order to, as Otley (1989) argues, strengthen the links between theory verification and theory construction. Laughlin and Lowe (1990, p.34) contend that proponents of this perspective claim that:

> Current knowledge about accounting systems design has failed to appreciate or uncover this important social dynamic which both moulds and is moulded by more visible technical practices of accounting.

[12] The critique of the contingency approach is stated in Strati (2000, p.47).

[13] The term 'emergent strands' used in organisational literature to refer to the lines of analysis that arose simultaneously with the critique of comparative-structural and contingency approaches (Strati, 2000).

Laughlin and Lowe further contend that there are a wide variety of societal, organisational and personal factors, which influence the design of MCSs, and listed different empirical research in accounting following this line of argument. For example, as Laughlin and Lowe indicate, Laughlin (1984) traces the reasons for highly simple accounting systems in the Church of England to dominant social beliefs in this institution. Furthermore, Neimark and Tinker (1986) traced the origins of the management control system in 'General Motors' to important social mechanisms to do with inter-organisational and social conflict.

According to Otley *et al.* (1995), other work in this field has taken a more anthropological approach by studying the role of culture in MC (e.g., Ansari and Bell, 1991; Dent, 1991; Birnberg, 1998). Moreover, proponents of this perspective believe that each organisation is unique in its context and processes. Therefore researchers must study each firm and its control system individually (Fisher, 1995; Hrebiniak, 1978). They prefer to adopt the anthropological stance on the basis that control system design depends on understanding the unique factors affecting each firm. According to Merchant and Simons (1986) case study researchers tend to believe that the determinants of control systems are produced by many significant interaction factors, and case research would provide a rich description of all factors affecting MCS design. Thus, this research, as Merchant and Simons argue, scores high on their criteria 'specification of organisational variables', but generalisation of findings to other firms is not applicable. The rationale for this perspective, as Fisher (1995, p.29) argues is similar to contingency approach, but "the number of possible combinations of contingent factors is so large that attempting to find broad classes of contingent variables is seen as futile".

However, proponents of the contingency approach reject this rationale and consider it as inappropriate, on the basis that there are common contexts which result in similarities across organisations, thus generalisations can be made for classes of business settings. Furthermore, Merchant and Simons (1986) contend that research under this perspective suffers from two serious problems. First, the level of confidence in research findings is low due to the limitation in the number of sites studied. Second, the findings are subject to bias and misinterpretation since they are highly dependent on the researcher.

2.6 Summary

Table 2.1 summarises the representative studies, focus, research methods and major assumptions of the four perspectives in MC literature. As can be noted, these perspectives have addressed different sorts of problems in fundamentally different ways and thus provide different insights and add richness to MC literature. Furthermore, the diversity and development of new approaches in MC literature, as Otley *et al.* (1995) suggest, have not led to the abandonment of work in earlier strands of the literature. Furthermore, Kelly and Pratt (1992) contend that any attempt to favour one approach over another is problematical, and can be grounded only in value judgements.

Table 2.1 Summary of research areas in MC

Perspective	Representative studies	Focus	Methods	Assumptions
Rational-Closed Perspective	Anthony, 1965; Flamholtz *et al.*, 1985.	Cost accounting; formal control system; cybernetic & feedback control.	Personal experience observation	An optimal control system holds in all settings and firms.
Natural-Closed Perspective	Argyris, 1952; Hofsted, 1968; Hopwood, 1972; Otley, 1978.	Behavioural consequences of formal control systems; uses of budget for managerial evaluation.	Case study	Budgets have an impact on job-related behaviour.
Rational-Open Perspective	Gordon & Miller, 1976; Otley, 1980.	Relationship between organisation settings, MCS and performance.	Questionn-aire survey	Organisations can be custom designed to facilitate performance in a variety of settings.
Natural-Open Perspective	Chua *et al.*, 1989; Ansari and Bell, 1991; Laughlin and Broadbent, 1993; Birnberg, 1998.	Control processes in unique organisational settings.	Case study, observation and interviews.	Systems can be best understood with detailed knowledge of organisational unique circumstances.

(Source: Adapted from Otley *et al.*, 1995 and Merchant and Simons, 1986).

The classical organisation theory and the behavioural school of thought both rest on the assumption that organisations are closed systems. This means that the organisation is not disturbed internally by any external shifts in the environment. However, as the rate of change in business environment is rapid, as Otley *et al.* (1995) suggest, adaptation on the part of organisations is crucial for the survival of these organisations. The insight is that organisations need to change in response to changes in the environment in order to survive. The process of adaptation requires the efforts of a wide range of organisation participants rather than merely left to senior management, and the idea of control in an open system facing an uncertain environment is central for the design of effective MCS that will assist organisations to survive. Thus, in a changing environment, the universalistic approach, which views control system design to hold in all settings and firms, appears to be unsound. On the other hand, treating the organisation as unique in its context and processes, and that control system design depends on the unique factors affecting each firm also seems to be inappropriate (Fisher, 1995; Hrebiniak, 1978).

This study sees the contingency approach to be most appropriate for studying control systems design in a changing environment, since, as Fisher (1995) argues, this approach is situated between these two extremes (the universalistic and situation-specific approaches). Moreover, proponents of the contingency view argue that the contingency approach is a "mid-range" theory that provides a synthesis to the two extreme views of organisations (Hrebiniak, 1978). However, It should be noted that contingency theory has been severely criticised for such problems as a lack of theoretical clarity and a failure to specify the form of interaction between the variables (Schoonhoven, 1981). Nevertheless, when the hidden assumptions of contingency theories are made explicit, they can be made amenable to statistical testing (Van de Ven and Drazin, 1985). In fact, the empirical research provides evidence in favour of the contingency view (Fisher, 1998).

Moreover, Otley (1989, p.30) related the contradictory findings of much of MC contingency research to the researchers themselves rather than the contingency theory approach. He contends that:

> Unfortunately, there was a tendency for researchers to take what were often tentative theories and incorporate them uncritically into the accounting arena with little appreciation of their defects and weaknesses, even though organisational theorists themselves were becoming increasingly critical of their validity.

Thus, this research attempts to pay attention to previous criticisms and learn from past experience to specify a more easily testable contingency approach to MCS design. The organisation contingency theory, its main themes and criticisms are the focus of the next chapter. The aim is to provide an understanding of the tenets, strength and weaknesses of the contingency theory.

CHAPTER 3

STRUCTURAL CONTINGENCY THEORY: THEMES, DEVELOPMENTS AND CRITICISMS

CHAPTER 3

Structural Contingency Theory: Themes, Developments and Criticisms

3.1 Introduction

Chapter 2 has demonstrated the complexity and diversity of approaches towards studying management control systems (MCS), and concluded that the contingency theory approach is appropriate for providing a framework for studying MCS design. It was also mentioned in Chapter 2 that MC contingency research has followed contingency research on organisation structure, and that the contradictory findings of much of MC contingency research were related to the way researchers employed the contingency approach rather than the contingency theory approach itself (Otley, 1989). Thus understanding and adopting the main themes and tenets of the contingency theory approach is essential for uncovering much of the confusion in MC contingency research.

The importance of organisation structure to the design of management accounting systems has long been recognised by many scholars. According to Horngren (1972, p.157):

> Ideally, the organization itself and its processes must be thoroughly appraised, understood and altered, if necessary, before a (management accounting) system is constructed (cited in Waterhouse and Tiessen, 1978, p.100).

Anthony (1965) views structure as given, thus MCS need to be designed to meet the needs of organisation structure. Similarly, Chenhall, Harrison and Watson (1981, p.88) argue that:

> Formal structure is one of the most important aspects of the internal context that influences the design of management accounting systems.

On the other hand, other theorists have advocated the position that organisation structure is considered as another control mechanism (Otley, 1980; Flamholtz *et al.*, 1985). However, Flamholtz *et al.* (1985) recognise that structure *per se* is not a control mechanism and that different structural dimensions arise as a response to situational variables and may not directly contribute to the function of control or the achievement of organisational objectives. The literature (e.g., Child, 1972; Waterhouse and Tiessen, 1978; Flamholtz *et al.*, 1985) suggests that two dimensions of organisational structure are directly related to the function of control and serve as additional control mechanisms. These are bureaucratisation or structuring of activities (i.e., setting operating roles and procedures) and centralisation of decision making (i.e., direct surveillance by managers). Moreover, according to Otley (1980) organisation structure and accounting controls may be used as substitutes for each other. For example, firms may rely on operating procedures and direct supervision to avoid the expense of running complex accounting systems. Thus, organisation structure is considered as an important control device. Hence, the question of how best to design organisations, which contingency research on organisational structure deals with, is a major issue for MCS design (Sathe, 1975; Chenhall *et al.*, 1981; Emmanuel and Otley, 1985).

The aim of this chapter is to review the contingency research relating to organisation structure. The first section of this chapter will provide definitions for organisational design and structure in order to facilitate the discussions in the forthcoming sections. The second section will review early contingency research on organisation structure. The last section will concentrate on the themes and tenets of contingency theory approach. This will provide the foundation and main themes and arguments for the next chapter that deals directly with MC contingency theory.

3.2 Organisation structure: Definitions and concepts

Child (1972, p.2) defines organisational structure as "the formal allocation of work roles and the administrative mechanisms to control and integrate work activities". Similarly, Mintzberg (1979, p.2) defines structure as "the sum total of the ways in which (an organization) divides its labour into distinct tasks and then achieves coordination among them". In other words, organisational structure "involves the central issues of how the organisation should be segmented and how the organisation should be integrated to accomplish organisational objectives" (Watson, 1975, pp.67-68). It appears from these definitions that organisational structure is mainly concerned with two opposing requirements: segmentation or differentiation and the coordination or integration of these tasks to achieve the goals and objectives of organisations.

According to Hodge and Anthony (1988), segmentation, departmentalisation or differentiation seeks to divide the overall task to be accomplished into sub-tasks and assign them to various units within the organisation and to individuals within each unit. This process of differentiation enables units and people to concentrate on a particular subset of the overall task and become specialised and proficient at it. Similarly Kreitner (1998) argues that it is through departmentalisation that related jobs, activities, or processes are grouped into major organisational sub-units. However, Kreitner concludes that the term departmentalisation does not always literally apply, and labels such as division, group, or units are generally used in large organisations. Organisations usually differentiate their activities on the basis of function, products or services, geographical location, market or customers and work flow processes. According to Chenhall *et al.* (1981, p.88) segmentation can also be considered "as a means of enabling the organisation's environment to be sub-divided into parts that are manageable by the organisation's decision maker". Lawrence and Lorsch (1967) developed this view of segmentation through the concept of differentiation, which will be discussed later in this chapter.

Formal organisational structure involves also that the separate sub-unit activities are co-ordinated, so that they collectively aim to attain the overall goals of the firm (Chenhall *et al.*, 1981). Mintzberg (1979, p.3) defines coordination as "the glue that holds organisations together," and argues that coordination is concerned with control and communication, and that recent developments in MC literature suggests that coordination and control are the same in principle. According to Emmanuel and Otley (1985) a broad definition of MC, as adopted in this thesis, would include those formal mechanisms concerned with integration and coordination of differentiated tasks and divisions. Integration or coordination can be achieved through a number of formal mechanisms including authority and power, standard policies and procedures, and accounting control systems, as well as informal mechanisms such as mutual adjustment (e.g., informal communication and liaison devices). These mechanisms, according to Hodge and Anthony (1988, p.14), "are the internal adhesives that help hold the various departments and divisions in the organisation together". They further argue that "the notion of differentiation and integration must be considered from a situation-specific perspective, which the contingency theory of organisation structure deals with".

3.3 The contingency theory and organisation structure

It was pointed out in Chapter 2 that the classical management theories (scientific management theory, administrative theory, bureaucratic theory) viewed organisational structure as an independent variable and suggested that there is *'one best way to organise that is applicable to all organisations'* (Watson, 1975). These theories implicitly treated organisations as closed systems, operating in isolation from other organisations and ignored the impact of external environment. They were concerned primarily with two issues: one emphasising formal authority and close supervision, the other emphasising strict work roles throughout the organisation. According to Mintzberg (1979, p.10), the classical theorists viewed organisation structure as "a set of official standardised work relationships built around a tight system of formal authority". This view seems strongly related to the image of the bureaucratic/mechanistic organisation (to be discussed later in this section under the work of Burns and Stalker, 1961).

However, in the face of rapid change and increasing environmental uncertainty, the traditional closed-systems and rigid prescriptions became inadequate, and the contingency approach became a promising alternative (Kreitner, 1998). In contrast to classical management theories, the contingency theory argues that *'there is a one best way, but it all depends'.* It attempts to take a step away from universally applicable principles of management toward situational appropriateness. The contingency approach is:

> An effort to determine through research which managerial practices and techniques are appropriate in specific situations (Kreitner, 1998, p.55).

The contingency theory of organisation structure, which was derived from the empirical work of Burns and Stalker (1961), Woodward (1965) and Lawrence and Lorsch (1967), emphasises that the effectiveness of particular organisational structure is dependent upon a number of contextual variables. Although these contextual variables that effect structural choices are left unspecified in the contingency theory (Pfeffer, 1982), contingency researchers have developed contingency theories related to effective organisational structure design. A number of researchers have indicated the importance of technology as a primary determinant of structure (Woodward, 1965; Perrow, 1967). Others have found the effect of organisational environment as a major determinant of structure (Burns and Stalker, 1961; Lawrence and Lorsch, 1967), and still others have emphasised the relationship between organisational design and size (Pugh *et al.*, 1969). These three areas of research will be reviewed and referred to as technology-structure, size-structure, and environment-structure perspectives. However, no attempt will be made here to cover all the work that has been undertaken in these areas. Instead, the chapter discusses the major studies of structural contingency theory, and synthesises the material presented, so that the main themes and problems with contingency research become clearer and better understood.

3.3.1 Technology-structure perspective

This perspective emphasises organisation's technology or technical system as an important variable that influences the design of organisations in general, and the design of the operating core[1] in particular. Woodward (1965), Perrow (1967), and Thompson (1967) are considered as the three major studies falling within this perspective. These studies have recommended that structure should be matched to production technology. This has become known in the literature as the "technological imperative". However, the term technology has no single acceptable definition in the literature, and the three major studies, as shown in Table 3.1, have operationalised technology in three different ways.

Woodward (1965)

Woodward (1965) selected one region in England and investigated 70 manufacturing companies located there, and studied the relationship between their structures and production technical systems. To operationalise technology, Woodward categorised firms' production systems into three groupings (essentially unit, mass and process) to represent a scale of technological complexity or sophistication[2]. Unit production is the least complex, while process is the most complex. Woodward's specific research question was: Are organisations that adopt the principles of classical management more successful than those that do not? The findings of this work provided support to the contingency theory and raised doubts about the possibility of prescribing general management principles to all firms.

Table 3.1 Categories of technology

Woodward (1965)	Level of technological complexity or sophistication (Unit and small batch; large batch and mass; process).
Perrow (1967)	Number of exceptions and nature of search process (Routine, non-routine, craft, and engineering).
Thompson (1967)	Level of interdependence among subunits (Pooled; sequential; and reciprocal).

1 Operating core or technical core are two terms used in the literature to refer to the part that produces the essential outputs. It encompasses those members (the operators) who perform the basic work related directly to the production of products and services (Mintzberg, 1979).

2 Technical complexity represents the extent of mechanisation of the manufacturing process. High complexity means machines perform most of the work. Low complexity means workers play a larger role in production process (Daft, 1992).

Unit production systems were found in organisations that manufactured non-standard or individual products (tailored to specific customers' need), and were associated with the use of the least sophisticated technology. Woodward found that unit production firms had the least differentiated tasks because all functions from marketing to development to production need to work closely with each other, thus high frequency of personal contacts and organic structure is required.

On the other hand, mass production firms dealt with standard products where economies of scale play an important factor in keeping costs low. Woodward considered production as the prime function in these firms. Hence, they were willing to invest more in their technical systems than those in unit production firms. Woodward also found that mass production firms had very differentiated (segmented) structures, with formal communication systems between different functions. Work flowed from development to production to marketing. Development took place in advance of production, and production and marketing were 'decoupled by buffer inventories'. Coordination in these firms was achieved through bureaucratic structures that emphasise standardisation of work process and formalisation of behaviour.

Process production was the most sophisticated production system, and was found in firms built for the continuous production of fluid substances, like oil refineries. The technical systems in these firms were highly mechanised requiring a small but skilled labour force to operate the highly sophisticated machines. Thus Woodward found structures in these firms to be organic in nature, with informal communication systems. For coordination they relied on training and indoctrination, and tended to work in small groups (teams and task force). These firms had high capital costs, and without assured markets they could fall into in difficult situations. Thus, work flowed from development to marketing to production. First products and processes have to be developed, and then markets have to be assured before production starts.

<u>Perrow (1967)</u>

Perrow's (1967) theoretical study also considers technology to be the major variable determining structure. Technology is defined in terms of problem solving or actions that an individual performs to achieve a task. If a person is assigned to a task or receives an order or signal, which is unfamiliar, he "searches" in order to respond. Two important aspects of technology are the "frequency of search", and the "nature of search" process. Perrow considers "search" as an exceptional action, and "frequency of search" (the first aspect of technology) to depend upon the level of unfamiliarity with the task or job. In other words, when individuals encounter a large number of unexpected situations, with frequent problems, many exceptional actions will occur. The other aspect, "nature of search" concerns how individuals respond to unexpected situations and problems that arise in the course of their work. If problems are well understood (i.e., cause-effect relationships are understood), individuals will engage in "analysable search". They may use stored knowledge and procedures such as instructions, manuals, standards and programs or textbooks to respond to these problems or situations. However, if problems or situations that arise are not well understood (i.e., the cause-effect relationship is not clear), the search process becomes "unanalysable". Thus, prescribed solutions are not available, and experience and intuition are relied upon in order to make a response or decision. Perrow identified four different types of technology (routine, non-routine, craft, and engineering) depending on the two aspects of technology; namely the analysability of decision search procedures (clarity of cause-effect relationship), and the number of exceptions (unexpected situations) the organisation encounters in the product or service generation process. An adaptation of Perrow's model is shown in Figure 3.1.

	Few Exceptions	**Many Exceptions**
Unanalyseable search	Craft	Non-Routine
Analysable search	Routine	Engineering

Figure 3.1 Perrow's Classification of technology
(Source: Adapted from Perrow, 1967).

Perrow suggests that each type of technology requires a distinctive organisational structure designed to suit the special needs of the task. Routine technology is found in organisations with repetitive and routine tasks so procedures can be worked out for handling them as with assembly line manufacturing, which is characterised by few exceptions and analysable search. In these firms, a classical bureaucratic structure[3] is required, and interdependence and interaction between middle management and lower management concerned with the supervision of production is limited. Centralised planning, and standardising the work procedures achieve coordination in these firms. This is similar to Woodward's mass production technology (Mintzberg, 1979). In contrast, non-routine technology tasks are not well structured, and standards and methods for handling them are not available. In this situation, when contingencies or problems arise, a great deal of effort is devoted to analysis or search, and individuals rely on their instinct and experience to respond to them. This type of technology is found in research organisations and non-standard product manufacturing (e.g., one-off customised machine tool manufacturing). Non-routine technology involves high levels of vagueness and events are difficult to predict. Thus an organic structure is required to facilitate high levels of personal contact and participation to respond to contingencies and problems that may arise. Moreover, non-routine organisations have the least amount of differentiation, and coordination is achieved by mutual adjustments (i.e., informal communication).

Craft technology is characterised by a fairly predictable stream of activities, but the production process is not well understood. Work is not standardised and ready solutions are not available. Thus tasks and problem solving are based on the intuition and experience of individuals rather than by standardisation of work or ready made solutions. Craft technology is similar to Woodward's unit technology and is found, for instance, in organisations producing products that require talented and skilful labours (e.g., fine glassware and artistic products). Thus these organisations require decentralised structures. In contrast, organisations with an engineering technology (technical/professional) require a functional bureaucratic structure.

Thompson (1967)

The third study within the technology-structure perspective is that of Thompson (1967). Thompson's theoretical work also falls within environment-structure perspective. Thompson was concerned with how organisations best deal with uncertainty. He argues that

[3] Perrow used the term bureaucratic structure to imply stable pattern of behaviour based upon a structure of roles and specialised tasks (Macintosh, 1981).

organisations attempt to protect their "technical core" or basic activities from the environment by creating what he called "boundary spanning units" to deal with the environment and its uncertainties. In other words, organisations reduce uncertainty by sealing their "technical core" from the environment so that it can run smoothly without interruptions, and let other functions deal with the environment (e.g., by having a purchasing department to handle suppliers and sales department to deal with customers). Moreover, there are various methods that organisations can use to protect their "operating cores" such as standardisation of work processes, planning, and stockpiling supplies and outputs. For example, by stockpiling supplies and outputs, work can continue as if there were a steady stream of supplies and steady demand by customers. Another approach, Daft (1992) contends, is to open the whole organisation to the environment and expose the technical core to external environment by establishing good relationships with its customers and suppliers. In this case, employees throughout the organisation are serving in boundary-spanning roles.

Thompson attempted to link a firm's technology to various organisational arrangements, focusing particularly on the different mechanisms of coordination which were appropriate for more complex technologies. He argues that one of the key components of firm technology is the interdependence among the firm's subunits. Thompson identified three categories of interdependence between organisational sub-units (pooled, sequential, and reciprocal) to represent a scale of interdependence among subunits. This is illustrated in Figure 3.2. Pooled interdependence involves the least amount of interdependence, while reciprocal the highest level of interdependence. Moreover, these levels of interdependence differ from each other in the extent to which they are difficult to coordinate successfully. Thompson suggested that achieving co-ordination is most difficult when the level of interdependency is high.

In pooled interdependence, functional divisions share common resources but otherwise operate independently from each other. Thompson suggests that coordination by standardisation of rules and procedures is the most appropriate in these situations. In sequential interdependence, work is done in a series where the output from one subunit (e.g., purchasing department) becomes the input of another (e.g., production department). A motor manufacturing company also illustrates this situation. The output from the engine plant becomes the input of the car assembly plant. In this situation planning is the most appropriate form of coordination. The work of each function is planned to flow in sequence with that of the next line so work flows smoothly without interruptions from any line.

In reciprocal interdependence, each subunit receives inputs from and provides outputs to the others. This is exemplified by an airline company, which contains both operations and services units. The output from maintenance or servicing unit in the form of a serviceable aircraft ready for use by operations; and the output by operations is input for the maintenance department in the form of an aircraft needing maintenance. Coordination is best achieved under this situation by mutual adjustment.

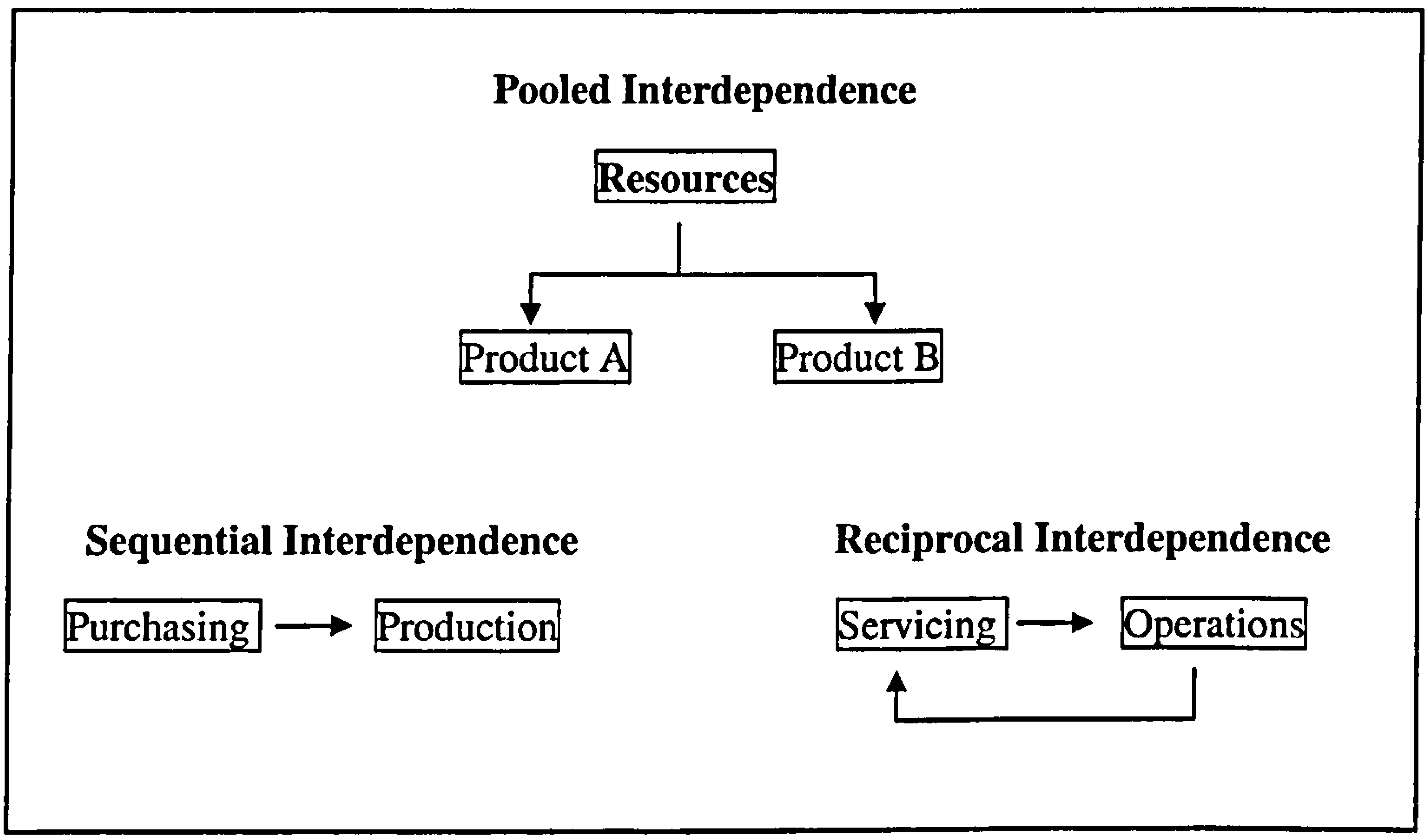

Figure 3.2 Thompson's types of interdependence
(Source: Dessler 1976, p.138).

To conclude this perspective, Woodward's (1965) empirical study is considered as a breakthrough study under this perspective. Based on the above discussion of technology as a contingency factor, it seems that technology has its greatest influence on the structure of the "operating core" or production units (Mintzberg, 1979). Thus it is most beneficial to study this factor at the organisational subunits level, for example departments or project teams. At the lower level (inter-organisational level), Pennings (1992) suggests that the technology imperative in general, and interdependence in particular, should be integrated into contingency research.

3.3.2 Environment-structure perspective

The environment comprises all factors external to the organisation. It is defined as "all elements that exist outside the boundary of the organisation and have the potential to affect all or part of the organisation" (Daft 1992, p.71). These factors encompass the economic, political, social and technological environments in which organisations must operate. It also includes the organisations' nature of products, customers, suppliers and competitors, as well as their geographical location (Mintzberg, 1979). Contingency research under this perspective has attempted to describe the impact of environment on structure and to determine those environmental factors relevant to organisational design. Environmental uncertainty has been the primary variable employed in the environment-structure research (Wood, 1979). It involves the level of change in the environment that occurs unexpectedly, such as unpredictable shifts in the economy; unexpected changes in customer demand or competitor actions or supply; rapidly changing technology and so on (Mintzberg, 1979). This variable has been also used in the literature under different labels (e.g., instability, dynamism, variability, discontinuity, and unpredictability) though having a similar meaning. The contingency literature has identified other dimensions of environment[4] that impinge on organisational structure. For example environmental complexity, heterogeneity and diversity imply almost the same meaning (Chenhall *et al.*, 1981). They are concerned with the diversity of elements facing the organisation. Organisations with a broad range of customers; or of products or services; or geographical areas in which the outputs are marketed face a complex environment. In other words, an environment is complex or heterogeneous to the extent that it requires the organisation to have a great deal of sophisticated knowledge about products, customers, or markets. Other dimensions of environment have also been referenced in the literature such as hostility, or aggressiveness to refer to the level of competition in the market, as well as the availability of resources. The most cited and influential empirical studies referred to in the literature relating to the environment-structure perspective are Burns and Stalker (1961), Lawrence and Lorsch (1967) and Khandwalla (1972; 1973).

Burns and Stalker (1961)

Burns and Stalker (1961) were the first to study the effect of environmental uncertainty on organisational structure. They studied twenty British manufacturing firms operating in the

[4] A useful discussion of these environmental dimensions may be found in Khandwalla (1977, Ch. 9).

electronics industry. Environmental uncertainty was defined in terms of the level of market and technological change. By change, Burns and Stalker (1961, p.96) mean:

> The appearance of novelties: i.e., new scientific discoveries or technical inventions, and requirements for products of a kind not previously available or demanded.

Burns and Stalker (1961, p.vii) found that:

> When novelty and unfamiliarity in both market situation and technical information become the accepted order of things, a fundamentally different kind of management system becomes appropriate from that which applies to a relatively stable commercial and technical environment.

Two types of organisation were found as being effective responses to low or high uncertainty: mechanistic and organic organisations. Table 3.2 summarises the differences between organic and mechanistic systems. The mechanistic type corresponds to Weber's (1947) bureaucratic model. It is characterised by highly specialised jobs, reliance on concentration of authority and vertical communication. This type is most appropriate for firms facing stable environment where precise responsibilities and actions can be specified. On the other hand, organic types (characterised by being less bureaucratic and less centralised structures) were found to be suitable for dynamic and uncertain environments. In other words, when changes occur frequently, organisations need to be adaptable to these changes. Communications and actions are dictated by the problem being tackled, not by charts and documents specifying clear responsibilities and functions.

Table 3.2 Mechanistic and organic organisation forms

Mechanistic	Organic
Tasks are broken down into specialised separate parts.	Employees contribute to the common task of the department.
Tasks are rigidly defined.	Tasks are adjusted and redefined through teamwork.
Strict hierarchy of authority and rules.	Less hierarchy of authority and rules.
Knowledge and control of tasks are centralised at top of organisation.	Knowledge and control of tasks are located any where in organisation.
Communication is vertical.	Communication is horizontal.

Source: Adapted from Daft (1992, p.83).

Lawrence and Lorsch (1967)

Lawrence and Lorsch (1967) presented a different and more sophisticated argument concerning the relationship between structure and environment. They studied ten firms in three different US industries - plastics (six firms), food (two firms), and containers (two firms). These industries were chosen because they faced different levels of environmental uncertainty (both in terms of technology and product change). Plastic firms face the most uncertain environment while container firms face the least. Lawrence and Lorsch found that the greater the degree of uncertainty, the greater the need of firms to differentiate their structures. By differentiation, they mean the "state of segmentation of the organisational system into subsystems". This differentiation calls for 'integration' or co-ordination of efforts among the various subsystems to attain the goals of the organisation. High levels of differentiation would impose a more difficult task of integrating or coordinating the organisation.

Lawrence and Lorsch argued and found that the most successful companies were those which matched the necessary level of differentiation with the different types of environments, and also were able to integrate the diverse departments effectively. Moreover, high performing organisations in the three industries used a different combination of devices for integrating their tasks, depending on their level of differentiation. Table 3.3 provides a comparison of the integrative devices used in the three highly performing firms.

Table 3.3 Comparison of integrative devices in three high-performing firms

	Plastic	Food	Container
Uncertainty	High	Moderate	Low
Differentiation	High	Moderate	Low
Integrative Device	Direct managerial contact, managerial hierarchy and paper work; Permanent cross-functional teams; Integrative department.	Direct managerial contact, managerial hierarchy and paper work; Temporary cross-functional teams; Individual Integrator.	Direct managerial contact managerial hierarchy and paper work.

Source: Adapted from Lawrence and Lorsch (1967, Chapter 6).

As can be noted from Table 3.3, the most effective plastic firm, which faced the highest levels of uncertainty, differentiated its structure the most and used the most detailed and sophisticated integrative mechanisms to co-ordinate its tasks. It relied not only on direct contact between managers, but also established a special department for integrating the effort among the basic functional units. In addition, it established permanent teams composed of members from various functional departments and from the integrating department for the purpose of co-ordination and problem solving. On the other hand, an effective firm in the containers industry, that operated in a relatively stable environment, differentiated its structure the least, and had the least complex integrative devices (i.e., the need for integration was less because the degree of differentiation was smaller than those in plastics industry). It relied primarily on managerial hierarchy, with some reliance on direct contact among functional managers and on paper work to integrate and co-ordinate its activities.

Finally, Table 3.3 shows that the high-performing firm in the food industry had moderate levels of uncertainty and thus a moderate level of differentiation. This firm falls between the two extremes, plastics and container firms. It has more complex formal integrative devices than the container firm, but compared to the plastics firm, it has less complex integrative devices. In addition to managerial hierarchy, it relied on paper work and direct managerial contact (which the other two firms also employed). It also relied to some extent on temporary integrative teams when problems arise as well as assigning integrative roles for functional managers within their departments.

<u>Khandwalla (1972)</u>

Although environmental uncertainty has been the primary variable investigated by researchers within the environment-structure perspective, the extent of competition has also been considered. Khandwalla (1972) investigated the relationship between competition and the design and use of management control systems (considered as one of the most important integrative devices in organisations). Khandwalla (1972) investigated the effect of the three types of competition (price, marketing, and product) on accounting information and control systems in 92 US manufacturing companies. His main findings were that intense price competition may not require the firm to have sophisticated control system[5], but intense product competition requires sophisticated control systems. In an attempt to explain the findings of his earlier study, Khandwalla (1973) investigated 96 US manufacturing firms, by means of a cross-sectional analysis of questionnaire data. In this study, he broadened the definition of MCS to include the use of sophisticated accounting controls, the decentralisation of authority, and the selectivity in the employment of each of these two control mechanisms

[5] The sophistication of management control systems was obtained by adding up and averaging the ratings of 9 accounting controls assessed by presidents' ratings on anchored 7-point scale.

(i.e., investigated the trade off between accounting controls and decentralisation of authority). Building on Lawrence and Lorsch (1967) findings, Khandwalla (1973, pp. 285-286) argues that:

> Competition represents turbulence, stress, risk and uncertainty. It imposes on the organisation a seemingly conflicting set of demands...the need for differentiated, creative, flexible responses implies a degree of organisational differentiation and decentralisation. The need to respond rapidly and predictably to crises implies a high degree of organisational integration and co-ordination.

In other words, the organisation must be creative in responding to competitive pressures by having more delegation of authority (decentralisation) while maintaining control to ensure that the organisation responds effectively by employing sophisticated management controls. Khandwalla found that product competition was positively related to both delegations of authority and accounting controls[6]. An organisation facing intense product competition, Khandwalla suggests, is likely to have organic decentralised structures rather than bureaucratic ones, and to be performance or output oriented rather than rules and procedures oriented. In contrast, there was no significant relationship between price competition and the delegation of authority or the use of sophisticated accounting controls. However, there was a significant relationship between price competition and the degree of selectivity in the use of management controls. Khandwalla did not provide any plausible explanation of this finding, but he suggested that organisations facing price competition are more concerned about reducing their costs and maintaining their profitability. Thus, they are more likely to have mass production systems and less research and development activities as a way to reduce their costs. They are also more likely to have less differentiation (delegation of authority) and to have bureaucratic structures. Thus, they would rely on standardisation of work to control and coordinate their activities rather than on sophisticated accounting controls that requires a costly professional integrative department to employ them.

To conclude discussion on this perspective, Figure 3.3 summarises the main themes about environment-structure relationships discussed earlier. Effective organisations facing high levels of environmental uncertainty are associated with those that have flexible organic structures and systems rather than the rigid bureaucratic or mechanistic structures. They are

[6] Khandwalla (1973) argues that accounting controls represent primarily an integrative device, while delegation is primarily a device that facilitates organisational differentiation. He considers the relationship between these two as complimentary; the more controls a company uses, the more decentralisation it can afford, and vice versa.

expected to have high levels of differentiation and decentralisation to facilitate creativity and adaptability, but at the same time, they need high levels of integration to maintain internal coordination and control between their various activities and tasks.

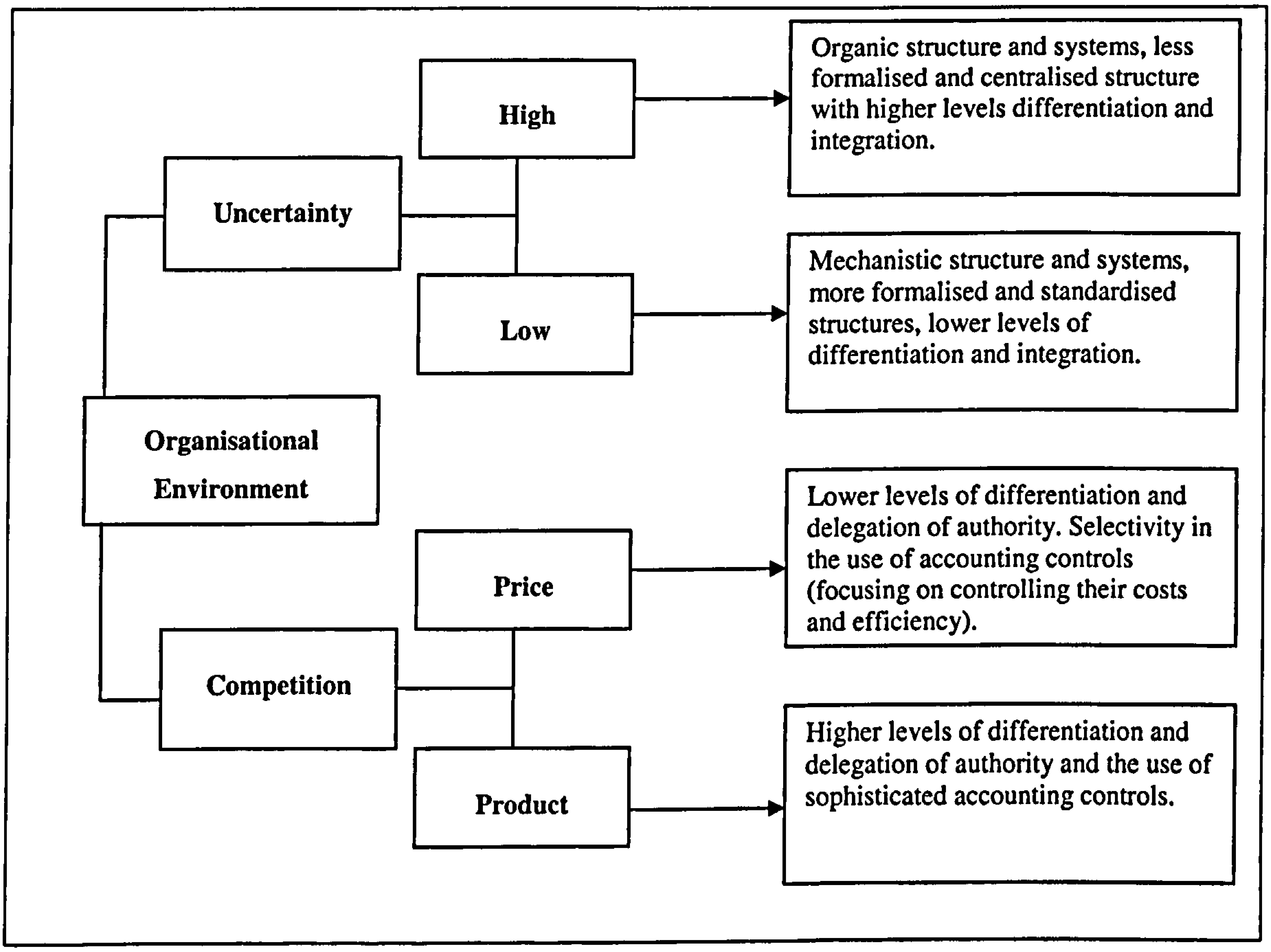

Figure 3.3 Relationships between environment and organisational structure

In addition, organisations facing high levels of product competition require similar structures to those facing uncertain environments (Khandwalla, 1973). These organisations require a high level of flexibility and creativity (through differentiation and delegation of authority), and a high order of internal control and co-ordination (through the use of sophisticated accounting controls). Conversely, organisations facing price competition require similar structures as those facing stable environments. Effective organisations facing stable environments are found to be those with bureaucratic and mechanistic structures with less differentiated and less decentralised structures. These organisations also require fewer integrative devices than those facing uncertain environments. Thus in stable environment, organisations are able to attain coordination and control through standardised rules and centralised decision-making. As the environment becomes more unpredictable, decentralised decision making and the reliance on more sophisticated control mechanisms become more important.

3.3.3 Size-structure perspective

Other studies have argued that in addition to the external environment and technology, organisation design should be consistent with the internal characteristics of the organisation. The work of the Aston group[7], started in the 1960s and led by Derek Pugh, provided the foundation for the size imperative. This work, attempted to relate various dimensions of organisational structure to a wide range of contingent variables, which included, in addition to size and technology, factors such as origins, history, ownership and control, location, resources, and dependence of sub-units on a parent body (Pugh *et al.*, 1968; 1969). The work continued into the 1970s with a number of studies intended to replicate the early findings, and to refine the methodological techniques used. This work is summarised at length in Pugh *et al.* (1976a; 1976b; 1977).

The Aston researchers put forward a view of the structure of organisations as composed of two distinct elements, 'structuring of activities' and 'concentration of authority'[8]. These elements respectively emphasise the specialised and procedural control of behaviour, and the distribution of authority. The Aston group found a significant relationship between size and their structuring of activities variable. They found that the larger the firm, the more likely its employees are to work in very specialised functions, following standardised procedures and formalised documentation (it will have many of the characteristics of bureaucracy). However, they found no significant relationship between organisational size and the extent to which authority over decision-making was concentrated (i.e., centralised). They also found centralisation as negatively related to specialisation[9] (Pugh *et al.*, 1976a). They reported that an environmentally oriented variable was the strongest predictor of their concentration of authority factor (that is the greater the dependence of the organisation on its environment, the

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[7] The Aston group included several researchers such as John Child; David Hickson; Bob Hinings; Roy Payne and Diana Pheysey (Pugh and Hickson, 1996).

[8] These concepts reflect dominant views about bureaucratisation and how to manage. Structuring of activities refers to the combined measures of specialisation, standardisation and formalisation (i.e., levels of bureaucratisation), while concentration of authority refers to centralisation of decision making and the autonomy of an organisation's decision- making from any owing organisation (Pugh *et al.*, 1996).

[9] Lawrence and Lorsch differentiation concept is related to division of labour or specialisation. The greater the division of labour (job specialisation) the greater the differentiation (Mintzberg, 1979).

greater the centralisation of authority). In other words, organisations which are dependent on other organisations by virtue of ownership ties, or economic integration will centralise many decisions concerned with finance and purchasing (Pugh *et al.*, 1976b).
Moreover, the Aston researchers replicated Woodward's study and found that the relationships between technology and structural dimensions in manufacturing organisations were very small and that technology plays a secondary role relative to other contextual features such as size and interdependence with other organisations (e.g., owning group, customers, suppliers). They specifically rejected what they called Woodward's 'technological imperative', arguing that the firms in Woodward's sample were mostly small, with the result that all their activities were close to the operating core and therefore influenced by its technical system. Thus, Pugh (1973, p.33) concluded "away from the shop floor, technology appears to have little influence on organisational structure."

The Aston work provides support for the importance of size and environment in explaining several dimensions of organisational structures. Child (1975) found that successful companies (in terms of growth of sales) operating in variable or uncertain environments need to be adaptable to changes in the environment, thus having lower structuring of activities than less successful firms. High and low performing firms operating in stable environments showed no significant differences in their structures. On the other hand Child found that large successful companies have higher structuring of activities scores than less successful ones. For smaller companies there were no significant differences between successful and less successful firms. These findings, Child argues, raised a question of how large organisation operating in uncertain environment design their structures. In other words how would organisations deal with multiple contingencies, which have opposite effects when designing their structures. Child investigated this matter and found that in stable environments, firms adapted their structures to be consistent with their large size. Successful large firms tend to structure their activities and delegate authority more than low performers or less successful firms. In contrast with uncertain environments, there were no significant differences between successful and less successful large firms' structures. In a similar vein, Mintzberg (1979, p.287) synthesised previous research and suggests that:

> The environmental variables can have a profound effect on structure, often overriding those of age, size, and technical system. Thus, while the other factors may be paramount in stable environments, dynamic or uncertain environments seem to drive the structure to an organic state no matter what its age, size or technical system.

To conclude the main findings from the Aston work, size was found to be positively related to structuring of activities (specialisation, formalisation and standardisation), and negatively related to concentration of authority (centralisation). Moreover, there was a strong relationship between the conceptual dimension of dependence (i.e., on owning group, customers, and suppliers, etc.) with the concentration of authority (that is the greater the dependence of the organisation on its environment, the greater the centralisation of decision making, particularly for finance and purchasing decisions).

3.4 Themes and key concepts in the contingency theory

The results of early contingency work (Burns and Stalker, 1961; Woodward, 1965; and Lawrence and Lorsch, 1967) have resulted in a wide acceptance of contingency theory. However, later studies based on the contingency approach have produced divergent results (Tosi and Slocum, 1984; Kraft, Puia and Hage, 1995). Several interrelated problems with contingency theory that have caused much of the confusion in the empirical findings of contingency research have been suggested in the literature (Mintzberg, 1979; Schoonhoven, 1981; Tosi and Slocum, 1984; Drazin and Van de Ven, 1985; Gresov, 1989; Kraft *et al.*, 1995). Most problems of the contingency research, according to Tosi and Slocum (1984), can be summarised and resolved by understanding the key issues and notions of contingency approach. Simply stated, the contingency theory maintains that organisational performance or effectiveness depends on the level of fit or alignment between two or more factors. Thus, 'organisational effectiveness' and 'fit' are two key issues or concepts that need to be emphasised and understood by researchers adopting the contingency approach in order to produce stronger research findings (Tosi and Slocum, 1984).

3.4.1 Organisational effectiveness

Organisational effectiveness or performance has been presented as a necessary dependent variable in contingency research as it provides the means for determining the appropriate fit between the organisational design and its context. According to Pennings (1992, pp.274-275) "the theoretical and pragmatic relevance of the structural contingency theory is anchored in its presumed ability to explain the question about organisational effectiveness." Pennings concludes that "research without effectiveness does not inform us about variable levels of performance". Many contingency theory researchers have neglected the key concept of organisational effectiveness in their research design, which has led to inconsistency of their research findings (Pennings, 1992; Kraft *et al.*, 1995). These researchers view effectiveness broadly in terms of organisational adaptation and survival. In other words they consider context-structure relationship only exists in surviving organisations (Tosi and Slocum, 1984; Drazin and Van de Ven, 1985). However, Tosi and Slocum (1984, p.11) argue that "adaptation, as a construct, does not speak to the issue of the organisations' level of effectiveness."

Other contingency studies, which have included effectiveness or performance in their research design, have been criticised for measuring effectiveness narrowly. For example, early contingency empirical research (e.g., Lawrence and Lorsch, 1967), examined the relationship between structure and organisational effectiveness or performance, typically by comparing the structures of high and low profit business firms (Mintzberg, 1979). However, it has been argued that defining organisational effectiveness to mean only profitability is too narrow because effectiveness is multidimensional, and other performance criteria (such as market share, morale, growth, flexibility, efficiency, quality) exist which may be more appropriate than profit (Merchant and Simons, 1986).

Tosi and Slocum (1984) contend that at least three dimensions to measure effectiveness have been used in contingency research: efficiency (i.e., profitability), preference of organisational members (i.e., job satisfaction), and general social dimension (being a good citizen). These dimensions of effectiveness may oppose one another and tradeoffs between them are likely to exist. Thus, judging the effectiveness of any organisation ultimately involves individual values. The multidimensional approach to the assessment of effectiveness, as opposed to taking only one dimension, of say profitability, could itself be criticised as being arbitrary. Organisational effectiveness or performance has proved to be problematic to operationalise, and in whatever perspective it is placed, an adequate definition is not available (Child, 1972; Merchant and Simon, 1986). There is no algorithm available that is able to identify one criterion for assessing effectiveness as being inherently better than another. Therefore, the crucial point, as Cameron and Whetten (1983) suggest, is to make explicit the viewpoints from which effectiveness is assessed, and in this way avoid confusion and ambiguity about what is meant by effectiveness.

3.4.2 The concept of fit in the contingency theory

Drazin and Van de Ven (1985) consider the key concept in contingency theory is 'fit', and argue that the definition of fit that is adopted is crucial not only to the contingency theory, but also to the collection of data and the statistical analysis of propositions. Thus understanding the concept of fit should lead to more consistent research results and clarifies much of the confusion in contingency research (Schoonhoven, 1981; Drazin and Van de Ven, 1985; Venkatraman, 1989). Van de Ven and Drazin (1985) provide an excellent explanation of fit. They argue that conceptions of fit fall into one of three approaches: selection, interaction and systems. Each approach significantly alters the meaning of contingency theory and the expected empirical results. Drazin and Van de Ven (1985, p.522) further argue that the three approaches to fit (i.e. selection, interaction and systems) "are not mutually exclusive and can provide both unique and complementary information on the fit in a researchers data". They conclude that examining multiple approaches to fit in contingency studies help in solving the confusion in contingency theory literature and yield more insightful results. However, Venkatraman (1989, pp.440-441) contends:

> Philosophically, this recommendation is fine, but before researchers use multiple perspectives within a single study, they should evaluate both the appropriateness of each perspective and the design for collecting data.

3.4.2.1 The selection approach

This approach maintains that organisations must adapt to their context in order to survive. It assumes that only context-structure relationship need to be examined to assess fit, because such a relationship is presumed to exist in only surviving firms (Van de Ven and Drazin, 1985). Stated differently, fit is theoretically defined as a match between two related variables without reference to performance or effectiveness (Venkatraman, 1989). For example researchers simply hypothesise that organisations operating in uncertain environments require organic structures. This approach is empirically the most common in the contingency literature for its simplicity. However, Pennings (1987 and 1992) asserts that such simple associations between contextual and organisational variables do not differentiate between different types of effectiveness, the main premise in contingency theory. Drazin and Van de Ven (1985, p.517) assert that "it is unclear whether to conclude that this research did not address contingency theory or to conclude that contingency theory operated as untested assumptions underlying this organisational context-structure research." Drazin and Van de Ven further argue that a contingency proposition is more complex, and assumes that interaction exists between two sets of variables, which predicts effectiveness. This is explicitly recognised by Lazarsfeld (1968, cited in Pennings, 1987) who equates 'contingent' with 'interactive'. In a similar vein, Schoonhoven (1981) argues that researchers following this approach are implicitly stating that an interaction exists between two variables (e.g., environment and structure), but this interactive relationship is not acknowledged or tested. Schoonhoven (1981, p.351) suggests that "explicit recognition should be given to the fact that contingency arguments produce interactive propositions."

3.4.2.2 The interaction approach

This approach explicitly examines performance via the interaction effects of pairs of variables. In other words it tests for the effect of fit between the contingent variable and the organisational variable on performance. The focus here is not so much on understanding the congruence between context and structure as in selection approach but rather on the implications of fit on performance (Drazin and Van de Ven, 1985). Thus the fit between context and organisational variables is explicitly hypothesised to affect performance. For example, it suggests that organisations operating with low environmental uncertainty will perform better using mechanical or highly formalised structures. In this case environment uncertainty is the predictor, performance is the dependent variable, and structure is a moderating variable. However, mixed results and different interpretations for theoretical propositions are expected under this approach if these propositions are not stated clearly (Schoonhoven, 1981).

Thus far, these two approaches to fit (selection and interaction) are appropriate for specifying "bivariate fit". They tend to focus on how a single contextual factor affects a single structural characteristic, and how these pairs of context and structure variables interact to explain performance (Drazin and Van de Ven, 1985). In contrast, the following approach (systems) is appropriate for multivariate fit. It simultaneously specifies and tests fit among a larger set of variables.

3.4.2.3 The systems approach

The systems approach:

> Emphasises the need to adopt multivariate analysis to examine patterns of consistency among dimensions of organisational context, structure, and performance" (Drazin and Van de Ven, 1985, p.520).

Proponents of this approach argue that the strength of this approach lies in its ability to address several questions that go unanswered using bivariate approaches to fit (Miller, 1981;

Drazin and Van de Ven, 1985; Miller, 1987 and 1992; Galunic and Eisenhardt, 1994; Gresove and Drazin, 1997). As Child (1975, p.175) remarked:

> What happens when a configuration of different contingencies are found, each having distinctive implications for organisational design?

This approach maintains that two basic choices confront the organisational designer. One is to select the organisational structure and processes that match the set of contingencies facing the firm. The other is to develop structures and processes that are internally consistent (Drazin and Van de Ven, 1985). Drazin and Van de Ven (1985) adopted this approach by studying the effect of single contextual variable on multiple structural variables and processes, and emphasised the need to consider multiple contextual variables, multiple structural variables and multiple performance variables in future contingency research.

In addition, the systems approach to fit takes into consideration the concept of 'equifinality'. Equifinality implies that strategic choice (Child, 1972) or flexibility is available to organisation designers to approach a design problem or management issue (Hrebiniak, 1978). According to Govindarajan (1988, p.847) instead of assuming a deterministic relationship between context and structure, proponents of equifinality approach argue that multiple design alternatives may exist to respond to contextual variable. For example, Govindarajan suggests that "elements of control systems, and elements of structure could be used as substitutes for one another to effectively implement any given strategy". Gresov and Drazin, (1997, p.403) also argue that the concept of equifinality has arisen as one way to explain the absence of contingency theory findings, and can contribute to an expanded and enriched view of contingency theory. Equifinality means that organisational effectiveness "can be achieved through multiple different organisational structures even if the contingencies the organisation faces are the same".

3.5 Summary

This chapter has reviewed the pioneering early studies on structural contingency theory that laid the foundations to the contingency approach (i.e., Burns and Stalker, 1961; Woodward, 1965; Lawrence and Lorsch, 1967). These pioneering studies have led to the widespread adoption of the contingency approach by scholars and researchers from various research streams including organisational theory, strategic management and management accounting.

The strength of the contingency approach was found to lie in themes of 'effectiveness' and 'fit', and much of the confusion in the findings of subsequent contingency research in general was attributed to the tendency of researchers to neglect these two concepts when designing their research models. Thus, paying a closer attention towards understanding these two concepts by researchers adopting the contingency approach would provide stronger research findings and would explain much of the confusion of earlier contingency research.

CHAPTER 4

THE CONTINGENCY THEORY OF MANAGEMENT ACCOUNTING AND CONTROL SYSTEMS

CHAPTER 4

The Contingency Theory of Management Accounting and Control Systems

4.1 Introduction

This chapter aims to review the literature on management accounting and control contingency theory, and seeks to evaluate this literature based on the main themes and tenets of the contingency theory discussed in the previous chapter. To recall, the previous chapter concluded that in order to resolve much of the confusion in the findings of many contingency studies, contingency researchers must understand and address two important themes or concepts in their research design. These are the concepts of fit (bivariate and multivariate) and organisational effectiveness.

This chapter is structured as follows: Section 4.2 provides an overview of management accounting and control contingency theory, and reviews the main pioneering studies that contributed to its development. This is followed by Section 4.3, which introduces the general categories of the contingent variables used in MC contingency studies and identifies the contingent variables that will be used for this research. Sections 4.4 and 4.5 review MC empirical contingency research concerned with investigating the relationships between the contextual variables and MCS design. Finally, Section 4.6 provides a summary and some concluding remarks.

4.2 An overview of the contingency theory of management accounting

As discussed in Chapter 3, the rationale of organisational contingency theory is that universal prescriptions are inadequate because different organisations face different situations and circumstances. Thus, it is expected that different organisations will have different organisational design and processes. Similarly, the contingency theory of management accounting, which is mainly concerned with control systems design, implies that there is no universally best MCS that applies to all situations (Merchant, 1998). It attempts to fit accounting and control system to a particular situation, and seeks to identify the circumstances under which specific MCS features (e.g., orientation,) and mechanisms (e.g., budgeting systems) are appropriate (Chastain, 1979; Otley, 1980). Figure 4.1 represents a general MC contingency framework whereby situational or contingent factors influence the choice and design of MCS "package" and the correct match between these factors and management control "package" will enhance the possibility that the desired outcomes and performance will be achieved (Fisher, 1995).

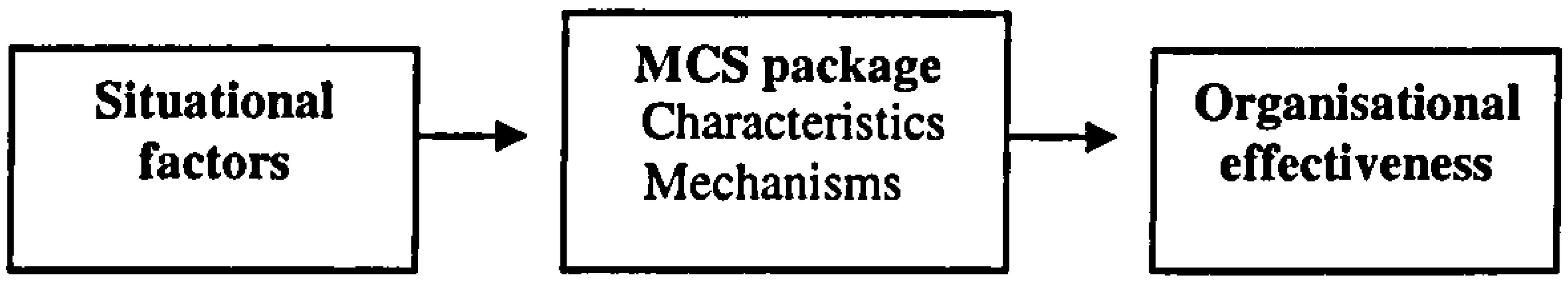

Figure 4.1 A General MC Contingency Framework

4.2.1 Early management accounting and control contingency studies

It was not until the middle and late 1970s that accounting researchers began to apply the contingency approach to the subject of management accounting and control systems (Parker, 1986). Drawing off the understandings of the contingency theories of organisational structure, several streams of contingency studies have been conducted in the area of management accounting and control systems. Chapman (1997) comments on these streams of contingency studies and contends that on the basis of Hopwood (1972) and Otley (1978) findings, discussed earlier in Chapter 2, one stream of studies (e.g., Hirst, 1981 and 1983; Brownell, 1985; Govindarajan, 1984) was concerned with the relationship between the specific notion of accounting as a tool for organisational control and its relationship with uncertainty. These studies were mainly concerned with the use of MCS and specifically the impact of superiors' reliance on accounting performance measures. Another stream of theoretical and empirical contingency studies, which this research will follow, sought to address the contingent nature of accounting systems and how these systems might be affected by a variety of contingent variables (Hopwood, 1989; Chapman, 1997). This stream of contingency studies sought to address the contingent nature of accounting within a broader context, and included, amongst others, the work of Bruns and Waterhouse (1975), Gordon and Miller (1976) and Waterhouse and Tiessen (1978).

Although most early contingency studies in the area of management accounting and control systems were of a theoretical nature, they provided the foundations and impetus for adopting the contingency approach in later empirical studies (Parker, 1986; Chapman, 1997). However, before proceeding with reviewing these early MC contingency studies, it should be emphasised that they have focused mainly on management accounting control systems as the major control mechanism within the overall MCS (Drury 2000). It should also be noted that different terms have been used in this literature to represent the MCS. The terms accounting information systems[1] (AIS), management accounting information systems (MAIS), management accounting control systems (MACS) and management control systems (MCS) are widely used in the literature. In order to conform to approaches adopted in the literature, these terms will be used interchangeably throughout the chapter. The following provide a brief review of the early pioneering studies of the contingency theory of management accounting and control systems.

4.2.1.1 Bruns and Waterhouse (1975)

Bruns and Waterhouse (1975) empirically investigated the relationships between organisation structure and budget related behaviour. Data was collected via administering a questionnaire survey to divisional managers in 25 US manufacturing and service organisations. Organisation structure was viewed as a source of control, and defined in terms of the Aston measures: structuring of activities and concentration of authority. According to Bruns and Waterhouse there are two alternative strategies of structural control. One is to control by decentralisation but with structuring of activities, which they labelled administrative control. The other alternative strategy of control is to centralise authority at higher levels within organisation, in this case control is interpersonal[2]. They contend that the choice between the two alternative strategies of control is limited by the context in which the organisation operates. The contextual variables considered are size and technology. They further argue that these two alternative control strategies tend to elicit particular types of budget related behaviour. However, no link was made between the contextual variables and budget related behaviour.

Bruns and Waterhouse argued and found that administrative control strategy is appropriate for large organisations with routine and standardised activities. Work related behaviour is controlled by

[1] AISs serve different users (internal managers, external users, and taxing authorities), and different purposes (planning and control, investment and credit, and tax liability). This research is mainly concerned with AIS related to planning and control aspects provided by management accounting systems.

[2] Structural control strategies were emphasised by Child (1972 and 1977), and were discussed earlier in Chapter 2.

formalised and standardised operating procedures. Managers participate in setting budgetary goals and spend more time on budgetary activities, thus they tend to perceive themselves and others as having more control. Moreover, they found that structuring of activities is negatively correlated with innovation and flexibility factors. On the other hand, Bruns and Waterhouse argue that interpersonal control strategy is found in organisations which are small or dependent on other organisations. They found that as the organisation becomes centralised and less autonomous, organisation's control system becomes less complex. Managers are held accountable for fewer financial variables, and spend less time working with superiors on budget planning, thus, they view budgets as less useful and limiting their flexibility and innovation.

4.2.1.2 Waterhouse and Tiessen (1978)

Waterhouse and Tiessen (1978) provided a significant contribution to the development of contingency theory in accounting and control literature. They stress that the essential argument in the contingency theory of management accounting is that the organisation structure is largely dependent upon its context, and the effectiveness of MAS design is contingent upon organisation structure. Thus, they suggested a model for contingency research on MAS design, which is mainly concerned with understanding possible relationships between organisational structure and the effective design of MAS. This model is illustrated in Figure 4.2. Waterhouse and Tiessen's (1978, p.101) acknowledge that MASs are only one type of control mechanism available in organisations, and that structural dimensions of authority concentration and structuring of activities are related to organisational control strategy. They contend that considering these two structural dimensions when designing MAS would answer many questions not possible to answer if they were neglected, such as:

> How important are MAS control systems relative to other means of exercising management control?
> What properties of the organisation or its environment increase the reliance placed on formal MAS control systems?

Waterhouse and Tiessen's theoretical study has focused on two contextual factors, technology and environment. They argue that organisations operating in certain environments with routine technologies are expected to exercise effective control by means of procedure specification and centralised authority. From this, they derive the likely impact on MAS design. According to

Waterhouse and Tiessen, plans stated either in the form of budgets or specified procedures are a means of co-ordinating activities within organisations. They hypothesise that planning through specification will decrease reliance on planning through budgeting process. Faced with routine technologies and/or certain environment, organisations rely on procedure specification as an efficient planning mechanism because procedures predetermine activities and sub-goals for long time periods.

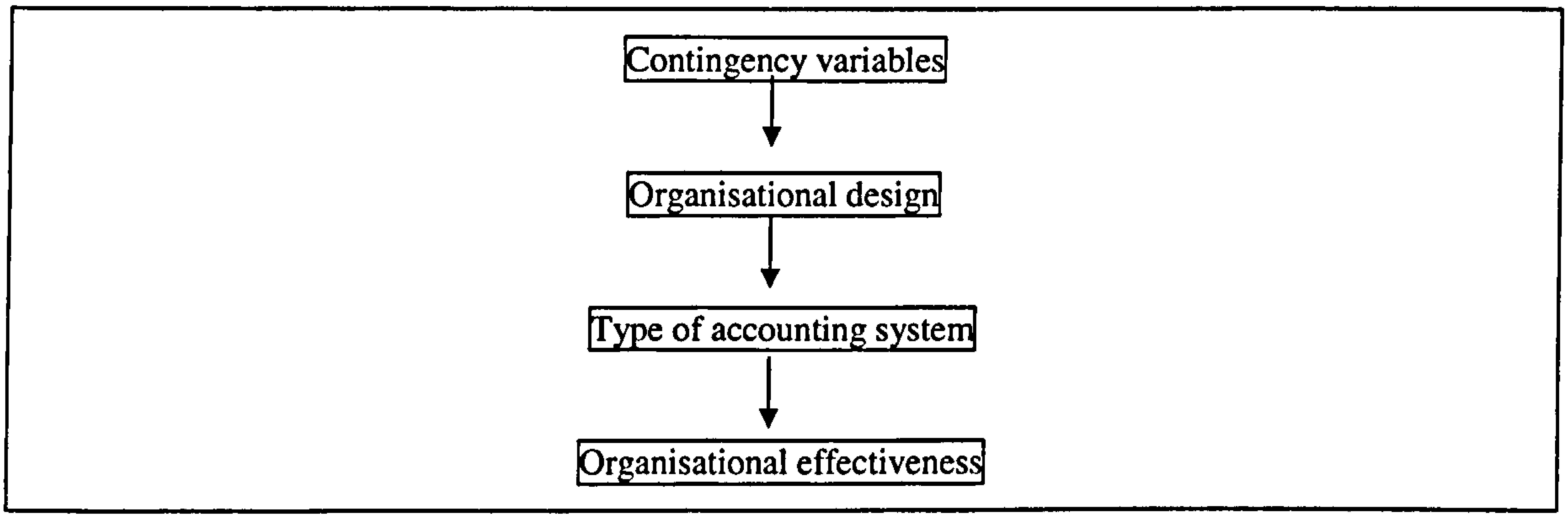

Figure 4.2 Waterhouse and Tiessen's model for contingency research on MAS design.
(Source: adapted from Otley, 1980, p.93).

Moreover they suggest that since procedure specification imply that the knowledge base for operating or managing decisions is known to centralised decision-makers, the planning process tends to be non-participatory.

In contrast, in organisations facing uncertain environments and/or using non-routine technologies, procedures are difficult to specify and document. Thus, under such conditions direct control measures which specify procedures and then evaluate performance in terms of adherence to those procedures are not possible. Control will focus to a large degree on planning and internal resource allocation, on monitoring outputs and on selection and socialisation of employees. Moreover, they suggest that decentralised decision making and extensive reliance on budgeting process as an efficient planning mechanism becomes apparent. Furthermore, planning through budgeting is expected to be participatory, broader and less specified than planning through specified procedures. They further emphasise the importance of organisational adaptiveness and response times in organisations faced with unpredictable and changing environments. They suggest that as uncertainties increase, the organisation will rely more on the budgeting process rather than on long term and fixed procedure specification, that would decrease organisational responsiveness. Thus, according to Waterhouse and Teissen, budget flexibility and budget revision are considered as important organisational responses to environmental uncertainty.

4.2.1.3 Gordon and Miller (1976)

Gordon and Miller's (1976) theoretical study is another contribution to the development of management accounting contingency theory. They provided a contingency framework for designing accounting information systems which takes into account the environment, structure and managerial decision making style as contingent variables which have implications upon AIS design. Similar to Mintzberg's (1979) theoretical work discussed earlier in Chapter 3, the environment was studied in terms of level of dynamism, heterogeneity, and hostility. They argued that as environmental dynamism increases, historic and financial information alone become insufficient to inform managers of important trends before they become crises. Thus, effective AIS should incorporate more forecast and non-financial information, such as information on competitor actions or changes in consumers' tastes. Moreover, they argue that a dynamic environment requires an increase in the frequency of feedback. They also argue that decentralised or differentiated organisations require more decentralised (as opposed to centralised) accounting systems since various divisions and business units may operate in different environments that require different AIS to cope with these environments.

Gordon and Miller further suggested that there are three archetypes of organisations, which represent typical combinations of environmental, organisational, and decision style traits, that are expected to need different AIS. The three archetypes are adaptive, running blind, and stagnant bureaucracy. The adaptive firm faces dynamic and simple (homogeneous) environments that require the flexibility of organic structures to respond to changes in the environment, however authority can remain centralised. Gordon and Miller argue that centralised rather than decentralised AIS seems to be appropriate since differentiation is low and the same types of information can be used in all divisions. Moreover, they hypothesised that as environmental dynamism increases the importance of non-financial information, as well as financial information in tracking the environment, also increases. They further suggested that timely information with broad and low levels of details such as those provided by budgets rather than procedures and rules are required.

The running blind firm operates in a dynamic and complex environment which requires decentralised and flexible organic structures. Differentiation is high and separate, and sometimes conflicting, objectives seem to be pursued by the various organisational sub-units. Gordon and Miller argue that the high degree of organisational differentiation and the absence of effective integrative measures make necessary the employment of coordinative mechanisms in the AIS. Thus they hypothesised that a well designed cost accounting and control system should be set to eliminate the ill effects of pursuing divisional rather than organisational objectives, without providing an apparent solution.

Finally, the stagnant bureaucracy firm operates in a stable and homogeneous environment. Organisational differentiation is very low and direct supervision and rigid rules and programs are the main integrative mechanisms. Gordon and Miller expected that the information and intelligence system of these firms to be inadequate since the external environment is rarely scanned for recent changes or opportunities. Thus, they argued that the main role of the AIS in these firms should be to make the enterprise more responsive to any changes in the environment that would disturb its operations. Thus, the AIS should be directed towards gathering information on external factors such as new products and trends in the market share.

4.2.1.4 Amigoni (1978)

Amigoni (1978) developed another theoretical framework for designing management control systems, which is related to organisational environment without explicitly considering the organisational structure. Amigoni's classification of organisational environment is consistent with Duncan's (1972) classification, which distinguishes between the internal environment and the external environment. Amigoni argues that as environmental dynamism and uncertainty increases, MCS must provide more information on future events (forecast and non-financial information) with a higher degree of quickness. This is consistent with Gordon and Miller's (1976) arguments. However, Amigoni further suggests that as the environment becomes more stable, the style of control changes from tight to loose. In other words, Amigoni implicitly suggests that in uncertain and highly changing environment, participation in setting budgetary targets is low. Managers must consider the imposed targets as firm commitments, and performance evaluation is oriented to accounting measures. In contrast with stable environments, targets are considered to be only reference points and managers are evaluated on the basis of multiple factors.

4.2.2 Synthesis of early MC contingency studies

It can be argued that these early theoretical contingency studies were mainly concerned with the implications of uncertainty deriving from the environment and technology for organisation structure and hence accounting systems. They suggest that organisations operating in uncertain and changing environments with non-routine technologies require organic and decentralised structures (Gordon and Miller, 1976; Waterhouse and Tiessen, 1978). In these situations, the lack of integrative devices imposed through organisation structure (by means of centralisation or activity structuring) means that there would be greater reliance on accounting control systems to achieve integration and co-ordination in these organisations. Thus, it is expected that a well designed and complex ACS will be found in these organisations (Gordon and Miller, 1976; Amigoni, 1978; Waterhouse and Tiessen, 1978). Moreover, uncertainty requires organisations to be adaptive and responsive to external opportunities and threats. Thus, these studies suggest that effective MCS must provide more non-financial and more future oriented information on a timely and frequent bases, so that decision makers are able to respond before it is too late. Conversely, in a certain and stable environment organisations with routine and standardised activities would rely more on direct supervision and rigid rules and procedures for integration and co-ordination and less on ACS.

Otley (1980) reviewed the development and content of early contingency theories of management accounting and commented that they were based on inadequate and insufficiently articulated frameworks. He concluded that this was mainly due to neglecting organisational effectiveness, organisational structure or both. Otley also criticised these frameworks on the basis that the contingent variables are hypothesised to effect the structure of an organisation not the AIS design. According to Otley (1980, p.102):

> As the same contingent variables are likely to affect both organisational structure and accounting system design, it appears unwise to use structure as the sole intervening variable between contingent variables and the choice of the accounting information system.

Otley further recognised the need to evaluate AIS in their wider managerial, organisational and environmental context, and that an organisational control package can only be evaluated as a whole including AIS design, organisational design, and any other control mechanisms available in organisations.

There is a debate in the literature regarding the relationship between organisational structure and MCS design (Machin, 1983). Many accounting scholars (e.g. Anthony, 1965; Horngren, 1972; Waterhouse and Tiessen, 1978; Merchant, 1981) view structure as given and designed before the AIS. Thus, they view AIS design as dependent on organisation structure. Others (e.g. Gordon and Miller, 1976; Otley, 1980) view organisational structure and AIS as complementary control strategies often designed simultaneously and sometimes independently to cope with environmental uncertainty. Thus, as Machin (1983, p.24) concludes, researchers have "a choice between: Structure-dependent systems; structure-linked systems; and systems independent of structure." However, though Machin emphasised the importance of these choices, he did not specify which choice is more suitable for the future research in management control systems design. The three choices have been applied in management accounting contingency research to some extent or another.

4.3 General categories of the contingent variables suggested in MC contingency literature

The significance of the early MC contingency studies lies in the fact that they provided the foundations and impetus for researchers to employ the contingency approach in the area of accounting (see Otley, 1980 and Hopwood, 1989 for a comprehensive review of this literature). Subsequently, several empirical contingency studies were conducted by accounting researchers, partly to test the validity of these theoretical findings, and to investigate the implications of other contingent variables on management accounting and control systems design. Various contingent variables, which are expected to influence the design and choice of MCS, have been suggested in the literature of management accounting and control contingency theory. According to Merchant (1998, p.727) "because the range of organisational settings is huge, literally thousands of sometimes-relevant contingent variables exist."

The general contingent variables that were recognised in the contingency literature of management accounting and control systems can be classified into four broad categories: The external environment variables, technology variables, organisational and personality variables, and strategy and mission variables. Each of these contingent variables is expected to influence the design and choices of the MC "package" implemented by the organisation (Merchant, 1998). Table 4.1 lists the main contingent variables suggested in MC contingency research. However, it should be noted that the list is not exhaustive since not all contingent variables can be identified.

Table 4.1 The contingency variables classified by major categories

The External Environment Variables
- Environmental uncertainty
- Environmental complexity
- Intensity of competition

The Technology and Interdependence Variables
- Level of technological complexity (unit, mass, and process production)
- Production routineness and programmability variables
- Level of interdependence (pooled, sequential, reciprocal)

The Organisational and Industry Variables
- Organisation size
- Organisation structure
- Organisation culture
- Management style
- Industry variables

The Strategy and Mission Variables
- Diversification (corporate) strategy (related and unrelated diversification)
- Business (competitive) strategy (low cost-differentiation, defender-prospector)
- Operational (manufacturing) strategy
- Strategic mission (build, hold, harvest, and divest)

Source: Adapted from Merchant (1998, p.729) and Drury (2000, p.649).

The first category of contingent variables listed in Table 4.1 relates to the external environment. The contingency theory literature has regarded the external environment as the primary source of constraint upon the organisational design in general and MCS design in particular (Child, 1972; Otley, 1999). The contingent variables listed under this category are mainly concerned with the level of environmental uncertainty (Fisher, 1995; Drury, 2000). To recall from the discussion in section 3.2.2, uncertainty involves the level of change in the environment that occurs unexpectedly, such as unpredictable shifts in the economy; rapidly changing technology; unexpected changes in customer demand or competitor actions or supply; and so on (Mintzberg, 1979). Given that environmental uncertainty represents one of the major contingent factors addressed by this research, the major studies relating to environmental uncertainty and MCS design will be examined in the next section.

The second category of contingent variables shown in Table 4.1 relates to the internal or task environment. This category consists of variables, concerned with technology and interdependence. These variables were developed by Woodward (1965), Perrow (1967) and Thompson (1967) and were discussed in Chapter 3 in relation to structural contingency theory. As the literature indicates that technology contributes to the uncertainty with which the organisation must cope (Pennings, 1992), this research will consider technology under environmental uncertainty variable.

The third category of contingent variables is concerned with organisational and industry variables, such as organisation size, structure, culture, and leadership style. According to Fisher (1995) MCSs differ depending on firm's industry. For example, Drury (2000) argues that manufacturing firms are expected to design their control systems differently than non-manufacturing firms. In manufacturing industry, it is most probable that the knowledge of transformation process is clearer than in non-manufacturing industry. The organisational contingency theory discussed in the previous chapter, as well as most of MC contingency literature has focused mainly on firms in manufacturing industry sector. Thus, this research will also focus on MCS design in firms operating in manufacturing industry for reasons of comparability with other studies. Moreover, given that most of the contingent factors falling within this category (organisational culture and personality variables) are beyond the scope of this empirical study, the literature relating to these features will not be discussed. However, organisation structure will be considered within a broader definition of MCS.

The fourth category of contingent variables relates to strategy and mission variables. Strategy variables include corporate strategy, business or competitive strategy, and manufacturing or operational strategy. According to Langfield-Smith (1997), corporate strategy is concerned with determining the types of businesses to operate in, and the kind of businesses to acquire or divest. Business or competitive strategy is concerned with how strategic business units or organisations with high level of functional autonomy compete within their particular industries. Operational strategy (e.g., manufacturing strategies) is concerned with how various functions of the organisation contribute to the implementation of competitive strategy.

Strategic mission variables include build, hold, harvest, and divest strategies. These variables indicate the organisation's intended trade-off between market share growth and the maximising short-term profit (Langfield-Smith, 1997). The build strategy is concerned with improving market share and competitive position more than maximising short-term profit or cash flow. In contrast, the harvest mission is concerned more with maximising short-term profit and cash flow. A hold mission falls between the two extremes (build vs harvest strategies). It seeks to protect the existing market share and at the same time obtain a reasonable return on investment. The divest strategy occurs when a business decides to cease operation and withdraw from the market through a process of liquidation or sale. As this research is primarily concerned with two contingent variables, competitive business strategy and environmental uncertainty, only the contingency literature relating to the competitive strategy within the strategy and mission variables category will be examined.

Thus, the major contingent variables which will be examined are environmental uncertainty and business competitive strategy. Organisational structure is considered as another control subsystem within MCS along with accounting control system. The relationship between these contingent variables and MCS, as well as the relationship between organisational structure and accounting control systems will be investigated further in the remaining two sections of this chapter. Sections 4.4 and 4.5 provide a review of representative empirical studies that investigated the impact of environmental uncertainty and business strategy on MCS design categorised by different researchers. However, it should be indicated that only representative key studies related to this study will be reviewed. In addition, empirical studies that included organisation structure in their models (though very few) will be reviewed under Sections 4.4 and 4.5 rather than in separate section due to the scarcity of this literature.

4.4 Environmental uncertainty and MCS contingency research

4.4.1 Gordon and Narayanan (1984)

Gordon and Narayanan (1984) investigated the relationships among an organisation's environment, structure and MAS. They were mainly concerned with providing empirical evidence on the nature of existing relationships among perceived environmental uncertainty (PEU), organic forms of structure and three characteristics of MAS: external, non-financial and future oriented information. Data on these variables was collected by interviews based on structured questionnaires with controllers in 34 medium-size, non-divisionalised U.S firms. Gordon and Narayanan argue that the relationship between PEU and organic forms of structures, and the relationship between PEU and MAS characteristics has been established in both organisation and accounting contingency literature. However, they argue that the relationship between organisation structure and MAS characteristics is relatively less clear. More precisely they were concerned with determining whether the relationship between structure and MAS was real or simply an artefact of relationship each have with the environment. The effects of PEU and organisation structure on MAS characteristics were examined singly and in combination. Gordon and Narayanan hypothesised that if organisation structure design is logically prior to MAS, then a positive association between MAS characteristics and organic forms of organisation, even after controlling for PEU is expected. However, if they were designed simultaneously or independently, then the partial correlation would be insignificant.

Their analysis showed strong correlation between PEU, organic forms of structure and perceived usefulness of MAS characteristics. They found that as PEU increases, organisations tend to seek external, non-financial and ex ante information in addition to other types of information, and increasingly move towards an organic form of organisation. However, after controlling for the effects of PEU, organic structure and MAS showed no significant correlations. These findings, according to Gordon and Narayanan, suggest that organisation structure and MAS are both determined by the environment, rather than MAS being determined by structure. They conclude that organisation structure and MAS are complementary strategies in response to their perception of the environment. Thus, these findings lend support to Otley's (1980) theoretical formulation that the design of MAS and organisation structure are complementary and considered as part of the organisational control package. Moreover, their study stressed the importance of considering the environment and other contingent factors particularly business strategy in designing MAS.

However, caution is required when interpreting these findings, since Gordon and Narayanan made no attempt to relate their findings to any measure of organisational effectiveness. In addition, the study looked at only a few MAS characteristics and neglected the possibility that other features of MAS might be determined by organisation structure. Thus, the lack of significant relationship between organic forms of structure and MAS does not mean that there is no relationship between structure and MCS. To recall from the earlier discussions in this chapter and in Chapter 3, organisation theory and MC contingency literature indicates that not all structural dimensions are related to the function of control and different structural dimensions arise as a response to situational variables. The literature identified formalisation and centralisation as two structural dimensions that are directly related to the function of control (Child, 1972; Bruns and Waterhouse, 1975; Waterhouse and Tiessen, 1978). Thus, it is no surprise that no significant relationship was found between structure and the characteristics of MAS in this study since each structural dimension is expected to have different impact on MCS design.

4.4.2 Chenhall and Morris (1986)

Chenhall and Morris (1986) partially replicated Gordon and Narrayanan (1984) study, and investigated the effect of one structural dimension (decentralisation), PEU and organisational interdependence on the perceived usefulness of four broad dimensions of MAS. A summary of these dimensions is provided in Table 4.2. Data was gathered by structured interviews from sixty-eight managers from thirty-six medium size Australian manufacturing companies. By adopting a similar approach to Gordon and Narayanan (1984), Chenhall and Morris examined the direct effect of these contextual variables as well as the indirect effect of PEU and interdependence acting through decentralisation on the perceived usefulness of MAS. They argue that examining the direct and indirect effects of contextual variables on MAS design enables researchers to unravel the complex effects of interacting contextual variables on MAS design. Figure 4.3 illustrates their research model.

Table 4.2 Chenhall and Morris' MAS characteristics

Dimension	Description
Scope	External information (e.g. economic conditions) Non-financial information (e.g. customer preferences) Future-oriented information (e.g. probabilistic; forecast)
Timeliness	Frequency of reporting Speed of reporting
Aggregation	Aggregated by time period (e.g. monthly) Aggregated by functional area (e.g., marketing) Analytical or decision models (e.g., marginal analysis, DCF)
Integration	Precise targets for activities and their relationship with sub-unit Reporting on intra-sub-unit interactions

Source: Chenhall and Morris (1986, p.19).

Chenhall and Morris found that PEU was directly associated with broad scope and timely information and indirectly associated with aggregation acting through decentralisation. They found no significant association between decentralisation and broad scope or timeliness information. These finding lend support for Gordon and Narrayanan (1984) findings that managers require information that improve their decision response time and aid in environmental scanning. The study also found that aggregated and integrated information was directly associated with decentralisation and interdependence.

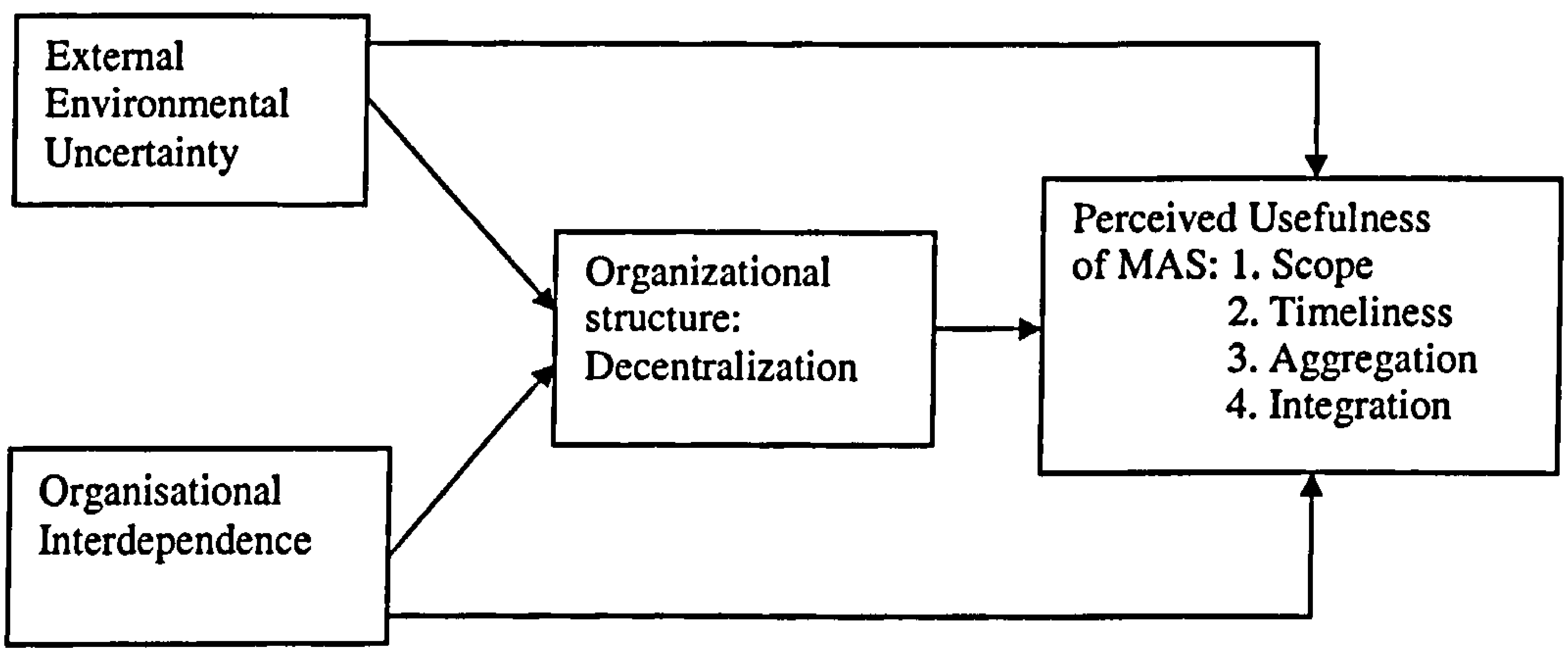

Figure 4.3 A contingency model of perceived usefulness of MAS

(Source: Chenhall and Morris 1986, p.17).

Chenhall and Morris argue that this supports the view that responsibility accounting systems should aggregate and integrate information in ways that recognise the complexities and interdependencies found in many decentralised operations.

Unfortunately, although Chenhall and Morris considered some of the recommendations suggested by Gordon and Narayanan (1984) regarding investigating broader dimensions of MAS, and testing the effects of PEU along other contextual variables on MAS design, they did not consider organisational effectiveness in their research model. This omission resulted in a failure to consider which type of MAS is appropriate in different situations. Moreover, these results are applicable only for cost and revenue centres of medium size manufacturing firms.

4.4.3 Gul (1991)

In an attempt to link MAS and PEU to performance and effectiveness, Gul (1991) investigated the interacting effects of MAS and PEU on managerial performance in small business units. Data were collected from forty-two managers/owners of light engineering manufacturing firms in Australia, via administering a questionnaire survey. In this empirical work, Gul was mainly concerned with whether a fit between MAS and PEU would lead to high performance and effectiveness. The MAS was conceptualised in terms of a continuum from the traditional type of MAS to sophisticated MAS using a modified version of Chenhall and Morris' four MAS dimensions discussed earlier. Gul hypothesised and found that sophisticated MAS contributes to performance in high PEU situations, but hampers performance in low PEU situations. He argues that when PEU is high, managers require sophisticated MAS information to cope with uncertainty and make appropriate decisions. Thus broad scope, timely, integrated and aggregated information is required to evaluate and respond rapidly to changes in the competitive environment and market demand. In contrast, Gul found that when the environment is perceived to be certain and predictable, traditional or less sophisticated MAS information would be enough and lead to high performance. In this situation, sophisticated information may lead to information overload[3] and low performance. Thus matching MAS design

[3] Information overload is defined as "the amount of information which is greater than that which the organisation or its decision maker can adequately handle"(Gul and Chia, 1994, p.416).

with PEU would lead to high organisational performance, while a mismatch would lead to low performance.

The findings of this study provide some support to earlier empirical studies (e.g., Gordon and Narayanan 1984, Chenhall and Morris 1986) in that PEU requires broad scope and timely information. However they contradict with Chenhall and Morris (1986) who found no direct relationship between PEU and two dimensions of MAS, i.e., aggregated and integrated information. This contradiction may possibly be attributed to the difference in organisational size or level of analysis. Moreover, caution is required when interpreting Gul's (1991) findings since the sample was taken from one industry and the possibility of non-response bias exists. Moreover, the effect of other contingency variables such as structure and strategy were not considered in this study.

4.4.4 Gul and Chia (1994)

Extending Chenhall and Morris (1986) and Gul (1991) studies, Gul and Chia (1994) adopted a multivariate approach to fit rather than a bivariate analysis (approaches to fit were discussed earlier in sub-section 3.4.2) and investigated the interaction effects of PEU, decentralisation and MAS on managerial performance. They argued that this approach explores the complex relationships between PEU and the two control subsystems of MAS and decentralisation, and their joint effect on performance. Data was collected by questionnaires from forty-eight sub-unit managers in both manufacturing and non-manufacturing companies in Singapore.

Gul and Chia investigated the "availability", rather than the "perceived usefulness", of two dimensions of MAS information, scope and aggregation. They argue that when PEU is high, organisations require a decentralised structure to respond to unexpected events and require sophisticated MAS information (in terms of broad scope and aggregation) to reduce uncertainty and improve decision-making. In contrast, when PEU is low interpreting the environment is relatively easy and sophisticated MAS would lead to information overload, which may adversely affect their performance. Thus, centralised structures with traditional MAS information would be adequate and lead to higher managerial performance.

The main findings of this study indicate that sophisticated MAS (in terms of scope and aggregation) are associated with superior managerial performance in organisations operating under high PEU and having more decentralised structures. In contrast, sophisticated MAS is associated with lower managerial performance in organisations operating under low PEU together with high levels of decentralisation. Gul and Chia concluded that their findings suggest that considering only one control subsystem in MC contingency studies is inadequate, and that "organisational designers need to consider the appropriate environment in the design and implementation of control subsystems" (1994, p. 424).

4.4.5 Chia (1995)

In recognition of the importance of the internal consistency of control sub-systems to enhance performance, Chia (1995) examined the effects of a combination of MC sub-systems on managerial performance. Chia investigated the relationship between both of the control subsystems of MAS and organisation structure (decentralisation) and their joint effects on managerial performance using the responses of 48 Singapore managers to questionnaires designed to measure these variables. MAS information characteristics were defined in terms of broad scope, aggregation, integration, and timeliness (Chenhall and Morris, 1986). Chia argues that when there is a fit between the control subsystems of organisational structure and MAS, it is likely that a higher level of managerial performance will result.

Chia hypothesised and found that in a highly decentralised organisation, more sophisticated MAS information contribute to higher managerial performance than a less sophisticated MAS. In contrast, in organisations where the degree of decentralisation is low, sophisticated MAS information has a negative impact on managerial performance. Chia argues that these findings are consistent with the notions that decentralisation promotes a high information processing capability as more managers are involved in making decisions. Thus, MAS which provide more sophisticated information will enhance managerial decisions and hence contribute to higher performance. However, a major limitation for this study is that it did not consider the impact of other important variables such as the competitive environment and strategy, which may be significant to the design of MCS and organisational performance.

4.5 Business strategy and MCS contingency research

The importance of including the business strategy as a contingent variable that affects the design of structure and control has long been recognised in the contingency literature (Miles and Snow, 1987; Porter, 1980; Waterhouse and Tiessen, 1978; Gordon and Narrayanan, 1984; Simons, 1987 and 1990; Dent, 1990; Langfield-Smith, 1997). However, the empirical research on this area is still limited and has only been conducted recently (From mid-1980s onwards). Two major streams of research in this area have evolved (Nilsson and Rapp, 1999; Kald, Nilsson and Rapp, 2000). One comprises studies concerned with how MCS contribute in the emergence and development of new strategies. Here a case-study approach is often used (e.g., Simons, 1990; Archer and Otley, 1991). Another significant branch of research focuses on the relationship between strategy and MCS, and how MCS should be designed to implement a given strategic orientation. Here, the contingency theory provides the theoretical foundation, and questionnaire surveys are the most common method of research (e.g., Govindarajan and Gupta, 1985; Simons, 1987; Govindarajan, 1988; Govindarajan and Fisher, 1990). These studies suggest that different types of strategies will cause different control system configurations, and that MCS should be tailored explicitly to support the strategy of the business to yield superior performance (Otely 1999; Langfield-Smith, 1997).

MC contingency researchers have studied business strategy under one of three classifications: Strategic typologies (Miles and Snow, 1978), strategic positioning (Porter, 1980), and strategic mission (Boston Consulting Group). However, the Miles and Snow (1978) and Porter (1980) classifications are the most widely used and validated typologies in strategic management and MC contingency research (Solieri, 2000). The probable explanation is that these strategic classifications are well accepted and internally consistent (Kald *et al.*, 2000). Table 4.3 summarises the main features of these two major classifications of business strategy.

The contingent nature of the relationship between business strategy and MCS has long been recognised by organisation theorists (e.g., Miles and Snow, 1978; Porter, 1980). Porter (1998, p.40) argues that the successful implementation of "generic strategies requires different organisational arrangements, control procedures and incentive systems." Porter suggests that an overall cost leadership strategy requires intense supervision of labour, tight cost control, frequent and detailed control reports and structured organisation and responsibility. In contrast, Porter suggests that a differentiation strategy require strong co-ordination between various functions and subjective performance measurement and incentives instead of quantitative measures. However Porter's (1980; 1985) work has focused mainly on the environment in which firms competed, providing little guidance about the internal structure and processes that should be established by the firm internally to implement the chosen strategy (Solieri, 2000).

Table 4.3 Schemes of business strategy classifications used in MC contingency studies

Study	Strategic variable	Archetypes	Features
Miles and Snow (1978)	Strategic pattern	Defender	Stable environment, limited product range, competes on low cost or high quality, internally focused, efficiency paramount, rigid centralised structures.
	Strategic pattern	Prospector	Uncertain environment, extensive product and market development, externally focused, flexible and centralised structure.
	Strategic pattern	Analyser	Hybrid, core of traditional products, enters new markets after viability established, matrix structure.
	Strategy lacking	Reactor	No articulated strategy, unsuccessful, misses opportunities, structure inappropriate to purpose.
Porter (1980)	Strategic position	Cost leadership	Low cost relative to competitors, related and standardised products, economies of scales, internally focused, structured organisation and responsibilities, with intense supervision of labour.
	Strategic position	Differentiation	Product uniqueness, emphasis on marketing and research, flexible structure.
	Strategic position	Focus	Focus on a narrow strategic target (buyer group, product line or geographic market) through differentiation, low cost or both.

Miles and Snow (1978) included the administrative system (structure and control systems) in their work. Thus, their work is considered as one of the earliest studies to provide clear evidence on the contingent relationship between business strategy and MCS design (Marginson 1996). Moreover, Miles and Snow classification of business strategy "provides the richest portrayal of organisational arrangements associated with particular strategies" (Dent, 1990, p.10). Therefore reviewing their study along with other representative MC contingency studies concerned with the impact of strategy on MCS design is warranted.

4.5.1 Miles and Snow (1978)

Miles and Snow developed Child's (1972) strategic-choice approach and proposed a complex strategic typology of choice interrelating business strategy, structure and process variables (Kald *et al.*, 2000; Solieri, 2000). They identified three fundamental issues or problems confronting management in responding to their environment. These are the entrepreneurial problem (e.g., identifying the product-market domain), the engineering problem (i.e., identifying production resources required in the form of technology and staff), and the administrative problem (i.e. how to structure and control the business). Based on how organisations choose to solve these three problems, Miles and Snow identified four organisational types, which they named defender, reactor, analyser and prospector. They argue that:

> Each of these types has its own strategy for responding to the environment, and each has a particular configuration of technology, structure and process that is consistent with its strategy (Miles and Snow, 1978, p.29).

Defender type strategy

The defender organisation perceives a great deal of stability in its external environment and concentrates on a narrow and limited mix of products and customers. It competes on product price, quality and customer service rather than innovation and product and market development. According to Miles and Snow (1978), defenders focus mainly on reducing production and distribution costs while improving quality. Thus, they are internally focused and dedicated largely to solving the engineering problem (focusing heavily on developing technological efficiency through investing on developing technology further without fear of major losses due to unpredictable demand). In support of this orientation toward efficiency, defenders employ uncomplicated and inexpensive mechanisms of co-ordination and control such as standardisation and scheduling (intensive planning not extensive) with higher formalisation through codification of job description and operating procedures which specify appropriate behaviours of organisation members. Miles and Snow argue that any deviation from prescribed behaviours is not tolerated since proper corrective response usually is known in advance. Performance evaluation in defenders involves comparing present indices of efficiency with those achieved by the organisation during previous years and this has implications for reward system. Thus, it can be concluded that defenders rely on tight action control systems[4] where specific desirable behaviours in the form of work rules and specific policies is defined, combined with direct supervision or detailed audits of action reports, and linking rewards systems to employees' compliance to these procedures.

Prospector type strategy

On the other hand, the prospector organisation perceives high uncertainty in its environment and continuously seeks new product and market opportunities. Thus, marketing and research and development functions are the core functions rather than production and finance (as in the case in defenders). Prospectors require flexible and decentralised organisational structures to facilitate innovation and rapid response to environmental change. Thus, it is best to structure the prospector organisation into single, self-contained business units where all the resources required to research, develop, produce and market a related group of products are placed in these divisions or sub-units. In addition, Miles and Snow (1978, p.62) argue that prospectors rely less on formalisation (contrary to defenders) because "it would not be economically feasible to codify job description and operating procedures in organisations whose tasks change frequently." Thus, prospectors emphasise broader planning processes and results-oriented controls (accounting control systems) to foster behaviour, which leads to effectiveness. This effectiveness orientation, according to Miles and Snow, requires decentralised control systems because the information required to assess current performance and take corrective actions is located in the operating divisions not in the upper echelon of management. Miles and Snow conclude that prospectors are effective as long as the level of change in the environment is high, however if the environment becomes more certain and predictable, prospectors cannot maximise profitability because of their inherent inefficiencies.

[4] For more complete discussion on tight action control systems see Merchant (1998).

Analyser type strategy

Analysers tend to operate in mixed product/market environments, where they maintain a base of traditional and stable products and markets, and simultaneously tend to exploit new product and market opportunities, and adopt successful product innovations of prospector competitors in their more turbulent environment. Thus, analysers combine attributes of both defenders and prospectors. The production and administrative systems in analysers attempt to balance stability and flexibility, reflecting an intermediate position between defenders and prospectors. They tend to have a dual technological core that allows them to produce familiar products or services efficiently while keeping pace with innovations produced by prospectors. Analysers' administrative systems are built around a matrix organisation, with no unified planning process (i.e., planning is both intensive and broad). Control is both centralised and budget oriented to encourage cost efficient production of traditional products, and simultaneously, decentralised and results oriented to enhance the effectiveness of the new product and project groups.

Miles and Snow conclude that the duality nature of analysers forces them to pursue a middle range and thus forces them not to be completely effective nor efficient. This type of organisations is a hybrid of prospector and defender types, and thus, it is not a pure concept as compared with defenders and prospectors (Kald *et al.*, 2000). This is one of the reasons why most contingency studies in the strategy-MC area have included only prospector and defender typologies in their studies (Kald *et al.*, 2000).

Reactor type strategy

Reactor organisations are considered as unsuccessful organisations because they have no clear real strategy to operate in the market. Thus, these organisations have been excluded from most strategy-MC contingency research which has focused mainly on successful organisations (Kald *et al.*, 2000). According to Miles and Snow (1978, p.81) "the reactor is an unstable organisation type because it lacks a set of consistent response mechanisms that it can put into effect when faced with a changing environment." Miles and Snow identified different reasons for organisations to become reactors such as not having a clear business strategy, misfits between their business strategy, structure and processes; or misfit between strategy-structure relationships and their external environment.

In summary, the main findings reached by Miles and Snow (1978), and which can also be extended to Porter's (1980) strategic position, since they appear to be similar (Simons, 1987), are as follows:

i. Defensive, efficiency-seeking strategies (i.e., defender/low cost strategies) generally perceive a great deal of stability in their environment. They require uncomplicated and inexpensive forms of co-ordination and control such as standardisation and scheduling, more formal, bureaucratic, and centralised structures and control. Their administrative systems emphasise problem solving rather than opportunity identification.

ii. Strategies that deal with greater uncertainty and seek innovative direction (i.e., prospector/differentiation strategy) require looser organic and decentralised structures to facilitate rapid responses to environmental change. At the same time, they require complex and expensive forms of co-ordination and control to integrate and monitor differentiated tasks. Thus, they emphasise results-oriented controls (accounting control systems) rather than action-oriented control to foster behaviour that leads to effectiveness.

4.5.2 Simons (1987)

Subsequent research has sought to investigate Miles and Snow (1978) findings and explore further the relationship between business strategy and administrative problem of organisation structure and control system choice. Most notable of these studies is Simons (1987) which was among the first to investigate the relationship between business strategy and control systems attributes from an accounting perspective (Langfield-Smith, 1997). Simons (1987) extended Miles and Snow findings in relation to the administrative problem in general, and accounting control systems in particular. Employing a bivariate approach[5], and using questionnaires, Simons investigated the nature and extent of differences in the accounting control systems of firms that follow different business strategies (defenders and prospectors) in seventy-six Canadian manufacturing firms[6]. Ten accounting control attributes, derived from using factor analysis on an original set of thirty-three anchored 7-point Likert type scales, were the focus of Simons' study. These attributes are summarised in Table 4.4.

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[5] Focusing on the relationship between two classes of variables, control systems attributes and business strategy.

In addition, a single measure of organisational effectiveness (i.e. ROI) was included to determine if successful implementation of business strategies require different accounting control system attributes. However, Simons acknowledges that the examination of this relationship was not tested statistically due to the small sample size.

Table 4.4 Simons' ten accounting control system attributes

Control system attribute	Description
Tight budget goals	Extent to which meeting tight budget targets is emphasised.
External scanning	Extent to which data on external events are included in control reports.
Results monitoring	Extent to which managers monitor inter-period budget and performance results.
Cost control	Extent to which cost analysis techneques and control are used.
Forecast data	The extent to which forecast data is included in control reports.
Goals related to output	Knowledge and importance of factors related to product output.
Reporting frequency	Frequency of issuing control reports.
Formula based bonus	Extent to which bonus remuneration is established by formula based on achieving budget targets rather than discretionary.
Tailored control systems	Extent to which control systems are tailored to departmental needs and circumstances. Associated with high level of detail in control reports.
Changeability of control systems	Frequency of change in control systems and importance of employing informal communication to transmit control information.

Source: Simons (1987).

The findings of this study support Miles and Snow's (1978) assertion that different business strategies require different administration systems (structure and control systems). The study also indicated that innovative strategies (prospectors) emphasised accounting control system more than efficiency-seeking strategies (defenders) which appeared to use their accounting control systems less intensively. Simons found setting tight budget goals and the close monitoring of results were positively associated with organisational performance in prospectors, while negatively associated in defenders, specifically large defenders (those with 600+ employees). Another difference concerned

[6] 85% of Simons' sample were firms with distinct legal entities and 15% were autonomous divisions of diversified, multidivisional companies.

the frequency of reporting and use of forecast data in control reports. Simons found high performing prospectors (in terms of ROI) attached more importance to forecast data in control systems and emphasised more frequent reporting. Moreover, defenders' bonus remuneration was based on the achievement of budget targets and they tend to have little change in their control systems compared to prospectors. With regard to cost control, interestingly, large prospectors as well as defenders exhibited a negative correlation with performance. This is not consistent with Miles and Snow's assertion that defenders will place high importance to cost control. However, Simons suggests that large defenders might rely on other control mechanisms to achieve the desired results.

Simons' results that prospectors use their accounting controls more intensively, while defenders de-emphasise accounting and cost controls appeared quite surprising to many scholars, and were initially thought to be in conflict with Miles and Snow study (Dent, 1990; Langfield-Smith, 1997). For example, Dent (1990, p.12) argues that considering the innovative orientation of prospectors, "one might expect prospectors to rely less on financial control than on qualitative and non-financial controls, for example rates of new product introduction and product-market development". However, Dent comments, as Simons' study focused only on accounting control systems, neglecting other control mechanisms available to prospector and defender organisations, it does not tell us much about the importance of accounting controls relative to other controls (Dent, 1990, p.13).

Indeed, one must persevere with this point a little longer, as it would explain Simons' findings and their presumable contradiction with Miles and Snow's (1978). Sim and Teoh (1997) related the inconsistency in research findings between Miles and Snow and Simons to the different conceptualisation of control systems used. They argue that while Miles and Snow, as organisational theorists, take a broad view of organisational control focusing on the administrative systems in general. Simons on the other hand takes a narrower view of management control, focusing only on accounting controls. To recall from earlier discussions in Section 4.2.1, accounting controls are only one type of control mechanisms available in the organisation. Considering structural dimensions of authority concentration and structuring of activities when designing MAS would provide an understanding of the importance of accounting controls relative to other means of exercising management control (Waterhouse and Tiessen, 1978; Otley, 1980). Thus, adopting a broader definition of MCS that includes both accounting and structural controls is required to explain Simons' findings and clarify some of the confusion in MC contingency studies.

Moreover, it was concluded in Sections 4.1.1 and 4.2.1 that organisations operating in uncertain and changing environments with non-routine technologies (as in prospectors) require organic and decentralised structures to foster innovative behaviour (Gordon and Miller, 1976; Waterhouse and Tiessen, 1978). In these situations, the lack of integrative devices imposed through organisation structure (by means of centralisation or activity structuring) means that there would be greater reliance on accounting control systems to achieve integration and co-ordination in these organisations. Thus, it is expected that a well-designed and complex ACS will be found in these organisations (Gordon and Miller, 1976; Amigoni, 1978; Waterhouse and Tiessen, 1978). In contrast, organisations operating in certain environments, with routine and standardised activities (as in defenders) would rely more on direct supervision and rigid rules and procedures and less on ACS (Bruns and Waterhouse, 1975; Amigoni, 1978; Waterhouse and Teissen, 1978).

Simons' (1987) study goes some way towards opening up the interface between business strategies and control systems design from an accounting perspective (Dent, 1990). However, Langfield-Smith, (1997) states that caution is required when interpreting Simons' findings due to the inappropriate measures of effectiveness. She criticises Simons' use of ROI to measure organisational effectiveness of all firms, especially prospectors, and argues that high (short-term) profits are not appropriate for firms focusing on product development and innovation. On the other hand, Simons (1987, p.363) acknowledges that:

> While ROI is an imperfect measure of firm performance, and conclusions must therefore be tentative, this analysis is used to motivate discussions concerning the possible relationship between firm performance and strategy.

Thus, Simons' study was mainly concerned with determining the attributes of accounting control system under different strategies rather than their interaction effects on performance (Greve and Hagg, 2000).

Rooted in contingency theory, Govindarajan and Gupta developed an extensive research program to measure the interaction effects between business strategy and administrative systems on performance

(Govindarajan and Gupta, 1985; Govindarajan, 1988; Govindarajan and Fisher, 1990). They were mainly concerned with business strategy implementation in strategic business units (SBUs) within divisionalised companies rather than designing MCS. Consequently, these studies were part of a larger research series, and control was measured as a single variable within a much larger set of organisational, environmental and strategic variables, thus providing a limited view of designing effective MCS. Nevertheless, these studies do offer clear evidence regarding the contingent relationship between business strategy and specific dimensions of MCS (e.g., incentive systems and performance evaluation style) and their interaction effect on organisational effectiveness.

4.5.3 Govindarajan and Gupta (1985)

This study examined the interaction effect between strategy and incentive bonus systems (single variable of the MCS) on effectiveness at the strategic business unit (SBU) level within diversified firms. Data was collected by questionnaires from 58 manufacturing SBUs within eight large US corporations. Govindarajan and Gupta used the strategic mission classification (build, hold, and harvest) to operationalise business strategy. The components of incentive compensation system investigated were the relative importance given to long-run criteria (e.g., new product and market development) vs. short-run criteria (e.g., ROI) when determining managers' bonus and the degree of reliance on quantitative formulas vs. subjective judgement in determining the amount of managerial bonuses. Effectiveness of SBUs in this study was measured using a multidimensional approach (financial and non-financial measures) rather than a single objective or subjective approach. The reason for choosing this, according to Govindarajan and Gupta, is that objective (financial) measures of effectiveness (e.g., ROI) are not suitable for measuring many performance dimensions critical to the success of build strategy (for instance, new product development, market development and R&D).

Adopting a contingency approach, Govindarajan and Gupta argue that SBU's objectives are more likely to be achieved if the incentive compensation system is tied to its strategy rather than to a uniform set of performance criteria across all SBUs. Thus, they hypothesised and found that greater reliance on long-run criteria and a subjective (non-formula) method in determining managerial bonuses will have a positive effect on the effectiveness of SBUs adopting build strategy, whereas a negative effect applies relating to effectiveness within harvest organisations. However, they found no support for their other proposition that short-run criteria (specifically cost control, ROI) for bonus determination would make a greater contribution to effectiveness in the case of harvest rather than build SBUs. In other words, short-run financial and accounting measures of performance were found to be relevant for all firms regardless of their strategies, while long run (non- financial performance measures) are critical for the successful implementation of build strategies along with short-run financial measures of performance. To explain these findings, Govindarajan and Gupta (1985, p.659) suggested that:

> Whereas an emphasis on short-run objectives may not always imply an emphasis also on long-run objectives, an emphasis on long -run objectives may always imply an emphasis on short-run objectives also. Conceivably, therefore, managers at the build end of the strategy spectrum face a greater multiplicity of objectives than do managers at the harvest end of the strategy spectrum.

Another interpretation to these findings may also be related to differences in the level of environmental uncertainty facing build and harvest strategies. The build strategy SBUs are normally concerned with increasing their market share and entering new markets and products, thus facing higher environmental uncertainty than those adopting harvest strategy. To recall from our discussions in Section 4.4, SBUs facing uncertain environments (as in the case with build strategies) require more sophisticated and broad scope accounting controls that include both financial and non-financial performance measures, as well as flexible and more subjective bonus schemes (as opposed to the more rigid formula bonus schemes) to respond to environmental uncertainty.

The findings of this study provide some evidence regarding the contingent relationship between business strategy and a single dimension of MCS (the design of managerial bonus systems). Thus, they provide only a limited knowledge regarding the relationship between strategy and MCS design. Govindarajan and Gupta acknowledged their narrow view of MCS as the most significant limitation of their study and argue that:

> Matching incentive bonus systems to strategy is only one - albeit a significant one - of the control mechanisms used by the corporate level executives to ensure effective implementation of SBU strategies (1985, p.665).

Moreover, they identified another weakness in their study relating to the way they operationalised business strategy. They argue that Miles and Snow (1978) and Porter (1980) classifications provide richer and more comprehensive view of strategy than strategic mission classification.

4.5.4 Govindarajan (1988)

Interestingly, Govindarajan (1988) was the first to use both bivariate and multivariate analysis to explore the relationship between the implementation of SBU strategy and three administrative mechanisms. The three administrative mechanisms are decentralisation (an organisational structure variable), budget evaluative style (a control system variable) and managers' locus of control (a managerial characteristic variable). As with all of Govindarajan's other work, this study focuses on intra-corporate level of analysis, where the concern is on SBUs within divisionalised corporations (Galunic and Eisenhardt, 1994). Data was collected by questionnaires from 121 manufacturing SBUs at 24 large US corporations.

Govindarajan used Porter's competitive strategy (low-cost and differentiation strategies) to operationalise business strategy. Budget evaluative style was measured according to the amount of emphasis placed on meeting budgetary goals when evaluating the general manager's performance. A multiplicity of dimensions rather than any single dimension were used to measure SBU effectiveness. Ten financial and non-financial performance dimensions were used for this purpose, including ROI, profit, cash flow, cost control, development of new products, sales volume, market share, market development, personnel development, and political-public affairs. Moreover, decentralisation between a corporate office and SBU was considered rather than decentralisation within a SBU.

Building on the established linkages between competitive strategies and environmental uncertainty, and between uncertainty and performance evaluation, Govindarajan used uncertainty as the unifying concept between strategy and administrative mechanisms fit. He argues that firms pursuing a differentiation strategy face greater uncertainty than firms pursuing a low cost strategy. High uncertainty implies that it is difficult to predict future events, and arrive at a priori budget targets that can serve as satisfactory standards for performance evaluation. Moreover, uncertainty implies that cause-effect knowledge is incomplete for decision-makers. Thus, subjective approaches towards evaluating managerial performance are expected since financial measures (e.g., budgets) alone are not enough to reflect managerial performance. From these arguments, Govindarajan hypothesised that for SBUs employing a strategy of differentiation, de-emphasising budgetary goals during performance evaluations, is likely to be associated with high performance. Conversely, emphasising budgetary goals is likely to be associated with high performance in SBUs employing low cost strategy. In addition, two other bivariate hypotheses related to decentralisation and locus of control, and one multivariate hypothesis related to the interaction effect of strategy and the three administrative mechanisms together on performance were tested after controlling for SBU and corporate size. The results of this study suggested that the proper alignment of the three administrative mechanisms with the competitive strategy resulted in superior performance. Interestingly, this multivariate fit was significant among differentiation SBUs but not significant among low-cost units. Unfortunately, Govindarajan provided no explanation for this difference between the two strategies.

Again, a significant limitation of this study is its narrow focus on a few design variables for administrative and control systems. Govindarajan acknowledges this limitation and directs future research towards developing and testing theoretical models with multiple contingency variables, multiple design variables and multiple outcome variables. Moreover, he provides reflective thoughts for future contingency research to consider and emphasis the importance of adopting both bivariate and multivariate approaches to fit since both approaches provide complementary and useful insights.

4.5.5 Govindarajan and Fisher (1990)

In this study, Govindarajan and Fisher adopted a multivariate or systems approach to fit to investigate the relationships among control systems, resource sharing and competitive strategies and their interactive effects on SBU performance. Similar to Govindarajan (1988), they used questionnaires to collect data from 121 SBUs in 24 corporations in the USA. Strategy and effectiveness were measured as in Govindarajan (1988), and resource sharing refers to the sharing of functional activities by two or more SBUs within a single corporation. Following Ouchi (1979), they focused on the use of output control (focusing on the attainment of the desired targets) and behavioural control (monitoring actions and decisions on an ongoing basis). These two control mechanisms are seen as alternative control strategies. By incorporating insights from agency theory into Ouchi's (1979) model, they provided complex arguments regarding the various situations under which behaviour control or output control might be appropriate. These situations are the competitive strategy pursued and the level of resource sharing.

As hypothesised, the findings indicated that high performing cost leaders rely on output controls and high resource sharing, whereas high performing differentiators with high resource sharing relied on behavioural controls. However, these findings contradict with Miles and Snow (1978) assertion that defenders rely on standard operating procedures (behaviour control), and prospectors rely on results or output control. Moreover, the results and arguments of this study are not consistent with organisation theory and Ouchi's original model, which implies that output control is appropriate for firms facing high uncertainty, while behaviour control is appropriate under a stable environment. The findings and arguments presented by Govindarajan and Fisher were criticised by Langfield-Smith (1997) on the basis that these findings and arguments are not convincing. Langfield-Smith (1997, p.220) argues that:

> Govindarajan and Fisher rely on agency theory to argue that output controls are effective in SBUs following a low cost strategy, and behaviour controls in differentiators. However, their arguments are not convincing, given the specific information and operational needs of prospectors and differentiators.

Again, Govindarajan and Fisher emphasised the need to adopt multivariate models and develop complex theories by incorporating other contextual and organisational variables that are relevant to the implementation of business strategies, and relevant to the function of control. They suggested that future research needs to include additional variables, most notably environment uncertainty and other structural and control features such as centralisation and formalisation.

4.5.6 Chong and Chong (1997)

The final study reviewed is that of Chong and Chong (1997) who sought to investigate the mediating role of MAS on strategy-performance and PEU-performance linkages. They used Miles and Snow defender/prospector typology to measure SBU strategy, while effectiveness was measured on 12 financial and non-financial measures similar to those used in Govindarajan and Gupta (1985) study. The study focused on a single accounting information attribute (broad scope of information) developed by Chenhall and Morris (1986). Broad scope relates to the use of external, non-financial and future oriented information, while narrow scope relates to the use of only traditional MAS (internal, financial and historical accounting information). Data on these variables were collected by questionnaires from 62 managers drawn from various manufacturing SBUs in Australia.

Two bivariate hypotheses were tested in this study. One relates to the interaction effect between PEU and broad scope information on performance, while the second relates to the effect of strategy and broad scope information on performance. Chong and Chong argue that the relationship between SBU strategy and performance and the relationship between PEU and performance are mediated by the extent to which managers use broad or narrow scope MAS information. They argue that earlier empirical research suggested that high PEU induce managers to use more external, non financial and future oriented accounting information, while under stable and more predictable environment, traditional financial information is adequate. Moreover, they argue that SBUs pursuing a prospector type strategy operate in a wide and uncertain environmental domain, thus requiring greater amount of information to cope with the uncertainty. In contrast, SBUs adopting a defender type strategy operate in narrow and more predictable environment, thus, a narrow scope information would be adequate and result in higher performance. The findings provided support for their hypotheses, suggesting that both strategy and PEU are important antecedents of MAS design.

Again, as with earlier studies, the limitations of this study relate mainly to the use of only single dimension of MAS, and their examination of only bivariate type hypotheses. Considering wider dimensions of MCS and using multivariate approach to fit that examine the joint effect of the two contingencies on MAS would have provided us with a better understanding of MCS design.

Other studies under this stream of reseach attempted to replicate some of the earlier studies or to investigate other dimensions of MCS but failed to find significant findings that could enhance understanding of the impact of business strategy on MCS design. These studies suffered from various limitations. For instance Sim and Teoh (1997) attempted to replicate Simons (1987) study but failed to provide significant findings that would support or contradict Simons' findings. They attributed their lack of finding significant results to the way MCS was operationalised in their study and to small sample size of their study. Collins, Holtzmann and Mendòza (1997) also attempted to study the impact of business strategy on budgetary usage but found slim evidence indicating that prospectors tend to use budgets more intensively than defenders or analysers.

4.6 Summary

This chapter has reviewed the extant literature that contributes to our knowledge regarding management accounting and control contingency theory, with particular emphasis on the impact of organisational environment, competitive strategy and organisational structure on MCS design. Choosing these contextual variables from the vast range of variables suggested in the literature was mainly due to their critical importance to the design of MCS, and the need to consider them in MC contingency research (Gordon and Miller, 1976; Waterhouse and Tiessen, 1987; Otley, 1980; Gordon and Narayanan, 1984; Chenhall and Morris, 1986; Simons, 1987; Dent, 1990; Langfield-Smith, 1997; Sim and Toeh, 1997; Chong and Chong, 1997; Chenhall, 2003). This is not to imply that other variables such as organisational culture or technology are of less importance, however it is not possible to include all variables in one empirical study for reasons of time constraints and research manageability.

It has been also emphasised in this chapter that early MC contingency studies were mainly of theoretical nature and have provided the foundations and impetus for researchers to employ the contingency approach in the area of accounting. These studies concerned themselves mainly with understanding the effect of the external environment and organisational structure on accounting control systems. Some of these early studies were mainly concerned with understanding possible relationships between organisation structure and the effective design and use of accounting control systems (ACS) in general and budgets in particular (e.g., Bruns and Waterhouse, 1975; Waterhouse and Tiessen, 1978). Other studies adopted a different approach and considered the direct effect of external environment on ACS attributes, and/or considered the design of organisational structure and ACS independently or simultaneously within a wider organisational control system (e.g., Gordon and Miller, 1976; Amigoni, 1978; Otley, 1980). This Chapter has also reviewed the pioneering works of Miles and Snow (1978) and Porter (1980). These two studies provide some of the earliest evidence on the contingent nature of the relationship between business strategy and MCS. Moreover, these two studies have enabled contingency researchers to study the impact of business strategy on MCS design.

Subsequently, several empirical contingency studies were conducted , partly to test the validity of the theoretical arguments of early pioneering studies and/or to investigate the implications of other contingent variables on management accounting and control systems design. Gordon and Narayanan (1984) and Chenhall and Morris (1986) studies have generated a stream of MC research mainly concerned with investigating the impact of PEU and organisational structure singly and together on MCS characteristics (i.e., scope, timeliness; aggregation and integration), while, Simons' (1987) study is considered as one of the first empirical studies to investigate the contingent relationship between business strategy and MCS design from accounting perspective. Other studies in this area of research have studied single aspects of MCS design and their relationships with business strategies within a broader research context. Table 4.5 provides the reader with a summary of the contingency studies reviewed in this chapter and their main findings. However it should be noted that although these studies provide support, albeit limited, to the contingent relationship between business environment, strategy, structure and MCS design, they suffer from many limitations and provide a contradictory and confusing web of findings. The limitations of these studies were highlighted in Chapter 1, and will be discussed further in detail next in Chapter 5, which also aims to present the research model and hypotheses.

Table 4.5 Summary of MC contingency research

Study	Country	Environment	Strategy	Other	Structure	MCS	Effectiveness	Comments
Bruns and Waterhouse (1975)	USA			Size and Technology	Activity structuring and Authority concentration	Budget related behaviour		Examined the relationship between organisation structure and budget. No link between contextual variables and budget was studied, however they found clear relationship between structure and budget uses.
Gordon and Miller (1976)	USA Theoretical	Dynamism, heterogeneity and hostility		Decision making style	Decentralisation	Scope and frequency of information		A theoretical study. Provided a broader frame work for designing AIS, which takes into account the environment, structure and management decision making style.
Waterhouse and Tiessen (1978)	USA Theoretical	PEU		Technology	Activity structuring and Authority concentration	Budgetary practices and usage		Another theoretical study. They argue that the design of accounting system should depend largely on the structure of the organisation and that structure in turn depends on organisation context.
Merchant (1981)	USA			Size and diversity	Decentralisation	Administrat ive and interperso-nal control systems.		Investigated how differences in budgeting systems where related to corporate size, diversity and decentralisation. He found that larger firms make higher use of formal administrative control systems.
Gordon and Narayanan (1984)	USA	PEU			Organic and mechanistic structure	Scope of information		Examined the relationship among organisation environment, structure and accounting information systems. It found that structure and AIS are both a function of environment.

Continued: Table 4.1 Summary of MCS studies

Study	Country	Environment	Strategy	Other	Structure	MCS	Effectiveness	Comments
Chenhall and Morris (1986)	Australia	PEU		Interdep-endence	Decentralisation	Scope, timelines, aggregation and integration of information		Build on Gordon & Miller (76), and examined the effect of structural decentralisation, perceived environmental uncertainty and interdependency on MAS design. In addition the study sought to determine how independent variables interacted. However, the study neglected organisation effectiveness from its model.
Govindarajan & Gupta (1985)	USA		Build and harvest strategic mission			Incentive bonus schemes	Financial and non- financial performance measures.	Examined the linkages between strategy & bonus schemes (one aspect of management control). Its focus on only few variables pertaining, and not including structure are its main limitations.
Simons (1987)	Canada		Prospector and defender typology			Ten ACS Attribute	ROI	Considered among the first studies to investigate the relationship between strategy and MCS from accounting perspective. Employed a bivariate approach and found that prospectors use their accounting controls more intensively.
Govindarajan (1988)	USA		Low cost and differentiation strategic position		Decentralisation	Budget evaluation style.	Financial and non-financial measures.	Studied the relationship between strategy and three control system variables, budget evaluation, decentralisation & locus of control. He found the alignment of the three control system variables with strategy increased SBU performance.

CHAPTER 5

RESEARCH MODEL AND PROPOSITIONS

CHAPTER 5

Research Model and Propositions

5.1 Introduction

The review of the literature of organisational contingency theory discussed in Chapter 3, and the literature of MC contingency theory presented in Chapter 4 provide some support to the contingent relationships between business environment, strategy, structure and MCS design. However, these relationships are still not clear due, partly, to the limited research in this area, and/or to the limitations of previous research (Dent, 1990 and 2002; Langfield-Smith, 1997; Chapman, 1997; Otley, 1999; Kald *et al.*, 2000; Chenhall, 2003). The aims of this chapter are to highlight gaps and limitations of earlier MC contingency research and to present the research model and the hypotheses that will be investigated in this thesis.

This chapter is structured as follows: Section 5.2 discusses the limitations and gaps of MC contingency research reviewed in Chapter 4. This is followed by Section 5.3, which re-introduces the research objectives that were discussed in Chapter 1. Section 5.4 provides an overview of the research theoretical model, and Section 5.5 discusses the conceptual definitions of the variables incorporated in the research model. The framework used to conceptualise the MCS concept and the rationale behind selecting its dimensions are reserved to Section 5.6. The anticipated relations between the variables depicted in the research model and the formulations of the research hypotheses and questions are given in Section 5.7. The chapter concludes with a summary given in Section 5.8.

5.2 Limitations of MC contingency studies

The limitations of previous MC contingency studies were highlighted in Chapter 1 and will be reiterated in this section for ease of presentation and consistency of discussions. Several writers have drawn attention to the fact that previous MCS contingency research has provided weak and fragmentary results due to several limitations and gaps in the research design and models of these studies (Dent, 1990; Langfield-Smith, 1997; Chapman, 1997; Otley, 1999; Kald *et al.*, 2000). These limitations can be summarised as follows:

1. Insufficient attention given to organisational effectiveness;
2. Excessive focus on bivariate models;
3. Lack of consistency in identifying and measuring MCS attributes;
4. Lack of methodological rigour in instrument validation and model testing.

5.2.1 Insufficient attention given to organisational effectiveness

The literature on organisational contingency theory reviewed in Chapter 3 emphasised that "the theoretical and pragmatic relevance of the structural contingency theory is anchored in its presumed ability to explain the question about organisational effectiveness" (Pennings, 1992, pp.274-275). Moreover, the contingency theory literature has emphasised that research models neglecting this key variable do not address the notions of the contingency approach. Unfortunately, much of the reviewed MC contingency research, as apparent in Table 4.5, has neglected organisational performance or effectiveness (e.g., Bruns and Waterhouse,1975; Gordon and Narayanan, 1984; Chenhall and Morris, 1986; Sim and Teoh, 1997).

Furthermore, the concept of organisational effectiveness is problematic to define or measure. Many of the studies that have incorporated effectiveness have measured it in a questionable way. For example, some studies (e.g., Gul, 1991; Gul and Chia, 1994) have preferred to use the notion of managerial effectiveness rather than organisational effectiveness. Such a partial construct does not provide a satisfactory criterion for MCS design or reflect the effectiveness of the organisation as a whole (Lowe and Chua, 1983). Other studies (e.g., Simons, 1987) have used only financial performance to measure effectiveness for all firms. It has been argued that high (short-term) profits may not be considered as a good measurement for effectiveness in firms following prospector or differentiation strategy, which focus on product innovation (Miller, 1981; Langfield-Smith, 1997). Thus, using a multiplicity of dimensions (financial and non-financial measures) rather than any single dimension to measure effectiveness has been emphasised by many researchers (Govindarajan and Gupta, 1985; Govindarajan, 1988; Govindarajan and Fisher, 1990; Langfield-Smith, 1997).

5.2.2 Excessive focus on bivariate models

Most MC contingency studies have employed 'bivariate' models to investigate the joint effect of a single contingent variable and a single control variable on performance (e.g. Govindarajan and Gupta, 1985; Gul, 1991; Simons, 1987; Chong and Chong, 1997). These 'underspecified' models and the 'piecemeal way' in which contingent control research has been undertaken is a major weaknesses and may account for the unrewarding results of prior research (Miller, 1981; Dent, 1990; Langfield-Smith, 1997; Fisher, 1998). Fisher (1998), for instance, argues for the importance of adopting a multivariate approach to fit where interactions between multiple contingent variables and multiple control variables are considered as essential for determining the effectiveness of MCS design. Fisher (1998) further contends that because of equifinality, the effects of some variables that are significant in a bivariate analysis might fail to show significance in systematic or multivariate analysis.

The literature on structural contingency theory, discussed in Chapter 3, has also emphasised that adopting multiple approaches to fit in contingency studies helps in solving the confusion in contingency theory literature and yields more insightful results. It is suggested that both bivariate and multivariate approaches to fit provide complementary and significant information that may not be uncovered using a single approach (Drazin and Van de Ven, 1985; Govindarajan and Fisher, 1990; Pennings, 1992).

5.2.3 Lack of consistency in identifying and measuring MCS attributes

Another possible reason for the unrewarding results from prior contingency research on MCS design relates to the difficulty in identifying and measuring the attributes of MCS. Variations in the attributes that have been researched and measured make it difficult to develop a coherent body of knowledge that provides a comprehensive view of MCS design (Merchant and Simons, 1986; Langfield-Smith, 1997; Fisher 1998; Chenhall 2003). It is apparent from Table 4.5 that a wide variety of control attributes have been investigated in MC contingency research. For example, Gordon and Narrayanan (1984) studied scope of accounting information characteristics (e.g., non-financial, external and future information) and Simons (1987) studied ten financial controls. Other researchers have focused on only one control dimension. Examples include incentive bonus schemes (Govindarajan and Gupta, 1985), budget evaluation style (Govindarajan, 1988) and output vs. behaviour controls (Govindarajan and Fisher, 1990). The variation in the number and type of controls that have been researched makes it difficult to compare, contrast and integrate the findings of these studies.

Despite the recognition of the need to develop a consistent and comprehensive classification for MCS, little progress has been made towards achieving this task (Merchant and Simons, 1986; Macy and Arunachalam, 1995; Fisher, 1995; Langfield-Smith, 1997). Otley (1999) argues that studies addressing aspects of MCS have been part of this literature for many years. However, the integration of these areas to provide a description of the overall management control systems of an organisation is relatively novel. In addition Chenhall (2003, p.4) argues that:

> It is unfortunate that it is not part of MCS research tradition to spend more time on developing robust measures of the elements of MCS, particularly when there is ambiguity in the meaning of constructs.

A further problem relating to identifying and measuring the attributes of MCS is that some studies have examined accounting control systems (ACS) in isolation and without consideration for the interactions of other control sub-systems (e.g., Simons, 1987; Sim and Teoh, 1997; Chong and Chong, 1997). Also some studies have focused on only a single aspect or attribute of ACS (e.g., Govindarajan, 1988; Govindarajan and Fisher, 1990; Chong and Chong, 1997). Such narrow and partial definitions of MCS have limited the ability to explore possible relationships and trade-offs between control sub-systems. Moreover, it can be noted from Table 4.5 that all of the reviewed studies that considered organisation structure (with exception to Gordon and Narayanan, 1984) have focused on only one dimension of structure (i.e. decentralisation). It has been argued that at least two dimensions are needed to properly characterise organisation structure and to properly understand its relationship with ACS within a broader definition of MCS. These dimensions are formalisation and centralisation (Macy and Arunachalam, 1995).

5.2.4 Lack of methodological rigour in instrument validation and model testing

Finally, A further key limitation of earlier MC contingency studies that has contributed to such unrewarding results relates to the way researchers defined and measured the contextual variables used in their studies. Many of the variables used in MC contingency studies are abstract or theoretical constructs that are not capable of direct measurement such as MCS, environment uncertainty, competitive strategy, organisational structure and organisational effectiveness constructs (Ittner and Larcker, 2001; Sharma, 2002). Chenhall (2003, p.4) for instance argues that "it is unfortunate that it is not part of MCS research tradition to spend more time on developing robust measures of the elements of MCS, particularly when there is ambiguity in the meaning of constructs". In addition, these theoretical constructs are subject to measurement error and this has negative implications on the significance and validity of results found (further details on this point is provided in Chapter 7 which deals with the validity and reliability of the constructs used in this research).

Unfortunately, none of the earlier MC contingency studies reviewed in Chapter 4 have controlled for measurement error prior to conducting their analysis. In addition, many studies in management accounting in general and MC in particular have not systematically demonstrated the validity of the constructs used in their studies (Ittner and Larcker, 2001; Sharma, 2002; Smith and Langfield-Smith, 2002; Chenhall, 2003). Many of these studies simply conduct a reliability analysis without verifying statistically the validity of these constructs prior to aggregating the items into a single scale. Sharma (2002) for instance argues that various aspects of these constructs (e.g., PEU) may be more important under different organisational settings and contexts. Thus, researchers are required to develop and refine constructs used in their studies in order to unravel some of the contradictory results found in MC contingency research.

Several recent papers in leading management accounting journals have called for greater methodological rigour in instrument validation and model testing in management accounting research in general and MC contingency research in particular (Hartmann and Moers, 1999; Sharma, 2002; Smith and Langfield-Smith, 2002; Ittner and Larcker, 2001; Chenhall, 2003). More specifically, these papers have called for making greater use of structural equation modelling (SEM) method in management accounting research in order to control for measurement error and to provide simultaneous tests of measurement validity, reliability and structural relations (further details on SEM is provided in Chapters 6, 7 and 8).

5.3 The research aim and objectives

To recall from our earlier discussions in Chapter 1, the current research aims to advance the current knowledge and understanding of the effective design of MCS. This is achieved by extending previous MC contingency research and addressing the major limitations discussed in the previous section by:

1. Incorporating organisational effectiveness as a variable within the research model and measuring effectiveness using multidimensional (financial and non-financial) measures;
2. Adopting multivariate or systems approaches of fit by examining the relationships between multiple contingent variables and multiple control variables simultaneously, and determine the impact of their coalignment or fit on organisational effectiveness;

3. Developing and adopting a wider and comprehensive definition of MCS (discussed in detail in Section 5.6); and
4. Providing greater methodological rigour in constructs validation and model testing through utilising structural equation modelling (SEM).

More specifically, the current research aims to achieve three main research objectives:

1. To examine the direct relationships between the three contextual/contingent variables of: a) environmental uncertainty b) business strategy, and c) organisational structure and various attributes of MCS simultaneously;
2. To examine the indirect relationship between the two contextual variables of: a) business strategy, and b) environmental uncertainty, acting through organisational structure, on various attributes of MCS; and
3. To examine whether a fit or coallignment between the contextual variables and MCS attributes is associated with greater organisational effectiveness.

5.4 An overview of the theoretical model developed to achieve research objectives

To achieve the above research objectives, a wider research model than previous MC contingency studies has been developed. The research model is presented in Figure 5.1. For the first research objective, the direct relationships between the contextual variables and MCS attributes are represented in the model by a single directed line or arrow connecting each contextual variable with MCS attributes. These direct relationships are shown in the model by the pathways $P_{4i\,1}$ for PEU, $P_{4i\,2i}$ for business strategy and $P_{4i\,3i}$ for organisational structure links to MCS attributes.

For the second research objective, the indirect relationships between PEU and MCS, and between business strategy and MCS attributes acting through organisational structure are represented in the model by the pathways connecting the two contextual variables of environmental uncertainty and business strategy with MCS attributes via organisational structure variable.

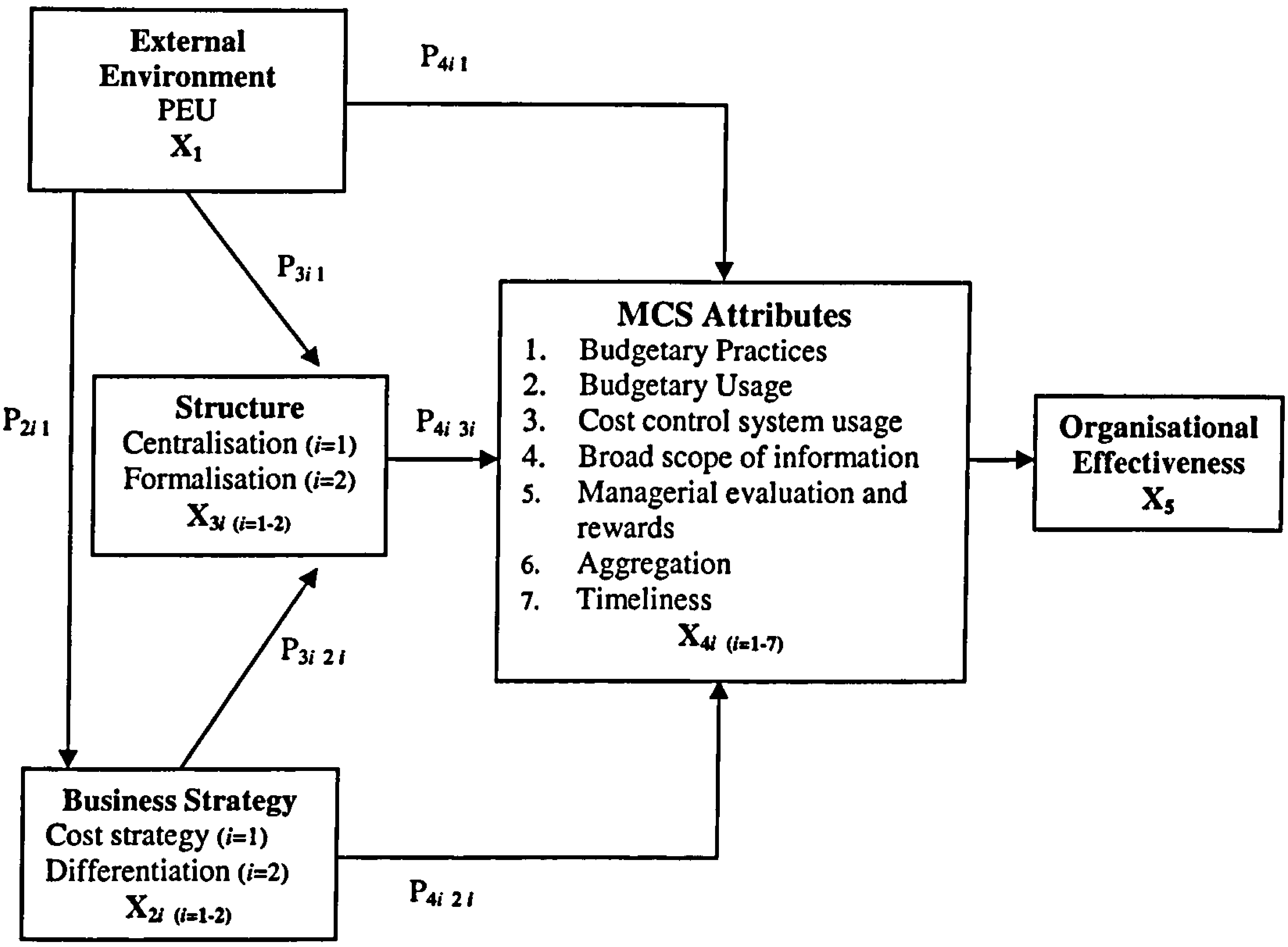

Figure 5.1 The research theoretical model

Organisational structure is viewed in this case as an intervening or mediating variable between the two contextual variables and MCS attributes. The indirect effects are represented in the model by two direct effect arrows linking the contextual variables to organisational structure and linking organisational structure to MCS attributes. This is shown in the model by the pathways $P_{3i\,1}$ and $P_{4i\,3i}$ for PEU, and the pathways $P_{3i\,2i}$ and $P_{4i\,3i}$ for business strategy indirect effects on MCS attributes. The magnitude of these indirect effects is the product of the paths $P_{3i\,1} \times P_{4i\,3i}$ for PEU and the product of the paths $P_{3i\,2i} \times P_{4i\,3i}$ for business strategy.

For the third research objective relating to the impact of fit or coalignment between PEU, strategy, structure and MCS attributes on organisational effectiveness, it can be noted from the research model that there is no trace (P with two subscripts) on the arrow or pathway going to organisational effectiveness. This is because the relationship between MCS and organisational effectiveness is problematic and there is no clear theory or empirical evidence to validate that unidirectional relationship between MCS and organisational effectiveness

(Van der Stede, 2000, p.614). Thus, it is not the intention of this research to test direct relationships between MCS design and organisational effectiveness as implied by the arrow going from MCS attributes to organisational effectiveness. However, to be consistent with the multivariate or systems approach of fit it is emphasised that it is the internal consistency, fit or coallignment between the contextual variables and MCS design that contribute to organisational effectiveness rather than MCS or any other variable acting by it self.

In addition to those paths of direct relevance to the research objectives, the model also includes pathways required to account for expected relationship between PEU and business strategy (pathway $P_{2i\ 1}$), between PEU and organisational structure (pathway $P_{3i\ 1}$) and between business strategy and organisation structure ($P_{3i\ 2i}$). It is apparent from the studies reviewed in Chapter 4 that the environment-strategy-structure link has not been examined together at the same time. Empirical evidence concerning the directions or the significance of the relationship between PEU, business strategy and organisational structure is still weak and not validated in strategic management and MC contingency empirical literature. This deficiency has also been identified by Smith and Langfield-Smith (2002) and Chenhall (2003). Thus, additional insights can be gained by examining the relationships among these variables in the model presented in Figure 5.1. For instance, prior MC contingency researchers who examined the relationship between strategy and MCS have based their theoretical arguments on the expected relationship between PEU and MCS and on the assumption that PEU and strategy are related. Uncertainty is the main mechanism through which MCS are hypothesised to vary across competitive strategies. Thus, these studies assume that different strategies imply different degrees of uncertainty and thus require different management control systems without verifying if this assumption holds in their studies (e.g., Govindarajan, 1988; Govindarajan and Fisher, 1990; Fisher and Govindarajan, 1993).

5.5 The conceptual definitions of the variables included in the research model

The research model depicted in Figure 5.1 consists of five sets of research constructs or variables. These variables are the external environment, business strategy, organisational structure, MCS and organisational effectiveness. The conceptual definitions of these variables are discussed briefly in the following sub-sections. However, the specific details of the operational definitions and measurement scales used to capture these variables and their validity-reliability assessments are explained in Chapter 7 (Section 7.3).

5.5.1 External environment (represented in the research model in box X_1)

To recall from our discussion in Chapter 4 (Section 4.3), the contingency theory literature has regarded the external environment as the primary source of constraint upon the organisational design in general and MCS design in particular (Child, 1972; Otley, 1999). The dimension of perceived environmental uncertainty (PEU) is used in the research model to capture external environment construct. PEU relates to the rate of change in the environment that occurs unexpectedly. Examples include unpredictable shifts in the economy, rapidly changing technology, and unexpected changes in customers' demand, competitors' actions or sources of supply (Miles and Snow, 1978; Mintzberg, 1979; Govindarajan, 1984). Hence, when the rate of change in the environment that occurs unexpectedly is high, PEU is considered high, and when the rate of change that occurs unpredictably is low, PEU is considered low.

5.5.2 Business strategy or competitive strategy (X_{2i})

Business strategy refers to how a business unit competes in its market to achieve a competitive advantage relative to its competitors (Porter 1980). Two dimensions or strategies are used in the model to capture the business strategy construct. These are the cost leadership and differentiation strategies. As defined in Chapter 4, Section 4.5, cost leadership/defender strategy focuses on being the low cost producer of a narrow product range. This implies that little product and market development is undertaken. In contrast, a differentiation/prospector strategy focuses on being first-to-market with a variety of innovative products or services. It strives to create products or services that are perceived by customers as being unique as a result of pursuing superior product features, brand image, product innovation, etc. (Miles and Snow, 1978; Porter, 1980).

5.5.3 Organisational structure (X_{3i})

Following the argument developed earlier in Chapter 2 Sub-section 2.3.1, Chapter 3 Section 3.2 and earlier in this chapter Sub-section 5.2.3, two structural dimensions are incorporated in the research model to capture organisational structure construct. These are centralisation or concentration of authority and formalisation or structuring of activities. These structural dimensions are considered as the most important and relevant structural dimensions to the process of co-ordination and control in organisation (Mintzberg, 1979; Child, 1972;

Waterhouse and Tiessen, 1978; Flamholtz *et al.*, 1985). Centralisation refers to the extent to which the right to make decisions and evaluate activities is concentrated at high levels in the organisation. While formalisation refers to the extent that the rules governing behaviour is precisely and explicitly formulated, and to the extent that roles and procedures are detailed. Standardisation is also related to formalisation, which is defined as the extent to which rules and procedures cover all circumstances and apply invariably.

5.5.4 Management control system attributes (X_{4i})

In Sub-section 5.2.3, it was pointed out that the conceptualisation of MCS is problematic and the literature lacks a coherent conceptual definition for this concept. However, seven MCS dimensions or attributes are used in the research model to capture MCS concept. These attributes are budgetary practices, budgetary usage, cost control system, scope of information, managerial evaluation and rewards system, aggregation and timeliness of information. The conceptual definitions of these seven dimensions and the rationale behind selecting them to capture MCS are explained in detail next in Section 5.6.

5.5.5 Organisational effectiveness (X_5)

It was emphasised in Sub-section 3.4.1 that organisational effectiveness or performance is a necessary dependent variable in contingency research as it provides the means for determining the appropriate fit between MCS design and contextual variables. Also it was indicated that organisational effectiveness is multidimensional and that there is no adequate conceptual definition available in the literature to capture this construct (Child, 1972; Merchant and Simon, 1986; Chenhall, 2003). However, based on the argument presented earlier in Sub-section 5.2.1, a multiplicity of dimensions (financial and non-financial measures) is used capture organisational effectiveness construct. The specific details of these dimensions are discussed later in Chapter 7 Sub-section 7.3.7.

5.6 Conceptualisation of MCS

In Sub-section 5.2.3, it was pointed out that the conceptualisation of MCS is problematic and that the literature lacks a coherent measure for this concept. The aim of this section is to provide a comprehensive conceptualisation of the attributes of MCS that are used in the study (see attributes listed in Figure 5.1). Studies by Chenhall and Morris (1986) and Simons (1987) provided two classifications or models for studying MCS, which are somewhat different and not comprehensive. The classification adopted by Chenhall and Morris (1986) represents the most widely used classification of MCS. They focused on information characteristics of control systems such as level of scope, timeliness, aggregation and integration. In terms of the relationship between MCS and strategy, Simons' (1987) study has attracted a great deal of interest. Simons' classification of MCS focused on financial controls or techniques, such as cost control, budgets and incentive systems. It did not consider non-financial controls.

Given the importance of these two studies, this research adapts, integrates and updates aspects of these two classifications in order to provide a more coherent conceptual definition for studying MCS. In particular, this research seeks to provide a comprehensive view of MCS design as well as aiming to enhance the comparability with previous research that have been based on either Simons' or Chenhall and Morris' models. However, a framework is initially established to provide a basis for determining which attributes of MCS must be considered in the research model. This framework is based on the "Statement of Principles for Financial Reporting" (SPFR), published in the UK by the Accounting Standards Board (ASB) in 1999. The SPFR indicates that an effective accounting information system is expected to have certain qualitative characteristics to yield useful information for decision-making and control. These characteristics can be categorised under the following three dimensions:

1. Selection of relevant information and relevant control mechanisms;
2. Presentation of information; and
3. Timeliness of information.

Thus, it can be argued that effective and comprehensive MCSs are those systems that seek to incorporate the above aspects. They aim to use appropriate control mechanisms to provide relevant and reliable information in a timely manner, or whenever they are mostly needed, and present this information to decision makers in a comparable and understandable form. In other words, effective systems consider the above three dimensions by determining for each of the control mechanisms which information to select, how and when to present them.

Different organisations are expected to deal with the above aspects in different ways based on their circumstances and needs. These circumstances (determined in the present research model as external environment, business strategy and structure) will affect the choice of control mechanisms, the frequency and the form of reporting. Thus, different control techniques and practices are likely to be more relevant and important, depending on the degree of environmental uncertainty, strategies employed and structural design forms.

5.6.1 Selection of relevant information and appropriate control mechanism

The first dimension deals with which information and control mechanisms should be included in the system, and it is similar to the content or tools dimension used in accounting control systems (ACS) literature (e.g., Amigoni, 1978; Simons, 1987). The statement of principles for financial reporting indicates that the selected information needs to be relevant and reliable, so that it can influence control and decision-making. In other words, the selectivity of relevant and reliable information means that key measures or variables that significantly influence the success of the business are clearly identified and managers are aware of them. Hence, the system operates as a filter for that information not actually useful. This dimension deals with:

1. Which control mechanisms or tools are appropriate and how they may be used;
2. Which control information or performance measures are regarded as useful;
3. Which incentive schemes are more suitable and which methods are most appropriate for performance evaluation.

Thus, under this dimension, a comprehensive view of MCS will provide relevant information regarding the management control process that incorporates the budgetary control, cost control, performance measurement and managerial evaluation and compensation sub-systems. Within this dimension, the following attributes of MCS are incorporated in the research model:

1. Budgetary control practices including the tightness of budgetary practices;
2. Budgetary control system usage including the extent that budgets are used for different purposes;
3. The extent of usage of cost control systems;
4. The scope of information including the extent that environmental scanning and forecasting information and non-financial performance measures are incorporated in MCS; and

5. Managerial evaluation and incentives including the criteria for evaluating managers and determining bonus amount.

5.6.2 Presentation of information

The second dimension 'presentation of information' deals with how to present the information in a manner that satisfies the concepts of comparability and understandability. SPFR indicates that information is comparable and understandable if it enable users to evaluate similarities in, and differences between, the actual performance with that over time and across different reporting entities. This dimension is similar to the 'reporting form' dimension of ACS, and relates to the level of data aggregation and detail in control reports (Chenhall and Morris, 1986; Simons, 1987). Including this dimension in MC contingency models has long been emphasised in early MC contingency studies (Waterhouse and Tiessen, 1978; Amigoni, 1978) as well as recent MC literature (Moores and Yuen, 2001). For instance, Waterhouse and Tiessen (1978, p.111) contend that:

> Important questions regarding the effectiveness of alternative report designs may be addressed within a contingency framework. Two examples of variables which may be included under the heading of report design are the frequency of reporting and the level of data aggregation.

Thus, under this dimension, this study will consider the effectiveness of alternative report designs in which control information is presented to senior management by investigating the level of aggregation and detail of MCS. However the frequency of reporting will be considered within the next dimension.

5.6.3 Timeliness of information

The third dimension deals with when to present the information and has been dealt with in MC literature as speed and frequency of reporting (Chenhall and Morris, 1986; Simons, 1987).

5.7 Formulation of research hypotheses and questions

This section discusses the anticipated linkages or relationships between research constructs as depicted in the research model presented in Figure 5.1 and formulates the research hypotheses and questions. It consists of the following three sub-sections: Sub-section 5.7.1 presents the anticipated direct relationships related to achieving the first research objective depicted in the research model by the pathways $P_{4i\,1}$ for PEU, $P_{4i\,2i}$ for business strategy and $P_{4i\,3i}$ for organisational structure direct links to MCS attributes.

Sub-section 5.7.2 presents the anticipated relationships and hypothesis relevant to the second research objective depicted in the research model by the pathways required to account for expected relationship between PEU and organisational structure (pathway $P_{3i\,1}$), between business strategy and organisation structure (pathway $P_{3i\,2i}$) and between PEU and business strategy (pathway $P_{2i\,1}$).

Sub-section 5.7.3 discusses the hypotheses relevant to the third research objective relating to the implications of fit among all variables in the research model on organisational effectiveness variable. Thus taking a holistic or systems approach of fit discussed earlier in Chapter 3.

5.7.1 Direct relationships between the contextual variables and MCS

This section contains seven sub-sections (sub-sections 5.7.1.1-5.7.1.7). In Sub-sections 5.7.1.1 to 5.7.1.6, the hypotheses relating to the direct relationships between (1) PEU and (2) strategy and the seven attributes of MCS identified in section 5.6 and listed in the research model are formulated. Sub-section 5.7.1.7 discusses the anticipated direct relationships between organisational structure and the MCS attributes. Research questions rather than hypotheses are formulated and presented in this sub-section.

5.7.1.1 PEU, strategy and budgetary practices/usage

MC literature indicates that budgets can be used for different purposes. For example, budgets are used as plans to guide operations, as targets with which to evaluate performance and as motivating device by linking budgetary target achievement with compensation. However, trying to use budgets to achieve different purposes can only create confusion since there are inevitable conflicts between the different roles or purposes of budgets. For instance, Cowen and Middaugh (1990) argue that using budgets for planning purposes require that they be stated in realistic or most likely outcomes. Where budgets are used as a motivational device, they should be based on attainable outcomes. For evaluation purposes, budgets should be adjusted to exclude the impact of items beyond the control of the personnel evaluated, while to use it for motivational purposes the standards must be fixed.

The literature also indicates that the practices and the usage of budgets depend to a large extent upon the ability to plan with a high degree of certainty. Different strategies imply different degrees of uncertainty and different degrees of uncertainty require different control and budgeting systems (Bruggeman and Van der Stede, 1993). According to Waterhouse and Tiessen (1978) budgets can be used for planning and control. Plans stated either in the form of budgets or specified procedures are a means of co-ordinating activities within organisations. In stable environments, organisations rely more on procedure specification as an efficient planning mechanism and use budgets for control purposes. Conversely, uncertainty implies that procedures and rules cannot be specified, thus budgets are used instead as a short-term planning tool.

With this regard, Waterhouse and Tiessen (1978) further argue that organisations facing certain and/or routine technology, rely on procedure specification as an efficient planning mechanism because procedures predetermine activities and sub-goals for long time periods. In contrast, in organisations facing uncertain and/or non-routine technology (as in differentiation strategy case), procedures are difficult to specify and document. Thus, direct control measures, which specify procedures and standards and then evaluate performance in terms of adherence to these procedures and standards, are not possible. In this situation, extensive reliance on budgeting process as an efficient planning mechanism becomes more important. Waterhouse and Tiessen imply that budgets in this situation serve as a tool for increasing organisational adaptiveness and responsiveness to environmental uncertainties. Thus, budgeting is expected to be participatory, flexible and subject to frequent revisions so that the budget can serve as important organisational response to environmental uncertainty.

Similarly, Anthony and Govindarajan (2001) argue that budgets in uncertain environments (also applies to prospector/differentiation strategy which is expected to operate in such environment) are likely to be less appropriate for control and performance evaluation because they are subject to continuous revisions and alteration during the year. More emphasis is given in this situation to using budgets for short-term planning and co-ordination rather than for control and performance evaluation purposes. It is difficult to determine targets that can serve as valid standards for performance evaluation in highly unpredictable and changing environments. Thus, it is more difficult to regard budget targets as firm commitments and it may thus be inappropriate to consider unfavourable budget variances as clear indicators of poor performance.

Conversely, narrow scope information (i.e. financial, historical and internal information) is likely to be sufficient for control in organisations operating within a stable environment (as with defender/low cost strategy). Thus, it is expected that these organisations will place greater emphasis on traditional accounting control systems (such as budgetary performance measures and cost control) and also attach higher importance to the achievement of budget targets by regarding them as firm commitments. Anthony and Govindarajan (2001) also argue that in a highly unpredictable and changing environment, as with prospector/differentiation strategy, it is difficult to determine targets that can serve as valid standards for performance evaluation. Budgets are subject to continuous revisions and alteration during the year and are therefore less appropriate for control and performance evaluation. In such situations more emphasis is given to using budgets as a forecasting and short-term planning tool rather than as a tool for evaluation and control.

However, contingency empirical studies concerned with budgetary practices and usage have reported contradictory findings, and have not provided clear insights into the real relationship between budgetary control systems and the contextual variables of business strategy and environment. Simons (1987), for instance, found that prospectors attach a great deal of importance to tight budgetary control (defined as importance attached to meeting tight budgetary targets), whereas a negative relationship between performance and tight budgetary control were found in large defenders.

The opposite results were reported in Govindarajan's (1988) study. In organisations pursuing a differentiation strategy, a low emphasis on meeting budget targets was associated with higher performance. Conversely, greater emphasis on budgetary control was associated with higher performance in firms pursuing low cost leader strategies. Moreover, Bruggeman and Van der Stede (1993) reported different findings suggesting that managerial commitment to achieving budgetary targets (defined as degree of adherence to budget targets required from business unit managers) is desirable for all strategies. They also found that low cost strategies require tight budgetary control (defined as the extent of toleration of unfavourable deviation from budget targets) with no revisions of budget targets during the year. In contrast, they found that differentiation strategies require looser budgetary practices with frequent revisions of budgetary target. Thus, in the case of differentiation strategy, it is difficult to consider unfavourable budget variances as a direct consequence of poor performance.

Abernethy and Brownell (1999) argue that budget variances can serve as a means of learning and debating how to respond to changes in environmental and operating condition in prospector type organisations facing a highly uncertain environment. Accordingly, budgets are used interactively rather than diagnostically in organisations pursuing a prospector/differentiation strategy. Thus, budgets are considered as tools to gather information and stimulate discussions about the effects of competitors' actions and threats in the external environment. Conversely, diagnostic use of budgets (i.e. the use of budgets for performance evaluation and controlling behaviour) is likely to be more effective in organisations pursuing a defender/cost strategy since they operate in a more stable environment where there tend to be well understood routines for performing tasks (Simons, 1990 and 1998).

The above discussion suggest that budgets are used in a looser manner (i.e. frequent revisions and less emphasis on meeting budgetary targets) in business units operating in uncertain environments and/or pursuing a prospector/differentiation strategy. In contrast, budgets are used in a tighter manner (i.e. less frequent revisions and more emphasis on meeting budgetary targets) in business units operating in more certain environments and/or pursuing defender/low cost strategy. Regarding the different purposes for which budgets are used, the above discussion also suggests that business units operating in uncertain environments and/or pursuing a prospector/differentiation strategy, will place greater emphasis on using budgets for planning and coordination purposes rather than for motivation, controlling and performance evaluation purposes. In contrast, the reverse situation would appear to apply to business units operating in a more stable environment and/or pursuing a defender/low cost strategy. Hence, the above discussion leads to the formulation of the following two sets of hypotheses:

<u>**Tightness of budgetary practices:**</u>

H_{1a}: PEU has a negative effect on the tightness of budgetary practices (i.e. less frequent revisions and more emphasis on meeting budgetary targets).

H_{1b}: Differentiation strategy has a negative effect on the tightness of budgetary practices (i.e. less frequent revisions and more emphasis on meeting budgetary targets).

H_{1c}: Low-cost strategy has a positive effect on the tightness of budgetary practices (i.e. less frequent revisions and more emphasis on meeting budgetary targets).

Budgetary usage:

H_{2a}: PEU has (i) a positive effect on budgetary usage for planning, coordination and communication purposes and (ii) a negative effect on budgetary usage for motivation, controlling and performance evaluation.

H_{2b}: Differentiation strategy has (i) a positive effect on budgetary usage for planning, coordination and communication purpose and (ii) a negative effect on budgetary usage for motivation, controlling and performance evaluation.

H_{2c}: Low-cost strategy has (i) a negative effect on budgetary usage for planning, coordination and communication purpose and (ii) a positive effect on budgetary usage for motivation, controlling and performance evaluation.

5.7.1.2 PEU, strategy and cost control system usage

Because the literature reviewed in Chapter 4 did not provide a strong theory relating perceived environmental uncertainty (PEU) to cost control practices, no hypotheses are formulated to PEU and cost control techniques. However, the literature reviewed in Chapter 4, suggested that efficiency and ongoing cost reduction and control were more important to businesses pursuing a defender/low cost type strategy compared with businesses pursuing a prospector/differentiation type strategy (Miles and Snow, 1978; Porter, 1980). Also more intensive use of cost control systems has been suggested to be more applicable when product price is the key success factor. Indeed, given its emphasis on controlling costs, it is understandable why this application is suggested for low cost leader strategy (Fry, Steele and Saladin, 1995). However, the limited empirical findings are not consistent with these arguments. For example, Simons (1987) found that defenders, compared with prospectors, used control systems less intensively. Different interpretations have been suggested in the literature (though not empirically tested) to explain the contradictory findings such as since defenders operate in more stable environments, they may not use cost control intensively, and may more effectively achieve efficiency using non-financial measures (Dent 1990). This relationship is explored further by testing the following hypotheses:

Cost control systems:

H_{3a}: Differentiation strategy has a positive effect on the use of cost control systems.

H_{3b}: Low-cost strategy has a negative effect on the use of cost control systems.

5.7.1.3 PEU, strategy and scope of information

Broad scope of information refers to the extent that external, non-financial and future accounting information is incorporated in MCS reports. Effective MCS requires the collection of intelligence information on emerging issues, opportunities and threats in the firm's external environment (e.g. customers' preferences, compititors' actions, new governmental regulaions, new technological changes) to guard against surprises and to enable senior management to take proper actions before opportunities are lost (Chenhall and Morris, 1986; Simons, 1990; Fiegener, 1994). Moreover, gathering relevant information on the firm's external environment enables the firm to anticipate the need to change its strategies and pickup weak signals or symptoms of future problems, thus enabling the firm to become more adaptive and proactive to environmental changes. Simons (1990, pp.635-636) quotes Feldman and March (1981) assertion that:

> Organisations, as well as individuals, ... gather information that has no apparent immediate decision consequences. As a result, the information seems substantially worthless within a decision-theory perspective. The perspective is misleading. Instead of seeing an organisation as seeking information in order to choose among given alternatives in terms of prior preferences, we can see an organisation as monitoring its environment for surprises (or for reassurances that there are none). The surprises may be new alternatives, new possible preferences, or new significant changes in the world.

In addition, the successful implementation of a chosen business strategy requires that senior management have access to relevant information when making decisions. Relevant information means that financial information must be complemented with key non-financial measures in order that key activities important to the success of the business are emphasised. The results of previous empirical studies (see Sections 4.4 and 4.5) indicate that high environmental uncertainty requires organisations to be more adaptive and responsive to external opportunities and threats. It places increased information processing demands on firms to manage uncertainty. Thus, scanning the environment and identifying potential opportunities and threats enables these organisations to be alert to uncertainties and to adapt to rapidly changing environments. Thus, there is a greater need for an effective MCS that provides relevant external, non-financial and future information on a timely and frequent basis in organisations facing higher uncertainty (Gordon and Narrayanan, 1984; Chenhall and Morris, 1986). Moreover as greater environmental uncertainty is claimed to be associated with prospector rather than defender type strategies, a greater amount of information would therefore be required (Miles and Snow, 1978; Chong and Chong, 1997). Thus, broad scope information is expected to be associated more with prospector/differentiation strategy rather than defender/low-cost strategy.

<u>**Scope of information:**</u>

H_{4a}: PEU has a positive effect on broad scope of information (i.e., external, non-financial and future information).

H_{4b}: Differentiation strategy has a positive effect on broad scope of information (i.e., external, non-financial and future information).

H_{4c}: Low-cost strategy has a negative effect on broad scope of information (i.e., external, non-financial and future information).

5.7.1.4 PEU, strategy and managerial evaluation and rewards

Compensation design is a form of MC that can be used to reward employees for their performance and encourage managers to make decisions that are in the best interest of the company. The relevance and reliability of performance criteria by which managers are evaluated and rewarded is a major aspect of an effective management control system. The literature depicts a strong causal relationship between managerial efforts and the dimension of performance on which they are measured and rewarded. If managers do not feel that the measure fairly reflect all important dimensions of their performance, or key success factors, then they will act in a way which is not in the best interest of their business (Cowen and Middaugh, 1990). For example, Anthony and Govindarajan (2001) argue that relying solely on financial measures (e.g., ROI, profits) encourages short-term actions that are not in accord with the company's long–term interests. The more pressure that is applied to meet current profit levels, the more likely the business unit manager will be to take short-term actions that may be inappropriate in the long run. This is particularly inappropriate in businesses pursuing a prospector strategy which emphasises long-term objectives such as product and market development.

Effective MCS requires setting relevant measures and standards against which managerial performance can be evaluated and rewarded. These measures must reflect explicitly the set of means-end relationships or the critical success factors that the organisation has developed as the methods it will use to effectively implement its strategic orientation (Otley, 1999). The fundamental thesis of contingency theory is that there is no single answer to managerial performance evaluation and compensation system design and that effective design depends on the business strategy and environmental uncertainty. To date, we have only limited knowledge of the nature of performance evaluation and incentive systems under different strategies and environments.

MC contingency literature (e.g., Fisher and Govindarajan, 1993; Anthony and Govindarajan, 2001) suggests that in determining a specific bonus amount for SBU managers, superiors have three alternatives to choose from:

i. The amount of incentive might be based on strict formula-based plan tied to performance on quantifiable criteria.
ii. Alternatively, incentive bonus amount might be based solely on superiors' subjective judgement or discretion.
iii. Finally incentive bonus amount might be based on a combination of formula and subjective approach.

Another aspect is the accuracy and reliability of performance measures and targets in which managerial performance is evaluated and compared. The literature suggests (e.g., Anthony and Govindarajan, 2001) that managers can be evaluated by comparing their actual results to three different standards:

i. Internal standards such as profit budget or past performance.
ii. External standards such as competitors' performance
iii. Or a combination of both Internal and external standards.

Anthony and Govindarajan (2001) suggest that defenders operating in stable environment are expected to use internal standards whereas business units adopting a prospector strategy and facing high environmental uncertainty may rely on external standards for benchmarking managerial performance. Anthony and Govindarajan further argue that relying on objective (strict formula) criteria is effective if there is little uncertainty about performance standards. However this may induce managers to pay less attention to the performance of their business units along dimensions that are important but difficult to quantify such as research and development and customer satisfaction. Subjective criteria in determining bonuses may be more appropriate in business units where managers' personal control over units' performance is low. In this situation, objective criteria are less valid measures of managerial performance. Moreover, when the strategy requires much greater attention to longer-term concern (as in the case of prospector strategy and rapidly changing environment) subjective measures are required.

Prior empirical research indicates that strategy implementation under conditions of high uncertainty as with a prospector type strategy, requires a more subjective approach towards the determination of incentive bonus (Govindarajan and Gupta, 1985; Simons, 1987). This is due, according to Fisher and Govindarajan (1993), to several factors including the fact that it is difficult to develop performance measures that accurately reflect managerial performance. Also, to arrive at priori targets that can serve as valid standards for subsequent performance appraisal, the conditions that will exist during the coming year must be predictable. Moreover, the critical success factors associated with prospectors such as new product development, innovation and R&D are of a long-run nature and difficult to quantify objectively. In contrast, in defender type organisations that operate in a stable environment, the critical success factors tend to be internally rather than externally focused. They also emphasise short-term financial measures for evaluating performance and rely more on a formula-based approach (requiring the establishment of quantitative targets) to determine managerial bonus amount. Based on the above arguments the following hypotheses are suggested:

Bonus determination approach:

H_{5a}: PEU has a positive effect on the extent of reliance on subjective (non-formula) approach relative to objective (formula based) approach for determining managers' incentive award.

H_{5b}: Differentiation strategy has a positive effect on the extent of reliance on subjective approach relative to objective approach for determining managers' incentive award.

H_{5c}: Low-cost strategy has a negative effect on the extent of reliance on subjective approach relative to objective approach for determining managers' incentive award.

Benchmark for managerial performance evaluation:

H_{5d}: PEU has a positive effect on the extent of use of external standards (e.g., competitors' performance) relative to internal standards (e.g., budget targets, last year's performance) for evaluating managerial performance.

H_{5e}: Differentiation strategy has a positive effect on the extent use of external standards relative to internal standards for evaluating managerial performance.

H_{5f}: Low-cost strategy has a negative effect on the extent of use of external standards relative to internal standards for evaluating managerial performance.

Managerial performance evaluation criteria:

H_{5g}: PEU has a positive effect on the extent of reliance on long-term non-financial criteria compared to short term financial criteria for evaluating managerial performance.

H_{5h}: Differentiation strategy has a positive effect on the extent of reliance on long-term non-financial criteria compared to short term financial criteria for evaluating managerial performance.

H_{5i}: Low-cost strategy has a negative effect on the extent of reliance on long-term non-financial criteria relative to short term financial criteria for evaluating managerial performance.

5.7.1.5 PEU, strategy and aggregation of information

In Section 5.6, it was pointed out that the dimension of MCS "presentation of information" is similar to the information characteristic of aggregation developed by Chenhall and Morris (1986). It deals with how to present the information to senior management in a comparable and understandable manner. Information is comparable and understandable if it enables senior managers to evaluate similarities in, and differences between, the actual performance with that over time and across different reporting entities. Different organisations are expected to present control information to senior management in different levels of aggregation and different formats based on their needs and circumstances.

Effective MCS require providing information in various forms of aggregations to enable managers to consider more alternatives and develop a better understanding of the performance of their business units as well as the performance of the whole organisation. Moreover, aggregated information enables managers to process larger quantities of information, by condensing information into a format that can be processed quickly and thus, increase the overall amount of information that can be processed within a given time with reduced risk of information overload (Bouwens and Abernethy 2000).

The literature on the relationship between aggregation and environmental uncertainty (see Section 4.3) indicates that organisations operating in uncertain environments require greater amounts of information processing to assist in planning and managing uncertainty. Thus, it is suggested that these organisations tend to present information in a more aggregated manner than those operating in more stable environments.

The relationship between strategy and aggregation has not been examined. However, Simons (1987) investigated the relationship between strategy and the extent to which control reports are tailored to departmental circumstances and the level of detail in control reports (break down by operating units, tasks, or activities). Simons argued that prospectors tend to design their control systems to accommodate local needs. However, Simons' argument regarding this relationship seems to focus on whether control systems are centralised or decentralised, thus providing us with little information regarding the actual relationship between aggregation and business strategy. Based on the above arguments and the anticipated belief that prospectors tend to operate in an environment that is subject to greater uncertainty than defenders, the following hypotheses are formulated:

Aggregation of information:

H_{6a}: PEU has a positive effect on the extent of aggregation of information.

H_{6b}: Differentiation strategy has a positive effect on the extent of aggregation of information.

H_{6c}: Low-cost strategy has a negative effect on the extent of aggregation of information.

5.7.1.6 PEU, strategy and timeliness of information

The third dimension described in section 5.6 deals with when to present the information. This dimension has been dealt with in the control literature as speed and frequency of reporting (Chenhall and Morris, 1986; Simons, 1987). The literature reviewed earlier in Chapter 4 suggested that this dimension is directly related to environmental uncertainty (Gordon and Miller, 1976; Chenhall and Morris, 1986). Timely information has the potential to reduce uncertainty and enable managers to be responsive to threats and opportunities in the market before it is too late. Thus, effective MCS must provide managers with timely and frequent information, so that managers are able to respond before it is too late.

With regard to strategy, Porter (1980) and Simons (1987) studied the relationship between strategy and one sub-dimension of timeliness (i.e. frequency of reporting). Porter suggested that efficiency-seeking strategies of low cost leadership require frequent and detailed control reports. Conversely, Simons (1987) found that that prospectors provide control reports to managers more frequently than defenders. Assuming that prospectors operate in an environment that is subject to greater uncertainty than defenders, it can be argued that they will have a greater need for relevant information that is provided in a more timely and frequent manner. Thus, it can be concluded that timeliness of information is related to both uncertainty and strategy, and higher performance is expected in organisations that consider this relationship when designing their control systems. From this argument the following hypotheses are formulated:

Timeliness of information:

H_{7a}: PEU has a positive effect on timeliness of information.

H_{7b}: Differentiation strategy has a positive effect on timeliness of information.

H_{7c}: Low-cost strategy has a negative effect on timeliness of information.

5.7.1.7 Organisational structure and MCS attributes

This sub-section deals with the expected direct effect or relationship between organisation structure and MCS attributes, depicted in the research model (Figure 5.1) by the pathway $P_{4i\ 3i}$. The relevance of organisational structure to the design of management accounting systems in general and control systems in particular has long been recognised in MC contingency theory literature. According to Waterhouse and Tiessen (1978) the essential argument in contingency theory is that organisational structure depends on firm context, further the effectiveness of certain organisational and managerial process including management control systems are contingent on organisational structure. More recently, Dent (2002) argues that different organisational structures give rise to differing planning and control requirements, while Chenhall (2003, p.22) contends "structure remains an important factor in understanding MCS design".

However, despite the importance of organisational structure to the design of MCS, the relationship between organisational structure and MCS design is still not validated or understood mainly because very few empirical contingency studies have investigated the relationship between organisational structure and the design of MCS (Chenhall 2003, p.20). In addition, there is unresolved debate in the literature (discussed in Sub-section 4.2.2) regarding the relationship between structure and MCS design. Different authors have considered accounting controls and structures as complementary mechanisms to each other (e.g., Otley, 1980), as substitutes or dependent on each other (e.g., Waterhouse and Tiessen, 1978) or as independent of each other (Gordon and Miller, 1976).

Consistent with organisational contingency theory arguments, an appropriately structured organisation will need to be complemented by the information from management accounting systems to produce higher levels of organisation effectiveness. Thus, by focusing on control requirements of alternative organisation structures, it would be possible to suggest possible relationships between organisation structure and the effective design of MCS.

Centralisation of decision making and formalisation of activities are considered as two major dimensions of organisational structure which have implications for the design of MCS. For instance, formalisation or activity structuring facilitates control by reducing the variability of behaviour and in turn, increasing its predictability. In contrast, centralisation facilitates control by direct influence over the decision making process for non-programmable events (Flamholtz *et al.*, 1985). To recall from the discussion in Chapter 3, organisational structure is mainly concerned with two opposing requirements, differentiation and integration (Lawrence and Lorsch, 1967). Differentiation is concerned with grouping jobs, activities, or processes into major organisational subunits or divisions, while integration involves coordinating and controlling the separate sub-unit activities so that they collectively aim to attain the overall goals of the firm. The mechanisms to achieve structural differentiation involve decentralising authority, while integration or coordination can be achieved through a number of formal mechanisms including standard policies and procedures and accounting control systems (Chenhall, 2003). Lawrence and Lorsch's (1967) main arguments and findings reviewed in Chapter 3, suggest that environmental uncertainty imposes on the organisation a seemingly conflicting set of demands with regards to the levels of differentiation and integration. The need for differentiated, creative and flexible responses to PEU implies a degree of organisational differentiation and decentralisation. Also, the need to respond rapidly and predictably requires a high degree of organisational integration and co-ordination.

In other words, the organisation must be creative in responding to uncertainties by having more delegation of authority (decentralisation), while maintaining control to ensure that the organisation responds effectively to environmental uncertainties by employing sophisticated integrative devices and controls. Thus, according to Lawrence and Lorsch (1967), highly differentiated and decentralised organisations require in addition to standardised and formalised procedures other formal integrative devises such as the use of sophisticated accounting control systems for integration and controlling. In contrast, in low differentiated and centralised structures, standardised and formalised procedures are considered sufficient tools for integration and controlling (see Sections 3.3.2 and 4.2.2 for further discussion).

Thus, it can be concluded from the above arguments, and consistent with Amigoni (1978) and Mintzberg (1979), that the more differentiated and decentralised the organisation structure, the tighter the style of control, the more relevant, detailed and aggregated the information systems, and the higher procedural rigidity and formality (Mintzberg, 1979; Amigoni, 1978). This is slightly different from the commonly held belief amongst many contingency theory researchers that organic structures (decentralised and less formalised structures) require loose control systems rather than tight control systems, while mechanistic structures (centralised and formalised structures) require tight control systems (Burns and Stalker, 1961; Gordon and Narayanan, 1984; Miller, 1988).

The limited empirical studies that attempted mainly to explore the relationship between organisational structure and MCS revealed very limited insights about the possible relationships that may exist (e.g. Khandwalla, 1972; Bruns and Waterhouse, 1975; Merchant, 1981; Gordon and Narayanan, 1984; Chenhall and Morris, 1986; Chia, 1995). These studies suggest that in large decentralised organisations, greater participation in setting budgetary targets, higher importance on meeting budgetary targets and greater budgetary usage are expected. In centralised organisations managers are held accountable for fewer financial variables and they perceive budgets as less useful and limiting their flexibility. According to Waterhouse and Tiessen (1978), control within decentralised organisations is more complex. Direct controls, which rely on specified procedures, are not feasible due to high environmental uncertainty and non-routine technology. Thus, organisations rely on more accounting control systems to reduce uncertainty and foster co-ordination. Also, there was some evidence relating the interaction of decentralisation and broad scope, integrated, aggregated and timely information received from MCS to managerial performance (Chia, 1995; Chenhall, 2003). Gordon and Narayanan (1984) found that broad scope and future oriented information was related to organic structures. However, after controlling for environmental uncertainty variable, no significant relationship was found.

Given the limited evidence provided by earlier empirical research, the anticipated relationship between structural dimensions of centralisation and formalisation and MCS attributes are posed as a general research question rather than research hypothesis: Does organisational structure have a direct effect on MCS design? This general research question can be sub-divided into seven questions relating to each dimension of MCS investigated in this research:

RQ_1: Do the structural dimensions of a) centralisation and b) formalisation have a direct effect on budgetary control system practices?

RQ_2: Do the structural dimensions of a) centralisation and b) formalisation have a direct effect on budgetary control system usage?

RQ_3: Do the structural dimensions of a) centralisation and b) formalisation have a direct effect on cost control system usage?

RQ_4: Do the structural dimensions of a) centralisation and b) formalisation have a direct effect on broad scope of information?

RQ_5: Do the structural dimensions of a) centralisation and b) formalisation have a direct effect on managerial performance evaluation and rewards?

RQ_6: Do the structural dimensions of a) centralisation and b) formalisation have a direct effect on aggregation of information?

RQ_7: Do the structural dimensions of a) centralisation and b) formalisation have a direct effect on timeliness of information?

5.7.2 Direct relationships between PEU, strategy and organisational structure

The previous section has considered the direct effects of contextual variables of PEU, business strategy and organisational structure on MCS dimensions. This section discusses the hypotheses relating to the anticipated relationships or linkages depicted in the research model between PEU and structure (pathway $P_{3i\,1}$), strategy and structure (pathway $P_{3i\,2i}$) and between PEU and strategy (pathway $P_{2i\,1}$). These pathways are relevant to testing the indirect effects of PEU and strategy on MCS acting through organisational structure. For instance, if both PEU and business strategy can be linked to the structural dimensions of centralisation and formalisation, and structural dimensions can be linked to MCS attributes MCS attributes, then the indirect effects of these variables on MCS acting through organisational structure can be assessed.

5.7.2.1 PEU and structure (pathway $P_{3i\,1}$)

It was pointed out in Chapter 3 that the main argument of structural contingency theory posits that variation in organisational structure is a consequence of, or dependent on, variations in environmental uncertainty. To recall from the discussion in Chapter 3, high environmental uncertainty encourages the development of organic type structure that emphasises decentralisation of decision-making and low degree of formality for effective organisations. In contrast, where there is low environmental uncertainty a mechanistic structure, with its high degree of formality and centralised decision-making, is more appropriate (Burns and

Stalker, 1961; Gordon and Narayanan, 1984; Miller, 1988). Generally, the common belief or rationale advanced for this relationship suggests that organisations facing uncertain environments will tend to design decentralised structures in order to be more effective and flexible in responding to unpredictable environmental changes. In addition, under high environmental uncertainty, procedures are difficult to specify and document and thus it is not possible to control behaviour in terms of adherence to these procedures and rules (Waterhouse and Teissen, 1978). Based on this argument the following specific hypothesis will be tested in this research:

H_8: PEU has a negative effect on the structural dimensions of (i) centralisation, and (ii) formalisation.

5.7.2.2 Strategy and structure (pathway $P_{3i\,2i}$)

Strategic management researchers suggest that an optimal strategy-structure match will result in higher performance (Miles and Snow, 1978; Porter, 1980; Miller, 1988). To recall from section 4.5.1, defensive and efficiency seeking strategies, i.e. defender/cost leader strategies, generally perceive a great deal of stability in their environment. Thus they require uncomplicated and inexpensive forms of co-ordination and control such as standardisation and scheduling of activities, and more formal, bureaucratic and centralised structures. Strategies that deal with greater uncertainty and innovation, i.e. prospector and differentiation strategy, require looser, organic and decentralised structure to facilitate rapid response to environmental change and to encourage innovation. Flamholtz *et al.* (1985) argue that in entrepreneurial organisation (i.e. proactive, innovative and risk-taking organisations), the structure ought to be characterised by decentralisation rather than centralisation, loosely defined rules rather than tight rule definition and minimal rules and standard operation procedures rather than extensive rules and procedures. If not, there will be an obvious incongruity or misfit between strategy and organisational structure. From this, the following two hypotheses are suggested:

H_{9a}: Differentiation strategy has a negative effect on the structural dimensions of (i) centralisation and (ii) formalisation.

H_{9b}: Low-cost strategy has a positive effect on the structural dimensions of (i) centralisation and (ii) formalisation.

5.7.2.3 PEU and business strategy (pathway $P_{2i\,1}$)

It has been pointed in Chapter 4, Section 4.5 that organisations pursuing a differentiation or prospector strategy have broad product lines and engage in product innovation and development. Thus, it is considered more appropriate and useful in environments that are unpredictable and subject to much change in customers' preferences, products and practices. Without innovation and new product development firms operating in uncertain environments would lose market share and become less profitable (Miles and Snow, 1978; Porter, 1980; Miller, 1988). Cost leadership/defender strategy, in contrast, focuses on being the low cost producer of a narrow product range and keeps the essentially undifferentiated product offerings relatively stable over time. This implies that little product and market development is undertaken. Thus, uncertain environments (unpredictable and subject to much change) create severe diseconomies for firms trying to pursue cost leadership strategy. From this argument, the following two hypotheses are suggested:

H_{10a}: PEU has a positive effect on differentiation strategy.

H_{10b}: PEU has a negative effect on low-cost strategy.

5.7.3 MCS design and organisational effectiveness

This sub-section deals with the hypothesis relating to the third research objective concerned with the implications of fit among all variables included in the research model on organisational effectiveness. It was pointed in Section 5.4 that the relationship between MCS and organisational effectiveness is problematic and there is no clear theory or empirical evidence to validate that unidirectional relationship between MCS and organisational effectiveness (Van der Stede, 2000, p.614). It was also pointed out in Chapter 3, Sub-section 3.4.2 that the systems approach of fit emphasises the need to examine patterns of consistency among dimensions of organisational context, structure and performance. In the context of MCS, this would mean that it is the appropriate coalignment or fit among PEU, business strategy, structure and MCS attributes that will influence performance (further details on this approach and the statistical analysis procedure is given in Chapter 8, Section 8.5). Thus, the systems approach to fit adopted in this research assumes that any one dimension or variable by itself is insufficient for achieving organisational effectiveness. Based on this argument, the following hypothesis is formulated:

H_{11}: The internal consistency, coalignment or fit among MCS attributes, PEU, strategy and structure has a positive effect on organisational effectiveness.

5.8 Summary

Based on the literature reviewed in Chapters 3 and 4, the limitations and gaps of earlier MC contingency studies have been discussed and summarised as follows:

1. Insufficient attention given to organisational effectiveness (Sub-section 5.2.1);
2. Excessive focus on bivariate models (Sub-section 5.2.2);
3. Lack of consistency in measuring MCS attributes (Sub-section 5.2.3);
4. Lack of methodological rigour in instrument validation and model testing (Sub-section 5.2.4).

A detailed discussion of the research model (Section 5.4) including the conceptual definitions of the variables incorporated in the model have been also introduced in this chapter. The illustration and discussions forwarded for explaining the research model indicated that the current research extends earlier studies and achieves the following research objectives:

1. To examine the direct relationships between the three contextual/contingent variables of: a) environmental uncertainty b) business strategy, and c) organisational structure and various attributes of MCS simultaneously;
2. To examine the indirect relationships between the two contextual variables of: a) business strategy, and b) environmental uncertainty, acting through organisational structure, on various attributes of MCS; and
3. To examine whether a fit or coallignment between the contextual variables and MCS attributes is associated with greater organisational effectiveness.

A thorough discussion of the conceptual definition of MCS and the attributes selected in this research to provide a comprehensive view of MCS design has been given in Section 5.6. Finally, the anticipated relationships between the contextual variables and MCS as were depicted in the research model and the theoretical arguments for the research questions and hypotheses that will be investigated in this research were discussed in Section 5.7.

CHAPTER 6

THE RESEARCH METHODOLOGY

CHAPTER 6

The Research Methodology

6.1 Introduction

According to Hussey and Hussey (1997) research methodology is more than simply the methods by which data are collected. It refers to the overall approach to the research process that involves theoretical development, data collection and analysis. The aim of this chapter is to describe the research methodology that has been applied for undertaking this research and to explain the stages undertaken and the methods employed by the researcher to collect the data. More specifically, this chapter is structured as follows: it starts with an overview of the research paradigm and methodology, followed by a detailed discussion of the research population, sample and sampling procedure. It then provides a detailed description of the data collection method and stages including questionnaire construction and pre-testing, features of the covering letter, the respondents, survey administration and response profile. Finally the chapter ends with non-response bias tests and the justification for the statistical methods used for achieving the research objectives. The operationalisation of the research constructs and their validity-reliability assessments are reserved for Chapter 7.

6.2 Research methodology and paradigm

There are different types of research methodology available for researchers to conduct their studies (e.g., survey, case study, and experiment). The choice of any particular methodology depends on the research paradigm or philosophy (i.e. the view or approach) that a researcher follows to conduct his research (Cresswell, 1994). The two main research paradigms or philosophies about the way in which knowledge is developed and research is conducted in social sciences in general and management accounting literature in particular are "positivism" and "phenomenology". These two research paradigms are sometimes described in the literature by different terms. However, Hussey and Hussey (1997) pointed out that the terms that relate to each paradigm tend not to be interchangeable and have arisen as a result of personal preferences of different authors. Table 6.1 summarises some of the more common terms used in literature.

Table 6.1 Alternative terms for the main research paradigms

Positivistic paradigm	Phenomenological paradigm
Quantitative	Qualitative
Objectivist	Subjectivist
Scientific	Humanistic
Experimentalist	Interpretivist
Traditionalist	Postpositivist
Empiricist	Naturalistic

Source: Adapted from Hussey and Hussey (1997, p.47) and Cresswell (1994, p.4).

According to Perry (1998) the differences between the positivistic and phenomenological research paradigms can be viewed in terms of the two major approaches to theory development, deductive theory testing and inductive theory building. The deductive approach represents the positivistic paradigm and the inductive approach represents the phenomenological paradigm.

The positivistic paradigm seeks to deduce or identify a testable hypothesis about the relationship between two or more variables from a theory, which is then tested empirically by gathering data on the relevant variables and then applying statistical tests to the data in order to identify significant relationships. The findings may either confirm the theory or result in the modification of the theory in the light of the findings (Saunders, Lewis and Thornhill, 2000; Hussey and Hussey, 1997). The emphasis is on a highly structured methodology to facilitate replication and verification of the revised theory by other researchers. Also quantifiable data is obtained from a large sample to generalise the findings and to conduct statistical analysis (Saunders *et al.*, 2000). According to Ryan, Scapens and Theobald (1992), contingency theory research which attempt to determine general relationships that are replicated across large number of organisations provides good illustration of the positivistic paradigm. Thus, cross sectional studies employing a survey methodology are often used in this paradigm.

In contrast, the phenomenological paradigm arose as a result of criticisms of the positivistic paradigm. Critics argued that the positivistic paradigm made causes and effect links between variables without consideration of the way in which humans interpreted their social world. Thus, the starting point for phenomenological paradigm according to Ryan *et al.* (1992), is the belief that social practices, such as management accounting practices, are not ratural phenomena. Instead they are socially constructed and emerge as a result of the social practices of organisational participants.

The importance attached by positivism to producing generalisations was criticised on the bases that business situations are complex and unique to each organisation. Thus, looking for universal law and generalisation across organisations is not realistic and not of crucial importance (Saunders *et al.*, 2000). With the phenomenological paradigm, the context in which a phenomenon, such as management accounting practices is taking place is more important. Therefore, in contrast to the positivistic paradigm, the phenomenological paradigm requires a holistic orientation in which a phenomena is studied in its wider organisational, social and political context over time. Studies that fall under this paradigm often require a longitudinal case study research methodology that employs a variety of methods to collect data from small sample of organisations in order to develop detailed and different views of phenomena. Table 6.2 summarises the distinguishing features between the positivistic and phenomenological paradigms or philosophies. Hussey and Hussey (1997) point out that the two paradigms shown in Table 6.2 must be viewed as two extremes of a continuum, and that none of these two paradigms is considered better than the other. The choice of either paradigm is determined partly by the current knowledge of the topic and research problem under investigation.

Table 6.2 Distinguishing features of the main research paradigms

Positivistic paradigm	**Phenomenological paradigm**
Tends to produce quantitative data	Tends to produce qualitative data
Uses large samples	Uses small samples
Concerned with hypothesis testing	Concerned with generating theories
Data is highly specific and precise	Data is rich and subjective
Generalises from sample to population	Generalises from one context to another

Source: Hussey and Hussey (1997).

Given the research objectives and the fact that prior MC contingency research (though still limited and disparate) has provided a fairly good priori indication of the important contingency factors, the 'positivistic paradigm' is considered as the most suitable approach for conducting the present research. Also because of the desire for greater generalisability and external validity, cross sectional survey methodology, based on data collected from a large number of organisations just once and over a short period of time, is adopted for this study. The justification behind choosing this research methodology is fourfold:

1. For practical considerations including the time savings arising from adopting a cross-sectional survey methodology and the effort and resources required in comparison with longitudinal and case study methodologies (Cresswell, 1994). Moreover, the difficulties associated with gaining access to UK manufacturing companies, particularly for oversees researchers, has initiated the preference for a survey methodology over case study or experimental methodologies.
2. In surveys, it is possible to generalise the research findings relating to management control systems design to the whole population rather than few organisations or contexts (Hussey and Hussey, 1997; Saunders *et al.*, 2000; de Vaus, 2001).
3. Unlike case studies, surveys allow the collection of a large amount of data from a large population in a highly economical way (Saunders *et al.*, 2000). This provides more evidence about the specific types of control that suits different strategies and situations (Chenhall and Langfield-Smith, 1998).
4. Conducting multivariate analysis, as in this research, requires a fairly large number of organisations, which can be reached by adopting a survey methodology (Pennings, 1987).

According to Saunders *et al.* (2000), two critical stages are required that need special attention when conducting a survey methodology: first, the selection of research sample that is representative of the population from which it is drawn; second, choosing the appropriate method for collecting the data. These two critical stages are discussed next.

6.3 Research population and sample boundaries

Oppenheim (1992) states that the term population is defined as all those individuals, companies or cases who fall into the category of concern. The population of this research is defined as all medium and large manufacturing companies in the UK. The justifications for selecting this category of organisations are as follows:

1. Only medium and large organisations are considered in the population of this study, while small companies are excluded. The reason for this is that small firms, employing less than 200 employees, are expected not to rely on sophisticated and well designed MCS or to

employ a clear articulated business strategy. Instead, these firms are likely to rely more on informal systems and strategies. This criterion was also used in earlier strategic management and MC contingency studies (e.g., Miller, 1987; Chong and Chong, 1997; Sim and Teoh, 1997; Gosselin, 1997; Choong and Grover, 2000).

2. This research is mainly concerned with studying the effect of business strategy, environment and structure on the effective design of MCS at the organisational level (i.e. at the level of self-contained divisions, stand-alone subsidiaries and organisations) rather than at the functional or departmental level. To recall from our discussion in section 4.2.1, the variables under investigation in this research can best be studied at the organisational level rather than at the departmental or functional level. This is not to imply that studies at the departmental level are not important, but it is the organisational level of analysis that has been employed by major contingency studies (e.g. Burns and Stalker, 1961; Porter, 1980; Miles and Snow, 1978; Miller, 1988; Simons, 1987).

3. Consistent with the recommendations to control for certain variables like industry segments, technology and/or size to ensure greater validity for the findings of empirical research, it was decided to include only companies operating in the manufacturing industry. Therefore companies in non-manufacturing industry are excluded from the sample population. The rationale behind this decision is based on the argument that manufacturing companies may design their MCSs differently than non-manufacturing industries (Fisher, 1995; Drury, 2000). Thus, moving from one industry sector to another may cause problems in terms of comparability among measures of MCS and its correlates. Moreover, as the contingency theory of MCS is still not fully developed it may be wiser to conduct different studies in different industry sectors before a comprehensive sampling plan is finally prepared. This is consistent with the approach suggested by Snow and Hambriak (1980). Thus, sampling based only on the manufacturing industry ensures some homogeneity in the type of business operations and provides comparability with earlier MC contingency research that has focused mainly on manufacturing industry (e.g., Miles and Snow, 1978; Porter, 1980; Simons, 1987).

6.4 Research sample and sampling frame

Having defined the research population, and the criteria to be used to select a representative sample, it was necessary to identify the sampling frame or the appropriate list of the population from which the sample could be drawn. According to de Vaus (1993), the ability to establish a representative sample depends on the availability of a complete and accurate list of the population. Thus, based on the criteria set for selecting the companies and the need to target a single respondent in each company for achieving an adequate response rate an appropriate database was required. The criteria for selection were accuracy and the provision of complete information for each company relating to size, industry sector, the names of the directors and their job titles.

Initially, three different databases were available for the researcher to set the sampling frame. These were the Times 1000, FAME and CIMA databases. The Times 1000 database includes information on largest 1000 UK manufacturing and non-manufacturing companies. However, after excluding non-manufacturing companies, only 296 manufacturing companies remained as potential sampling frame. The need for a large number of medium as well as large companies and the expected low response rate commonly found in mail surveys resulted in the exclusion of this database.

The second database was FAME. This database was updated in 2001 and contained information on the latest number of employees, sales turnover, industry segment and names and addresses of over 136 thousand companies operating in the UK. Based on the criteria established earlier for selecting the sampling frame, the FAME database consisted of about 4800 companies operating in the manufacturing industry with 200 or more employees. Unfortunately, this database did not include the job titles of the directors of each company. The third database considered was the CIMA database. It consisted of names of more than 18,000 CIMA members specifying their job-titles, their companies' name and address and the size of each company. The limitations were that information relating to the size of some companies was missing and the size category used was too broad (i.e. 201-10,000 employees, 10,000+). Much effort was made to shorten the CIMA database to fit the criteria. Initially the list was shortened to 5700 names operating in manufacturing companies with over 200 employees. Deleting the companies entered more than once also shortened this list to 2300 companies with the names and addresses of their financial controllers, finance directors or management accountants.

Comparing FAME and CIMA databases it was decided to use FAME database for setting the research sampling frame and selecting a random sample because it was more comprehensive and covered a larger number of medium and large manufacturing companies. Therefore, the sampling frame was based on the FAME database. It consisted of 4888 medium and large manufacturing companies operating in the UK. Additionally the decision to obtain data from directors of finance, financial controllers or equivalent senior management accountants resulted in the need to use CIMA database as a complementary list for providing additional information on the selected sample.[1]

Having chosen the sampling frame it was necessary to determine the sample size and to select a random sample. According to de Vaus (2001) determining the sample size depends on funds, time and the planned method of analyses. Moreover, de Vaus (2001) suggests that the larger the sample size the more it can be subdivided so that meaningful sub-group comparison (e.g. between different business strategies and their MCSs) can be made. Bearing this in mind, and given that the research objectives require a large amount of data to facilitate conducting advanced statistical techniques, a random sample of 1000 companies operating in various manufacturing sectors with their size ranging from 200 to over 10,000 employees was selected from the population. This large sample was also selected to provide caution against the risk of obtaining a low response rate, which is common in mail surveys. For instance, Saunders *et al.* (2000) examined the response rates of recent business surveys and found that rates as low as 15-20 percent are common in mail surveys.

6.5 Data collection method

Two main methods of data collection are commonly used within survey methodology, mail questionnaires and interviews. According to de Vaus (2001) the choice of any particular data collection method will depend on many factors including the size of the sample, the extent to which they are clustered in one place or are widely scattered, the time and resources available and the sensitivity and complexity of data collected.

[1] The rationale for this decision will be discussed later in this chapter, Section 6.8.

Given the objectives of this study, which require a potentially large sample of a targeted population in geographically dispersed locations, mail questionnaires were chosen as the method of data collection for the following reasons:

1. Unlike interviews, mail questionnaires enable researchers to collect data from a large and dispersed random sample of population at a relatively low cost and high speed. This reduces the time pressures and cost constraints commonly facing PhD researchers.
2. Unlike interviews, mail questionnaires place less pressure on respondents for an immediate response and provide them with a feeling of anonymity. This enables them to participate in the study and express their points of view more freely and away from interviewer's expectations (Gosselin, 1997).

6.6 Questionnaire construction and pre-testing

According to Dillman (1978, p.119) the mail questionnaire more than any other data collection method requires careful construction because it is under the respondents' complete control. Unlike other data collection methods, questionnaires provide the researcher with only one chance to collect the data. It is difficult and time consuming to return to the respondents to collect additional information once they have completed and returned the questionnaire. Thus, to ensure that the relevant questions are asked prior to data collection, considerable time and effort was devoted towards the construction and pre-testing of the questionnaire used in this research. Several drafts and a thorough evaluation and pre-testing were carried out prior to determining the final version of the questionnaire. The questionnaire employed in this study consisted of eight pages (A4 sized) including the front and back covers. It contained 86 items categorised under six main sections. The first five sections covered the research variables MCS,* business strategy, external environment, structure, and organisational effectiveness. The last section provided additional data regarding respondents' characteristics and their interest in receiving a copy of research findings. A copy of the questionnaire is shown in Appendix A.

According to de Vaus (1993) the construction of a "good questionnaire" involves thinking ahead about research problem and what the concepts mean and how they should be operationalised. In addition, it is necessary to decide on which question format to use (open or closed ended) and questionnaire layout. The following is more detailed description of the different stages of questionnaire construction and pretesting.

6.6.1 Question types and formats

Two types of questions are available for constructing the questionnaire, the open-ended and close-ended types (de Vaus, 1993). An open ended question is one for which respondents formulate their own answers, while close-ended question is one in which a number of alternative answers are provided for respondents to choose from. According to de Vaus (1993) there is no right or wrong approach and the choice of open or closed questions depends on respondent motivation to participate, method of administration, type of respondents and type of question content. In long and comprehensive mail questionnaires it is recommended that closed-ended questions are used since they can be quickly answered and easily coded, and to restrict the use of open questions to a minimum (de Vaus, 1993; Mangione, 1995).

In this research, the main type of question used in constructing the questionnaire was the closed-ended type. In addition, a few open questions in the form of "others (please specify)" or "anything else" were used in questions A15, A20, and at the end of the questionnaire to give respondents the opportunity to express their views on specific questions or to add additional insights or comments. Also open questions were used in questions B1-B4 in order to obtain specific and short answers about the business unit size and type of operations. This is consistent with Mangione (1995) recommendation to use open questions in circumstances where questions require short and specific answers or the list of all possible answers is so large that is impractical to put a check box response for each one.

Due to the comprehensiveness of the questionnaire, and the complexity of research variables, three types of closed questions were used in the questionnaire. These include category questions, ranking questions and scale questions. According to Saunders *et al.* (2000) category questions are designed so that each respondent's answer can fit only one category. These questions are useful when collecting data about behaviour or attributes (i.e., about respondents', or their organisations', practices or characteristics). This type of questions was used in the questionnaire in two sections. The first was in section B (Part 3) where the respondents were given three statements and asked to select the one that represented their organisations' type. The second was in the last section (questions F1, F7 and F8) which were concerned with respondents' location in the organisation structure, approval to arrange a meeting and request for research results respectively. The second type of question used is the ranking type. A ranking question asks the respondent to place items in rank order in order to determine their importance to the respondent. This type of questions was used only in question A27 where respondents were asked to rank non-financial performance measures in order of importance to their organisations.

The main type of closed questions used in this questionnaire was scale or rating questions. Rating questions include a list of alternatives that range from not much of a particular attribute to a great deal of that same attribute (Mangione, 1995). Rating scales are often used in terms of a Likert scale in which respondents indicate how strongly they agree or disagree with a statement or series of statements by ticking a box or number. According to Hussey and Hussey (1997) rating scale questions have the advantage of listing different statements that do not require much space and are quicker for respondents to complete and for researchers to code. This type of questions was used throughout this questionnaire to measure the main research variables including business strategy, environment, structure, effectiveness, and most of the MCS dimensions. Positive and negative statements were included for the rating questions (e.g. questions A1, A7 and A8) to ensure that the respondents read each statement carefully and thought about which number to tick (consistent with Saunders *et al.*, 2001 recommendation). Another variation of rating scale question, the semantic differential scale, was also used in section A (part 5) to describe managerial evaluation and rewards practices in respondents' business units. This form of scales involves selecting two words or phrases to represent two ends of a continuum and respondents are asked to mark their choices usually on a seven-point scale.

Finally, although the length of scales is a debatable issue, seven-point scales were used throughout the questionnaire based on the argument that more points on a scale provide an opportunity for greater sensitivity of measurement (Roberts, 1999). In addition, itemised scales where each category in the scale is being defined were used (where possible) throughout the questionnaire. This is consistent with Emory and Cooper (1991) argument that itemised scales provide more information and help respondents to develop and hold the same frame of reference as they complete the questionnaire.

6.6.2 Questionnaire layout and flow

Two potential problems often encountered mail surveys are low response rate and non-response bias. In order to maximise the probability of responses and minimise non-response bias Dillman's (1978) "total design method for surveys" was mainly considered for constructing the questionnaire. This approach considers understanding respondent's behaviour and the reasons for it as the key issue for constructing effective surveys and maximising response rates. According to Dillman (1978) constructing effective mail questionnaires includes not only the questions but also other critical aspects such as general appearance, clear instructions and ordering the questions. Leaving any of these attributes unattended will make the overall design of the questionnaire less appealing. For instance, Dillman (1978, p.120) argues that "the respondent's first exposure to the look and feel of the questionnaire provides the first of several critical tests that the questionnaire must pass."

The eight-page questionnaire was printed as a booklet, which consisted of two A3 sheets of paper, folded in the middle and stapled to form a booklet. Printing questionnaires on both sides of the page as in booklets requires less paper and makes them appear shorter and more professional, which would motivate respondents to participate (Dillman, 1978). The front page or cover creates respondents' first impression. It was therefore reserved for material that would stimulate interest in the research. It contained the logo and name of Huddersfield University placed at the top of the cover, followed by the study title and a summary of the main message in the covering letter with instructions for completing the questionnaire. A return address was also included in the front cover to enable respondents to return the questionnaire in case it was separated from the covering letter and return envelope. In addition, the name, job title and address of the respondent was printed at the top right-hand side of the front page to facilitate the administration process of the questionnaire and the follow up procedures. Although respondents' anonymity was not assured, the confidentiality of information including respondents' names and their organisations was assured in the front page, the last page and in the covering letter.

Another important issue in questionnaire design is the flow or order of questions in the questionnaire. A questionnaire with good flow is easier to use, motivates respondents and helps them to remember and provide accurate information (Mangione, 1995). Consistent with the guidance suggested by Dillman (1978, pp.123-127) and Saunders *et al.* (2001, pp.300-301), the flow of the questionnaire was based on the following two principles:

First, the most relevant questions to the survey purpose and of interest to the respondents (i.e. financial directors) were placed at the beginning of the questionnaire (i.e. questions about MCS), while less relevant questions (i.e. personal questions) were placed at the end. This contradicts the general belief to begin with easy questions (e.g. age, sex, and number of employees) in order to "break the ice" with respondents. It was considered that the well-articulated covering letter (to be discussed later) and the general instructions in the front page of questionnaire served as an "icebreaker". In addition, the importance of the topic and respondent's opinion to its development was communicated in the covering letter in order to establish respondents' willingness to participate. Thus, starting the questionnaire with personal or less relevant questions to the topic is likely to jeopardise respondents' initial enthusiasm to participate (Dillman, 1978).

Second, questions that are similar in content were grouped under five major topics or sections. For instance all questions related to MCS were grouped together under Section A whereas questions relating to organisational type and strategy, environment, structure, effectiveness and respondent's personal attributes were grouped under Sections B, C, D and E respectively. In addition, within each section (where applicable) similar questions were ordered under different sub-titles. For instance, in section A, questions relating to each control sub-system or dimension (e.g. budgeting, costing, performance measures, presentation of information) were grouped together. Grouping questions into sub-topics helps respondents keep a frame of reference as they answer the questions and encourages them to provide well thought out answers (Dillman, 1978; Mangione, 1995).

Another important element of constructing questionnaires, which also has an effect on response rates, is the clarity of instructions. According to Mangione (1995, p.74)

> It is not surprising to find that forms that have complicated or confusing or wrong instructions create frustration to respondents and that the result of this frustration is a failure to return the questionnaire.

Thus, in order to have clear instructions the purpose of each section in the questionnaire was stated in a bold upper-case letters at the beginning of each section. In addition, precise instructions for each section or sub-section were printed in boldface italic letters in order to distinguish between instructions and questions or statements (de Vaus, 1993). For scale questions, fully itemised scales in boxing format and printed in boldface letters were also used to provide clearer instructions.

6.6.3 Questionnaire pre-testing procedures

Although a considerable effort was made to produce a well-designed questionnaire, it was essential to pilot or test the questionnaire before distributing it. Pre-testing the questionnaire prior to data collection is vitally important to ensure that the final version contains questions that are specific, clearly understandable and capable of being answered by respondents (Chisnall, 2001; Saunders *et al.*, 2001). Moreover pre-testing was essential to identify any construction defects, to establish face validity of the questionnaire and to improve format and scales (Dillman, 1978; Saunders *et al.*, 2001).

According to Remenyi, Williams, Money and Swartz (1998, p.151) pre-testing can be informal involving consulting colleagues, experts or people of diverse opinions. Alternatively it can be formal involving a pilot study which replicates the main survey, but on a small scale. Three groups of people were consulted for testing and refining the questionnaire including colleagues, experts or academics and practitioners or people representing the targeted respondents. Each of these groups has provided different insights and comments, which helped in improving the questionnaire. This is also consistent with the recommendations to include people from various fields and with different perspectives in the pre-testing stage to obtain different insights and ideas (Dillman, 1978; Oppenhiem, 1992; Mangione, 1995; Huusey and Hussey, 1997).

The first stage of pre-testing started with distributing the first draft of the questionnaire to eight colleagues undertaking their PhDs in various subjects at Huddersfield University Business School. The feedback obtained from this group resulted in very minor changes relating to the wording of questions and instructions. Also the majority commented on the clear presentation and layout of the questionnaire.

The second stage of pre-testing was conducted with four academic professors in different subjects including accounting, organisation theory and management at Huddersfield University Business School. Useful comments were received from this group including suggestions for changes to the wording and scales of some questions. For instance, one professor commented on the wording and layout of questions relating to the "presentation of information" dimension in section A (Part 6) suggesting rewriting them to save some space and shorten the questionnaire. This was considered in the third version of the questionnaire. Another professor commented on the scales used for questions A41 and A42 and suggested using multiple choice question format since seven-point scales 'seemed to stretch things a bit.' However, it was decided to retain the seven-point scale for these questions to preserve the consistency of scales used throughout the questionnaire and the comparability with previous research that used the same question format (e.g. Simons, 1987; Sim and Toeh, 1997). Other comments were merely related to stylistic issues. In general, the comments indicated that there were not any significant problems with the questionnaire and that it was consistent with the objectives of the research.

The third stage of pre-testing involved a meeting with a finance director of a large manufacturing company operating in the UK. The aim of this meeting was to obtain feedback from persons similar to the respondents in the targeted sample. Consistent with Margione (1995, pp.24-25) recommendations for conducting this stage of pre-testing, the aim of the study was explained at the beginning of the meeting. The meeting sought to obtain feedback on unclear instructions, ambiguous wording, confusing questions, the time required to complete the questionnaire and the ability of respondents to answer the different aspects targeted in the questionnaire. The questionnaire was completed by the finance director during the meeting. This was followed by a thorough discussion of its contents and on the subject of management control in general. Significant benefits and comments were obtained from this meeting indicating that no significant changes were required. The following are some of the comments made during the meeting, which lasted for approximately two hours:

1. The high interest in the subject of survey and its importance to manufacturing companies.
2. Finance directors and controllers should have sufficient knowledge for answering all the questions in the survey. This provided some assurances regarding the appropriateness of respondents to answer this survey.
3. The questions were clear and understandable and the layout and structure of the questionnaire was excellent.
4. The questionnaire took 35 minutes to complete but the respondent indicated that it would has been possible to complete it in less time if no interruptions had occurred. This suggests that the length of questionnaire is suitable.

At the end of meeting the finance director asked for a copy of the results. In addition, he provided names and addresses of another three finance directors who were able to participate in the pilot testing stage. A questionnaire was sent to each one of them with a covering letter asking them to comment on its content. Two questionnaires were returned completed with no comments, which suggests that the questionnaire was satisfactory.

In addition, before and throughout all of the above pre-testing stages, the questionnaire was also subject to thorough discussions and revisions between the researcher and his director of studies to ensure that the final version was adequate. According to Dillman (1978, p.158) "it is desirable to complete the pre-testing process with a small scale survey in which all the procedures to be followed in the actual survey are used." However, as discussed earlier, the questionnaire was subject to different pre-testing stages and revisions prior to reaching its final state. Thus, it was decided that the questionnaire in its present state was suitable for the main survey and that an additional pilot survey would not provide any significant improvements. This is also consistent with Dillman (1978, p.158) argument that "if the other pre-tests have been done adequately, a pre-test survey probably provides very little additional insights into questionnaire defects."

6.7 Features of the covering letter

In most mail surveys, respondents receive questionnaires without prior notifications. Thus, the covering letter accompanying the questionnaire establishes the initial and perhaps the only communication link between the researcher and respondents. Consequently, the appearance and message contained in the covering letter will have an effect on convincing and motivating respondents to participate in the survey and on the response rate (Dillman, 1978; de Vaus, 1993; Saunders *et al.*, 2001). Consistent with the recommendations mainly suggested in Dillman (1978, pp.165-172) and others (e.g. Erdos and Morgan, 1970, p.102; de Vaus, 1993, pp.116-117; Mangione, 1995, pp.63-64; Saunders *et al.*, 2001, pp.303-304), the following are the main features of the covering letter used in this research.

The letter was written on a single page and used Huddersfield University official letterhead. The first paragraph provided information about the study purpose and its importance to respondents' organisations. It was considered necessary to begin the letter with such information in order to establish in the respondents' mind that the study is important and to encourage them to read the rest of the letter. The second paragraph aimed to give the respondents the impression that their participation in the study was very important to its success and to let them know why and how they were selected. The third paragraph was devoted mainly to overcome some of the fears held by many respondents that their answers would be used for purposes other than research purposes. Respondents were assured that their answers would only be used for academic purposes. In addition, the complete confidentiality of information provided by respondents including their names and their organisations' was assured in the third paragraph and was reiterated in the questionnaire's front and last pages. It was also stated in the third paragraph that the results will be available for respondents by ticking a box in the last page of the questionnaire. Such a statement was given to encourage respondents to complete the questionnaire. The last paragraph of the cover letter re-emphasised the importance of respondents' participation and provided a statement asking them to return the questionnaire within a specific date and that a postage-paid addressed envelope was attached. Finally, the covering letter was personally addressed to a specific person in each organisation to obtain a high response rate. According to Erdos and Morgan (1970) addressing the respondents by name will always look more personal than the "Dear Sir" salutation and will generally increase the probability of their participation in the study. A copy of the covering letter is shown in Appendix B.

6.8 The respondents

In the face of time and cost constraints the single informant approach was considered because it allows for a large number of organisations to be surveyed. Although the CEO is generally viewed as the individual in an organisation who is most qualified to provide valid responses to questions (Conant, Mokwa and Varadarajan, 1990) senior management accountants, such as finance directors or controllers, were used in this study as key informants for a number of reasons:

1. Finance directors or controllers are responsible for designing MCS in their organisations and are therefore likely to be able to provide accurate and useful information regarding the design of MCS (Chenhall and Langfield-Smith, 1998).
2. Pre-tests, particularly the meeting with the finance director revealed that finance directors or controllers often play an active role both in business level strategy and MCS design. Hence they were viewed as the appropriate respondents to be targeted for the study.

6.9 Survey administration and response profile

The main or initial survey consisted of 1000 questionnaires and was mailed on March 12, 2002. Each participant was sent a questionnaire together with a cover letter and a prepaid self-addressed envelope for the questionnaire to be returned. Within about four weeks of mailing the main survey, 230 responses had been received. This included 196 useable questionnaires and 34 returned either not completed or completed by respondents operating in non-manufacturing companies. A reminder letter was sent to those who had not responded to the main survey on April 9, 2002, about four weeks after mailing the main survey. A copy of the reminder letter is shown in Appendix C. As a result of the reminder letter another 101 responses were received including 78 usable questionnaires and 23 unusable questionnaires, raising the total usable responses to 274 and the final response rate to 28%. For a field survey involving a complex questionnaire, such as in this study, a response rate of about 20-22% is usually considered very good (Saunders *et al.*, 2001). Thus, it was decided that the response rate reached was adequate for conducting statistical analyses and that further reminders were not considered necessary. The composition of the survey responses is shown in Table 6.3.

Table 6.3 Survey response profile

	Main Survey	Follow-up	Total
Usable Response	196	78	274
Non-existent/ Unreachable	11	-	11
Ineligible/ non-manufacturing	10	4	14
Refusals/ Decline participation	13	19	32
Total	230	101	331
Total response rate	**23%**	**10%**	**33%**
Usable response rate[2]	**20%**	**8%**	**28%**

(Total number of questionnaires mailed out: 1000 questionnaires).

From the comments received from participants, it was noted that two factors might have encouraged them to participate in this survey. First, the high level of current interest in the research topic. This was evident from their many comments on the importance of the research topic to their businesses. To quote some of these comments, one financial director stated that:

[2] Response rate = total number of response / total number in sample – (unreachable + ineligible).

> I think this is a very important area as I believe accountants as management controllers have vital role in helping manufacturing in the UK.

Another stated that:

> This research is of major interest. Please feel free to contact me should you require any further information. You would be very welcome to visit our factory and view our manufacturing process.

In a similar vein, responses to question F5 showed that over 30% of respondents (86 firms) expressed their willingness to be involved further in this research. In addition, the respondents were asked in question F6 to indicate whether or not they would be interested to receive a copy of the research findings. A total of 150 respondents (78%) indicated that they were interested in receiving a copy of the findings. A copy of the preliminary statistical findings was e-mailed to each one of them with a short note of thanks.

Second, the clarity of questions and the "professional look" of the questionnaire and the cover letter as evident from the respondents' many comments. For instance, to quote some of these comments, "challenging questions. Better than most surveys", "good, well explained and easy to complete", "above than average questionnaire", "very good questionnaire".
From the comments received from the non-participants, it was noted that the main reasons for not completing the questionnaire were the unyielding workload and companies' policy not to participate in surveys for confidentiality reasons.

6.9.1 Characteristics of responding firms

Table 6.4 shows the characteristics of responding firms with regard to their manufacturing activities, number of employees and annual sales. It can be noted from Table 6.4 that the responding firms cover a wide range of manufacturing activities including food and drinks, industrial machinery, chemicals and pharmaceuticals, electronics, motor vehicles and engineering products, paper, steel and fabricated metal and aerospace and defence equipment. No one industry is dominant or exceeds 14% of the total sample. In addition, the mean number of employees was 743 and the mean annual sale was £115 million. Thus, these profiles indicate that the respondents are suitable and represent a sample that best serves the purpose of this study.

Table 6.4 Key characteristics of the responding firms

1. Manufacturing activity/industry	Frequency	Percent
Food, drinks & tobacco products	38	13.9
Industrial and commercial machinery	15	5.5
Chemicals and pharmaceutical products	33	12.0
Domestic products including furniture and electrical pulps	19	6.9
Electrical and electronics including IT products	36	13.1
Motor vehicles, shipbuilding, & motorcycles	9	3.3
Engineering products including automotive parts & engines	33	12.0
Steel and fabricated metal including medical devices	19	6.9
Paper, stationery, cartoons and boxes	17	6.2
Aerospace and defence equipment	13	4.7
Other products including glass, bricks, toys...	39	14.2
Not responded to	3	1.1
Total	274	100

2. Size/Number of Employees (Mean = 743 employees)	Frequency	Percent
200 – 600	184	67.1
601 – 1000	42	15.4
1001 – 2000	26	9.5
2001 – 4000	10	3.6
More than 4000	6	2.2
Not responded	6	2.2
Total	274	100

3. Size/ Annual Sales (Mean = 115 million pounds)	Frequency	Percent
Less than 20 Million pounds	41	15
20 to less than 40	72	26.3
40 to less than 60	41	15
60 to less than 100	49	17.9
100 to 500	52	19
More than 500	8	2.9
Not responded	6	2.2
Total	274	100

6.9.2 Characteristics of responding executives

The perceptions of respondents and the quality of their responses to the questionnaire can be affected by their functional responsibilities, work location and experience. It was important to ensure that respondents were senior executives who could be considered sufficiently experienced and knowledgeable about business environments, strategies, structure and MCSs in their firms. Table 6.5 shows the characteristics of respondents with regard to their job title, location at the organisational level, years in current position and working experience.

Table 6.5 Key characteristics of responding executives

1. Respondents' job titles	Frequency	Percentage
Director of Finance	69	25.2
Finance Manager	28	10.2
Financial controller	77	28.1
Budgetary control manager, Management accounting manager/ senior management accountant	23	8.4
General Manager/ Manufacturing director	20	7.3
Management accountant	24	8.8
Other, including financial analyst, reporting accountant	33	12
Total	274	100

2. Location at Organisational level	Frequency	Percent
Group head office	54	19.7
Divisional head office	48	17.5
SBU/operating unit	147	53.6
Other	24	8.8
Not responded to	1	.4
Total	274	100

3. Experience in current position (Mean = 4.83 years)	Frequency	Percent
Less than 2 years	52	19.0
2 to less than 5 years	120	43.8
5 to less than 10 years	62	22.6
10 to less than 15 years	27	9.8
15 years and more	12	4.4
Not responded to	1	0.4
Total	274	100

(Continued: Table 6.5 Key characteristics of responding executives)

4. Working experience (Mean = 20.87 years)	Frequency	Percent
3 years to less than 10 years	29	10.6
10 to less than 15	51	18.6
15 to less than 20	47	17.2
20 to less than 25	47	17.2
25 years and more	99	36.0
Not responded to	1	.4
Total	274	100

It can be noted from the characteristics listed in Table 6.5 that the respondents occupied senior positions in their firms and over 70% were located at the operating units/SBUs or divisional level. In addition, they were highly experienced in their profession with a mean number of years of working experience of over 20 years, and in their current positions of over 4 years. This provides sufficient evidence that the respondents were more than adequately knowledgeable about their firms and able to provide reliable responses to the questionnaire items.

Nevertheless, to ensure that respondents who completed the questionnaire possessed an adequate knowledge about the research constructs, a screening question, developed by Conant, Mokwa and Varadarajan (1990), was included in the questionnaire. This question (F6) focussed on the degree of confidence the respondent had toward answering all the questions included in the survey. Over 97% of respondents who completed the questionnaire indicated high confidence level in their answers.

6.10 Check for non-response bias

In order to generalise the survey findings it was very important to identify whether the data obtained from the respondents was truly representative of the targeted sample population. The generalisability of the survey findings is impaired if respondents' characteristics are systematically different from non-respondents. According to Kervin (1992, p.419) non-response bias exists "when cases with certain characteristics are more likely to be refusals or non contacts." Thus, testing for non-response bias is important and often involves collecting additional data from a sample of non-respondents (Choong and Grover, 2000). However, such additional data are not easily attainable. In addition, the respondents in this study happened to be more at the divisional or SBU or operating unit (over 70%) and published data are also not easily or readily obtainable for all units.

Thus, non-response bias is assessed by comparing the characteristics of early respondents with those of late respondents. According to Kervin (1992, p.448) this method assumes that respondents who return their questionnaire late are more like refusals compared with those who return them early. This method is probably more valid when the researcher has used reminders or follow-up letters. In other words, it is assumed that those firms that responded after the reminder letter would not have responded had the reminder not have been sent. Therefore, comparing early respondents (main/initial survey respondents) with late respondents (i.e. respondents after the reminder letter) can assess the extent of non-response bias. Non-response bias exists when there is a significant difference between the two groups of respondents.

Chi-square and Mann-Whitney U statistical tests were used to determine whether there was a significant difference between the two groups of respondents (early and late respondents) in respect of the characteristics of industry type, number of employees and annual sales. The results of these tests are reported in Tables 6.6 and 6.7. The results show no significant differences between the 'early' and 'late' respondents regarding industry type, number of employees and annual sales. The results therefore suggest that non-response bias does not apply and that the findings of this survey can be generalised within the boundary of the research sample.

Table 6.6 Chi-square test comparing industry type in early and late respondents

Type of Industry * early and late respondents Crosstabulation

			early and late respondents		
			Early respondents	Respondents after remider letter	Total
Type of Industry	Food, confectionery, drinks and Tobacco products	Count	26	12	38
		Expected Count	27.3	10.7	38.0
	Industrial and commercial machenery including cranes, lifts,	Count	14	1	15
		Expected Count	10.8	4.2	15.0
	chemicals and pharmaceutical products	Count	24	9	33
		Expected Count	23.7	9.3	33.0
	Domestic Products including furniture	Count	11	8	19
		Expected Count	13.7	5.3	19.0
	Electricals & Electronics including IT&diagnostic	Count	27	9	36
		Expected Count	25.9	10.1	36.0
	Motor Vehicles, shipbuildind and	Count	7	2	9
		Expected Count	6.5	2.5	9.0
	Engineering products including automotive	Count	21	12	33
		Expected Count	23.7	9.3	33.0
	Fabricated metal & steel products including	Count	15	4	19
		Expected Count	13.7	5.3	19.0
	Paper and stationery, cartoons, boxes	Count	16	1	17
		Expected Count	12.2	4.8	17.0
	Others including toy, glass & bricks	Count	27	12	39
		Expected Count	28.1	10.9	39.0
	Aerospace and defence equipments	Count	7	6	13
		Expected Count	9.4	3.6	13.0
Total		Count	195	76	271
		Expected Count	195.0	76.0	271.0

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	13.806[a]	10	.182
Likelihood Ratio	15.787	10	.106
Linear-by-Linear Association	.058	1	.810
N of Valid Cases	271		

a. 4 cells (18.2%) have expected count less than 5. The minimum expected count is 2.52.

Table 6.7 Mann-Whitney test comparing size in early and late respondents

Ranks

	early and late	N	Mean Rank	Sum of Ranks
Size/number of employees	Early respondents	193	133.34	25735.50
	Respondents after remider letter	75	137.47	10310.50
	Total	268		
Size/annual sales	Early respondents	189	129.14	24407.00
	Respondents after remider letter	74	139.31	10309.00
	Total	263		

Test Statistics[a]

	Size/number of employees	Size/annual sales
Mann-Whitney U	7014.500	6452.000
Wilcoxon W	25735.500	24407.000
Z	-.392	-.976
Asymp. Sig. (2-tailed)	.695	.329

a. Grouping Variable: early and late respondents

6.11 Statistical method used for data analysis

The cornerstone for conducting scientific research adopting the positivist paradigm (the predominant MC contingency paradigm) rests on developing sound theoretical models followed by the rigorous testing of proposed theories (Garver and Mentzer, 1999). In a similar vein, Ittner and Larcker (2001, p.397) reviewed existing empirical research in management accounting and indicated that "a key to improving managerial accounting research is better model specification that explicitly articulate linkages derived from the theory being tested." They also emphasised the need for greater effort to deal with measurement error[3] and construct validity since measurement error depresses statistical power for hypothesis testing and threatens the validity of research findings. According to Mackenzie (2001, p.160) measures of abstract constructs (e.g., PEU, strategy, budgetary tightness) commonly used in management accounting research reflect not only the constructs they are intended to represent, but also random and systematic measurement error. Random

[3] Measurement error is the degree to which measured variables are not perfect indicators of the abstract construct or variable they intend to measure (Schumacker and Lomax, 1996).

error occurs because of the inherent difficulties in accurately measuring abstract constructs. In contrast, systematic error can be due to contaminating/confounding factors (e.g., non-hypothesised constructs or constructs that are not included in the research model) or response biases.

Recent papers in leading management accounting journals have called for greater methodological rigour in instrument validation and model testing in management accounting research (e.g., Hartmann and Moers, 1999; Shields and shields, 1998; Ittner and Larcker, 2001; Smith and Langfield-Smith, 2002; Chenhall, 2003). More specifically, these papers have emphasised the need for making greater use of structural equation modeling (SEM) in management accounting research in order to control for measurement error and to provide simultaneous tests of measurement validity, reliability and structural relations. In addition these papers have argued for the potential of SEM to improve theory development and testing since it requires researchers to explicitly specify measurement relationships as well as structural relationships.

SEM is "a very general linear statistical model that can be used to evaluate most research hypotheses of interest to social scientists" (Hoyle, 1995, p.5). It has become one of the most popular multivariate statistical tools to test the relationships proposed in research models in different disciplines including psychology, marketing and management (Medsker, Williams and Holahan, 1994; Smith and Langfield-Smith, 2002). However, very few management accounting empirical studies have utilised SEM (e.g., Anderson and Young, 1999; Sheilds, 2000; Van der Stede, 2000). According to Smith and Langfield-Smith (2002) this may be due to the lack of awareness of this powerful statistical technique among management accounting researchers and/or due to the limitations of the data. For example, SEM requires a fairly large sample (recommended minimum of 100) for a reliable analysis, which is sometimes hard to obtain in management accounting research (Sharma, 2002).

Thus, in response to the growing number of calls for methodological rigour in instrument validation and model testing in management accounting research in general, and MCS research in particular, SEM was utilised in this research using the EQS 5.7 statistical software package (Bentler, 1995).

6.11.1 Advantages of SEM over other multivariate statistical techniques

SEM has been found to be a powerful multivariate statistical technique that functions better than other multivariate techniques such as multiple regression, path analysis and factor analysis (Chau, 1997; Hair *et al.*, 1998; Cheng, 2001; Mackenzie, 2001; Smith and Langfield-Smith, 2002). The advantages of SEM over other multivariate statistical techniques include:

1. SEM enables researchers to adopt a more holistic approach and test complex theoretical models. It examines a series of dependence relationships simultaneously so that one dependent variable may be an independent variable in other dependence relationships. The capacity to treat a single variable as both a dependent and an independent variable lies at the heart of the indirect effect, which is one of the objectives of this research.
2. SEM can control for measurement error in latent variables[4] and also provide greater rigour regarding testing for measurement reliability and validity. Further discussion of this point will be provided in the next chapter when dealing with the measurement model.

6.11.2 Structural equation modeling approach: An overview

SEM is a model-based approach to multivariate data analysis that includes both a measurement model and a structural model (Hoyle, 1995). The measurement model specifies relationships between the observed measures and latent variables or constructs (Medsker *et al.*, 1994). The measurement model contains information about how constructs are operationalised and measured in each study (Maruyama, 1998, p.178). Confirmatory factor analysis (CFA) is utilised in the measurement model to establish the loading of each measured variable on the latent variable and to establish the reliability and validity of the construct. The structural model involves the evaluation of the hypothesised relationships between the constructs. A regression equation in the context of SEM is called a structural equation, and the parameter, a structural parameter (Bentler, 1995). Structural parameters are equivalent to coefficients in a multiple regression model but they are considered to have more theoretical meaning than ordinary regression weights since they account for the measurement error in the variables. In contrast, ordinary regression coefficients can be affected by the amount of measurement error. In summary, SEM represents a logical coupling of regression

[4] A latent variable is "a hypothesised and unobserved concept that can be approximated by observed or measurable variables" (Hair *et al.*, 1998, p.585).

and factor analytic approaches (Maruyama, 1998), and allows for simultaneous analysis of the measurement and structural models.

SEM is usually accompanied by some kind of path diagram that provides a representation of the research model. It is standard convention to use different symbols for constructing a complete path diagram for SEM (Byrne, 1994; MacCallum, 1995). Squares or rectangles represent observed or measured variables and circles or ellipses represent latent variables. Single headed arrows represent directional effects (regression coefficients) between variables and double-headed arrows depict non-directional relationships (correlation) among variables. However, it must be noted that directional arrows in path diagrams do not indicate that directionality or causality has been established. Instead, they are used to depict relations in the structural equation model (Hoyle, 1995). In addition, all endogenous variables have arrows labelled with Es and Ds. Es represent measurement error related to observed variables and Ds are disturbances or residuals and represent that part of the endogenous variable that is not accounted for by the linear influence of other variables in the model. These error terms can be viewed as consisting partly of random error and partly of systematic error that is not explained, but could theoretically be explained by variables or effects not included in the model.

SEM analysis involves several procedures including: a) specification of the proposed model to be estimated (i.e., specify a pattern of directional and non-directional relationships among the variables of interest), b) identification, (c) estimation, (d) evaluation of the model fit, and (e) model modification as needed (Hoyle, 1995, pp.1-9 provides an extensive discussions of these procedures). Statistical identification refers to the ability of the proposed model to generate unique estimates. It is concerned with: "whether there is a unique set of parameters consistent with the data" (Byrne, 1994, p.15). A model is said to be identifiable and hence its parameters estimable if the number of free parameters to be estimated is less than or equal to the number of data points (observed variables or indicators). In this situation the model is considered to be over identified or just identified respectively.

Various estimation techniques are available in SEM including maximum likelihood (ML), weighted least square (WLS), generalised least square (GLS) and asymptotically distribution free (ADF). These estimation methods vary in effectiveness as sample size and model complexity varies. Generally, ML is the most commonly used approach in SEM. It is efficient and unbiased when the assumption of multivariate normality is met (Hair *et al.*, 1998). In addition, extensive research has also found ML to be quite robust to the violation of normality (Chou and Bentler, 1995, p.38). According to Hoyle and Panter (1995, p.163):

> A growing body of research indicates that ML performs reasonably well under a variety of less than optimal analytic conditions (e.g., small sample size, excessive kurtosis).

Several indices and methods are available for researchers to evaluate the model goodness-of-fit in SEM (Medsker *et al.*, 1994, pp.440-447 and Chau, 1997, pp.316-318 provide a comprehensive review of various fit indices). It is recommended that multiple fit indices or measures be used since there is no single index or measure considered to be adequate or sufficient for model fit evaluation (Hair *et al.*, 1998; Chau, 1997). Table 6.8 lists various measures of model fit provided by EQS and their recommended values as suggested in the literature. Poor goodness-of-model-fit require model modification. The goodness of fit measures applicable to this research are discussed in section 7.3 in the next chapter.

Table 6.8 Recommended values of goodness-of-fit measures.

Goodness-of-fit Measure	Recommended Value
Chi-square	$p \geq .05$
Goodness-of-fit index (GFI)	$\geq .90$
Adjusted Goodness-of-fit index (AGFI)	$\geq .80$
Normed Fit Index (NFI)	$\geq .90$
Non-Normed Fit Index (NNFI)	$\geq .90$
Comparative Fit Index (CFI)	$\geq .90$
Root Mean Square Residual (RMSR)	$< .10$

(Source: Adapted from Chau, 1997, p.318)

Model modification involves adjusting a specified and estimated model by either freeing parameters that formerly were fixed or fixing parameters that formerly were free. According to Hoyle (1995, p.8):

> The bases for modification typically is an inspection of parameter estimates, an evaluation of some form of the residual matrix, or in the spirit of stepwise regression, the use of statistical searches for adjustments that will result in more favourable indicators of fit.

Modification indices are used to help determine possible sources of the lack of fit. Using these indices can help improve the model in terms of lowering the chi-square statistic, thus achieving a better model fit (Chau 1997, p.318). In the EQS program, the Wald and LM tests can be used to evaluate chi-square change as a result of re-specifying one or many parameters.

6.12 Summary

The steps undertaken by the researcher to conduct this research and collect the empirical data have been explained in this chapter. First, the differences between research paradigms and methodologies available for researchers were discussed and the justification for the approach employed in this research was given. The positivistic paradigm employing a cross sectional survey methodology was considered as the most appropriate approach for conducting this research and achieving its objectives.

The sampling frame and data collection method and procedures have also been discussed in detail in this chapter. The sampling frame was based on FAME database and consisted of 4888 medium and large manufacturing companies operating in the UK. The CIMA database was also utilised for providing additional information on the selected sample concerning names and job-titles of respondents. A random sample of 1000 companies, operating in various manufacturing activities was chosen. The mail questionnaire method was selected as the most appropriate data collection method since it enabled researchers to collect a large amount of data from a diverse and scattered population.

To maximise the response rate and minimise non-response bias, Dillman's (1978) "Total design method for surveys" was used as a basis for constructing the questionnaire. The questionnaire was subject to several drafts and a thorough evaluation and pre-testing before determining the final version. A total of 274 usable questionnaires were received, representing a 28% response rate. This response rate is considered satisfactory and sufficient for conducting rigorous multivariate analysis. Checking for non-response bias involved comparing the early responses without a reminder with late responses after a reminder based on a comparison of industry type, number of employees and annual sales. No significant differences were found, suggesting the absence of non-response bias.

Finally, the chapter concluded with a brief description of the structural modelling procedures that will be employed in this research. Further elaboration of the measurement model will be provided in the next chapter (Chapter 7) and the structural model evaluation and hypotheses testing will be presented in Chapter 8.

CHAPTER 7

MEASUREMENT MODEL AND VALIDITY-RELIABILITY ASSESSMENT

CHAPTER 7

Measurement Model and Validity-Reliability Assessment

7.1 Introduction

It was indicated in the previous chapter that the questionnaire was designed to collect data on different theoretical constructs identified earlier in the research model. These constructs (see Figure 5.1) include business strategy, environment, structure, MCS and organisational effectiveness. Operationalisation[1] and measurement of these abstract concepts in a meaningful way is critical to achieve the research objectives and ensure the validity of the results derived. However, as emphasised in the previous chapter, measuring abstract constructs in a meaningful way is sometimes problematic and often involves measurement error which impacts on the strength of association between constructs and the conclusions regarding the relationships investigated (Ryan, Scapens and Theobald, 1992, p.88). Accordingly, Abernethy, Chua, Luckett and Selto (1999, p.8), among others, emphasise the need for measuring theoretical constructs correctly and establishing construct validity in order to reduce measurement error and increase confidence in research findings. To meet this requirement, the measurement model analysis in structural equation model (SEM) is utilised in this research to provide a rigorous assessment of measurement reliability and validity and to control measurement error. The purpose of the measurement model analysis is to show how well the observed indicators measure the latent variable[2] under investigation (Garver and Mentzer, 1999, p.36). Once an acceptable goodness-of-fit has been achieved for the measurement model, and construct validity and reliability demonstrated, the structural model which relates the constructs to one another as expressed by the hypotheses and implied by the model will be evaluated.

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[1] Operationalisation involves defining and clarifying abstract concepts and translating them into specific, observable measures (de Vaus, 2001).

[2] The terms latent variable, construct, concept and factor will be used interchangeably in this chapter.

Thus, the purpose of this chapter is to provide a detailed discussion of the measurement model and procedures undertaken to control for measurement error and establish construct validity and reliability. The structural model analysis and hypotheses testing is presented in Chapter 8.

7.2 Measurement model validity-reliability assessment procedures

The measurement model in SEM specifies the measures (indicators) for each construct and assesses the validity and reliability of the constructs for estimating the structural model. Construct validity is broadly defined as the extent to which the construct is successfully operationalised in the research (Abernethy *et al.*, 1999, p.8). In other words, validity is concerned with the degree to which the measures or set of measures correctly capture the theoretical concept it intends to measure (Hair *et al.*, 1998, p.90). Specifying and validating the measurement model involves a hierarchy of stages and procedures, all of which must be satisfied to properly specify the measurement model and achieve construct validity (Hair *et al.*, 1998, p.117; Garver and Mentzer, 1999, p.34). These stages include assessing content validity, unidimensionality, reliability, convergent validity and discriminate validity. A detailed discussion of these stages and the procedures for assessing them is provided in the following paragraphs.

Content validity, refers to "the degree that the construct is represented by items that cover the domain of meaning for the construct" and is considered as an important first step for assessing construct validity (Graver and Mentzer, 1999, p.34). Assessing the content validity of a construct is subjective/judgmental and requires knowledge of the theoretical nature of the construct. According to Cooper and Schindler (1998, p.168) content validity can be approached through a careful operationalisation of abstract concepts, and through using a panel of persons to judge how well the selected measures or scales represent the underlying concepts. To meet the content validity requirements in this research, an extensive literature review was undertaken to define and clarify the theoretical construct and identify the measures or scales that capture the constructs under investigation. The scales used were mainly adopted or adapted from existing relevant studies (where available) to enhance their validity and reliability, and for reasons of practicality and comparability with other research. A detailed discussion of the operationalisation of research constructs is provided in the next section. In addition, the questionnaire items were critically examined and pre-tested by several doctoral students, academic experts and a senior financial director to provide face validity[3]. Once content validity is satisfied, the next step in demonstrating construct validity is to assess statistically the unidimensionality and reliability of the selected scales or measures (Graver and Mentzer, 1999, p.35).

Unidimensionality is considered as the first step in assessing statistically the construct validity, and refers to "the degree to which items represent *one and only one* underlying latent variable" (Graver and Mentzer, 1999, p.35, emphasis in original). According to Hair *et al.* (1998, p.599) when researchers use multiple item scales of a construct, it is imperative to assess the unidimentionality of the construct and the possibility of multiple sub-dimensions that can be represented in a second order factor analysis. Thus, the test of unidimensionality requires that each construct should consist of items loading highly on a single factor. According to Hair *et al.* (1998, p.117) assessing the unidimensionality and the appropriateness of the selected measures can best be approached with either exploratory factor analysis (EFA) or confirmatory factor analysis (CFA). Recent developments and research suggest that CFA is a more rigorous and precise test of unidimensionality as compared to EFA (Garver and Mentzer, 1999, p.40). Goodness of measurement model fit using SEM is the criterion for assessing unidimensionality in SEM.

Moreover, it has been recommended that EFA provides a useful first step in anticipating the measurement model in CFA (Maruyama, 1998, p.138; Hair *et al.*, 1998, p.96). Thus, both factor analysis techniques will be utilised in this research. First, exploratory factor analysis (EFA) is utilised to identify the pattern of relationships between measured variables or indicators and the construct or factor. Then CFA will be utilised to refine or confirm the unidimensionality of measurement instruments.

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[3] Face validity is the minimum assessment for construct validity and indicates that the measure apparently reflects the content of the construct in question (Bryman and Cramer, 1999, p.68).

Reliability is another contributor to validity and must be satisfied prior to achieving the more demanding requirements of validity (i.e. convergent and discriminant validity). Reliability relates to the degree to which the measures provide consistent results if used in different studies or contexts (Cooper and Schindler, 1998, p.171). Reliability is concerned with estimates of the degree to which a scale is free from measurement error (Cooper and Schindler, 1998, p.171). Different forms of reliability exist including test-retest, internal consistency and parallel form reliability. However, the most commonly used form of reliability is internal consistency assessed by Cronbach's alpha. Thus, Cronbach's alpha will be used in this research to assess the reliability of the scales.

Once the measurement model (each measurement instrument or scale) is assessed to be unidimensional, and reliable, the more demanding requirement of construct validity (i.e., convergent validity and discriminate validity) can be rigorously tested statistically using CFA in SEM. According to Garver and Mentzer (1999, p.43) "for a latent construct to possess construct validity, it must first be unidimentional and reliable."

Convergent validity is the extent to which the items intended to measure a latent variable or factor converge together (Garver and Mentzer, 1999, p.35). In other words, convergent validity assesses the degree to which the measures of each construct are correlated (Hair *et al.*, 1998, p.119). **Discriminant validity** relates to the extent to which the measures or indicators representing a construct discriminate that construct from other items representing other constructs. Thus, it represents the degree to which the measure of a construct does not correlate well with the measures of other constructs (Chau, 1997, p.313). The overall fit of the measurement model and the magnitude, direction and significance of the estimated parameters between the latent variables and their indicators provide explicit assessment of unidimensionality, convergent and discriminant validity of the measurement instrument for each construct or latent variable.

To summarise, the measurement model analysis procedures involve ensuring that the measurement instruments or scales used to measure the latent variables meet the requirements of 1) conforming to their conceptual definitions (i.e., content validity established); 2) exhibiting unidimensionality; 3) meeting the necessary level of reliability; and 4) demonstrating construct validity (i.e., convergent and discriminant validity). The final stage is to incorporate the measurement model in the next stage of SEM (i.e., evaluating the structural model).

There are two approaches for incorporating the measurement model in SEM (Ruyter and Wetzels, 1999, p.65). The first is to use a latent variable model with all indicators in evaluating the structural model and testing the hypothesised relations between the constructs. The second is to use an aggregate partial model where composite measure scales are constructed for each construct. According to Ruyter and Wetzels (1999, p.65) this latter approach yields the same results as latent variable model and is useful when one wishes to account for measurement error and/or the number of items is relatively large. In addition, Ruyter and Wetzels (1999, p.65) cited Bagozzi and Heatherton (1994), Buaumgartner and Homburg (1996), and Bentler and Chou (1987) assertion that:

> A latent variable model with multiple indicators might not be very helpful, since model complexity in terms of the number of constructs and/or indicators might prevent the researcher from finding a model fitting to the data.

Taking into consideration the complexity of the current research model in terms of number of constructs and the multi-item measures used to capture the constructs, composite scales rather than a latent variable model is utilised to reduce the complexity of the model and control for measurement error. This approach entails multi-item measures for each construct being summed and the total being used as a single-item indicator for the construct. Error variances can nonetheless be estimated from reliability estimates and thus incorporated into the structural model. This is done by fixing the error variance of each summated scale for each construct to 1 minus the value of reliability coefficient for the scale times the scale variance (Ruyter and Wetzels 1999, p.65; Singhapkdi, Vitell and Frank 1999, p.27). In addition, error terms for single-item measures used in the research (i.e., the managerial evaluation and rewards measures and organisational effectiveness) were set at 0.20. The implied reliability value of 0.80 is a more conservative arbitrary value than the 0.85 value recommended by Joreskog and Sorbom (1982) for estimating measurement error in single-item measures (Singhapkdi *et al.*, 1999, p.27).

Figure 7.1 summarises the stages described in this section and recommended in the literature (Hair *et al.*, 1998, p.117; Garver and Mentzer, 1999, pp.34-35; Ruyter and Wetzels, 1999, p.65) for constructing measurement scales and establishing construct validity and reliability. A detailed discussion of the results of the measurement model analysis and the validity of the constructs that are used in this research is presented in the next section.

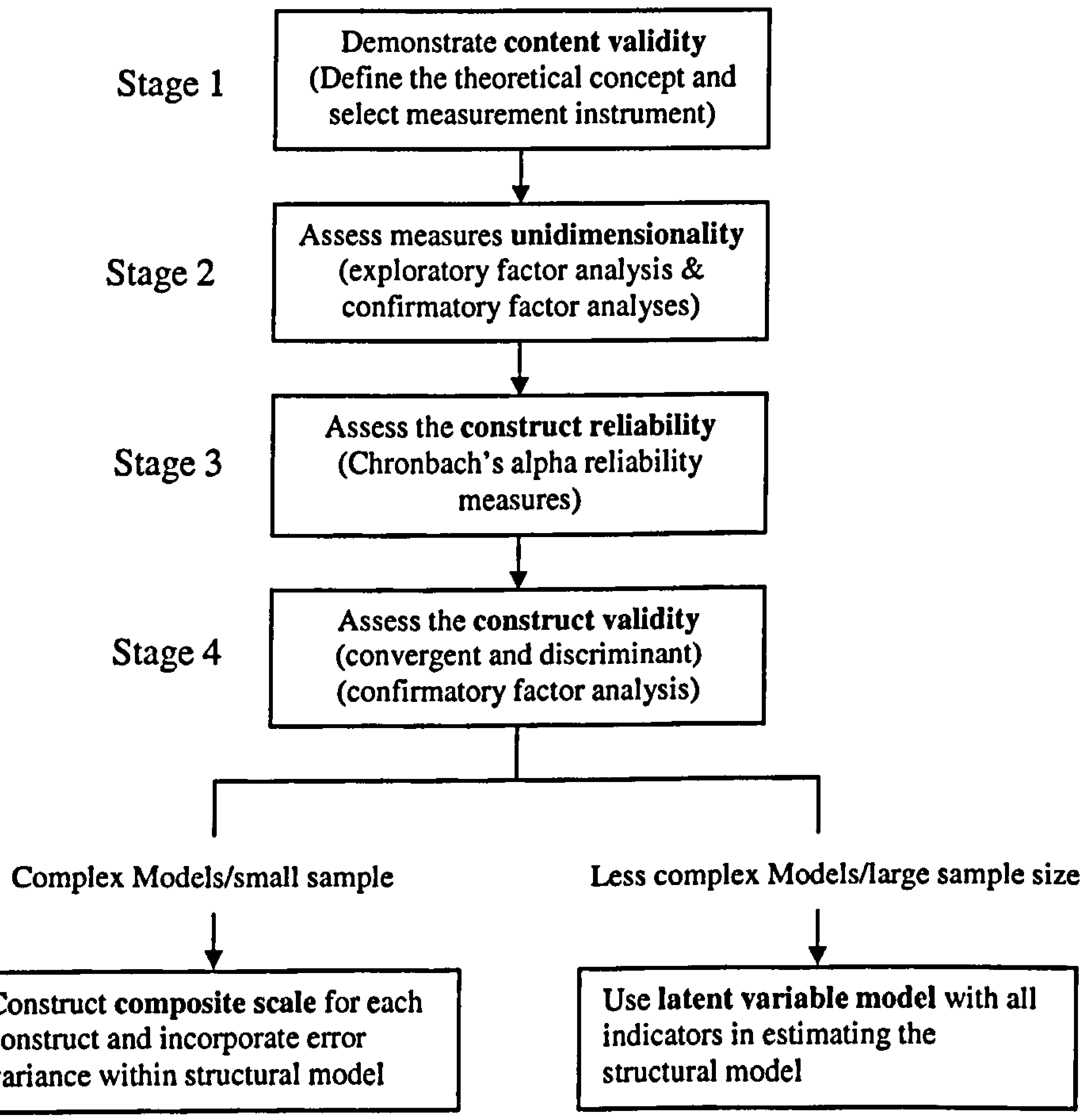

Figure 7.1 Stages for constructing and validating the measurement model.

7.3 Measurement model analysis and validity of research constructs

In the current research there are a number of abstract concepts included in the research model (Figure 5.1), which had to be properly operationalised to ensure that the measures used accurately represent their underlying concepts. To meet this objective, the procedures and stages recommended in the literature and summarised in Figure 7.1 will be followed. The detailed discussion of the operationalisation and validation of each of the research constructs shown in Figure 5.1 (i.e., perceived environmental uncertainty, business strategy, organisational structure, the seven attributes of MCS and organisational effectiveness) is presented in the following sub-sections.

7.3.1 Perceived environmental uncertainty (X_1)

The organisational theory literature stresses the importance of uncertainty as a critical variable to which firms must adapt in order to perform better. Environmental uncertainty involves the rate of change in the environment that occurs unexpectedly. Examples include unpredictable shifts in the economy, rapidly changing technology, and unexpected changes in customers' demand, competitors' actions or sources of supply (Miles and Snow, 1978; Mintzberg, 1979). Uncertainty is considered to be a function of managerial perceptions and can vary across firms facing apparently the same environments. Several instruments to measure perceived environmental uncertainty have been used in MC contingency studies.

Miles and Snow's (1978) instrument focused on the degree of predictability of the rate of change for 6 factors measured by 24 questions rated on a 7-point Likert scale (ranging from highly predictable to highly unpredictable). These factors included suppliers' actions, competitors' actions, customer demand for existing and new products, the financial/ capital market (interest rate, credit availability), government regulations, laws and policies, and labour union actions.

Gordon and Narayanan (1984) used another instrument adapted from Khandwalla (1972; 1977). A 7-point Likert scale was used to measure seven items relating to the respondents' perception about the predictability and stability of various aspects of their organisation's industrial, economic, competitive and customer environment. Chong and Chong (1997) and Sim and Teoh (1997) have also used this instrument.

Govindarajan (1984) also developed an instrument similar to Miles and Snow's (1978) but consisting of only eight questions. Respondents were asked to indicate on a five-point Likert scale, ranging from highly predictable to highly unpredictable, the predictability of the rate of change of various factors within the context of their business units. The factors were manufacturing technology, competitors' actions, market demand, product attributes/design, raw material availability, raw material price, government regulation and labour union actions. This scale has also been used in other MC contingency studies (e.g., Gul and Chia, 1994; Gul, 1991).

This research opted to measure perceived environmental uncertainty (PEU) with an adaptation of Govindarajan's (1984) instrument because of its brevity and simplicity. A seven-point Likert scale, ranging from highly predictable to highly unpredictable rate of change, was used rather than the five-point scale of the original instrument in order to maintain consistent scales throughout the questionnaire. In addition, raw material availability and raw material price were combined to form one item since they are closely related to each other. Table 7.1 illustrates the seven items used in the questionnaire to measure the PEU construct.

Table 7.1 Measures of PEU construct

Construct	No.* and description of measures used
Perceived environmental uncertainty (PEU)	C1 Predictability of change in manufacturing technology
	C2 Predictability of change in competitors actions
	C3 Predictability of change in customers' demand and taste
	C4 Predictability of change in product attributes/design
	C5 Predictability of change in raw material availability
	C6 Predictability of change in labour union actions
	C7 Predictability of change in government regulations

* Denotes questionnaire items displayed in Appendix A.

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	C3 Predictability of change in customers' demand and taste
	C4 Predictability of change in product attributes/design
	C5 Predictability of change in raw material availability
	C6 Predictability of change in labour union actions
	C7 Predictability of change in government regulations

* Denotes questionnaire items displayed in Appendix A.

To assess construct unidimensionality, the measures relating to PEU were initially factor analysed using principal component factor analysis [4] implemented in the SPSS statistical package. The results presented in Table 7.2 indicate that two factors, rather than one factor as conceptualised for PEU, emerged from this analysis. These two factors were labelled as "operational oriented PEU" (OPEPEU) and "regulatory oriented PEU" (REGPEU). All the factor loadings were greater than 0.40, ranging from 0.59 to 0.80, and the total cumulative variance explained by these two factors was 55 percent supporting the multidimensional structure of PEU. The Bartlett test of sphericity (321, $P < 0.001$) and Kaiser's measure of sampling adequacy for factorability of PEU (0.697) indicated that conducting the exploratory factor analysis (EFA) was appropriate and within the acceptable levels for conducting this analysis (Hair *et al.*, 1998, p.99).

Table 7.2 Exploratory factor analysis for PEU construct [a]

Items and measures description	Operational-PEU	Regulatory- PEU
C1 Manufacturing technology	.712	
C2 Competitors' actions	.674	
C3 Customers' demand and taste	.790	
C4 Product attributes	.782	
C5 Raw material availability		.590
C6 Labour union actions		.808
C7 Government regulations		.761

Extraction Method: Principal component analysis.
Rotation Method: Oblimin with Kaiser Normalization.
[a] Rotation converged in 4 iterations.

In addition, the internal consistency reliability coefficient measures (Cronbach's alpha) for OPEPEU and REGPEU were 0.73 and 0.56 respectively, thus, indicating acceptable

[4] Four commonly used decision rules for conducting exploratory factor analysis were followed in this research (Hair *et al.*, 1998, pp.100-112): The minimum eigen value for each factor to be one; considering the sample size, factor loading of .40 for each item was considered as the threshold for retaining items. This ensures greater confidence in the findings than the minimum factor loading of .30; oblique rotation was used since there are no theoretical grounds to assume that the factors are uncorrelated as imposed in orthogonal rotation; and finally, single item and/or unreliable factors are discarded since retaining them is neither appropriate nor parsimonious (Nunnally, 1978).

levels of reliability using Nunnally's (1978) criteria whereby measures greater than 0.50 are assumed to fall within the acceptable levels of reliability (Sharma, 2002, p.116).

The multidimensional structure of PEU proposed in this analysis is inconsistent with the commonly held belief in management accounting research that PEU is a unidimensional construct (Sharma, 2002, p.115). Thus, to further confirm and validate the findings that emerged from EFA, the measurement model of PEU was evaluated by confirmatory factor analysis (CFA) using EQS 5.7 software (Bentler, 1995). The measurement model relates the observed variables or measures to their latent variable or construct. A range of fit measures for evaluating the measurement model fit are used in this research to rule out measuring biases inherent in each measure (Hoyle, 1995). Table 7.3 lists various measures of model fit used in this research and their recommended values as suggested in the literature.

Table 7.3 Goodness-of-fit measures used in this study

Goodness-of-fit Measure	Recommended Value
Chi-square	$P \geq 0.05$
Goodness-of-fit index (GFI)	≥ 0.90
Adjusted goodness-of-fit index (AGFI)	≥ 0.80
Non-normed fit index (NNFI)	≥ 0.90
Comparative fit index (CFI)	≥ 0.90
Root mean square of approximation (RMSEA)	< 0.10

(Source: Adapted from Chau, 1997, p.318)

Figure 7.2 depicts the measurement model of PEU construct and provides a summary of the model fit measures observed for the model. As shown in Figure 7.2, all measures of fit surpassed the acceptable levels (Chi-square 11.15, P = 0.13; CFI 0.98; AGFI 0.96; GFI 99; NNFI 97; RMSEA 0.05). In addition, the entire specified path loading were significant and strong (ranging from 0.50 to 0.84, t-values 3.27-6.67; $P < .001$). These results indicate that the measurement model uniquely represents PEU as a multidimensional construct and demonstrates its construct validity. The model goodness of fit was reached after deleting item C5 'raw material availability' for cross loading on both dimensions of PEU. This is consistent with the recommendations to delete measures or indicators from the measurement model that have low internal consistency or measure more than one construct (Cheng, 2001, p. 653). The Cronbach alpha reliability measures remained acceptable even after the deletion of item C5 (0.73 for OPEPEU and 0.55 for REGPEU). Therefore, PEU is represented in this study with two dimensions, OPEPEU measured by four items (C1-C4) and REGPEU measured by two items (C6-C7).

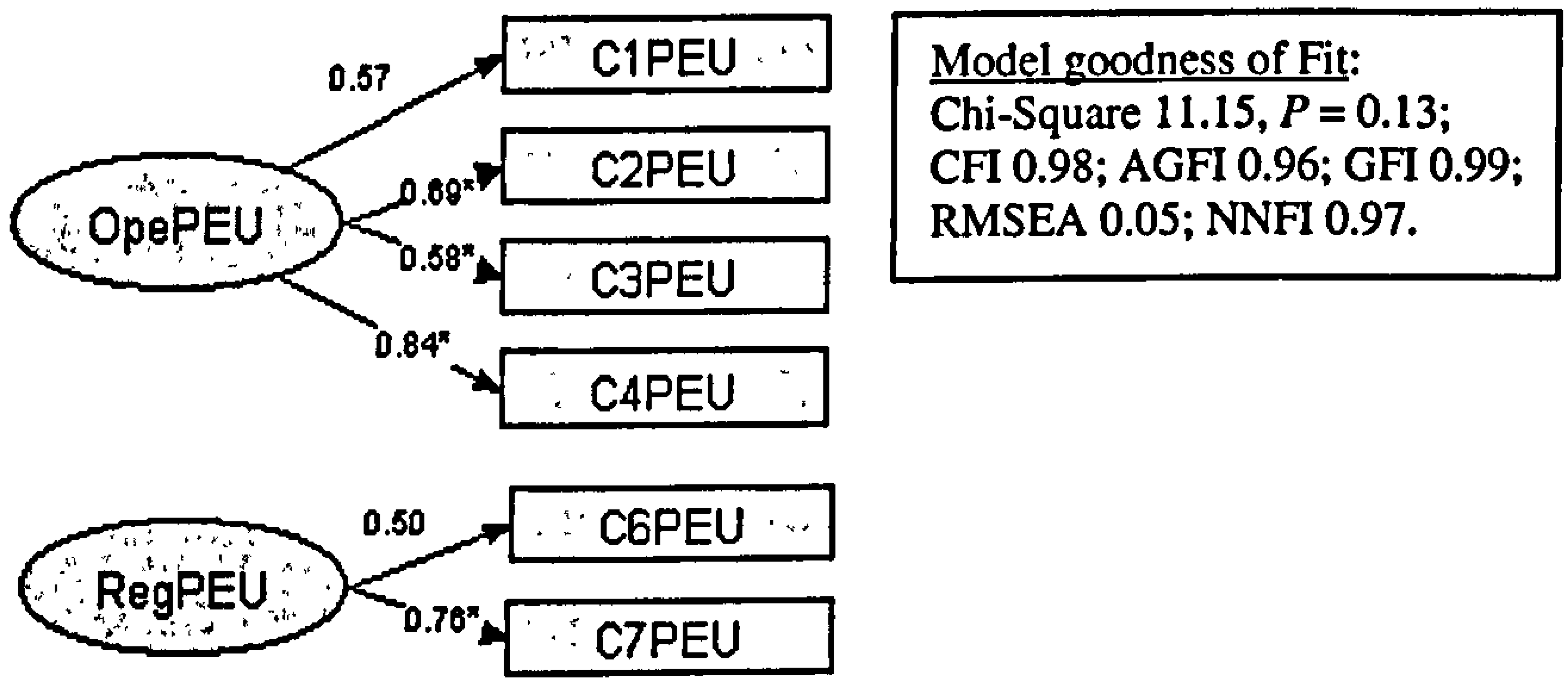


Figure 7.2 Confirmatory factor analysis for PEU (two-factor model)

7.3.2 Business strategy

Business strategy (or competitive strategy) refers to how a business unit competes in its market to achieve a competitive advantage relative to its competitors (Porter, 1980). As defined in the strategy literature, a defender, harvest or cost leadership strategy focuses on being the low cost producer of a narrow product range. This implies that little product and market development is undertaken. In contrast, a prospector, build or differentiation strategy focuses on being first-to-market with a variety of innovative products or services. It strives to create products or services that are perceived by customers as being unique as a result of pursuing superior product features, brand image, product innovation, etc. (Miles and Snow, 1978; Porter, 1980).

Two main approaches for measuring strategies have been used in MC empirical studies. The first is the self-typing or paragraph approach developed by Snow and Hrebiniak (1980) to measure Miles and Snow's (1978) strategic types of prospector, defender, analyser and reactor. It requires the respondents to read a short unlabeled paragraph description of the four strategic types and select the paragraph which best describes their organisation. This measurement instrument has been widely used and validated in strategic management and MC contingency research (James and Hatten, 1995, Simons, 1987, Sim and Teoh, 1997; Chong and Chong, 1997; Collins *et al.*, 1997).

The second approach for measuring strategies was developed by Govindarajan (1988) to measure Porter's (1980) differentiation and low cost strategies. It requires respondents to position their products relative to those of leading competitors in different areas including product-selling price, percent of sales spent on research and development, product quality, brand image, and product features. A seven-point Likert scale was used with values ranging from "significantly below average" to "significantly above average." The scores for these items were summed to form a combined scale. The response set was split so that high values on this variable indicated a differentiation strategy and low values indicated low-cost strategy. This measurement instrument was used in different MC contingency studies (e.g., Govindarajan and Fisher, 1990; Bruggeman and Van der Stede, 1993; Nilson and Rapp, 1999).

The choice of a suitable scale to measure strategy has presented a difficult problem. There is no "ideal" way to operationalise this construct. Recent literature on strategy and MCS design have attributed the contradictory findings of contingency studies on strategy and management control to problems in the measures of strategy used in these studies (Langfield-Smith, 1997; Kald *et al.*, 2000; Ittner and Larcker, 2001). For instance, Ittner and Larcker (2001, p.363) argue that:

> Most studies measure this construct using a simple continuum between firms following a cost strategy and those following an innovation or growth oriented strategy. Given the multidimensional nature of strategy, a single measure is unlikely to capture many relevant strategic distinctions.

Thus, ideally, differentiation and cost leadership strategies should be measured as separate dimensions because a low score on differentiation does not necessarily imply high cost leadership.

Hence, given the multidimensional nature of strategy it was decided to recognise cost leadership and differentiation strategies as separate dimensions of business strategy. Items measuring the two dimensions of strategy were adapted from Govindarajan's (1988) instrument. Using a seven point Likert scale ranging from considerably lower to considerably higher, respondents were asked to position their business units, relative to their leading competitors in six dimension related to their business strategies. Table 7.4 illustrates the six items used in the questionnaire to measure the two dimensions of strategy. The first two items (B5 and B6) measure low cost strategy, and the last four (B7-B10) measure differentiation strategy. Reverse scores for items (B5-B6) were used to measure low cost strategy (so that considerably higher becomes 1 and considerably lower becomes 7) as used in Lee and Miller (1993). This is different from Govindarajan's (1988) scale that measures the strategy of each company along a continuum where high scores indicated differentiation and low scores indicated low cost strategies.

Table 7.4 Measures of business strategy construct

Construct	No.* and description of measures used
Low cost strategy	B5 Low product selling price (R)
	B6 Low manufacturing costs (R)
Differentiation strategy	B7 High research and development expenditure
	B8 High product quality
	B9 High brand image
	B10 High product features

* Denotes questionnaire items displayed in Appendix 6.1
(R) Denotes reversed coded.

The results of EFA presented in Table 7.5 confirmed the multidimensionality of business strategy. Two factors as conceptualised for business strategy emerged from this analysis explaining 59 percent of variability of business strategy. These two factors were labelled as hypothesised "differentiation strategy" (DIFSTR) and "cost leader strategy" (COSTSTR). All loadings were greater than 0.40, ranging from 0.50 to 0.93. The Bartlett test of sphericity (313, $P < 0.001$) and Kaiser's measure of sampling adequacy (0.70) indicated that EFA was appropriate and within acceptable levels (Hair *et al.*, 1998, p.99).

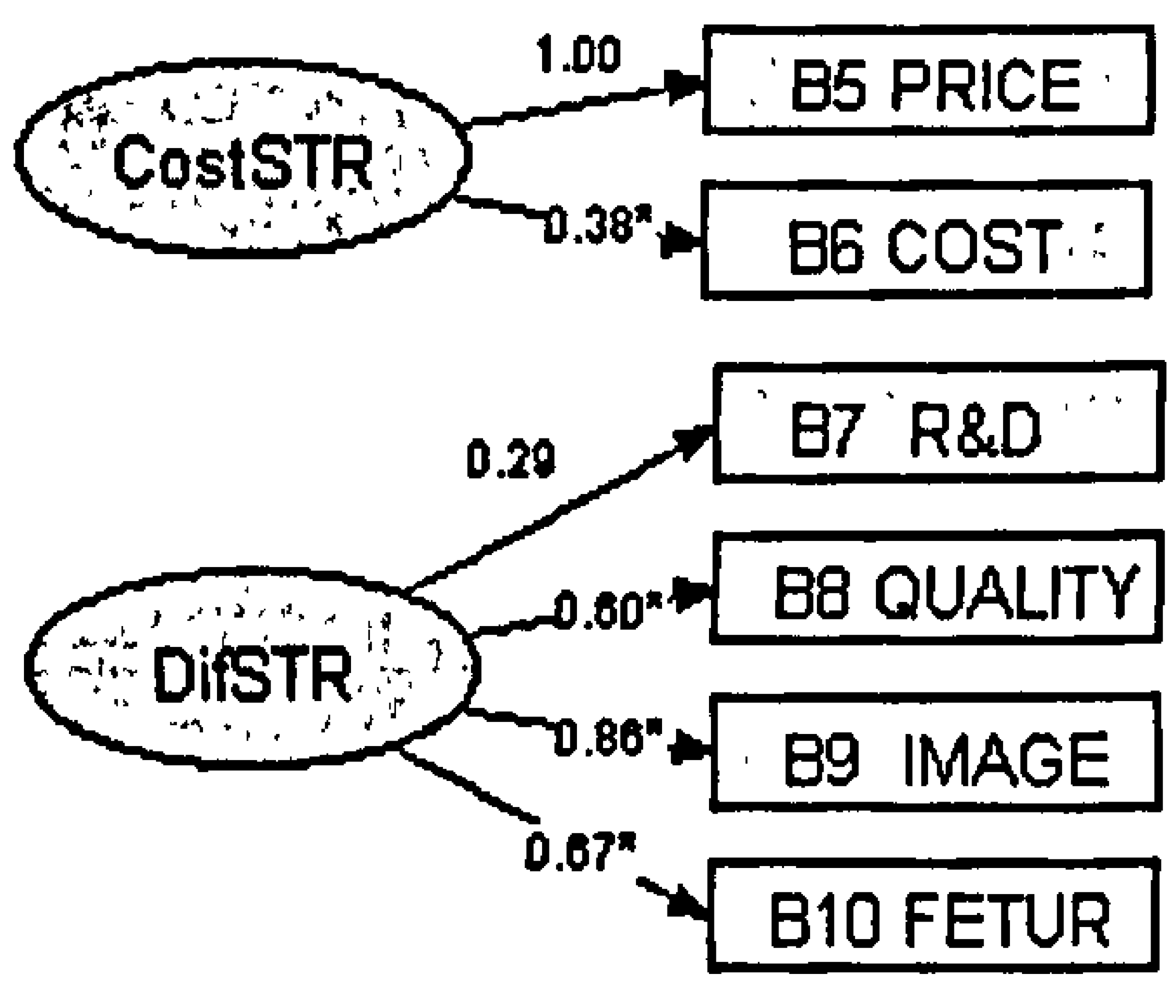
In addition, the Cronbach's alpha for DIFSTR and COSTSTR were 0.66 and 0.54 respectively, indicating acceptable levels of reliability (Nunnaly 1978).

Table 7.5 Exploratory factor analysis for business strategy construct [a]

Items and measures description	Differentiation	Cost strategy
B5 Products' selling price		.641
B6 manufacturing costs		.933
B7 Research and development expenditure	.506	
B8 Product quality	.664	
B9 Brand image	.839	
B10 Products features	.786	

Extraction Method: Principal component analysis.
Rotation Method: Oblimin with Kaiser Normalisation.
[a] Rotation converged in 5 iterations.

To further confirm the multidimensionality of business strategy and assess construct validity, two factor CFA using structural equation modelling was conducted using EQS 5.7 (Bentler 1995). The results presented in Figure 7.3 indicated that the measurement model goodness of fit was excellent (Chi-square 15.18, $P = 0.09$; CFI 0.98; RMSEA 0.05; AGFI 0.96; GFI 0.98; NNFI 0.97). In addition, all the specified path loadings were significant and strong (ranging from 0.29 to 1.00, t-values 4.05-6.45; $P < .001$).



Model goodness of Fit:
Chi-Square 15.18, $P = 0.09$;
CFI 0.98; AGFA 0.96; GFI 0.98
RMSEA 0.05; NNFI 0.97;

Figure 7.3 Confirmatory factor analysis for business strategy (two-Factor Model)

These results suggest that the measurement model uniquely represents the business strategy construct and demonstrate its multidimensionality and construct validity. Therefore, business strategy is represented in this study as two separate dimensions, low cost strategy (measured by two items, B5 and B6) and differentiation strategy (measured by four items, B7, B8, B9 and B10). Summated scales will be used for the two dimensions of business strategy and incorporated into the structural model evaluation with the measurement error estimation as specified earlier in this chapter.

7.3.3 Organisational structure

Following the argument developed in Chapter 5, two dimensions of organisation structure are considered in this study, namely centralisation or concentration of authority and formalisation or structuring of activities. Centralisation relates to the extent to which decisions are made at relatively high levels in the organisation. It also relates to the distribution of power (decision making authority) in the organisation. In contrast, formalisation refers to the extent that the rules governing behaviour are precisely and explicitly formulated, and to the extent that roles and procedures are detailed. Standardisation is also related to formalisation, which is defined as the extent to which rules and procedures cover all circumstances and apply invariably. Numerous ways to capture these structural dimensions appear in organisation theory literature.

This study opted to capture the two dimensions of organisational structure with nine items adopted from Ramamurthy (1990). Centralisation measures consisted of six items to capture the locus of decision making responsibility for several managerial decisions relating to capital budgeting, new product introduction, pricing policies of major product lines, penetration into new markets, major changes or new manufacturing processes and personnel policies. Formalisation measures consisted of three items that focused on measuring the extent of operating procedure documentation and degree of adherence to documented rules and procedures were used to capture this construct. A seven-point Likert scale ranging from "Strongly disagree" to "Strongly agree" was used to measure respondents' perceptions. Table 7.6 illustrates the nine items used in the questionnaire to capture organisational structure dimensions.

Table 7.6 Measures of organisational structure

Construct	No.* and description of measures used
Centralisation	D1 Locus of decision making for new product introduction
	D2 Locus of decision making for capital budgeting decisions
	D3 Locus of decision making for pricing policies
	D4 Locus of decision making for penetration into new markets
	D5 Locus of decision making for new manufacturing processes
	D6 Locus of decision making for personnel policy decisions.
Formalisation	D7 The extent of formal documentation of rules and procedures
	D8 The extent of reliance on operating rules and procedures
	D9 The extent of tolerance to violation of documented procedures

* Denotes questionnaire items displayed in Appendix 6.1.

The results of EFA presented in Table 7.7 confirm the multidimensionality of organisational structure. Two factors as conceptualised for organisational structure emerged from this analysis explaining 58 percent of the variability of organisational structure. These two factors were labelled as "centralisation" (CENTRA) and "formalisation" (FORMAL).

Table 7.7 Exploratory factor analysis for organisational structure construct [a]

Items and measures description	Centralisation	Formalisation
D1 New products introduction decisions	.671	
D2 Capital budgeting decisions	.725	
D3 Pricing policies decisions	.760	
D4 Penetration into new markets decisions	.777	
D5 New manufacturing processes decisions	.732	
D6 Personnel policies decisions	.576	
D7 Documentation of rules and procedures		.815
D8 Reliance on operating rules and procedures		.850
D9 Tolerance to violation of procedures		.868

Extraction Method: Principal component analysis.
Rotation Method: Oblimin with Kaiser Normalisation.
[a] Rotation converged in 4 iterations.

All items loaded highly on their hypothesised dimensions and were greater than 0.40, ranging from 0.57 to 0.86. The Bartlett test of sphericity (730, P < 0.001) and Kaiser's measure of sampling adequacy (0.763) indicated that EFA was appropriate and within acceptable levels (Hair *et al.*, 1998, p.99). In addition, the Cronbach's alpha for CENTR and FORMAL were 0.80 and 0.81 respectively, indicating good levels of reliability for both factors.

The results of the CFA presented in Figure 7.4 indicated that the measurement model goodness of fit was excellent (Chi-square 21.71, $P = 0.30$; CFI 0.99; AGFI 96; GFI 98; RMESA 0.02; NNFI 99). The model goodness of fit was reached after deleting the centralisation item D6 "personnel policies decisions" for cross loading on both dimensions (Cronbach alpha for CENTRA became 0.79). All remaining items loaded significantly and strongly on their specified factors or latent variables (ranging from 0.54 to 0.85, t-values 6.97-9.98; $P < .001$). These results suggest that the measurement model uniquely represents organisational structure dimensions and confirm the construct multidimensionality and validity. Therefore, organisation structure is represented in this study as two separate dimensions, centralisation (measured by six items, D1-D6) and formalisation (measured by three items, D7-D9).

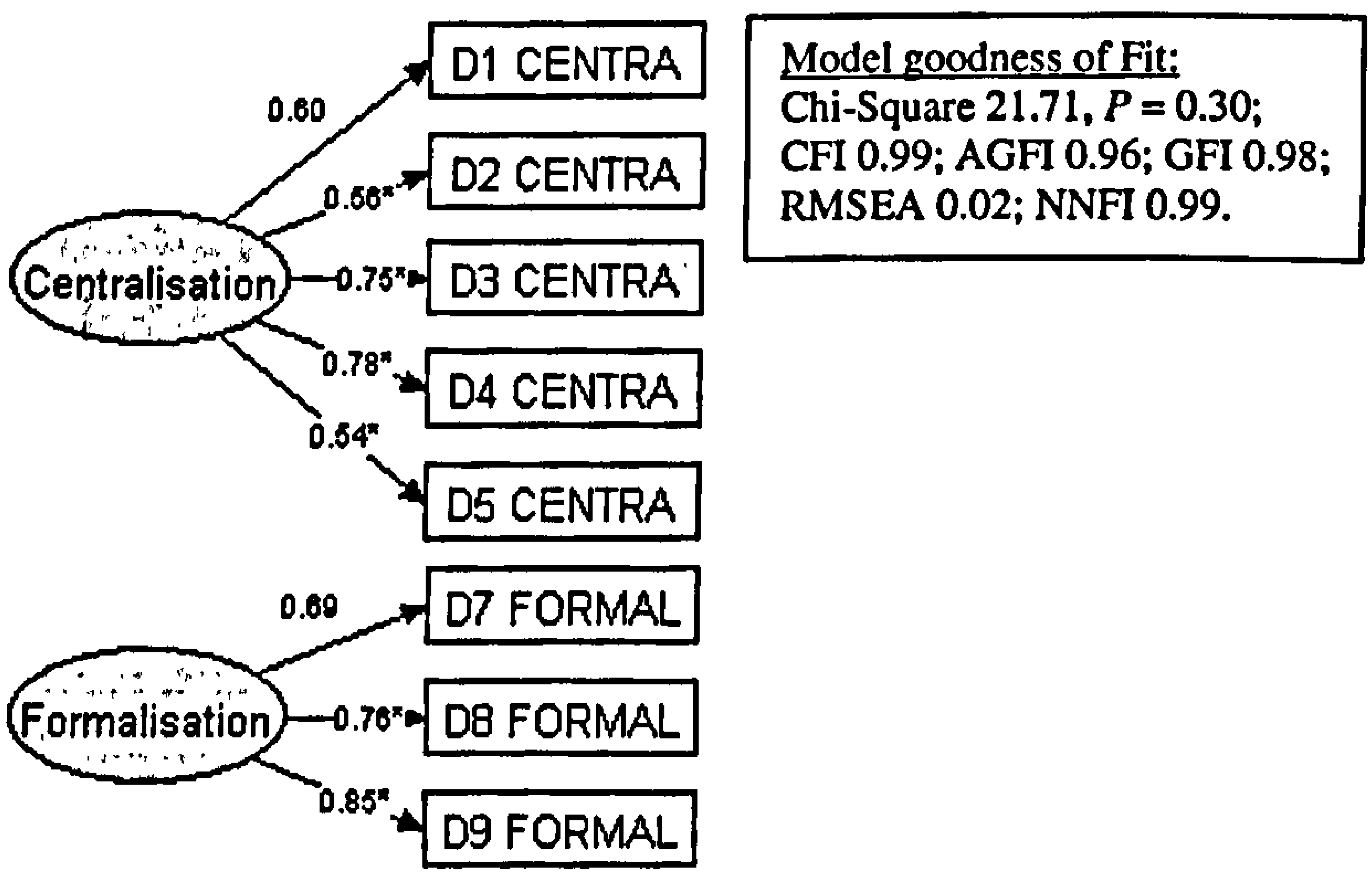


Figure 7.4 Confirmatory factor analysis for organisational structure (two-factor model)

7.3.4 Management control system attributes

To recall from the arguments presented in Chapter 5, the MC literature lacks a coherent and validated measurement of MCS. Based on the argument presented earlier in Chapter 5 (Section 5.6) the seven dimensions of MCS listed in Figure 5.1 and considered under the three categories of selection, presentation and timeliness are discussed in the following sub-sections.

7.3.4.1 Budgetary control practices

Different attributes of budgetary practices have been studied in relevant MC contingency literature. These include the tightness of budgetary practices, the importance attached to meeting budgetary targets, the extent of budgetary revisions and change and the level of participation in setting budgetary targets. Different measures have been used in the literature to operationalise these attributes. For instance, Amigoni (1978) studied budgetary control practices under the tightness of budgetary practices attribute. Amigoni argues that budgetary control can be defined as tight when:

- Targets are imposed and managers must consider them firm commitments;
- There is low participation in setting budgetary targets, and
- Performance evaluation is oriented to meeting budgetary targets.

Simons (1987), defines tight budgetary practices as the extent to which meeting tight budget targets is emphasised. Bruggeman and Van der Stede (1993) measured tight budgetary control as the extent of toleration of unfavourable deviation from budget targets, with no revisions of budget targets during the year.

On the other hand, Merchant (1981) operationalised the importance of meeting budgetary targets as:

- The extent to which budget variances require written explanations;
- The reaction of superiors to budget variance; and
- The extent to which budgets are linked to extrinsic rewards.

Anthony and Govindarajan (2001) considered budget revisions, and written explanation for variances as good measures for the importance of meeting budgets.

It can be noted from the above discussion that the measures of budgetary practices used in earlier studies are interrelated and can be subsumed under the general classification of the tightness of budgetary control systems. Thus, in this study, the tightness of control practices or systems involves mainly two dimensions. These include, budget revisions and change captured by questions A1, A2 and A3, and importance attached to meeting budgetary targets captured by questions A4, A5, A6, and A7 and A8. Another question (A9) relates to the difficulty of budget targets, used by Simons (1987), was also included in the questionnaire to measure budgetary practices.

Using a seven-point Likert scale, ranging from strongly disagree to strongly agree, respondents were asked to indicate the extent to which they perceived nine items relating to budgetary practices were used in their organisations. The higher the score the tighter the perceived budgetary control practices. Table 7.8 illustrates the nine items used in the questionnaire to capture budgetary control practices.

Table 7.8 Measures of budgetary control practices

Construct	No.* and description of measures used
Budgetary revision and change	A1 The frequency of changing budgetary targets (R)
	A2 The formality of changing budgetary target
	A3 The extent to which budget revisions are not allowed
Importance attached to budgetary targets	A4 The importance attached to meeting budgetary targets
	A5 The extent to which variances need written explanation
	A6 The extent of participation in setting the budgets
	A7 The extent of reliance on budgets as a control tool (R)
	A8 The extent of tolerance of budget variances (R).
	A9 The extent of difficulty of budgetary targets

* Denotes questionnaire items displayed in Appendix 6.1.
(R) Denotes reversed coded.

Item A9, the extent of difficulty of budgetary targets, was excluded prior to conducting EFA because of its insignificant correlation with all other measures of the scale. This is consistent with the recommendation to drop any items that do not correlate significantly with any other item in the scale prior to conducting EFA[5] (Field 2000). The results of EFA represented in Table 7.8 show the emergence of four factors for budgetary control practices. Based on the criteria established earlier in this chapter for conducting EFA, it was decided to exclude factors 3 and 4 from further analysis. Factor 3 (items A7-A8) was excluded because its Cronbach's alpha reliability measure was 0.38, thus being below the acceptable level suggested in Nunnally (1978) for exploratory research. Factor 4 was also excluded because it has a single item loading (item A6) after dropping item A2 because of its high loading on two factors (factors 2 and 4).

Table 7.9 Exploratory factor analysis for budgetary practices construct [a]

Measures of organisational structure	Factor 1	Factor 2	Factor 3	Factor 4
A1 Frequency of budgetary change	.928			
A2 Formality of budgetary change		.443		-.427
A3 Extent of budgetary revision	.881			
A4 Importance of meeting targets		.774		
A5 Variances require written explanation		.810		
A6 Participation in setting budgets				.898
A7 Reliance on budgets for control			.802	
A8 Tolerance of budget variances			.769	

Extraction Method: Principal component analysis.
Rotation Method: Oblimin with Kaiser Normalisation.
[a] Rotation converged in 8 iterations.

The two factors that were retained for further analysis (factors 1 and 2) explain 42 percent of the variability of budgetary control practices, and were labelled as "budgetary revision" (BUDREV) and "budgetary importance" (BUDIMP). All items loaded highly on their Factors and were greater than 0.40, ranging from 0.77 to 0.92. The Bartlett test of sphericity (284, $P < 0.001$) and Kaiser's measure of sampling adequacy (0.54) indicated that EFA was appropriate and within acceptable levels (Hair et al 1998, p.99). Also the Cronbach's alpha for BUDREV and BUDIMP were 0.80 and 0.56 respectively, indicating acceptable levels of reliability for both factors.

[5] The correlation matrix for budgetary control practices measures is not presented here for the sake of practicality and ease of presentation.

To validate the results of EFA and assess the construct validity for BUDREV and BUDIMP, the measurement model in confirmatory factor analysis was conducted. Figure 7.5 depicts the measurement model of budgetary practices and provides a summary of the model fit measures observed for the model. As shown in Figure 7.5, all measures of fit surpassed the acceptable levels (Chi-square 4.3, *P.* = 0.11; CFI 0.99; AGFI 96; GFI 0.99; NNFI 0.99; RMSEA 0.06). In addition, all the specified path loadings were significant and strong (ranging from 0.51 to 1.00; *t*-values 2.16 to 15.02). These results indicate that the measurement model uniquely represents budgetary practices as a multidimensional construct represented by multiple dimensions or facets, BUDREV and BUDIMP. Therefore, budgetary practices is represented in this study as two separate dimensions, BUDREV (measured by two items, A1 and A3) and BUDIMP (measured by two items, A4 and A5).

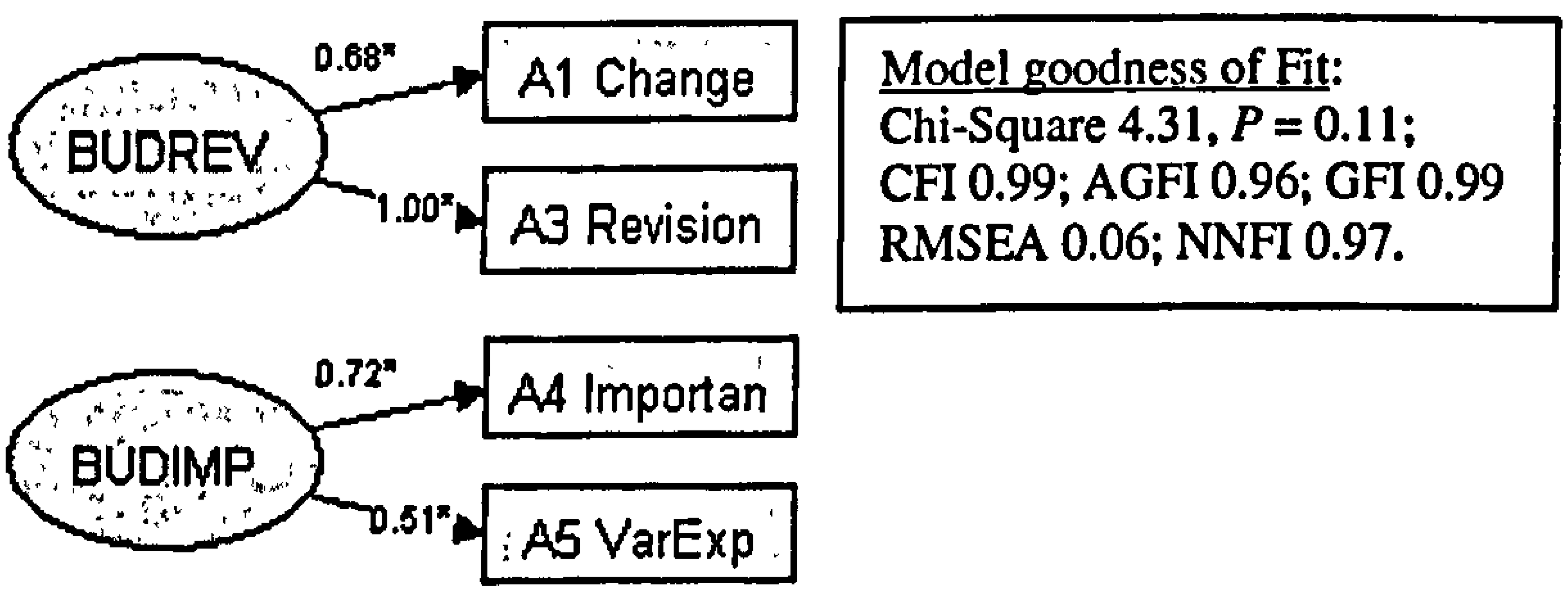


Figure 7.5 Confirmatory factor analysis for budgetary control practices (two-factor model)

7.3.4.2 Budgetary usage

It was indicated earlier in Chapter 5 that budgets can be used for different purposes including planning and forecasting annual operations, co-ordinating activities, communicating plans, motivating managers, evaluating performance and controlling activities. It was also pointed out in Chapter 5 that budgets can be used diagnostically or interactively (Simons 1990). Diagnostic usage of budgets relates to the traditional usage of budgets for motivating and evaluating managers and monitoring and controlling activities. In contrast, interactive usage of budgets relates to using budgets actively as a tool for planning, coordinating and communicating strategic priorities and plans (Abernethy and Brownell 1999, p.191). Respondents were asked, on a seven point Likert scale ranging from "not used at all" to "used to a very high extent," to rate the extent to which budgets were used for each of six purposes in their organisations. This question was adapted from Collins *et al.* (1997) to measure budgetary usage. Table 7.10 illustrates the six items used in the questionnaire to capture budgetary control practices.

Table 7.10 Measures of budgetary usage construct

Construct	No.* and description of measures used
Interactive usage of budgets	A10 The extent of using budgets for planning purposes
	A11 The extent of using budgets for coordinating activities
	A13 The extent of using budgets for communicating plans
Diagnostic usage of budgets	A14 The extent of using budgets for motivating managers
	A15 The extent of using budgets for controlling and monitoring
	A16 The extent of using budgets for evaluating performance

* Denotes questionnaire items displayed in Appendix 6.1.

The results of the EFA are consistent with Simons' (1990) classification of diagnostic and interactive budget system use discussed earlier. The results presented in Table 7.11 indicated that two factors as conceptualised for budgetary usage emerged, explaining 64 percent of variability of budgetary usage construct. These two factors were labelled as "interactive budgetary usage" (INTBUD) and "diagnostic budgetary usage" (DIAGBUD).

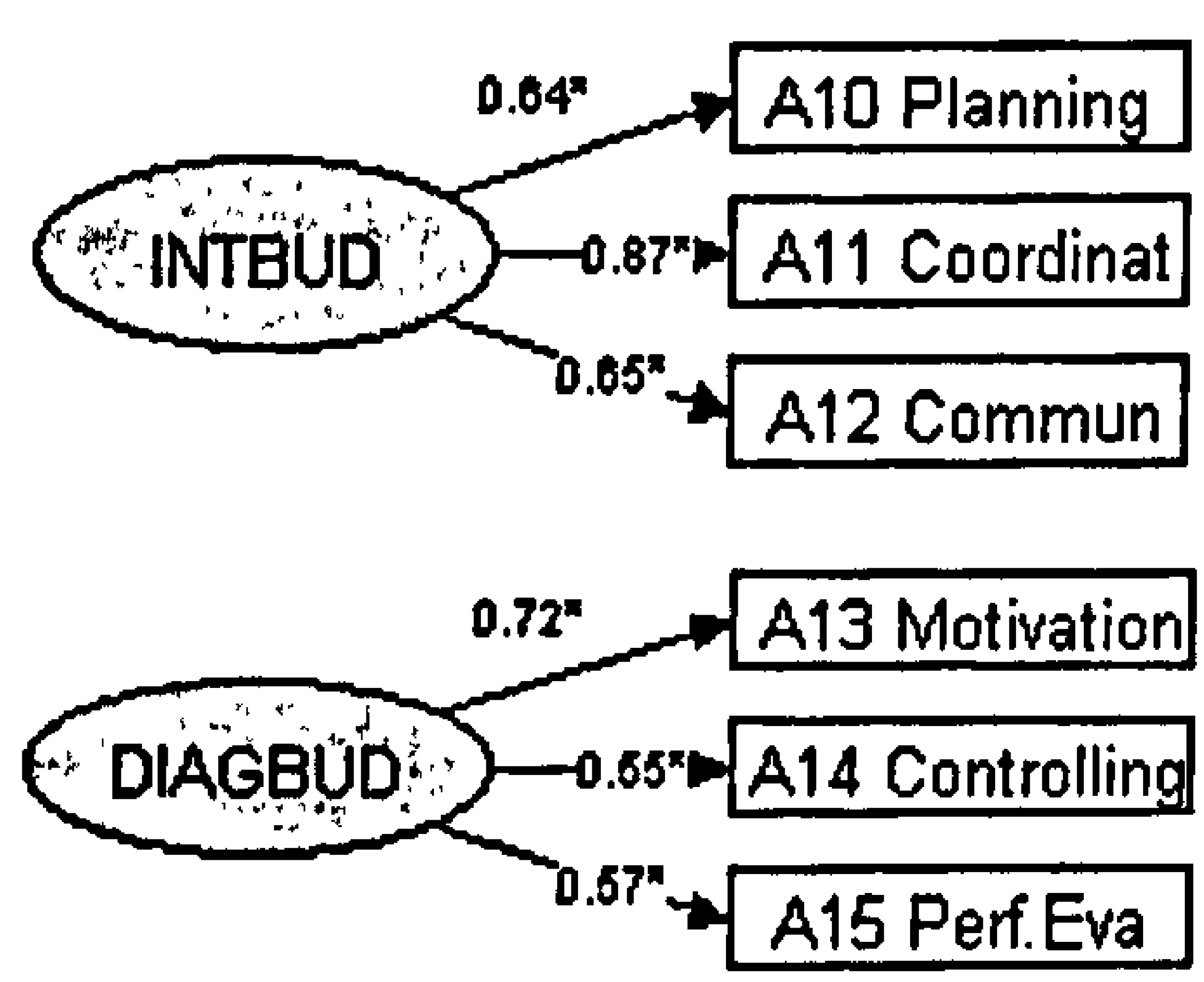
Table 7.11 Exploratory factor analysis for budgetary usage construct [a]

	Interactive usage	Diagnostic usage
A10 Usage of budgets for planning	.873	
A11 Usage of budgets co-ordinating activities	.847	
A12 Usage of budgets for communicating plans	.679	
A13 Usage of budgets for motivating employees		.711
A14 Usage of budgets for controlling behaviour		.557
A15 Usage of budgets for performance evaluation		.913

Extraction Method: Principal component analysis.
Rotation Method: Oblimin with Kaiser Normalisation.
[a] Rotation converged in 7 iterations.

All items loaded highly on their hypothesised dimensions and were greater than 0.40, ranging from 0.55 to 0.91. The Bartlett test of sphericity (338, $P < 0.001$) and Kaiser's measure of sampling adequacy (0.721) indicated that EFA was appropriate and within acceptable levels (Hair et al 1998, p.99). In addition, the Cronbach's alpha for INTBUD and DIAGBUD were 0.76 and 0.64 respectively, indicating good levels of reliability for both factors.

The results of the CFA presented in Figure 7.6 confirmed the EFA results and indicated that the measurement model goodness of fit was acceptable (Chi-square 11.73, $P = 0.07$; CFI 0.98; AGFI 93; GFI 98; NNFI 94; RMSEA 0.07). In addition, all items loaded significantly and strongly on their specified factors or latent variables (ranging from 0.55 to 0.87, $P < .01$). These results suggest that the measurement model uniquely represents budgetary usage and confirm the measurement scales unidimentionality and validity for both dimensions INTBUD and DIAGBUD. Therefore, budgetary usage is represented in this study as two separate dimensions, INTBUD (measured by three items, A10-A12) and DIAGBUD (measured by three items, A13-A15).



Model goodness of Fit:
Chi-square' 11.73, $P = 0.07$;
CFI 0.98; AGFI 0.93; GFI 0.98
RMSEA 0.07; NNFI 0.94.

Figure 7.6 Confirmatory factor analysis for budgetary usage (two-factor model)

7.3.4.3 Cost control systems

To measure the extent to which cost control techniques are used, respondents were asked, on a seven-point scale, to indicate the extent to which four cost control techniques were used in their business units. The four techniques were use of cost centres, standard costing, activity-based costing and target costing. This question was adapted from Simons (1987) and Chenhall and Langfield-Smith (1998). Table 7.12 illustrates the four items used in the questionnaire to measure cost control systems.

Table 7.12 Measures of cost control systems

Construct	No.* and description of measures used
Cost control systems	A16 The extent of using cost centres for controlling costs
	A17 The extent of using standard costing for controlling costs
	A18 The extent of using activity-based cost management
	A19 The extent of using target costing for controlling costs

* Denotes questionnaire items displayed in Appendix 6.1.

The results of EFA presented in Table 7.13, show the emergence of two factors for cost control systems, explaining 67 percent of total variance. The first two items A16-A17 loaded on one factor, which was labelled as "traditional cost systems" (TRACOST) and items A18-A19 loaded on another factor which was labelled as "emergent cost systems" (EMECOST). All loadings for both factors were greater than 0.40, ranging from 0.81 to 0.83. The Bartlett test of sphericity (71.56, $P < 0.001$) and Kaiser's measure of sampling adequacy (0.52) indicated that EFA was appropriate and within acceptable levels (Hair *et al.*, 1998, p.99). In addition, the Cronbach's alpha for TRACOST and EMECOST were 0.51 and 0.49 respectively, approaching the minimal levels of acceptable reliability (i.e., 0.50-0.60) for exploratory research suggested in Nunnally (1978).

Table 7.13 Exploratory factor analysis for cost control systems [a]

	Traditional cost systems	Emergent cost systems
A16 Cost centres	.830	
A17 Standard costing	.819	
A18 Activity based cost management		.817
A19 Target costing		.813

Extraction Method: Principal component analysis.
Rotation Method: Oblimin with Kaiser Normalisation.
[a] Rotation converged in 5 iterations.

Taking into consideration that Cronbach's alpha is sensitive to the number of items, and that alpha provides conservative results for scales with few items, it was decided to retain both factors for further analysis. This is consistent with Hair *et al.* (1998, p.118) implication that as Cronbach's alpha has a positive relationship with the number of items in the scale, researchers could place less stringent reliability values for scales with relatively few items.

The results of CFA presented in Figure 7.7 evidenced that the measurement model goodness of fit was excellent (Chi-square 1.23, *P* .27; CFI 1; RMSEA 0.03; AGFI .98; GFI 1; NNFI .98). In addition, all laodings were strong and significant (ranging from 0.49 to 0.73; t-values 2.73 to 2.83; $P < .01$). Thus, in this study, cost control is represented as a multidimensional construct with two dimensions, TRACOST and EMECOST.

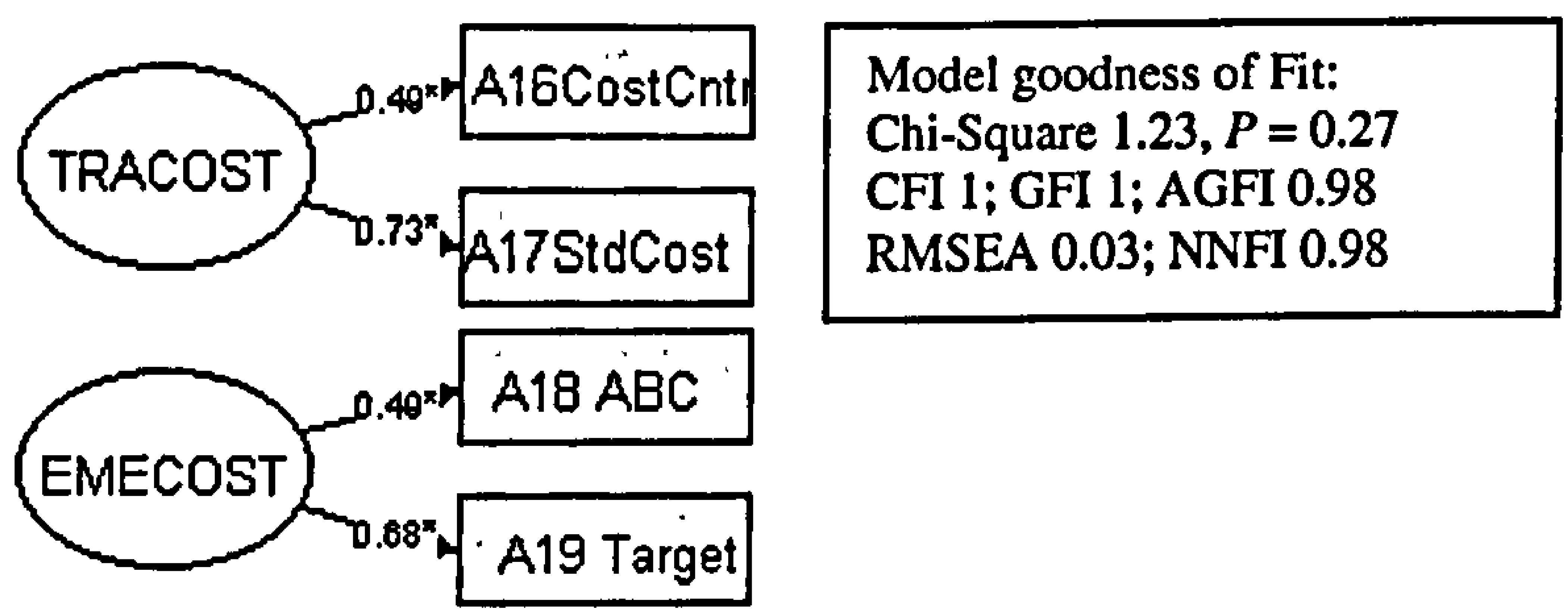


Figure 7.7 Confirmatory factor analysis for cost control system (two-factor model)

7.3.4.4 Scope of information

Scope of information is a multidimensional construct, which includes three dimensions: focus (internal or external); quantification (financial or non-financial); and time horizon (historical or future-oriented). The three dimensions have been studied in MC contingency research either individually (e.g., Gordon and Narayanan, 1984; Simons, 1987) or were subsumed under a single unidimensional construct as broad scope information (Chenhall and Morris, 1986; Chia, 1995; Bouwens and Abernethy, 2000). For instance, Chenhall and Morris (1986) classified scope of information as narrow scope and broad scope. Narrow scope information is linked to traditional accounting information that is internally focused, financial and historically based information. In contrast, broad scope information is externally focused, non-financial and future-oriented information.

This study is concerned with the broad scope dimension that refers to the extent that non-financial measures, external and future accounting information are incorporated in MCS reports. Chenhall and Morris' (1986) measurement instrument has been commonly used in MC contingency research to capture the three dimensions of broad scope information. This instrument measures scope of information along a continuum where high scores indicate broad scope and low scores indicate narrow scope. For instance, if data were classified as broad, it would have a relative high degree of non-financial, external, and future information (compared with narrow scope consisting of financial, internal and historical information).

This study also opted to measure scope of information in absolute terms rather than the relative way used in Chenhall and Morris (1986). In other words the extent of incorporating non-financial, external and future information in MCS reports is not relative to or dependent on the level of financial, internal or historical information incorporated in these reports. Thus, the three dimensions of broad scope information (i.e., non-financial, external and future information) are measured with 5 questions (A21-A25) adapted from Miller and Freisen (1982), Chenhall and Morris (1986), and Simons (1987). The first two questions (A21 and A22) were used in Miller and Freisen (1982) and Simons (1987) to measure environmental scanning and forecasting information. Questions (A23-A25) aimed to capture three types of non-financial performance measures relating to efficiency, customer and innovation measures. Respondents were asked on a seven point Likert scale, ranging from "not at all" to "a considerable extent", to indicate the extent to which these five types of information were incorporated in MCS reports in their business units. Table 7.14 illustrates the questions used in the questionnaire to measure the dimensions of broad scope information.

Table 7.14 Measures of scope of information dimensions

Dimension	No.* and description of measures used
External focused information	A21 The extent of data included in MCS reports related to opportunities and threats in the external environment.
Time horizon information	A22 The extent of data incorporated in MCS reports related to forecasting and predicting future events.
Non-financial measures	A23 The extent to which non-financial efficiency measures are incorporated in MCS periodic reports.
	A24 The extent to which non-financial customer measures are incorporated in MCS reports.
	A25 The extent to which innovation and learning measures are incorporated in MCS reports.

* Denotes questionnaire items displayed in Appendix 6.1.

Two factors emerged from the EFA, as presented in Table 7.15, explaining 58 percent of total variance. These two factors were labelled as "environmental scanning and forecasting" (ENVSCAN) and "non-financial measures " (NFM). Consistent with the criteria established earlier for conducting EFA, item A25 was dropped because of its high loading on two factors.

Table 7.15 Exploratory factor analysis for Scope of information construct [a]

	ENVSCAN	NFM
A21 Data on opportunities and threats in the environment	.923	
A22 forecasting and future data	.915	
A23 Non-financial efficiency measures		.885
A24 Non-financial customer measures		.897
A25 Non-financial innovation and learning measures	.419	.456

Extraction Method: Principal component analysis.
Rotation Method: Oblimin with Kaiser Normalisation.
[a] Rotation converged in 7 iterations.

All other items loaded highly on their factors and were greater than 0.40, ranging from 0.88 to 0.92. The Bartlett test of sphericity (730, $P < 0.001$) and Kaiser's measure of sampling adequacy (0.763) indicated that EFA was appropriate and within acceptable levels (Hair *et al.*, 1998, p.99). In addition, the Cronbach's alpha for ENVSCAN and NFM were 0.82 and 0.75 respectively, indicating good levels of reliability for both factors.

To validate the results of EFA and assess ENVSCAN and NFM construct validity CFA utilised in SEM was conducted. The results presented in Figure 7.8 show that all goodness of fit measures surpassed the acceptable levels for model goodness of fit (Chi-square 0.606, $P = 0.43$; CFI 1; AGFI 99; GFI 1; NNFI 1.007; RMSEA 0.00). In addition, all the specified path loadings were significant and strong (ranging from 0.77 to 0.85, $P < .001$). These results suggest that the measurement model uniquely represents the scope of information construct as a multidimensional construct represented by multiple dimensions or facets, ENVSCAN and NFM. Therefore, scope of information is represented in this study as two separate dimensions, ENVSCAN (measured by two items, A21-A22) and NFM (measured by two items, A23-A24).

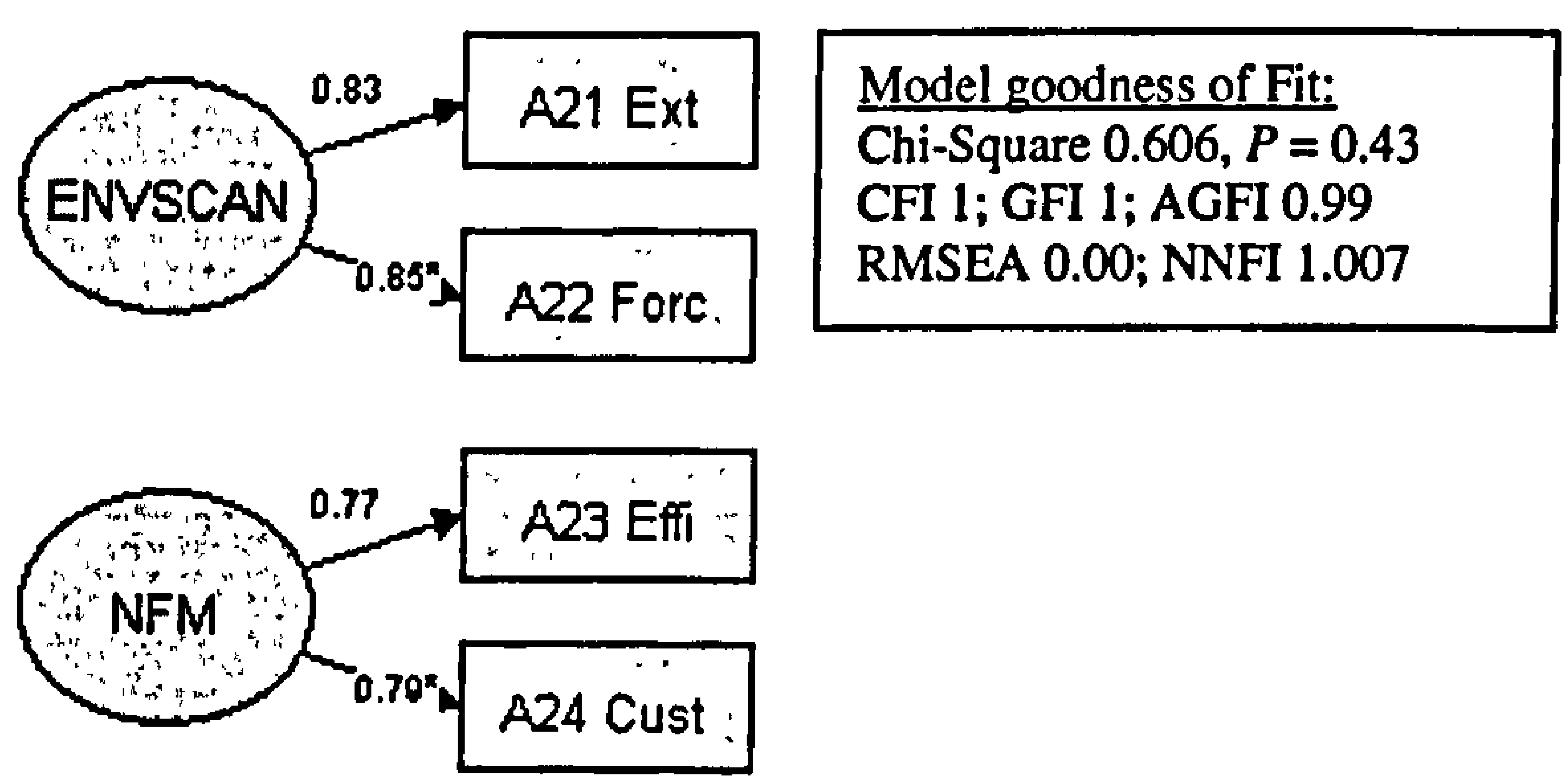


Figure 7.8 Confirmatory factor analysis for scope of information (two-factor model)

7.3.4.5 Managerial evaluation and rewards systems

This research is concerned with three attributes of managerial evaluation and rewards system: benchmarking for comparison, bonus determination criteria and performance evaluation criteria. Benchmarking for comparison refers to the basis against which actual managerial performance is compared to internal standards (e.g., budgets and historical standards) versus external standards (such as competitors' performance).

Bonus determination refers to the extent to which bonuses are determined by using objective strict criteria (such as percentage of operating profit) or by discretionary subjective criteria by managers' superiors. Performance evaluation refers to the extent to which managerial bonuses was determined by short-term performance criteria (such as sales volume, profits, meeting budget targets) or by long term performance criteria (such as market development, market share, customer satisfaction).

Three questions were used to measure managerial evaluation and rewards system attributes in a relative way. The first question (A28) deals with benchmarking for comparison of managerial performance. Respondents were asked, using a seven point semantic scale, to determine the degree of emphasis given to external standards (e.g., competitors' performance) relative to internal standards (budgets or previous year performance) when evaluating managerial performance. This question was derived from Anthony and Govindarajan (2001) and was not tested empirically prior to this study.

The second question (A29) focuses on the criteria used for bonus determination. Respondents were asked to indicate the extent to which bonus remuneration is determined by subjective criteria (based on superior judgement or discretion) compared to objective criteria (strict formula such as percentage of operating profits). A seven point semantic differential scale ranging from exclusive emphasis on objective criteria to exclusive emphasis to subjective criteria, with the middle point indicating the "same emphasis is given to both criteria". A similar question was used in Gupta and Govindarajan (1985) and Simons (1987).

The third question (A30) measures the relative emphasis that is given to long-term measures compared to short-term measures when evaluating managerial performance. A seven-point scale ranging from "exclusive emphasis on short term criteria" to "exclusive emphasis on long-term criteria" with the middle point indicating, "same emphasis is given to both criteria". This question was derived from Anthony and Govindarajan (2001) and was used in Govindarajan and Gupta (1985). Table 7.16 illustrates the three questions used to capture managerial evaluation and rewards system three dimensions and will be incorporated in the structural model as single dimensions.

Table 7.16 Measures of managerial evaluation and rewards system dimensions

Construct	No.* and description of measures used
Benchmark for comparison	A28 The relative emphasis that is given to external standards compared to internal standards for comparing managerial performance.
Bonus determination criteria	A29 The relative emphasis that is given to discretionary criteria compared to objective criteria for determining managerial bonus remuneration.
Managerial performance evaluation criteria	A30 The relative emphasis that is given to long-term measures compared to short-term measures when evaluating managerial performance

* Denotes questionnaire items displayed in Appendix 6.1.

7.3.4.6 Aggregation of information

Aggregation of information relates to the form of information presented to senior management (i.e., how information is classified or combined in MC reports). Chenhall and Morris (1986) developed the measures of this construct, which were then used by several researchers in MC contingency studies (e.g., Bouwens and Abernethy, 2000; Moores and Yuen, 2001). According to Chenhall and Morris (1986), MCS may present information in various forms of aggregation ranging from basic unprocessed data to a variety of aggregations around periods of time (e.g., monthly/quarterly/ annually), areas of interests (e.g., responsibility centres or functional areas) or classified in formats consistent with formal decision making and analytical models (e.g., sensitivity analysis).

In a similar vein, Amigoni (1978) described this feature of MCS as the degree of detail of control systems. Amigoni asserts that control systems can be more or less detailed, in relation to number of clusters (aggregation) in which information is collected and classified. The degree of details or aggregation is high if data are classified with reference to products, organisational units (or functions) variables etc.

This research opted to measure aggregation with an adaptation of the Chenhall and Morris' (1986) instrument. Respondents were asked, on a scale ranging from 1 = strongly disagree to 7 = strongly agree, to rate the extent to which MC information presented to senior management in their business units is aggregated around six areas. Table 7.17 illustrates the items in the questionnaire that were used to capture the degree of aggregation and details of MCS reports.

Table 7.17 Measures of aggregation of information construct

Construct	No.* and description of measures
Aggregation of information	A31 The extent to which data is aggregated in accordance with decision and analytical models.
	A32 The extent to which data is aggregated in accordance with fixed and variable costs.
	A33 The extent to which data is aggregated in accordance with controllable and uncontrollable variances
	A34 The extent to which data is aggregated in accordance with different functional areas (responsibility centres)
	A35 The extent to which data is aggregated in accordance with areas of interest (market trends, competitors' performance)
	A36 The extent to which data is aggregated in accordance with different time periods (weakly/monthly/quarterly etc.)

* Denotes questionnaire items displayed in Appendix 6.1.

The results of the EFA presented in Table 7.18 confirm the unidimensionality of this construct. All items loaded on one factor as expected, and were greater than 0.40, ranging from 0.48 to 0.68. The Bartlett test of sphericity (201, $P < 0.001$) and Kaiser's measure of sampling adequacy (0.73) indicated that EFA was appropriate and within acceptable levels (Hair *et al.*, 1998, p.99). In addition, the Cronbach's alpha reliability measure for aggregation of information (AGGINF) construct was 0.67 indicating an acceptable level of reliability.

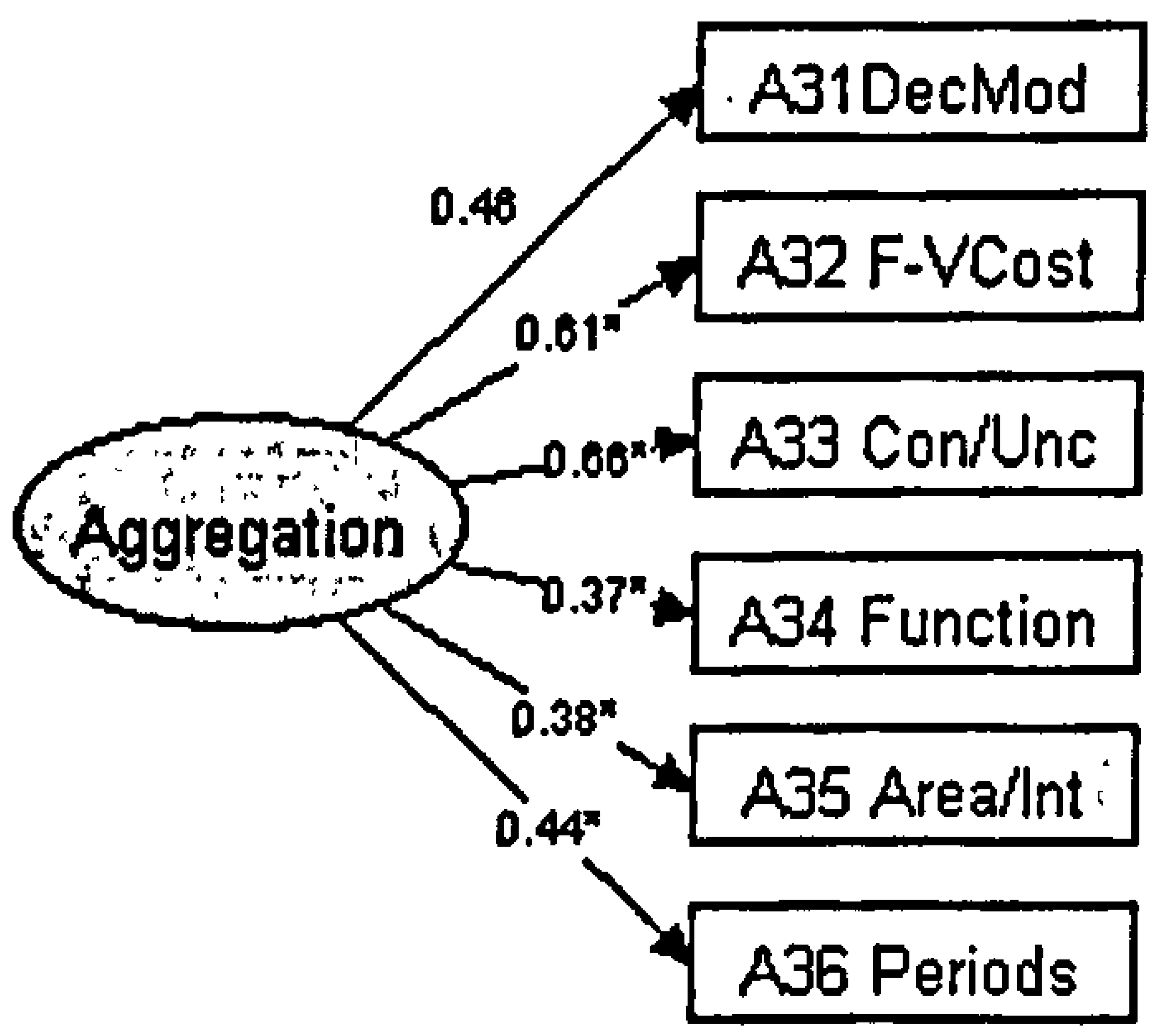
Table 7.18 Exploratory factor analysis for aggregation of information construct [a]

	Aggregation
A31 Aggregated in accordance with decision and analytical models.	.658
A32 Aggregated in accordance with fixed and variable costs.	.660
A33 Aggregated in accordance with controllable/uncontrollable variances	.688
A34 Aggregated in accordance with different functional areas	.488
A35 Aggregated in accordance with areas of interest	.604
A36 Aggregated in accordance with different time periods	.585

Extraction Method: Principal component analysis.
[a] One component extracted.

The results of the CFA presented in Figure 7.9, also confirmed the EFA results and demonstrated the construct validity. The measurement model goodness of fit was excellent (Chi-square 11.38, *P* .18; CFI 0.98; RMSEA 0.04; AGFI 0.96; GFI 0.99; NNFI 0.97). In addition, all items loaded significantly and strongly on their specified factor or latent variable (ranging from 0.37 to 0.66, $P < .01$). These results indicate that the measurement model uniquely represents AGGINF and demonstrates its unidimentionality and construct validity.

Therefore, Aggregation of information is represented in this study as one dimension, measured by six items (A31-A36). A summated scale for AGGINF as explained earlier will be incorporated in the structural model.



Model goodness of Fit:
Chi-Square 11.38, P = 0.18;
CFI 0.98; GFI 0.99; AGFI 1
RMSEA 0.04; NNFI 0.97

Figure 7.9 Confirmatory factor analysis for aggregation of information (one-factor model)

7.3.4.7 Timeliness of information

Timeliness of information relates to two sub-dimensions: the speed of reporting (i.e., the provision of information on request), and the frequency of reporting systematically collected information (how often control reports are provided to senior management). Timeliness is high when information is provided frequently (i.e., on a daily or weekly basis) and when there is no or little delay between the occurrence of an event and reporting it to managers. Various MC contingency studies (e.g., Gul and Chia, 1994; Chong and Chong, 1997; Bouwens and Abernethy, 2000) have measured this construct using the instrument developed by Chenhall and Morris (1986).

This study therefore opted to use the Chenhall and Morris' (1986) instrument with adaptation to measure timeliness of information construct. Respondents were asked, on a scale ranging from 1 = strongly disagree to 7 = strongly agree, to rate the extent to which they agreed or disagreed with four statements related to speed and frequency of reporting MC information to senior management in their business units. Table 7.19 illustrates the four items used in the questionnaire to capture this construct.

Table 7.19 Measures of timeliness of information

Construct	No.* and description of measures used
Speed of reporting	A38 The extent to which relevant data is available upon request
	A39 The extent to which data is available to managers "on line"
	A40 The extent of delay in reporting the occurrence of an event
Frequency of reporting	A41 The frequency of reporting MC reports to senior managers

* Denotes questionnaire items displayed in Appendix 6.1.

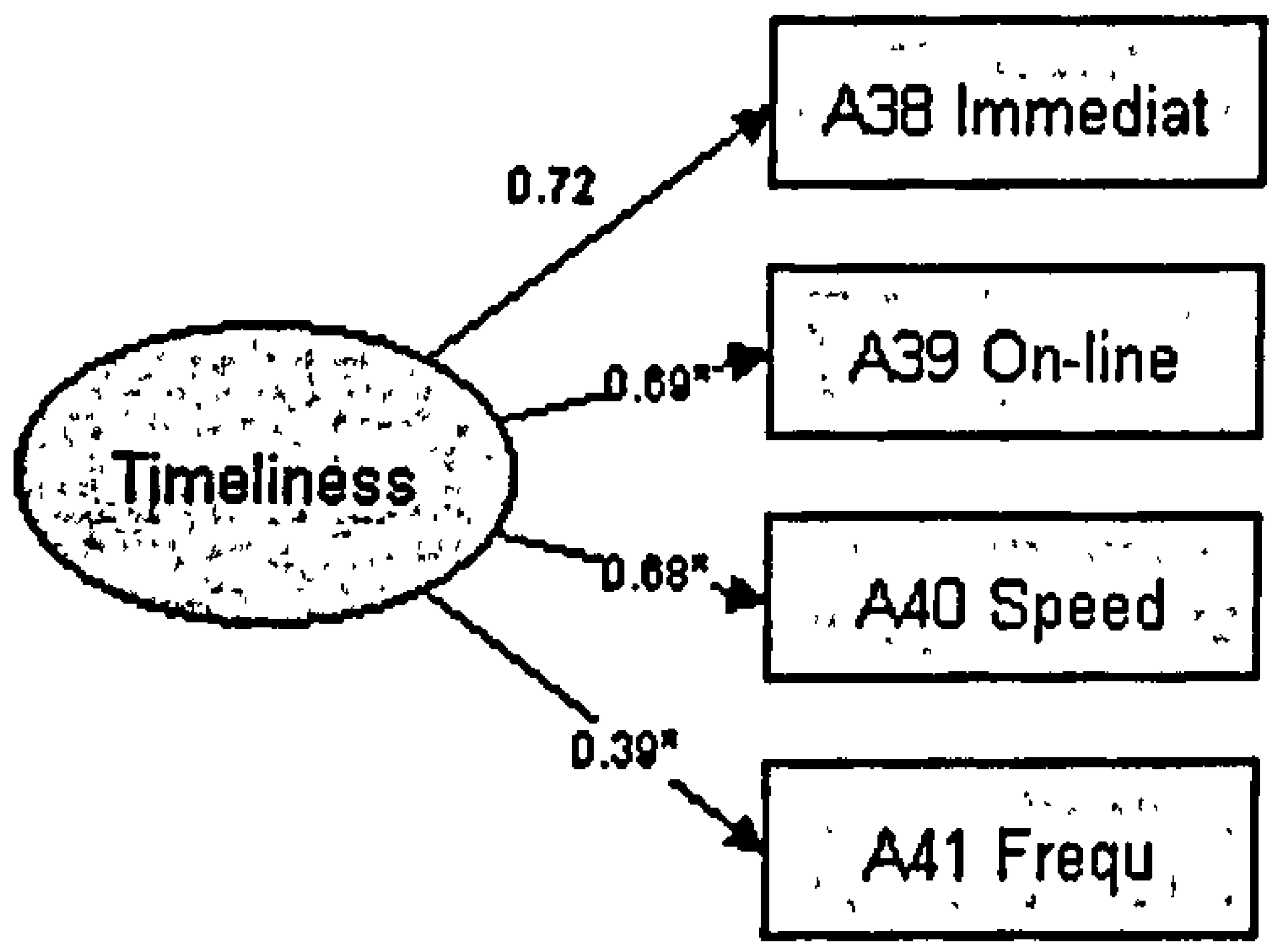
The results of the EFA presented in Table 7.20 indicate the emergence of one factor explaining 54 percent of the total variance. The loading of all four items were greater than the threshold value of 0.40, ranging from 0.55 to 0.79. The Bartlett test of sphericity (201, $P < 0.001$) and Kaiser's measure of sampling adequacy (0.738) indicated that EFA was appropriate and within acceptable levels (Hair *et al.*, 1998, p.99). In addition, the Cronbach's alpha reliability measure for TIMINF was 0.72 indicating an acceptable level of internal consistency.

Table 7.20 Exploratory factor analysis for timeliness of information construct [a]

	Timeliness
A38 Information available upon request (immediate reporting)	.796
A39 Information available "on-line"	.784
A40 Speed of reporting	.780
A41 Frequency of reporting	.557

Extraction Method: Principal component analysis.
[a] One component extracted.

The results of the CFA presented in Figure 7.10, also confirmed the EFA results and validated TIMINF construct. The measurement model goodness of fit was excellent (Chi-square 0.49, $P = 0.78$; CFI 1; AGFI 0.99; GFI 1; NNFI 1.02; RMSEA 0.00). In addition, all items loaded significantly and strongly on their specified factor or latent variable (ranging from 0.39 to 0.72, $P < .01$). These results suggest that all four items, A38-A41, represent TIMINF and that construct unidimentionality, reliability and validity are satisfied. Therefore, timeliness of information is represented in this study as one dimension, and a summated scale for TIMINF will be incorporated in the structural model.



Model goodness of Fit:
Chi-Square 0.49, $P = 0.78$;
CFI 1; GFI 1; AGFI 0.99;
RMSEA 0.00; NNFI 1.02.

Figure 7.10 Confirmatory factor analysis for timeliness of information (one-factor model)

7.3.5 Organisational effectiveness

To recall from the argument developed in Chapter 5, the measurement of organisational effectiveness or performance is problematic. Effectiveness can be measured through objective data or subjective means. Objective performance indicators such as profits or ROI are of limited value in the context of this research for several reasons. First, it is not possible to use the same set of criteria to evaluate every organisation, since different business strategies imply quite different goals. Second, no objective measures can capture some of the factors critical to the success of certain strategies. For example, R&D is a key success factor for strategies with an innovative direction (i.e., differentiation or prospectors). Thus, the measurement of organisational effectiveness is based on subjective and multidimensional (financial and non-financial) measures rather than a narrow objective measure.

The approach suggested by Govindarajan (1984) to measure effectiveness was used in this research. This approach has been used in several MC contingency studies (e.g., Chong and Chong, 1997; Govindarajan and Fisher, 1990; Govindarajan, 1988; Chenhall and Langfield-Smith, 1998). A two stage rating system was employed. First, respondents rated along seven-point scales, ranging from not important to vitally important, the importance of eight performance[6] measures to their organisations. These included cash flow, market share, return on investment, new product development, market development, cost reduction, research and development, and personnel development. A percentage weighting for each importance scale is then calculated by dividing the item score by the total of all importance scores for each company. Second, respondents were asked to score, again on a seven-point scale, ranging from poor to outstanding, how they perceived their organisations actually performed along each of these eight performance dimensions. Organisational effectiveness was then calculated for each respondent as the sum of the products of the importance weighting and actual performance.

Due to the nature of this scale (the use of a two stage rating scale and the multiplicity of measures used) it was not possible to conduct the same procedures discussed earlier in this chapter to assess reliability and validity of this construct. However, to provide some assurance of the reliability and validity of this construct, validity was assessed as a correlation coefficient. According to Oppenheim (1992, p.160) this method of

[6] Govindarajan's (1984) original instrument used a five-point scale. However, a seven-point scale was used in the present research to be consistent with the measurement scales used in the questionnaire.

establishing validity entails correlating the scores with other measures of the construct at the same time. This method is called concurrent validity. High and significant correlation between the two measures indicates validity is present. Thus an additional item (E9) was included in the questionnaire for this purpose. Respondents were asked to indicate the overall performance of their business units compared to their competitors over the last three years. The correlation coefficient evidenced that this item correlated highly and significantly with the calculated performance score ($r = 0.715$, $P < .01$; 2-tailed). Thus the sum of products of importance weighting and actual performance can be assumed to be reliable and valid and are therefore incorporated in the structural model.

7.4 Summary

This chapter has shown the procedures undertaken and the stages employed by the researcher to operationalse, refine and validate the research constructs that were included in the research model presented in Chapter 5 (Figure 5.1). The research constructs under investigation were environmental uncertainty, business strategy, organisational structure, MCS's seven attributes (i.e., budgetary practices and usage, cost control systems, scope, managerial evaluation and rewards, aggregation and timeliness) and organisational effectiveness.

The measurement model analysis in SEM was conducted with EQS version 5.7 statistical software package. Both exploratory and confirmatory factor analyses were utilised to anticipate and evaluate the measurement model for each of the research constructs. Each construct under investigation was modelled as a separate measurement model and was assessed separately for dimensionality, reliability and validity. The constructs of managerial evaluation and rewards and organisational effectiveness were not assessed owing to their single-item nature.

The results of the measurement models analyses showed that all measures of overall model goodness of fit well exceeded the recommended cut off points, thus lending sufficient support to deeming the measurement models an acceptable representation of the hypothesised constructs. In addition, all observed variables or measures that have significant loadings on their specified constructs were retained. Also, the Cronbach's alpha reliability measures for research constructs were all within the acceptable levels recommended in the literature (Nunnally, 1978). Thus, the results of measurement model analysis demonstrated that the refined scales or measures obtained from this analysis provide a satisfactory representation of the constructs under investigation and can be incorporated with confidence into the structural model analysis. Finally, the results of this analysis have also demonstrated that all of the research constructs, except aggregation and timeliness of information were in fact of multidimensional nature with multiple sub-dimensions or factors. Table 7.21 summarises the results obtained from the measurement model analysis including the constructs' sub-dimensions, measures, sources and reliability measures.

Table 7.21 Summary of constructs, measures, sources & Cronbach α Scores

	Perceived Environmental Uncertainty (X_1)
	(Govindarajan, 1984)
Items	**PEU-Operational oriented ($\alpha = 0.73$)**
C1	Predictability of change in manufacturing technology
C2	Predictability of change in competitors' actions
C3	Predictability of change in customers' demand and taste
C4	Predictability of change in product attributes/design
Items	**PEU-Regulatory oriented ($\alpha = 0.55$)**
C5*	Predictability of change in raw material availability
C6	Predictability of change in labour union actions
C7	Predictability of change in government regulations
	Business Strategy (X_{2i})
	(Govindarajan, 1988; Lee and Miller, 1993)
Items	**Low-cost strategy ($\alpha = 0.54$)**
B5	Product selling price (R)
B6	Manufacturing costs (R)
Items	**Differentiation Strategy ($\alpha = 0.66$)**
B7	Research and development expenditure
B8	Product quality
B9	Brand image
B10	Product features
	Organisational Structure (X_{3i})
	(Ramamurthy, 1990)
Items	**Centralisation ($\alpha = 0.79$)**
D1	Locus of decision making for new product introduction
D2	Locus of decision making for capital budgeting decisions
D3	Locus of decision making for pricing policies
D4	Locus of decision making for penetration into new markets
D5	Locus of decision making for new manufacturing processes
D6*	Locus of decision making for personnel policy decisions.
Items	**Formalisation ($\alpha = 0.81$)**
D7	The extent of formal documentation of rules and procedures
D8	The extent of reliance on operating rules and procedures
D9	The extent of tolerance to violation of documented procedures

* Item removed from scale; R, reverse coded.

Continued: Table 7.20 Summary of construct measures, sources & Cronbach α Scores

	Management Control System attributes (X_{4i})
	X_{41} Budgetary control system practices
	(developed from various sources)
Items	**Budgetary Revision and Change (α = 0.80)**
A1	The frequency of changing budgetary targets (R)
A2*	The formality of changing budgetary target
A3	The extent to which budget revisions are not allowed
Items	**Importance of budgetary targets (α = 0.56)**
A4	The importance attached to meeting budgetary targets
A5	The extent to which variances need written explanation
A6*	The extent of participation in setting the budgets
A7*	The extent of reliance on budgets as a control tool (R)
A8*	The extent of tolerance of budget variances (R)
A9*	The extent of difficulty of budgetary targets
	X_{42} Budgetary Control System usage
	(Simons, 1990; Collins *et al.*, 1997)
Items	**Interactive usage of budget (α = 0.76)**
A10	Usage of budget for planning purposes
A11	Usage of budget for co-ordinating activities
A12	Usage of budget for communicating plans
Items	**Diagnostic usage of budget (α = 0.64)**
A14	Usage of budget for motivating managers
A15	Usage of budget for controlling and monitoring
A16	Usage of budget for evaluating managerial performance
	X_{43} Cost Control Systems
	(Simons 1987; Chenhall and Langfield-Smith 1998)
Items	**Traditional cost control systems (α = 0.51)**
A16	Use of cost centres for controlling costs
A17	Use of standard costing for controlling costs
Items	**Emergent cost control systems (α = 0.49)**
A18	Use of Activity-based cost management for cost control
A19	Use of target costing for cost control

* Item removed from scale; R, reverse coded.

Continued: Table 7.20 Summary of construct measures, sources & Cronbach α Scores

	X_{44} Scope of Information
	(Chenhall and Morris 1986)
Items	**Environmental scanning and forecasting (α = 0.82)**
A21	Control reports incorporate data on opportunities and threats in the external environment
A22	Control reports incorporate forecasting and prediction data on future events
	Non-financial performance measures (α = 0.75)
A23	Control reports incorporate non-financial efficiency performance measures
A24	Control reports incorporate non-financial customer measures
A25*	Control reports incorporate non-financial innovation and learning measures.
	X_{45} Managerial evaluation and rewards system
	(Govindarajan and Gupta, 1985,; Simons, 1987; Anthony and Govindarajan, 2001)
Item	**Benchmark for comparison (α = N/A)**
A28	Managerial performance evaluation is based on external standards relative to internal standards
Item	**Bonus determination criteria (α = N/A)**
A29	Bonus determination is based on subjective criteria relative to objective criteria
Item	**Performance evaluation criteria (α = N/A)**
A30	Managerial performance evaluation is based on short-term measures relative to long-term measures
	X_{46} Aggregation of information (α = 0.67)
Items	(Chenhall and Morris, 1986)
A31	Data is aggregated in accordance with decision and analytical models
A32	Data is aggregated in accordance with fixed and variable cost
A33	Data is aggregated in accordance with controllable and uncontrollable variances
A34	Data is aggregated in accordance with functional areas
A34	Data is aggregated in accordance with areas of interests
A35	Data is aggregated in accordance with different time periods
	X_{47} Timeliness of information (α = 0.72)
Items	(Chenhall and Morris, 1986)
A38	Data is available upon request (Immediate reporting)
A39	Data is available on-line
A40	There is Little or no delay in reporting the occurance of an event (speed of reporting)
A41	Control information is frequently reported to managers (frequency of reporting)
	X_5 Organisational effectiveness (α = N/A)
	(Govindarajan 1984)
	Due to the nature and length of the scale used to measure this construct, the measures are not presented in this table. Readers may refer back to section 7.3.5 for these measures.

* Item removed from scale; R, reverse coded.

CHAPTER 8

STRUCTURAL MODEL ANALYSIS AND FINDINGS

CHAPTER 8

Structural Model Analysis and Findings

8.1 Introduction

It has been shown in the previous chapter that all research constructs have passed the reliability-validity assessment criteria and can be incorporated with confidence into the structural model for testing the structural relationships between the research constructs discussed in Chapter 5. This chapter aims to evaluate the structural model and present the findings relating to hypotheses tests. It comprises five sections. Section 8.2 provides descriptive statistics and preliminary analysis of research constructs including distribution, outliers, missing values, multicollinearity and singularity. Section 8.3 describes the procedures for testing the structural model in SEM and Sections 8.4 and 8.5 present the results of structural model analysis. Section 8.4 presents the findings relating to direct and indirect links between research constructs and MCS attributes. The findings relating to the effect of congruence (fit) between the contextual factors and MCS attributes on organisational effectiveness, thus taking a multivariate systems approach of fit recommended in the literature, are presented in Section 8.5. Finally, the chapter summary is presented in Section 8.6.

8.2 Descriptive statistics and data screening

Table 8.1 provides the descriptive statistics for the variables required for testing the hypotheses developed in Chapter 5. The descriptive statistics table includes the mean (measure of central tendency), standard deviation (measure of spread of distribution), minimum and maximum values, which were reviewed to screen for any unrealistic values. The values of skewness and kurtosis[1] (measures of distribution) for each variable are also reported in Table 8.1 in order to check variables for assumptions of normality. In general a skewness/kurtosis value greater than one indicates a distribution that differs significantly from a normal symmetric distribution (Hair *et al.*, 1998, p.37).

Table 8.1 Descriptive statistics for research constructs

Construct	Mean	STD DEV	MIN	MAX	Skewness	Kurtosis
PEU-Operation (OPEPEU)	3.126	0.977	1.25	6.5	0.731	0.337
PEU-Regulation (REGPEU)	3.167	1.075	1	7	0.528	0.163
Differentiation Strategy (DIFSTR)	4.830	0.798	2.5	6.75	-0.040	-0.304
Low-cost Strategy (COSSTR)	3.605	0.895	1	6.5	0.124	0.135
Centralisation (CENTRA)	5.484	1.032	2	7	-0.867	0.444
Formalisation (FORMAL)	4.631	1.206	1	7	-0.450	-0.345
Budgetary Revision (BUDREV)	4.876	1.842	1	7	-0.557	-1.035
Budgetary Importance BUDIMP)	5.402	1.189	1	7	-0.998	0.930
Interactive Budgetary Usage (INTBUD)	5.462	1.006	1.67	7	-0.778	0.521
Diagnostic Budgetary Usage (DIABUD)	5.267	0.919	2	7	-0.783	0.626
Traditional Costing (TRADCOST)	5.782	1.133	2	7	-1.138	1.094
Emergent Costing (EMECOST)	2.781	1.370	1	7	0.532	-0.292
Environment Scanning (ENVSCA)	4.103	1.492	1	7	-0.171	-0.644
Non-Financial Measures (NFM)	5.334	1.204	1	7	-0.760	0.684
Benchmark for Comparison (BENCH)	2.453	1.093	1	7	1.450	2.507
Bonus Determination (BONDET)	2.581	1.557	1	7	1.098	0.333
Performance Evaluation (PERFEV)	2.024	1.064	1	6	1.659	3.387
Aggregation (AGGINF)	4.723	0.919	2.17	6.67	-0.430	0.001
Timeliness (TIMINF)	4.434	1.083	1.75	7	-0.154	-0.557
Organisational Effectiveness (EFFECT)	5.076	0.860	2.06	7	-0.355	0.170

[1] Skewness and kurtosis measure the symmetry and peakedness of a distribution when compared with a normal distribution. A positively skewed distribution has relatively few large values and tails off to the right, and a negatively skewed distribution has relatively few small values and tails off to the left. A positive kurtosis value indicates a relatively peaked distribution and a negative value indicate a relatively flat distribution (Hair *et al.*, 1998, pp.37-38).

According to Hair *et al.* (1998, p. 601) SEM, similar to other multivariate analyses techniques, is sensitive to substantial departure from multivariate normality or a strong kurtosis or skewness in data. A substantial lack of multivariate normality may affect the validity of the findings and could result in an inflated Chi-square statistic, which indicates poor model fit. Data non-normality can also create upward bias in the standard error values required for determining coefficient significance. According to Byrne (1994, p.79) "when variables demonstrate significant non-zero univariate kurtosis, it is certain that they will not be multivariately normally distributed." Skewness and kurtosis values within the range of −1 to +1 indicate an acceptable range while values falling out side the range of −1 to +1 indicate a substantial departure from normal distribution which require taking remedial actions prior to evaluating the structural model (Hair *et al.*, 1998, pp.37-38; Poff, 2001, p.68).

Reviewing the descriptive statistics presented in Table 8.1 shows that skewness and kurtosis values for all variables fall within the acceptable range except for five variables (BUDREV, TRADCOST, BENCH, BONDET, PERFEV) which were out of the acceptable range (skewness and kurtosis values ranging from 1.035 to 3.387). The effect of these skewed/kurtotic variables may be sufficient for distribution to be multivariately non-normal, therefore violating the underlying assumption of normality associated with SEM analysis (Byrne, 1994, p.79). One of two remedial approaches is recommended for addressing the problem of non-normality in these variables (West, Finch and Curran, 1995, p.56; Byrne, 1995, p.147; Hu and Bentler, 1995, p.76):

1. Use an estimation method that assumes underlying non-normal distribution of the data (asymptotic distribution-free estimation method, ADF). However, this method is adequate only for very large samples (say over 1000).
2. Use an estimation method that assumes an underlying normal distribution (maximum likelihood method, but base evaluation of model fit on a test statistic that has been corrected to take non-normality into account. This latter action has been

recommended as the best and most appropriate especially for sample sizes in the range of 200 to 500, as in this research.

Thus, this study opted to use maximum likelihood estimation method for evaluating the structural model with scaled chi-square for testing the model fit, and robust standard errors for testing the significance of estimated parameters. One of the main features of EQS 5.7 computer programme, used in this research for conducting SEM analysis, is its ability to provide users with an option to request robust statistics with most selected estimation methods. According to Byrne (1994, p.27) "the availability of these robust statistics is an extremely valuable feature that is unique to the EQS programme."

In addition, the EQS programme is unique in its ability to identify multivariate outliers or influential cases that have the greatest contribution to multivariate kurtosis. Typically all measured variables will be considered together in these analyses (West *et al.*, 1995, p.56). In each run, EQS automatically detects the five cases that contribute most to multivariate kurtosis. An outlier case is identified based on the estimate presented for one case relative to those for the other four cases. If one case has extremely large estimates relative to other four cases it may be judged to be an outlier, and eligible for deletion. However, according to Byrne (1995, p.146), there is no absolute value upon which to make this judgement, and it is possible that none of these five cases is actually an outlier. In this research a very few cases were regarded as outliers and thus were deleted. Deletion of these cases made the normal chi-square and adjusted chi-square very close to each other. Details of these analyses are provided later in this chapter when evaluating the structural model.

Finally, EQS has no feature for handling or manipulating missing data found in other similar programmes such as AMOS. Missing data can have a profound effect on calculating the input data matrix and its ability to be used in the estimation process (Hair *et al.*, 1998, p.603). Thus, all cases must be complete and have no missing elements to run EQS. Although the number of missing data in this research is very minor and only very few cases have missing variables, missing data was solved with a mean substitution method as recommended by Hair *et al.* (1998, p.63). This method is widely used and considers the mean value of all valid responses for a variable as the best single replacement value (Hair *et al.*, 1998, p. 54). In addition, twelve cases were found to have complete missing variables (all items measuring a variable were missing). Thus, it was deemed appropriate to delete these cases from further analysis since it was not possible to impute their values from other variables or use variable mean substitution. This is consistent with Hair *et al's.* (1998, p.603) recommendations to delete those cases that have complete missing items for one or more variables especially when the missing data is small and the sample is sufficiently large to allow for the deletion of the cases with complete missing data.

The data was also screened for multicollinearity[2] by examining the bi-variate correlations of variables (Tabachnick and Fidell, 2001, p.392). Extremely highly correlated variables are multicollinear, and perfectly correlated variables cause singularity. Correlations of 0.90 or higher are considered to be indicators of multicollinearity, and correlations exceeding 0.80 are indicative of problems (Hair *et al.*, 1998, p.613). Examining the correlations among the research constructs shows that the highest bivariate correlation was 0.351 indicating that multicollinearity does not exist. In addition, to checking for multicollinearity, EQS 5.7 programme automatically detects if singularity between variables is present by generating error message and aborting analysis. Thus, multicollinearity and singularity did not appear to be present in the data. Having screened the data for distribution, outliers, missing values, multicollinearity and singularity, it was deemed appropriate to proceed with testing the structural model.

8.3 Structural model analysis procedures

The structural model in SEM tests the hypothesised relationships among variables simultaneously. The purpose of this multivariate analysis is to test whether the bivariate

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[2] Multicollinearity is the "extent to which a variable can be explained by the other variables in the analysis. As multicollinearity increases, it complicates the interpretation of the variate as its more difficult to ascertain the effect of any single variable, owing to their interrelationships" (Hair *et al.*, 1998, p.2).

relationship continues to be significant in the presence of other intervening variables. Thus the structural model analysis is powerful in testing the direct and indirect effects between variables. According to Maruyama (1998, p.196) and Schumacker and Lomax (1996, p.142) evaluating the structural model involves testing of the model goodness-of-fit, and assessing the significance of parameter estimates (path coefficients).

8.3.1 Evaluating the structural model goodness-of-fit

Goodness-of-fit relates to how similar the hypothesised model is to the observed data, and must be assessed prior to testing the hypothesised paths in the model. According to Hair *et al.* (1998, p.613):

> Before evaluating the structural model the researcher must assess the overall fit of the model in order to ensure that it is an adequate representation of the entire set of causal relationships.

Once an acceptable goodness-of-fit is obtained, the estimates of the structural parameters can then be considered valid and used for hypotheses testing. SEM is preferred to traditional path analysis for providing overall indices of how well a structural model fits the data. According to Magner, Welker and Campbell (1996, p.48) this information is important, however, because a poorly fitting model still could find strong and significant relationships between constructs, and thus cannot be trusted for providing reliable and valid estimates. Thus, similar to the procedures followed for assessing the measurement model goodness-of fit discussed earlier in Chapter 7, several fit indices will be used for assessing the structural model goodness-of fit including Chi-square, CFI, NNFI, RMSEA, GFI and AGFI.

8.3.2 Evaluating the significance of parameters estimates

Evaluating the estimated coefficients in SEM can be approached by different means. According to Hair *et al.* (1998, p.613) the most obvious examination of structural model involves the significance of estimated coefficients. The significance of parameter estimates in SEM is the basis for accepting or rejecting the proposed relationships between variables (Hair *et al.*, 1998, p.640), and can be determined by judging the calculated t-value for each coefficient (Maruyama, 1998, p.196). According to Hair *et al.* (1998, p.613) the selection of a critical t-value depends on the theoretical justification for the proposed relationships. For example if the direction of the relationship (positive or negative) is hypothesized, then a one-tailed test of significance can be employed. However, if the direction of relationship is not hypothesized, then a two-tailed significance test must be used. The difference between the two significance tests is in the critical t-values used to assess significance. For example, for the 0.05 significance level, the critical t-value is 1.645 for a one tailed-test and 1.96 for a two-tailed test, while for the .01 significance level, the critical values are 1.96 and 2.576 for a one-tailed and two-tailed tests respectively.

Another aspect of evaluating an estimated relationship is the assessment of the actual size of the parameter. In SEM, standardised coefficients (called beta weights in regression) estimate how much effect each variable has (Cohen, 2001, p.24). Coefficients close to zero have little, if any, substantive effect, while an increase in standardised coefficient value corresponds to increased importance. According to Hoyle (1995) using standardised coefficients enables researchers to make informal comparisons of parameters throughout the model and determine which independent variable has greater effect on the dependent variable. Thus, standardised coefficients in SEM correspond to effect-size estimates, which are common adjuncts to standard statistical information from mean comparison procedures such as t-test and ANOVA.

SEM can also determine the magnitude and significance of the indirect effects between variables. Each indirect effect is the product of the path coefficients that provide the pathway between two variables that are directly related. According to Cohen (2001, p.24) a path coefficient of 0.05 or a more conservative 0.10 is reflective of substantive significance. The sum of the direct and indirect effects represents the total meaningful effect of one variable on another. In addition, SEM provides the coefficient of determination (R^2) for each structural equation, similar to that found in multiple regression. R^2 determines the predictive power of the entire structural equation, and represents the variance accounted for or explained in the dependent construct. The higher the value of R^2 the more accurate and meaningful the interpretation of the parameter estimates (Cohen, 2001, p.24).

8.3.3 Sample size and model complexity

Sample size plays an important role in the estimation and interpretation of SEM results. SEM requires a fairly large sample for a valid and reliable analysis. The critical question is how large a sample is needed for SEM to provide valid and reliable results. According to Hair *et al.* (1998, p.604) the model size and its complexity play a crucial role in determining the minimum sample size required for conducting SEM. As the number of parameters (hypotheses) to estimate in structural model increases, the minimum sample size required for conducting SEM increases (Hair *et al.*, 1998, p.604; Sharma, 2002, p.117). Hair *et al.* (1998, p.604) recommended a minimum ratio of at least five respondents for each estimated parameter, with a ratio of 10 respondents per parameter as most appropriate for obtaining a valid and reliable solution.

Due to the complexity of the current research model in terms of the number of variables and parameters to be estimated, and due to the limitations of sample size, it was not possible to test the full research model with all MCS attributes, as depicted in Figure 5.1, in one structural model. Thus the structural model analysis will be approached in two stages. First, structural model analysis will be conducted to test the direct and indirect effects of PEU, business strategy and organisational structure on each of the seven dimensions of MCS (i.e., budgetary practices, budgetary usage, cost control, broad scope, managerial evaluation and rewards, aggregation and timeliness of information). The second stage of analysis tests the effect of congruence or fit between the contextual variables and MCS attributes on organisational effectiveness. Thus the first stage of analysis attempts to achieve the first two research objectives, discussed earlier in chapter 5, which relates to investigating the direct and indirect effects of the contextual variables on MCS design. The second stage deals with the third research objective concerned with investigating the effect of fit or congruence between the contextual variables and MCS on organisational effectiveness.

To sum up before presenting the results of structural model analysis, it is worth reminding the reader that covariance matrices are used for all analysis and all tests are performed with EQS version 5.7 (Bentler, 1995). Maximum likelihood estimation (MLE) procedure is used for parameter estimates since it is considered as the most appropriate estimation procedure given the sample size (Hair *et al.*, 1998, p.605). To overcome the limitations of MLE with respect to multivariate non-normality, robust measures for standard errors required for calculating t-values are used when data indicate the possibility of multivariate non-normality in each model. The complexity of the model in terms of number of indicators and constructs resulted in the adoption of the summated scales approach. Nevertheless, the measurement errors were controlled by fixing the error variance for each summated scale to (1-reliability coefficient) times scale variance as was discussed earlier in Chapter 7. The outputs from the analysis are the goodness-of-fit indexes, standardized regression coefficients (betas), t-statistics and R^2. The significance of the paths was tested using t-statistic, with beta estimates considered significantly different from zero when $t > 1.645$ ($P < 0.05$), $t > 1.96$ ($P < 0.01$) for directional hypothesis, while for non-directional hypothesis (i.e., research questions) beta estimates considered significantly different from zero when $t > 1.96$ ($P < 0.05$), $t > 2.576$ ($P < 0.01$).

8.4 Structural model analyses results/direct and indirect links with MCS

8.4.1 Structural model of budgetary control practices

The first structural model analysis aimed to test the direct and indirect effects of PEU, business strategy and structure simultaneously on the two dimensions of budgetary control practices (i.e., item 1 of MCS attributes in Figure 5.1). The two dimensions are budgetary importance (BUDIMP) and budgetary revision (BUDREV). One case was identified as a multivariate outlier, thus was deleted. The results of SEM analysis are reported in Table 8.2.

Table 8.2 Structural model results for budgetary control practices

Hypothesised relationship	Predicted direction	Direct effect coefficient	t-value	Indirect effect coefficient	t-value	Total effect coefficient
Budgetary Importance						
PEU-Operations (H_{1a})	-	- 0.115	- 1.066	- 0.006	- 0.159	- 0.121
PEU-Regulations (H_{1a})	-	- 0.046	- 0.334	0.026	0.452	- 0.020
Differentiation Strategy (H_{1b})	-	- 0.068	- 0.400	0.092*	1.774	0.024
Low-cost Strategy (H_{1c})	+	- 0.030	- 0.185	0.033	0.815	0.003
Centralisation (RQ_{1a})		0.096	0.947	N/A	N/A	0.096
Formalisation (RQ_{1b})		0.259♦♦	2.723	N/A	N/A	0.259
Budgetary Revision•						
PEU-Operations (H_{1a})	-	- 0.182**	- 1.993	0.019	0.596	- 0.163
PEU-Regulations (H_{1a})	-	- 0.123	- 1.066	- 0.004	- 0.069	- 0.127
Differentiation Strategy (H_{1b})	-	- 0.114	- 0.793	- 0.001	- 0.017	- 0.115
Low-cost Strategy (H_{1c})	+	- 0.212	- 1.539	- 0.006	- 0.330	- 0.218
Centralisation (RQ_{1a})		- 0.071	- 0.831	N/A	N/A	- 0.071
Formalisation (RQ_{1b})		0.052	0.652	N/A	N/A	0.052
Centralisation						
PEU-Operations (H_{8a})	-	- 0.110	- 1.154	0.022	0.739	- 0.088
PEU-Regulations (H_{8a})	-	0.243**	2.076	-0.051	-1.132	0.192
Differentiation Strategy (H_{9a})	-	0.210	1.480	N/A	N/A	0.210
Low-cost Strategy (H_{9a})	+	0.138	0.977	N/A	N/A	0.138
Formalisation						
PEU-Operations (H_{8b})	-	0.002	0.022	0.045	1.440	0.047
PEU-Regulations (H_{8b})	-	0.037	0.339	-0.078*	-1.761	- 0.041
Differentiation Strategy (H_{9a})	-	0.276**	2.075	N/A	N/A	0.276
Low-cost Strategy (H_{9b})	+	0.078	0.587	N/A	N/A	0.078
Differentiation Strategy						
PEU-Operation (H_{10a})	+	0.210**	2.211	N/A	N/A	0.210
PEU-Regulation (H_{10a})	+	- 0.314**	- 2.835	N/A	N/A	- 0.314
Low-cost Strategy						
PEU-Operation (H_{10b})	-	- 0.161	-1.549	N/A	N/A	- 0.161
PEU-Regulation (H_{10b})	-	0.110	0.916	N/A	N/A	0.110

• For this factor, a low score indicates greater budgetary revision and change.

Model Fit Statistics: Chi-square 1.25, $P = 0.26$; CFI = 1; NFI = 1; NNFI = 0.89; GFI = 1; AGFI = 0.96; RMSEA = 0.03.

* $P < 0.05$ ** $P < 0.01$ (one-tailed); ♦ $P < 0.05$, ♦♦ $P < 0.01$ (two-tailed).

8.4.1.1 The structural model goodness-of-fit

As shown in Table 8.2, all goodness-of-fit measures well exceed the recommended cut-off values (Chi-square 1.25, $P = 0.26$; CFI = 1; NFI = 1; NNFI = 0.89; GFI = 1; AGFI = 0.96; RMSEA = 0.03). Therefore, the hypothesised model fits the data well and the standardised estimates of the structural parameters (betas) can be used for hypothesis testing. In addition, examining the coefficient of determination (R^2) values on the endogenous variables indicates that the predictive power of the structural equation model is adequate. The structural model explained 9% of the variance in budgetary importance (BUDIMP), 9% of the variance in low budgetary revision (BUDREV), 11% of the variance in differentiation strategy (DIFSTR), 3% of the variance in cost strategy (COSTSTR), 6% of the variance in centralisation (CENTRA) and 5% of the variance in formalisation (FORMAL).

8.4.1.2 The significance of parameters estimates (H_1, RQ_1, H_8-H_{10})

As shown in Table 8.2, the structural model analysis for budgetary control practices (BUDIMP and BUDREV)[3] revealed the following results about the effect of PEU, business strategy and structure simultaneously on the tightness of budgetary practices:

1. PEU → Budgetary practices (H_{1a})

Both dimensions of perceived environmental uncertainty, OPEPEU and REGPEU were found to have negative direct effects on BUDIMP and BUDREV. This finding is consistent with the hypothesised direction of effect and supports the arguments presented for H_{1a} that budgets in uncertain environments are likely to be less appropriate for control and performance evaluation because they are subject to continuous revisions and alterations during the year. The magnitude or importance of the direct effect of PEU on BUDREV was also found to be substantial for both dimensions OPEPEU and REGPEU (standardised coefficient = -0.182 and –0.123 respectively), while the magnitude of their effect on BUDIMP was substantial only for OPEPEU (path coefficient = -0.115 and -0.046 respectively). However, the significance of this effect was only found for OPEPEU

[3] Table 8.1 provides the key for abbreviations of research constructs used throughout this chapter.

on BUDREV ($t = -1.993$, $P < 0.01$ one-tailed). Thus, H_{1a} was fully accepted for OPEPEU and BUDREV, and partially accepted for the direction of effect of OPEPEU on BUDIMP and for the direction of effect of REGPEU on both dimensions of budgetary practices (BUDREV and BUDIMP). With regards to the indirect effect, no substantial or significant indirect effects were found, indicating that PEU has no indirect effect on BUDREV or BUDIMP through structural dimensions or through business strategy. The absence of finding significant indirect effects is probably attributable to the insignificant relationships between PEU dimensions and structure (H_8) as will be discussed later.

2. Business strategy → Budgetary practices (H_{1b} . H_{1c})

Both differentiation (DIFSTR) and low-cost (COSTSTR) business strategies were found to have negative direct effects on BUDIMP and BUDREV. This finding is consistent with the hypothesised negative direction of effect for DIFSTR ($H1_b$), but contradicts the hypothesised positive direction of effect for COSTSTR ($H1_c$). The magnitude and significance of effects for DIFSTR and COSTSTR on BUDIMP were negative but neither substantial nor significant (path coefficient = -0.063, t = -0.400 and -0.030, t = -0.185 respectively). On the other hand, the magnitude of effect of DIFSTR and COSTSTR on BUDREV was substantial but also statistically not significant (path coefficient = -0.114, t = -0.793 and -0.212, t = -1.593 respectively). These findings seem to imply that both business strategies do not have a direct effect on budgetary practices. Thus H_{1b} was partially accepted with regard to the direction of effect of DIFSTR on budgetary practices, while H_{1c} was fully rejected.

However, an interesting positive and significant indirect effect was found between DIFSTR and BUDIMP (path coefficient = 0.092, t = 1.774). Sharma (2002, p.120) cited Bartol (1983) and Mia and Clarke (1999) assertion that a path coefficient of 0.06 and greater is considered substantive in a path analysis. This significant indirect positive effect is probably attributable to the significant positive relationship between DIFSTR and formalisation (FORMAL) which in turns has a positive direct and significant effect on BUDIMP (RQ_1) as will be discussed next in points 3 and 4. Thus, structural dimension of formalisation seems to mediate the relationship between DIFSTR and BUDIMP. This indirect and positive effect demonstrates that DIFSTR is substantially and positively related to BUDIMP despite not displaying a significant direct path. This probably contradicts the widely held view that DIFSTR is best achieved in organisations that minimise formal controls (Govindarajan, 1988; Dent, 1990). In addition, these results provide some explanations to Simons' (1987) contradictory findings that prospectors emphasise budgets to a greater extent than defender by providing evidence on the process by which this effect takes place. In order to explain these findings, it is imperative to understand how budgets are used in these organisations. Further elaboration on this point will be given in the next section when dealing with budgetary usage.

3. Structure → Budgetary practices (RQ_1)

The results of the structural model analysis (see Table 8.2) revealed that the structural dimension of centralisation (CENTRA) has no substantial or significant effect on both dimensions of budgetary practices, BUDIMP and BUDREV (path coefficients = 0.096 and –0.071, t = 0.947 and –0.831 respectively). However, the results reveal that formalisation (FORMAL) has a substantial and significant positive effect on BUDIMP (path coefficient = 0.259, t = 2.723, $P < 0.01$, two-tailed) and a very weak and non-significant effect on BUDREV (path coefficient = 0.052, t = 0.652). These results indicate that the more formalised and standardised the structure the more emphasis is placed on achieving budgetary targets and providing written explanation for variances. This is consistent with the arguments that organisational structure and budgetary control complement rather than substitute each other. Further explanation of this significant relationship will be given in the next section after testing the structural model of budgetary usage. No indirect effect between structural dimension and budgetary practices was hypothesised or tested in the model.

4. Other paths in the model (H_8, H_9 and H_{10})

Other interesting and significant paths were found from PEU dimensions to DIFSTR, from DIFSTR to FORMAL and from REGPEU to CENTRAL. Interestingly, the results in Table8.2 indicate that the two dimensions of PEU have significant but different effects on business strategy. For instance, OPEPEU has a significant positive effect on DIFSTR (as hypothesised) while REGPEU has a significant negative effect on DIFSTR (path coefficient = 0.210, t = 2.211, $P < 0.01$; -0.314, t = -2.83, $P < 0.01$ respectively). With regard to low-cost strategy, OPERPEU has a negative (as hypothesised) substantial but not statistically significant effect on COSTSTR while REGPEU has a substantial positive but not significant effect on COSTSTR (path coefficient = -0.161, and 0.110, t-values = -1.549 and 0.916 respectively). Interpretation of these result could be that innovation and differentiation are best achieved in unregulated industries, where government and institutional interventions and regulations are minimal in order to enable these organisations to expand and enter new markets freely. In addition, there are good reasons to believe that REGPEU constitutes a major hindrance to growth and innovation in these organisations (Nicoletti, 2000, p.1). Whereas the positive effect of REGPEU on COSTSTR is consistent with Collins *et al.* (1997) argument that well "protected (regulated) industry" is more appropriate for defenders (COSTSTR). The effect of OPEPEU on COSTSTR was not significant at the 0.05 significance level but was significant at the 0.10 significance level which is commonly used in strategic management literature (Miller, 1988).

Another interesting finding is the significant positive effect of DIFSTR on FORMAL (path coefficient = 0.276, t = 2.075, $P < 0.01$), and its substantive positive, but non-significant, effect on CENTRA (path coefficient = 0.210, t = 1.148). These findings contradict the commonly held believe that innovation and differentiation strategies require looser organic and decentralised structures to facilitate rapid responses to environmental changes and to encourage innovation. However, these findings are not without precedence in the literature (see for example Simons, 1987; Van der Stede, 2000). An interpretation of these findings could be that one way to hedge against environmental uncertainty in differentiation strategy is through implementing more integrative mechanisms such as formalisation, standardisation and accounting control systems (Van der Stede, 2000, p.36). In addition, Mintzberg (1979) argues that organisations prefer to centralise their decision making to the extent possible in order to rapidly counter uncertainties in their environments.

No significant relationship was found between OPEPEU and organisational structure. This finding seems to confirm the arguments in strategic management literature that PEU and organisational structure are both more related to business strategy than to each other (Miller, 1988).

8.4.2 Structural model analysis of budgetary usage (H_2, RQ_2)

The second structural model analysis aimed to test the direct and indirect effects of PEU, business strategy and structure simultaneously on the two dimensions of budgetary usage, interactive budgetary usage (INTBUD) and diagnostic budgetary usage (DIAGBUD). No cases were identified as outliers contributing to multivariate kurtosis. The results of SEM analysis are reported in Table 8.3.

Table 8.3 provides the model goodness-of-fit measures and the standardised parameter estimates (betas) for the direct, indirect and total effects of PEU, business strategy and structural dimensions on budgetary usage (INTBUD and DIAGBUD). Parameter estimates relating to the paths linking PEU, business strategy and structure together are not reported in Table 8.3 since they have been reported earlier in Table 8.2.

8.4.2.1 The structural model of budgetary usage goodness-of-fit

As shown in table 8.3, the overall goodness-of-fit of the structural model for budgetary usage is good. All goodness-of-fit measures well exceed the recommended cut-off values (Chi-square1.25, P = 0.26; CFI = 1; NFI = 1; NNFI = 0.93; GFI = 1; AGFI = 0.96; RMSEA = 0.03). Therefore, the hypothesised model fits the data well and the standardised estimates of the structural parameters (betas) can be used for testing H_2 and RQ_2. Examining the coefficient of determination (R^2) values for INTBUD (usage of budget for planning, co-ordination and communication) and DIAGBUD (usage of budget for motivation, controlling and performance evaluation) indicate that the predictive power of the structural equation model is adequate. The structural model explained 18% of the variance in interactive usage of budgets INTBUD and 5% of the variance in diagnostic usage of budgets DIAGBUD.

Table 8.3 Structural model results for Budgetary Usage

Hypothesised relationship	Predicted direction	Direct effect coefficient	t-value	Indirect effect coefficient	t-value	Total effect coefficient
Interactive Usage						
PEU-Operations (H_{2a})	+	- 0.060	- 0.627	0.021	0.503	- 0.039
PEU-Regulations (H_{2a})	+	0.353^{**}	2.849	- 0.059	- 0.925	0.294
Differentiation Strategy (H_{2b})	+	0.240^{*}	1.669	0.049	1.367	0.289
Low-cost Strategy (H_{2c})	-	0.244^{*}	1.683	0.013	0.464	0.257
Centralisation (RQ_{2a})		- 0.013	- 0.143	N/A	N/A	- 0.013
Formalisation (RQ_{2b})		0.189♦	2.275	N/A	N/A	0.189
Diagnostic Usage						
PEU-Operations (H_{2a})	-	$- 0.198^{*}$	- 1.949	0.010	0.349	- 0.189
PEU-Regulations (H_{2a})	-	0.037	0.284	- 0.019	-0.395	0.018
Differentiation Strategy (H_{2b})	-	0.064	0.399	0.027	0.767	0.091
Low-cost Strategy (H_{2c})	+	0.057	0.373	0.007	0.342	0.064
Centralisation (RQ_{2a})		- 0.008	- 0.080	N/A	N/A	- 0.008
Formalisation (RQ_{2b})		0.102	1.143	N/A	N/A	0.102

Model Fit Statistics: Chi-square 1.25, P = 0.26, CFI = 1; NFI = 1; NNFI = 0.93, GFI = 1; AGFI = 0.96, RMSEA = 0.03.

* $P < 0.05$ ** $P < 0.01$ (one-tailed); ♦ $P < 0.05$, ♦♦ $P < 0.01$ (two-tailed).

8.4.2.2 The significance of parameters estimates (H_2 and RQ_2)

SEM analysis revealed the following results (see Table 8.3) about the effect of PEU, business strategy and structure simultaneously on budgetary usage dimensions (INTBUD and DIAGBUD):

1. PEU → Budgetary usage (H_{2a})

With respect to the effect of PEU dimensions (OPEPEU and REGPEU) on budgetary usage, it was hypothesised that PEU will have a positive direct effect on INTBUD and a negative direct effect on DIAGBUD. The results of SEM (see table 8.3) indicate that the effect of PEU dimensions on INTBUD was substantial and significant only for REGPEU (path coefficients = 0.353, t = 2.849). Thus, hypothesis H_{2a} was supported only for the effect of REGPEU on INTBUD. The opposite was found regarding the effect of PEU dimensions on DIAGBUD. Only OPEPEU was found to have a substantial and significant negative effect on DIAGBUD (path coefficients = -0.198, t = -1.949). Thus, H_{2a} was supported only for the effect of OPEPEU on DIAGBUD.

These results indicate that uncertainty in the general regulatory environment of the entire industry was the main determinant for using the budget interactively. This seems to indicate that uncertainty in the regulatory environment, as perceived by manufacturing companies in the UK, encourages organisations to use budgets for short-term planning and forecasting, co-ordination and communication in order to increase organisational adaptiveness and responsiveness to environmental uncertainties. On the other hand, uncertainty in operations and task environment (e.g., customer's demand, competitors actions) makes it difficult for organisations to determine targets that can serve as valid standards for performance evaluation, thus, forcing organisations to place less emphasis on budget for controlling and performance evaluation purposes. This is consistent with Chenhall and Morris' (1986) argument that under high unpredictability, budgets become ineffective control devices as initial standards become outdated and less relevant. The results are also consistent with the common belief that when the environment becomes less predictable, then financial measures become less appropriate for control and performance evaluation purposes (Sharma, 2002; Govindarajan, 1984; Gordon and Narayanan, 1984). Finally, the results in Table 8.3 also indicate that PEU dimensions have no substantial or significant indirect effect on budgetary usage acting through organisation structure or business strategy.

2. Business strategy → Budgetary usage (H_{2b}, H_{2c})

It was hypothesised that differentiation strategy (DIFSTR) will have a positive effect on INTBUD and a negative effect on DIAGBUD (H_{2b}), whereas low-cost strategy (COSTSTR) will have a positive effect on DIGBUD and a negative effect on INTBUD(H_{2c}). The results of structural analysis, see Table 8.3, indicate that both

DIFSTR and COSTSTR have a substantial and significant positive effect on INTBUD (path coefficients = 0.240 and 0.244, t-values = 1.669 and 1.683 respectively). However, no substantial or significant effects were found between DIFSTR and COSTSTR on DIAGBUD (path coefficients = 0.064 and 0.057, t-values = 0.399 and 0.373 respectively). Thus, both hypotheses H_{2b} and H_{2c} were partially supported. These results indicate that the interactive usage of budgets is desirable for all business strategies in order to reduce uncertainty and foster co-ordination. In addition, lack of substantial or significant effect for both business strategies on diagnostic budgetary usage contradicts the long held belief that using budgets for evaluation and control purposes is more appropriate for businesses pursuing low-cost strategies than for differentiation strategy. However, these results are consistent with the findings presented earlier in Section 8.4.1.2 that loose budgetary practices with frequent budgetary revisions are more appropriate for all business strategies adopted. Moreover, these results shed the light on the findings that DIFSTR place higher importance on budgets, but as a tool for planning, forecasting and co-ordination more than for controlling and performance evaluation. This interactive usage of budgets would be to inspire organisational learning and the generation process of new ideas and strategies (Simons, 1995). Thus, it is important to meet the budget targets not for evaluating and punishing poor performing managers, but in order to understand why variances occur, what corrective actions need to be taken in response to these variances. In this setting, the budgeting system advocates organisational learning. Similar findings in the literature were found in Abernethy and Brownell (1999, p.194) study which concluded that strategic change (measured along the defender/prospector continuum) and performance is more positive when the style of budget use is interactive compared to when its diagnostic.

Finally, the results also show no substantial or significant indirect effects for business strategies on budgetary usage acting through organisation structure, indicating that business strategy has no substantial indirect effect on budgetary usage. However the total effect of both business strategies on budgetary usage dimensions show that DIFSTR had more "large" coefficients than COSTSTR (0.289 and 0.091 for DIFSTR; 257 and 0.064

for COSTSTR). Thus, these results are consistent with Simons (1987, p.370) and Collins *et al.* (1997, p.682) findings that defenders, compared to prospectors, 'appear to use their budgetary control systems less intensively'.

3. Structure → Budgetary usage (RQ_2)

The results of the structural model analysis (see Table 8.3) revealed that the structural dimension of centralisation (CENTRA) has no substantial or significant effect on both dimensions of budgetary usage, INTBUD and DIAGBUD (path coefficients = -0.013 and -0.008, t = -0.143 and -0.080 respectively). However, formalisation (FORMAL) has a substantial and significant positive effect on INTBUD (path coefficients = 0.189, t = 2.227, $P < 0.05$, two-tailed) and substantial but non-significant positive effect on DIAGBUD (path coefficient = 0.102, t = 1.143 respectively).

These results are consistent with our earlier findings on budgetary practices. To recall, earlier findings revealed that centralisation has no significant effect on both dimensions of tightness of budgetary practices, while formalisation has a substantial and significant effect only on budgetary importance. Thus, combining the results of both structural models indicates that the effect of structural dimensions on budgetary practices and usage arises only from formalisation. Formalised organisations seem to place more importance on budgets and use them interactively to reduce uncertainties in their business environment and signal any changes that may distracts their operations. On the other hand, the lack of finding significant effect for centralisation on budgetary practices and usage dimensions is consistent with the line of argument, presented earlier in Section 5.7.8, that control in centralised organisations is less complex and there is less reliance on accounting controls (Waterhouse and Tiessen, 1978; Flamholz *et al.*, 1985). Moreover, Waterhouse and Tiessen (1978) argue that in centralised organisations, managers are held accountable for fewer financial variables and perceive budgets as less useful and limiting their flexibility.

8.4.3 Structural model analysis of cost control systems (H_3, RQ_3)

The third structural model analysis aimed to test the direct and indirect effects of business strategy and structure simultaneously on the two dimensions of cost control systems, traditional cost systems (TRACOST) and emergent cost systems (EMECOST). No linkages were hypothesised in this model between PEU dimensions and cost control systems and no cases were identified as outliers eligible for deletion. Model parameter estimates were based on MLE estimation with scaled chi-square for testing the model fit, and robust standard errors for testing the significance of estimated parameters as were discussed earlier in section 8.2 in order to meet the normality assumption. No difference was found between the normal and robust estimation measures. The results of SEM analysis are reported in Table 8.4.

Table 8.4 Structural model results for cost control systems

Hypothesised relationship	Predicted direction	Direct effect coefficient	t-value	Indirect effect coefficient	t-value	Total effect coefficient
Traditional cost systems						
Differentiation Strategy (H_{3a})	+	0.231	1.548	0.063*	1.656	0.294
Low-cost Strategy (H_{3b})	+	0.209	1.367	0.019	0.600	0.228
Centralisation (RQ_{3a})		0.030	0.311	N/A	N/A	0.030
Formalisation (RQ_{3b})		0.228♦	2.010	N/A	N/A	0.228
Emergent cost systems						
Differentiation Strategy (H_{3a})	+	0.256	1.621	0.009	0.189	0.265
Low-cost Strategy (H_{3b})	+	0.120	0.716	- 0.015	- 0.348	0.105
Centralisation (RQ_{3a})		- 0.247♦	- 2.315	N/A	N/A	- 0.247
Formalisation (RQ_{3b})		0.151	1.505	N/A	N/A	0.151

Model Fit Statistics: X2 4.24, $P = 0.12$; S-X2 4.17, $P = 0.12$; CFI = 0.957; R-CFI = 0.957; NFI = 1; GFI = 1; AGFI = 0.94; RMSEA = 0.06.

* $P < 0.05$ ** $P < 0.01$ (one-tailed); ♦ $P < 0.05$, ♦♦ $P < 0.01$ (two-tailed).

8.4.3.1 The structural model goodness-of-fit

The model goodness-of-fit measures reported in Table 8.4 indicate that the overall goodness-of-fit of the structural model of cost control usage is good. All measures well exceed the recommended cut-off values (Chi-square 4.24, $P = 0.12$; S-chi-square 4.17, P

= 0.12; CFI = 0.957; R-CFI = 0.957; NFI = 1; GFI = 1; AGFI = 0.94; RMSEA = 0.06). Thus, the hypothesised model fits the data well and the standardised estimates of the structural parameters (betas) can be used for testing H3 and RQ3. Examining the coefficient of determination (R^2) values for TRACOST (usage of cost centres and standard costing for controlling costs) and EMECOST (usage of target costing and activity-based costing) indicate that the predictive power of the structural equation model is adequate. The structural model explained 11% of the variance in TRACOST and 13% of the variance in EMECOST.

8.4.3.2 The significance of parameters estimates (H_3 and RQ_3)

The results of structural model analysis for cost control usage (TRACOST and EMECOST) revealed the following findings:

1. Business strategy → Cost control usage (H_{3a} and H_{3b})

It was hypothesised that both differentiation strategy (DIFSTR) and low-cost strategy will have a positive effect on cost control usage (H_{3a} and H_{3b}). The results of structural analysis, see Table 8.4, indicate that both DIFSTR and COSTSTR have a substantial but not significant positive effect on TRACOST (path coefficients = 0.231 and 0.209, t-values = 1.548 and 1.367 respectively) and on EMECOST (path coefficients = 0.256 and 0.120, t-values = 1.621 and 0.716 respectively). Thus, both hypotheses H_{3a} and H_{3b} were not supported. However, examining the magnitudes and directions of these coefficients indicate that both strategies have a positive and substantial impact on both cost control dimensions. This is consistent with Chenhall and Langfield-Smith (1998, p.256) finding that emergent cost control techniques such as activity-based techneques and traditional cost techniques can be effective in combination and redress the shortcomings of each other. In addition, these results indicate that DIFSTR places higher emphasis on both dimensions of cost control techniques relative to COSTSTR. These results are consistent with Simons (1987) findings that prospectors emphasise cost control to a higher extent than defenders. Also these results provide additional insights into the relationship between business strategies and cost control systems. These results provide some support to suggest that DIFSTR emphasises EMECOST techneques (i.e., ABC and target costing) to a higher extent relative to TRACOST techneques (i.e., cost centres and standard costing), whereas COSTSTR emphasise TRACOST techneques to a higher extent relative to EMECOST techneques. No further discussion on this point will be given since it is out of this research scope.

With regard to indirect effect, the results (see Table 8.4) indicate that DIFSTR has a substantial indirect effect only on TRACOST acting through formalisation (path coefficient =0.063, t = 1.656, $P<0.05$, one-tailed). This may provide some explanation to Simons (1987) findings that prospectors have positive relationship with cost control.

2. Structure → cost control usage (RQ2)

The results of the structural model presented in Table 8.4 indicate that the structural dimensions of centralisation (CENTRA) and formalisation (FORMAL) have significant effect on cost control techniques usage. These results revealed that CENTRA has no substantial or significant effect on TRADCOST (path coefficient = 0.030, t = 0.311) but has a substantial and significant negative effect on EMECOST (path coefficients = –0.247, t = –2.315, $P < 0.05$, two-tailed). Whereas formalisation (FORMAL) has a substantial and significant positive effect on TRADCOST (path coefficient = 0.228, t = 2.210, $P < 0.05$, two-tailed) and a substantial but non-significant positive effect on EMECOST (path coefficient = 0.151, t = 1.505). These results suggest that in decentralised as opposed to centralised organisations, sophisticated cost control systems such as ABC and target costing are more appropriate than traditional costing systems. On the other hand, in organisations with formalised and standardised activities traditional cost control systems are appropriate.

8.4.4 Structural model analysis of scope of information (H_4 and RQ_4)

The fourth structural model analysis aimed to test the direct and indirect effects of PEU, business strategy and structure simultaneously on the two dimensions of scope of information, environmental scanning and forecasting (ENVSCAN) and non-financial performance measures (NFM). One case was identified as an outlier eligible for deletion, thus was deleted. The results of SEM analysis are presented in Table 8.5.

Table 8.5 Structural model results for scope of information

Hypothesised relationship	Predicted direction	Direct effect coefficient	t-value	Indirect effect coefficient	t-value	Total effect coefficient
Scanning and Forecasting						
PEU-Operations (H_{4a})	+	- 0.076	- 0.816	0.069	1.142	- 0.007
PEU-Regulations (H_{4a})	+	0.219*	1.828	- 0.167*	- 2.000	0.052
Differentiation Strategy (H_{4b})	+	0.442**	2.899	-0.039	- 0.649	0.404
Low-cost Strategy (H_{4c})	+	0.358*	2.464	-0.037	- 0.695	0.321
Centralisation (RQ_{4a})		- 0.328$^{\blacklozenge\blacklozenge}$	- 3.707	N/A	N/A	- 0.328
Formalisation (RQ_{4b})		0.108	1.357	N/A	N/A	0.108
Non-financial measures						
PEU-Operations (H_{4a})	+	- 0.128	- 1.361	0.016	0.482	- 0.112
PEU-Regulations (H_{4a})	+	0.076	0.642	- 0.028	- 0.539	0.049
Differentiation Strategy (H_{4b})	+	0.120	0.817	0.063*	1.626	0.183
Low-cost Strategy (H_{4c})	+	0.098	0.671	0.021	0.707	0.115
Centralisation (RQ_{4a})		0.041	0.467	N/A	N/A	0.041
Formalisation (RQ_{4b})		0.195$^{\blacklozenge}$	2.373	N/A	N/A	0.195

Model Fit Statistics. Chi-square 1.25, $P = 0.26$; S-Chi-square 1.071, $P = 0.30$, CFI = 1; NFI = 1, GFI = 1; AGFI = 0.96, RMSEA = 0.03.

* $P < 0.05$ ** $P < 0.01$ (one-tailed); $\blacklozenge$ $P < 0.05$, $\blacklozenge\blacklozenge$ $P < 0.01$ (two-tailed).

8.4.4.1 The structural model goodness-of-fit

As shown in Table 8.5, all goodness-of-fit measures well exceed the recommended cut-off values (Chi-square 1.25, P=0.26; Scaled Chi-square 1.071, P = 0.30; CFI = 1; R-CFI = 1; NFI = 1; GFI = 1; AGFI = 0.96; RMSEA = 0.03). Thus, the hypothesised model fits the data well and the standardised estimates of the structural parameters (betas) can be used for testing hypotheses H_4 and research question RQ_4. Examining the coefficient of determination (R^2) values for the two dimensions of scope, ENVSCAN and NFM, indicates that the predictive power of the structural equation model is adequate. The structural model explained 22% of the variance in ENVSCAN and 7% of the variance NFM.

8.4.4.2 The significance of parameter estimates

SEM analysis revealed the following results about the direct and indirect effects of PEU, business strategy and structure simultaneously on scope of information two dimensions (ENVSCAN and NFM):

1. PEU → Scope of information (H_{4a})

With respect to the effect of PEU dimensions of OPEPEU and REGPEU on scope of information two dimensions (ENVSCAN and NFM), it was hypothesised that PEU will have a positive direct effect on both dimensions of scope (H_{4a}). Surprisingly, the results of SEM (see Table 8.5) showed inverse and mixed results regarding the direct and indirect effects of OPEPEU and REGPEU on both dimensions of scope. The results revealed that OPEPEU has a negative and non-significant direct effects on both ENVSCAN and NFM (path coefficients = -0.076 and -0.128, t-values = -0.816 and -1.361 respectively), while REGPEU has a positive and significant direct effect on ENVSCAN (path coefficients = 0.219, t = 1.828, $P < 0.05$) and a positive but non-significant direct effect on NFM (path coefficients = 0.067, t =0.642). Thus, H_{4a} was partially supported for the effect of REGPEU on ENVSCAN. The negative and lack of significant effect of OPEPEU on scope of information dimensions is not consistent with Chenhall and Morris (1986, p.30) findings that management control systems with a "broad scope" were most supportive in firms which acted in an environment characterised by uncertainty.

Examining the indirect and total effects of PEU dimensions on ENVSCAN revealed that REGPEU has a substantial and significant, but inverse, indirect effect on ENVSCAN (path coefficient = - 0.167, t = 2.000, $P< 0.01$). This significant and inverse effect is attributable to the significant positive relationship between REGPEU and the structural dimension CENTRA (discussed earlier) which in turn has a substantial significant negative effect on ENVSCAN. Thus, the positive direct effect is offset by the indirect negative effect of REGPEU on ENVSCAN. This inverse effect has resulted in the reduction of the total effect of REGPEU on ENVSCAN to a non-significant or substantial effect (path coefficient = 0.052). These results contradict the argument presented earlier in Section 5.7.4 that uncertain environments require adaptive organisations and scanning measures.

Interpretation of this contradictory result is not an easy task, taking into consideration that the earlier studies have confirmed the positive relationship between scope of information and PEU (e.g., Gordon and Narayanan, 1984, Chenhall and Morris, 1986; Chong and Chong, 1997). However, one could argue that organisations facing high uncertainties in their environment would rely on informal mechanisms or systems for scanning and forecasting their environments and would de-emphasise formal systems such as MCS. The overall conclusion from these results indicate that PEU dimensions do not have significant effect on both dimensions of scope of information, and would rely on other informal and non-financial measures to scan their environments.

2. Business strategy → Scope of information (H_{4b} and H_{4c})

It was hypothesised that DIFSTR strategy would have a positive direct effect on scope of information dimensions (H_{4b}) and COSTSTR would have a negative effect on scope of information (H_{4c}). The results of structural model analysis revealed that both DIFSTR and COSTSTR have very substantial and significant positive effects on ENVSCAN (path coefficients = 0.442 and 0.358, t-values = 2.899 and 2.464 respectively). However, the results revealed no significant effect for both DIFSTR and COSTSTR on NFM (path coefficients = 0.120 and 0.098, t-values = 0.817 and 0.671 respectively). Thus, the results partially supported hypotheses H_{4b} and H_{4c} (but in the inverse direction) with regard to the effect of both strategies on ENVSCAN but failed to support the hypothesised effect of business strategies on NFM. Consistent with the arguments presented earlier in section 5.7.3, these results provide some support to suggest that the ENVSCAN is important for both business strategies and that differentiation strategy compared to low-cost strategy use MCS more intensively for scanning and searching the environment for threats and opportunities. On the other hand, the lack of significant effect on NFM is not consistent with the balanced score card approach that would require organisations to display several non-financial measures under different perspectives. However, these results seem to provide some support for Anthony and Govindrajan's (2001) argument that not all non-financial measures are applicable to all strategies. Only those non-financial measures that reflect key success factors or key performance indicators that will determine the successful implementation of business strategies must be included in MCS reports. Thus, reporting only the critical non-financial performance measures is essential to give reinforcing rather than conflicting signals to managers.

With regard to the indirect effects of business strategies on scope dimensions acting through organisational structure, the results (see Table 8.4) indicate that DIFSTR has a substantial indirect effect only on NFM acting through formalisation (path coefficient = 0.063, t = 1.626, $P < 0.05$, one-tailed).

3. Organisation structure → Scope of information (RQ_4)

The results of SEM presented in Table 8.4 revealed significant findings regarding the effect of the structural dimensions of centralisation (CENTRA) and formalisation (FORMAL) on scope of information dimensions. These results revealed that CENTRA has a very substantial and significant negative effect on ENVSCAN (path coefficient = -0.328, t = 3.707, $P < 0.01$, two-tailed), and non-significant effect on NFM (path coefficients = 0.041, t = 0.467). Whereas FORMAL was found to be the only factor in the model that has a substantial and significant positive effect on NFM (path coefficient = 0.195, t = 2.273, $P < 0.05$, two-tailed), however, the effect of FORMAL on ENVSCAN was found to be non-significant (path coefficient = 0.108, t = 1.357). These results indicate that decentralised, as opposed to centralised, organisations require more complex MCS to scan the environment and foster co-ordination, thus providing support to the slim evidence in the literature relating to the interaction of decentralisation and broad scope information to improve managerial decision making and hence, performance. In addition, these results indicate that formalised and structured organisations must be complemented with non-financial performance measures in order to deal with negative effects of formalisation. This is consistent with Agarwal (1999, p.363) argument that using non-financial performance measures is expected to reduce the negative effect of formalisation by increasing managers' flexibility to do what they deem appropriate to meet the specified goals, and in turn, increase their felt responsibilities and organisational commitment.

8.4.5 Structural model analysis of managerial evaluation and rewards (H_5 and RQ_5)

The fifth structural model analysis aimed to test the direct and indirect effects of business PEU, business strategy and structure simultaneously on the three dimensions of managerial performance evaluation and rewards systems: bonus determination (BONDET); benchmark for comparison (BENCH); and managerial performance evaluation criteria (PERFEV). To recall from our earlier discussion in section 8.2, these dimensions were highly kurtotic and skewed, thus violating the normality assumption for SEM. Thus, parameter estimates for this structural model will be based on MLE estimation with scaled chi-square for testing the model fit, and robust standard errors for testing the significance of estimated parameters as were discussed earlier in section 8.2 in order to meet the normality assumption. Two cases (2 and 79) were identified as outliers contributing to multivariate kurtosis so were deleted from this analysis. No significant differences were found between the normal and robust estimation measures. The results of SEM analysis are reported in Table 8.6.

8.4.5.1 The structural model goodness-of-fit

The model goodness-of-fit measures reported in Table 8.6 indicate that the overall goodness-of-fit of managerial performance evaluation and rewards system structural model is good. All measures well exceed the recommended cut-off values (Chi-square 0.967, P =0.325; Scaled chi-square 0.825, P = 0.0.36; CFI = 1; Robust-CFI = 1; NFI = 1; GFI = 1; AGFI = 0.96; RMSEA = 0.03). Thus, the hypothesised model fits the data well and the standardised estimates of the structural parameters (betas) can be used for testing $H_{5a\text{-}i}$ and $RQ_{5a\text{-}b}$. Examining the coefficient of determination (R^2) values for managerial evaluation and rewards dimensions indicate that the predictive power of the structural equation model is adequate. The structural model explained 5% of the variance in BONDET, 15% of the variance in BENCH, and 7% of the variance in PERFVA.

Table 8.6 Structural model results for performance evaluation and rewards system

Hypothesised relationship	Predicted direction	Direct effect coefficient	t-value	Indirect effect coefficient	t-value	Total effect coefficient
Bonus determination[1]						
PEU-Operations (H_{5a})	+	0.051	0.524	- 0.010	- 0.320	0.041
PEU-Regulations (H_{5a})	+	- 0.045	- 0.445	0.007	0.152	- 0.047
Differentiation Strategy (H_{5b})	+	0.061	0.415	- 0.049	- 1.134	0.017
Low-cost Strategy (H_{5c})	-	0.039	0.253	- 0.012	- 0.374	0.026
Centralisation (RQ_{5a})		0.048	0.649	N/A	N/A	0.048
Formalisation (RQ_{5b})		- 0.204♦	- 2.453	N/A	N/A	- 0.204
Benchmark comparison[2]						
PEU-Operations (H_{5d})	+	0.064	0.679	- 0.001	- 0.022	0.063
PEU-Regulations (H_{5d})	+	0.202*	1.797	- 0.058	- 0.825	0.144
Differentiation Strategy (H_{5e})	+	0.314**	2.149	- 0.028	- 0.737	0.286
Low-cost Strategy (H_{5f})	-	0.409**	2.524	- 0.024	- 0.802	0.382
Centralisation (RQ_{5a})		- 0.136	- 1.444	N/A	N/A	- 0.136
Formalisation (RQ_{5b})		- 0.001	- 0.010	N/A	N/A	- 0.001
Performance evaluation[3]						
PEU-Operations (H_{5g})	+	0.008	0.091	0.030	1.074	0.038
PEU-Regulations (H_{5g})	+	0.261**	2.000	- 0.044	- 0.978	0.217
Differentiation Strategy (H_{5h})	+	0.048	0.361	- 0.011	- 0.324	0.038
Low-cost Strategy (H_{5i})	-	- 0.047	- 0.359	- 0.014	- 0.603	- 0.061
Centralisation (RQ_{5a})		- 0.101	- 1.212	N/A	N/A	- 0.101
Formalisation (RQ_{5a})		0.038	0.469	N/A	N/A	0.038

Model Fit Statistics: Chi-square .967 P=0.32; S-Chi-square .828 P=0.36; CFI 1; CFI 1; NFI 0.99; GFI 1; AGFI 0.96; RMSEA 0.03

Notes:

1. High score for bonus determination denotes subjective (non-formula) criteria while low score denotes objective formula criteria.
2. High score for benchmark comparison denotes usage of external standards while low score denotes internal standards.
3. High score for performance evaluation denotes long-term non-financial criteria while low score denotes short-term criteria.

* $P < 0.05$ ** $P < 0.01$ (one-tailed); ♦ $P < 0.05$, ♦♦ $P < 0.01$ (two-tailed).

8.4.3.2 The significance of parameter estimates

The results of structural model analysis for managerial evaluation and rewards system dimensions (BONDET, BENCH, and PERFEV) revealed the following findings:

1. PEU → Managerial evaluation and rewards (H_{5a}, H_{5d} and H_{5g})

With respect to the effect of PEU dimensions on managerial performance evaluation and rewards system three dimensions (BONDET, BENCH and PERFEV), it was hypothesised that PEU will have a positive direct effect on all three dimensions (H_{5a}, H_{5d} and H_{5g}). The results (see Table 8.6) revealed that OPEPEU has positive (as hypothesised) but neither substantial nor significant direct effects on all three dimensions, BONDET, BENCH and PERFEV (path coefficients = 0.051, 0.064 and 0.008, t-values = 0.524, 0.679 and 0.091 respectively). With regard to REGPEU, the results revealed that REGPEU has a substantial and significant positive effects on BENCH and PERFEVA (path coefficients = 0.202 and 0.261, t-values = 1.797, $P < 0.05$ and 2.000, $P < 0.01$ respectively). However, the effect of REGPEU on BONDET was neither substantial nor significant and was in the opposite direction (path coefficients = -0.054, t = -0.415). Thus, hypothesis H_{5a} relating to BONDET was not supported for both dimensions of PEU, while hypotheses H_{5d} and H_{5g} relating BENCH and PERFEV were supported only for REGPEU. These results indicate that that under conditions of high uncertainty, long-term non-financial and external criteria for evaluating managerial performance are appropriate. In addition, lack of finding significant relation with BONDET may be due to employing other non-financial managerial rewards in these organisations such as promotions to higher managerial positions.

2. Business strategy → Managerial evaluation and rewards ($H_{5b\text{-}c}$, $H_{5e\text{-}f}$ and $H_{5h\text{-}i}$)

It was hypothesised that differentiation strategy (DIFSTR) will have a positive effect on BONDET (H_{5b}), BENCHM (H_{5e}) and on PERFEV (H_{5h}). In contrast, low-cost strategy (COSTSTR) will have a negative effect on all three dimensions of managerial evaluation and rewards systems (H_{5c}, H_{5f} and H_{5i}). The results of structural analysis presented in Table 8.6 show that both DIFSTR and COSTSTR have a very substantial and significant positive effect on BENCHM (path coefficients = 0.314 and 0.406, t-values = 2.149 and 2.524 respectively, $P < 0.01$). However, their effects on BONDET (path coefficients = 0.062 and 0.039, t-values = 0.415 and 0.253 respectively) and their effects on PERFEV (path coefficients = 0.048 and -0.047, t-values = 0.361 and –0.359 respectively) were neither substantial nor significant. Thus, the results did not provide any substantial evidence to support H_{5b-c} and H_{5h-i} with regard to the effect for both business strategies on BONDET and PERFEV. However, the results supported hypotheses H_{5e} with regard to the effect of DIFSTR on BENCHM and H_{5f} with regard to the significance of effect of COSTSTR on BENCHM (but not for the hypothesised negative direction of this effect).

The significant positive relationship between both business strategies and benchmarking is consistent with Chenhall and Langfield-Smith (1998, p.257) argument that benchmarking encourages best practices and assists in successfully developing business strategies. In addition, the significant results between business strategies and BENCH provides support for the argument put forward by Bromwich (1990, p.28) that:

> There is a need to release management accounting from the factory floor to allow it also to aid directly in meeting these market challenges. Such a reorientation would permit management accounting additionally to focus on the firm value added relative to its competitors.

The results in Table 8.6 also show no substantial or significant indirect effects for business strategies on any of performance evaluation and rewards dimensions acting through organisational structure dimensions.

3. Organisation structure → Managerial evaluation and rewards (RQ_{5a-b})

The results presented in Table 8.6 revealed that structural dimension of centralisation (CENTRA) has no significant or substantial effect on BONDET (path coefficients = 0.048, t = 0.649) but has substantial, although not significant, negative effects on BENCHM and on PERFEV (path coefficients = -0.136 and -0.101, t-values = -1.444 and –1.212 respectively). With regard to formalisation (FORMAL), the results indicate that FORMAL is the only factor in the model that has a substantial and significant negative effect on BONDET (path coefficient = -0.204, t = -2.453, $P<0.05$ two-tailed). Thus, formalised and structured organisations emphasise objective and strict formula-based plan for bonus determination. In addition, the results indicate that FORMAL has a negative effect on BENCHM and a positive effect on PERFEV, however, neither effect is significant nor substantial (path coefficients = -0.001 and 0.038, t-values = -0.010 and

0.469). These results seem to be consistent with the earlier results that control in centralised organisations is less complex and relies less on MCS, whereas formalised organisations place more emphasis on formal control systems for co-ordinating various sub-units' activities.

8.4.6 Structural model analysis of aggregation of information (H_6 and RQ_6)

The sixth structural model analysis aimed to test the direct and indirect effects of PEU, business strategy and structure simultaneously on the level of aggregation of information (AGGREG) presented to senior managers through MCS. No cases were identified as ouliers contributing to multivariate kurtosis and no significant differences were found between the normal and robust estimation measures. Table 8.7 presents the results of SEM analysis.

Table 8.7 Structural model results for aggregation of information

Hypothesised relationship	Predicted direction	Direct effect coefficient	t-value	Indirect effect coefficient	t-value	Total effect coefficient
Aggregation						
PEU-Operations (H_{6a})	+	0.013	0.124	0.034	0.829	0.047
PEU-Regulations (H_{6a})	+	0.104	0.833	- 0.059	- 1.021	0.046
Differentiation Strategy (H_{6b})	+	0.185	1.180	0.026	0.643	0.211
Low-cost Strategy (H_{6c})	-	0.206	1.380	0.001	0.033	0.207
Centralisation (RQ_{6a})		- 0.119	- 1.303	N/A	N/A	- 0.119
Formalisation (RQ_{6b})		0.182♦	2.095	N/A	N/A	0.182

Model Fit Statistics: Chi-square 1.08, $P = 0.29$; CFI = 1; NFI = 0.99; GFI = 1; AGFI = 0.97; RMSEA = 0.02.

** $P < 0.05$ ** $P < 0.01$ (one-tailed); ♦ $P < 0.05$, ♦♦ $P < 0.01$ (two-tailed).

8.4.6.1 The structural model goodness-of-fit

The model goodness-of-fit measures, see Table 8.7, indicate that the overall goodness-of-fit of managerial performance evaluation and rewards system structural model is good. All measures well exceed the recommended cut-off values (Chi-square 1.088, $P = 0.29$; CFI = 1; NFI = 0.99; GFI = 1; AGFI = 0.97; and RMSEA = 0.02). Thus, the hypothesised model fits the data well and the standardised estimates of the structural parameters (betas) can be used for testing $H_{6a\text{-}c}$ and the research question RQ_6. Examining the coefficient of determination (R^2) values for AGGREG indicate that the predictive power of the structural equation model is adequate. The structural model explained 9% of the variance in AGGREG.

8.4.6.2 The significance of parameter estimates

SEM analysis revealed the following results (see Table 8.7) about the effect of PEU, business strategy and structure simultaneously on aggregation of information (AGGREG):

1. PEU → Aggregation of information (H_{6a})

With respect to the effect of PEU dimensions (OPEPEU and REGPEU) on AGGREG, it was hypothesised that PEU will have a positive direct effect on AGGREG (H_{6a}). The results of SEM indicate that the effect of OPEPEU on AGGREG was neither substantial nor significant (path coefficient = 0.013, t = 0.124), while the effect of REGPEU on AGGREG was substantial but still statistically not significant (path coefficient = 0.101, t = 0.833). Thus, hypothesis H_{6a} was not supported. These results indicate that PEU dimensions have no significant effect on the level of aggregation of MCS information, thus providing support to Chenhall and Morris (1986) findings.

Moreover the results show no substantial or significant indirect effect for PEU dimensions on AGGREG. This is not consistent with Chenhall and Morris (1986) finding that PEU effect on AGGREG is mediated by structural dimension of decentralisation. The lack of finding significant indirect effect for PEU dimensions and AGGREG can be attributed to the lack of substantial or significant effect between structural dimensions (as will be discussed later) and AGGREG and/or between PEU dimensions and structural dimensions as was discussed earlier in Section 8.4.1. Thus, the findings suggest that the total effect (see Table 8.7) of PEU on the level of aggregation of information in MCS is positive but not substantial.

2. Business strategy → Aggregation of information (H_{6a} and H_{6b})

It was hypothesised that differentiation strategy (DIFSTR) will have a positive effect on AGGREG (H_{6b}) while low-cost strategy (COSTSTR) will have a negative effect on AGREG (H_{6c}). The results of structural analysis indicated that both DIFSTR and COSTSTR have substantial but non-significant positive effect on AGGREG (path coefficients = 0.185 and 0.206, t-values = 1.180 and 1.380 respectively). Thus, both hypotheses H_{6b} and H_{6c} were not supported. In addition, the results identified no substantial or significant indirect effect between both strategies and AGGREG acting through organisational structure. Although the results indicate a substantial positive total effect for both strategies on AGGERG (path coefficient = 0.211 and 0.207), the lack of statistical significance regarding these effects leads to the rejection of H_{6b} and H_{6c}. To the best of the researcher's knowledge, no earlier study has tested empirically this relationship, thus it is hard to compare these findings with others.

3. Structure → Aggregation ($RQ_{6a\text{-}b}$)

The results of the structural model analysis (see Table 8.7) revealed that the structural dimension of centralisation (CENTRA) has a substantial but not significant negative effect on AGGREG (path coefficient = -0.119 t = -1.380). Formalisation (FORMAL) has been found to have the only substantial and significant positive effect on AGGREG (path coefficient = 0.182, t = 2.095, $P<0.05$, two-tailed). These results are consistent with the earlier results that control in centralised organisations is less complex and relies less on MCS, whereas formalised organisations place more emphasis on formal control systems for co-ordinating various sub-units activities. Also these results are in line with Chenhall and Morris' (1986) argument that in centralised as opposed to decentralised organisations, senior managers who impose direct control on various activities, and are more familiar with the overall operations of their business have little time for analysis. Thus, their decisions tend to be intuitive and would rely less on formal control systems. Accordingly, MCS information presented is much less aggregated.

8.4.7 Structural model analysis of timeliness of information (H_7 and RQ_7)

The seventh structural model analysis aimed to test the direct and indirect effects of PEU, business strategy and structure simultaneously on timeliness of information (TIMLIN) presented to senior managers through MCS. Two cases were identified as outliers contributing to multivariate kurtosis so were deleted. In addition, no significant differences were found between the normal and robust estimation measures. The results of SEM analysis are reported in Table 8.8.

8.4.7.1 The structural model goodness-of-fit

The model goodness-of-fit measures presented in Table 8.8 indicate that the overall goodness-of-fit of timeliness of information structural model is good. All measures well exceed the recommended cut-off values (Chi-square 0.96, $P = 0.32$; CFI = 1; NFI = 0.99; GFI = 1; AGFI = 0.97; and RMSEA = 0).

Table 8.8 Structural model results for timeliness of information

Hypothesised relationship	Predicted direction	Direct effect coefficient	t-value	Indirect effect coefficient	t-value	Total effect coefficient
Timeliness of information						
PEU-Operations (H_{7a})	+	- 0.079	- 0.779	0.046	0.823	- 0.033
PEU-Regulations (H_{7a})	+	0.272**	2.087	- 0.117	- 1.513	0.154
Differentiation Strategy (H_{7b})	+	0.405**	2.506	0.011	0.251	0.416
Low-cost Strategy (H_{7b})	-	0.335**	2.127	- 0.012	- 0.309	0.323
Centralisation (RQ_{7a})		- 0.161	- 1.700	N/A	N/A	- 0.161
Formalisation (RQ_{7b})		0.162	1.863	N/A	N/A	0.162

Model Fit Statistics: Chi-square 0.96, P=0.32; CFI = 1; NFI = 0.99; GFI = 1; AGFI = 0.97; RMSEA = 0.

* $P < 0.05$ ** $P < 0.01$ (one-tailed); ♦ $P < 0.05$, ♦♦ $P < 0.01$ (two-tailed).

Thus, the hypothesised model fits the data well and the standardised estimates of the structural parameters (betas) can be used for testing $H_{7a\text{-}c}$ and the research question RQ_7. Examining the coefficient of determination (R^2) values for TIMLIN indicates that the predictive power of the structural equation model is adequate. The structural model explained 19% of the variance in TIMLIN.

8.4.7.2 The significance of parameter estimates (H_7 and RQ_7)

SEM analysis revealed the following results (see Table 8.8) about the effect of PEU, business strategy and structure simultaneously on timeliness of information (TIMINF) presented in MCS reports:

1. PEU → timeliness of information (H_{7a})

With respect to the effect of PEU dimensions (OPEPEU and REGPEU) on TIMLIN, it was hypothesised that PEU will have a positive direct effect on TIMLIN (H_{7a}). The results indicated that OPEPEU effect on TIMLIN is neither substantial nor significant and in the opposite direction (path coefficient = -0.079, t = -0.775). However, the effect of REGPEU on TIMLIN was found as hypothesised substantial and significant (path coefficient = 0.272, t = 2.087, $P < 0.01$). Thus, hypothesis H_{7a} was supported for REGPEU but not for OPEPEU. These results suggest that the higher uncertainty perceived in the operations and task environment the more difficult it is to provide information for managers in a timely manner. This contradicts the common held belief that the higher the uncertainty the more it is required to provide information on changing trends in the environment in a timely and frequent manner to enable decision makers to react rapidly before they become problematic (Gordon, and Miller, 1976; Amigoni, 1978; Chenhall and Morris, 1986; Sharma, 2002). Moreover, the results show no significant indirect effect for PEU dimensions on TIMLIN. The lack of significant findings for the indirect effect for PEU dimensions and TIMLIN can be attributed to the lack of significant effect between structural dimensions (as will be discussed later) and TIMLIN and to the weak relationship between PEU dimensions and structural dimensions as were discussed earlier in Section 8.4.1. Thus, it can be concluded from these results that the total effect (see Table 8.7) of PEU on the level of TIMLIN of information in MCS is positive and significant only for REGPEU.

2. Business strategy → timeliness of information (H_{7b} and H_{7c})

It was hypothesised that differentiation strategy (DIFSTR) will have a positive effect on TIMLIN (H_{7b}) while low-cost strategy (COSTSTR) will have a negative effect on

TIMLIN (H_{7c}). The results presented in Table 8.8 indicated that both DIFSTR and COSTSTR have very substantial and significant positive effects on TIMLIN (path coefficients = 0.405 and 0.335, t-values = 2.506 and 2.127, $P < 0.01$ respectively). Thus, hypothesis H_{7b} was fully supported while H_{7c} was partially supported for the significant effect of COSTSTR on TIMLIN but not for the hypothesised negative effect. Moreover, the results provide some support for Simons (1987) findings that increased frequency of reporting was more positively related to prospectors than defenders.

With regards to indirect effects of business strategies on TIMLIN, the results show no substantial or significant indirect effect for both strategies on TIMLIN acting through organisational structure.

3. Structure → Timeliness of information (RQ_7)

The results of the structural model analysis presented in Table 8.8 revealed that the structural dimensions of centralisation (CENTRA) and formalisation (FORMAL) have substantial but not significant effect on TIMLIN (path coefficients = -0.161 and 162, t-values = -1.700 and 1.863). These results suggest that organisational structure dimensions have no significant effect on TIMLIN.

A summary of all the results of the structural model analysis presented in this section (Section 8.4), with a detailed discussion of the major findings will be given in Chapter 9.

8.5 Structural model analyses results/coalignment effect on effectiveness

The second stage of analysis aims to achieve the third objective of this study concerned with investigating the effect of coalignment (also termed internal consistency, contingency, congruency or more popularly, fit) between PEU, business strategy, organisational structure and MCS dimensions on organisational effectiveness and performance.

Earlier MCS studies (although they are not many) that have considered organisational effectiveness in their models have often investigated effectiveness using interaction or moderation approach to fit (Venkatraman, 1989 provide a comprehensive review of different fit classifications used in the literature). Under this approach effectiveness is investigated in combination with the interaction effect between MCS dimensions and contextual factors using multiple regression analysis (e.g., Chia, 1995). The mediation approach to fit using path analysis was also used in MC contingency studies (e.g., Chong and Chong, 1997) to investigate the effect of fit between scope of information, business strategy and PEU on organisational effectiveness. Under the mediation approach to fit, MCS attributes are treated as intervening or mediating variables between the independent or antecedent variables (i.e., PEU, business strategy or structure) and organisational effectiveness (the consequent or dependent variable). In this case they assume a direct link or path between MCS and effectiveness, and between antecedents and MCS attributes. However, the argument presented earlier in section 5.7.9 indicates that there is no clear evidence or theory provided by these studies to validate the unidirectional relationships between MCS and organisational effectiveness. Thus, the current research investigates the effect on organisational effectiveness using a multivariate systems approach of fit, advocated in contingency theory literature (Van de Ven and Drazin, 1985). The systems approach emphasises the need to adopt multivariate analysis to examine patterns of consistency among dimensions of organisational context, structure and performance. In the context of MCS, this would mean that it is the appropriate coalignment of PEU, business strategy, structure and MCS attributes that will influence performance. Thus, it assumes that any one dimension is insufficient for achieving organisational effectiveness, which requires consistent attention to all four dimensions (Vankatraman, 1989, p.435).

For such a theoretical position, Venkatraman (1989, p.435) argues that fit must be specified among all latent constructs and it is most appropriately captured as the pattern of covariation. In this perspective, Venkatraman identifies second-order confirmatory factor analysis, in SEM, as the most appropriate analysis technique for testing internal consistency covariation among multiple constructs. According to Venkatraman (1990, p.24) general linear models like the regression analysis are of limited use given that they miss the concept of internal consistency or the logical linkage among the various independent variables. Thus, covariation among PEU, business strategy, structure and MCS dimensions is specified as reflecting a consistent organisational design which in turn has an effect on organisational effectiveness. The coalignment among PEU, business strategies, structural dimensions and MCS attributes is specified as a higher order latent construct or factor (labelled as coalignment), the meaning of which is derived through directly operationalised first order factors. Thus, internal consistency is formally represented in this analysis, labelled as coalignment, and its effect on organisational performance or effectiveness can directly be assessed by estimating the path linking coalignment to organisational effectiveness. This approach provides a deductive mechanism to separate the existence of coalignment from its effect on external criterion variable, namely performance or effectiveness (Venkatraman 1990; 1989).

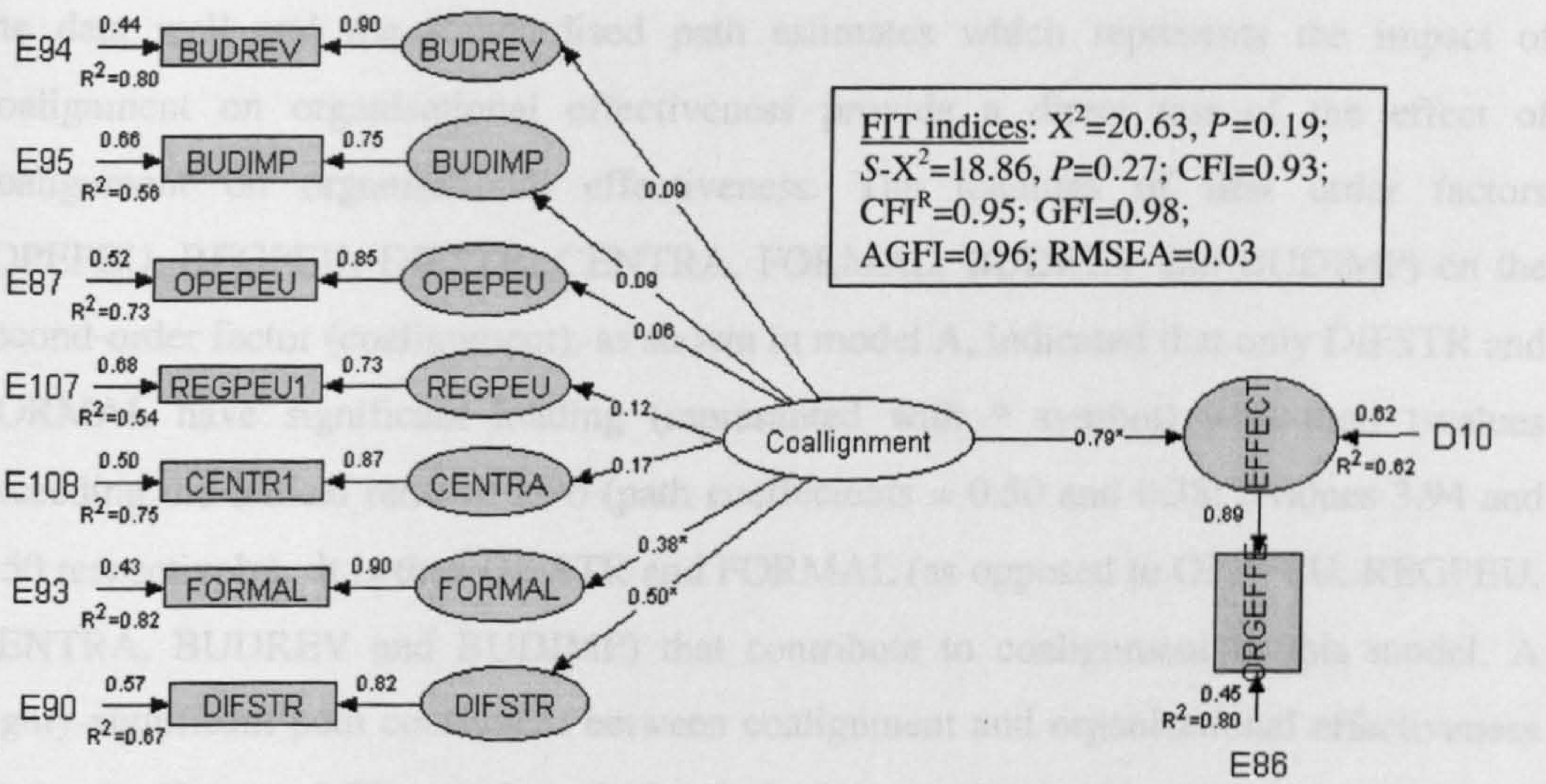
The analysis procedures for conducting this analysis require evaluating model goodness-of-fit and significance of parameter estimates as described in the earlier section. The statistical significance of first order factors (PEU, strategy, structure and MCS dimensions) loading on the second order latent factor (coalignment) indicates that first order factors are internally consistent and contribute to the latent construct of coalignment. The magnitude and significance of path coefficient between coalignment and organisational effectiveness give the effect of this fit or coalignment on organisational effectiveness, thus achieving the research objective.

Finally, Differentiation (DIFSTR) and low-cost (COSTSTR) business strategies are evaluated in two separate models in this analysis rather than combined in one model. This enables the significant differences between these two strategies and MCS design to be highlighted. This is consistent with Porter (1980; 1985) assertion that organisations following both strategies are subject to being "stuck in the middle", thus it is expected that organisations will be either low cost leaders or differentiators but not both. This is also consistent with Chenhall and Langfield-Smith (1998) study which adopted the systems approach to fit using cluster analysis and evaluated the two business strategies separately.

8.5.1 Coalignment model analysis of budgetary control practices

The first SEM analysis aims to investigate the impact of coalignment or fit between the contextual factors and budgetary control practices on organisational effectiveness. Figure 8.1 represents two coalignment models for budgetary control practices (Model A and Model B).

Model A



Model B

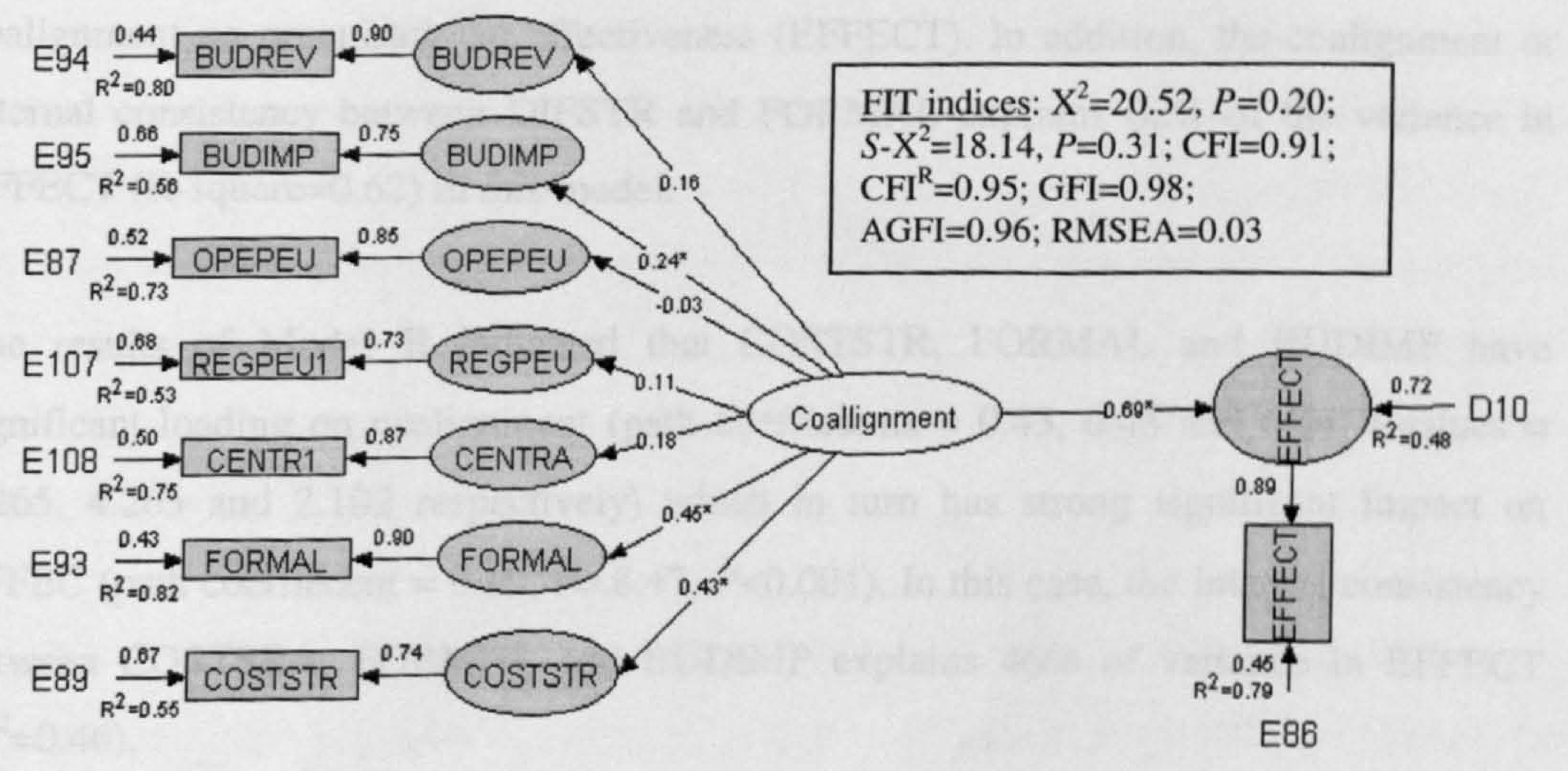


Figure 8.1 Coalignment model of budgetary control system practices

Fit is specified as "coalignment", an unobservable or latent construct, whose meaning is derived through the first order factors, namely OPEPEU, REGPEU, CENTRA, FORMAL, DIFSTR (COSTSTR in Model B) and budgetary control practices of BUDIMP and BUDREV.

The results shown in Figure 8.1 indicated that all goodness-of-fit measures well exceeded the recommended cut-off values for both models. Therefore, the hypothesised models fit the data well and the standardised path estimates which represents the impact of coalignment on organisational effectiveness provide a direct test of the effect of coalignment on organisational effectiveness. The loadings of first order factors (OPEPEU, REGPEU, DIFSTR, CENTRA, FORMAL, BUDREV and BUDIMP) on the second-order factor (coalignment), as shown in model A, indicated that only DIFSTR and FORMAL have significant loading (represented with * symbol) with their t-values exceeding the critical ratio of 1.96 (path coeffecients = 0.50 and 0.38; t-values 3.94 and 3.50 respectively). It is thus DIFSTR and FORMAL (as opposed to OPEPEU, REGPEU, CENTRA, BUDREV and BUDIMP) that contribute to coalignment in this model. A highly significant path coefficient between coalignment and organisational effectiveness (Path coefficient 0.79; t-value 5.12, $P<0.001$) confirms the positive impact of coalignment on organisational effectiveness (EFFECT). In addition, the coalignment or internal consistency between DIFSTR and FORMAL explains 62% of the variance in EFFECT (R-square=0.62) in this model.

The results of Model B indicated that COSTSTR, FORMAL and BUDIMP have significant loading on coalignment (path coefficients = 0.43, 0.45 and 0.24; t-values = 3.265, 4.265 and 2.102 respectively) which in turn has strong significant impact on EFFEC (path coeffiecent = 0.69, t =.8.47, $P<0.001$). In this case, the internal consistency between COSTSRA, FORMAL and BUDIMP explains 46% of variance in EFFECT (R^2=0.46).

In view of these results, it seems that the internal consistency between differentiation strategy and formalisation and between cost strategy, formalisation and BUDIMP would result in higher organisational effectiveness and performance. Thus, the importance attached to achieving budgetary targets (BUDIMP) seems to contribute to organisational effectiveness in organisations following a low-cost strategy with formalised structures, whereas, in the case of differentiation strategy, both dimensions of budgetary control practices (BUDIMP and BUDREV) seem not to contribute to the coalignment construct and hence to organisational effectiveness.

8.5.2 Coalignment model of budgetary usage

The second SEM analysis aims to investigate the impact of coalignment between the contextual factors and budgetary usage on organisational effectiveness. Figure 8.2 represents the results of coalignment models for budgetary usage (Models A and B). These results indicate that all goodness-of-fit measures well exceeded the recommended cut-of values for both models. Therefore, the hypothesised models fit the data well and provide a direct test of the effect of coalignment on organisational effectiveness. The results presented in Model A indicated that INTBUD, DIFSTR, FORMAL and CENTRA (although its loading is very weak compared to others) have significant loading on coalignment (path coefficients = 0.43, 0.44, 0.39 and 0.18; t-values = 4.534, 4.318, 4.312 and 1.993 respectively). It is thus these factors (as opposed to OPEPEU, REGPEU and DIAGBUD) that contribute to coalignment in this model. In addition, the highly significant path coefficient between coalignment and organisational effectiveness (path coeficient = 0.78, t-value = 6.659, $P < 0.001$) confirms the positive impact of coalignment, as this construct explains 61% of the variance in organisational effectiveness ($R^2 = 0.61$).

The results of Model B also indicated that INTBUD, COSTSTR, FORMAL, CENTRA and REGPEU are the main contributors to the coalignment construct. In addition, the results confirm the significant impact of coalignment or internal consistency between these factors on EFFECT (path coefficient = 0.72; t = 5.995, $P < 0.001$), which explains 52% of EFFECT variance (R^2=0.52).

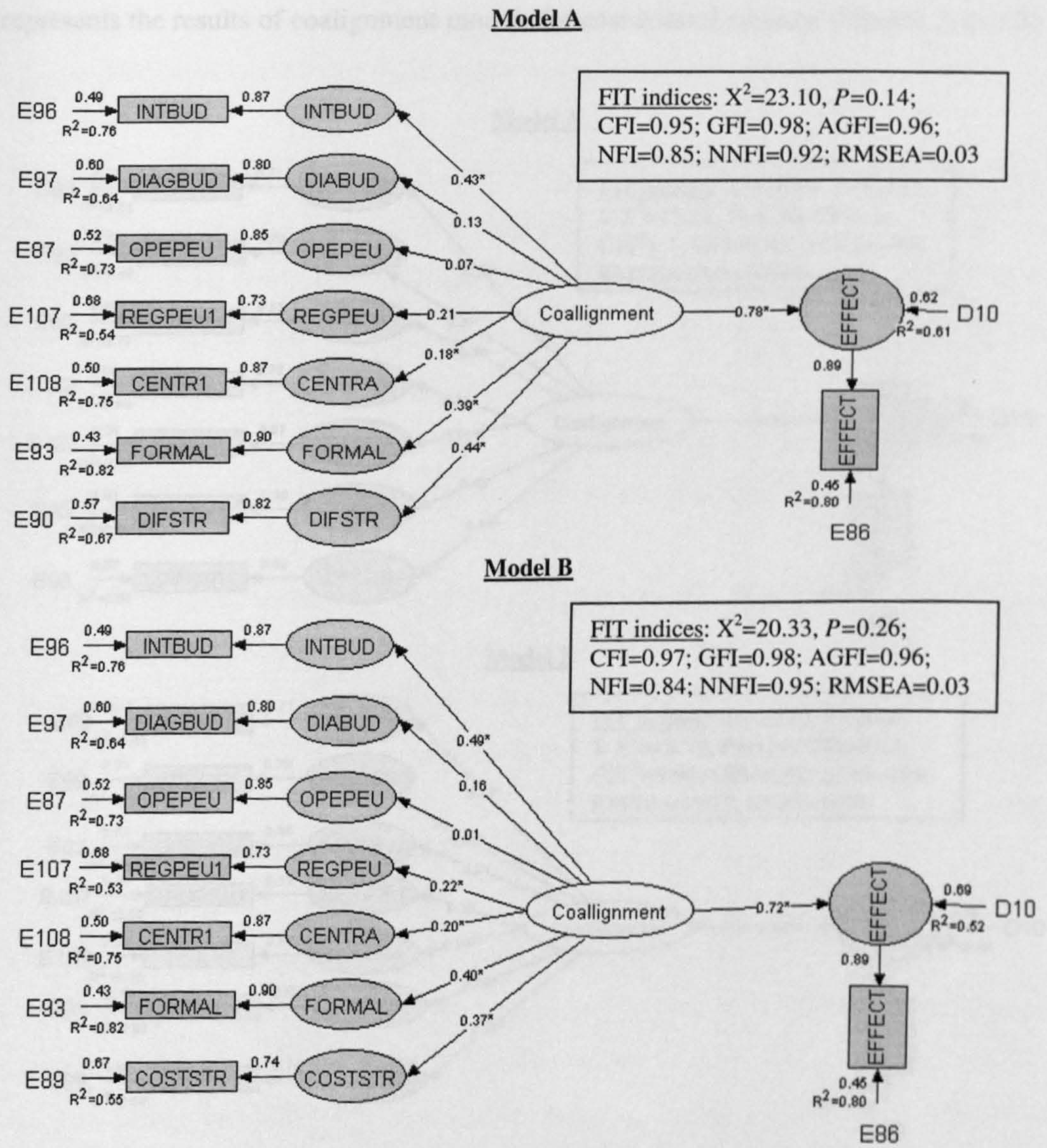


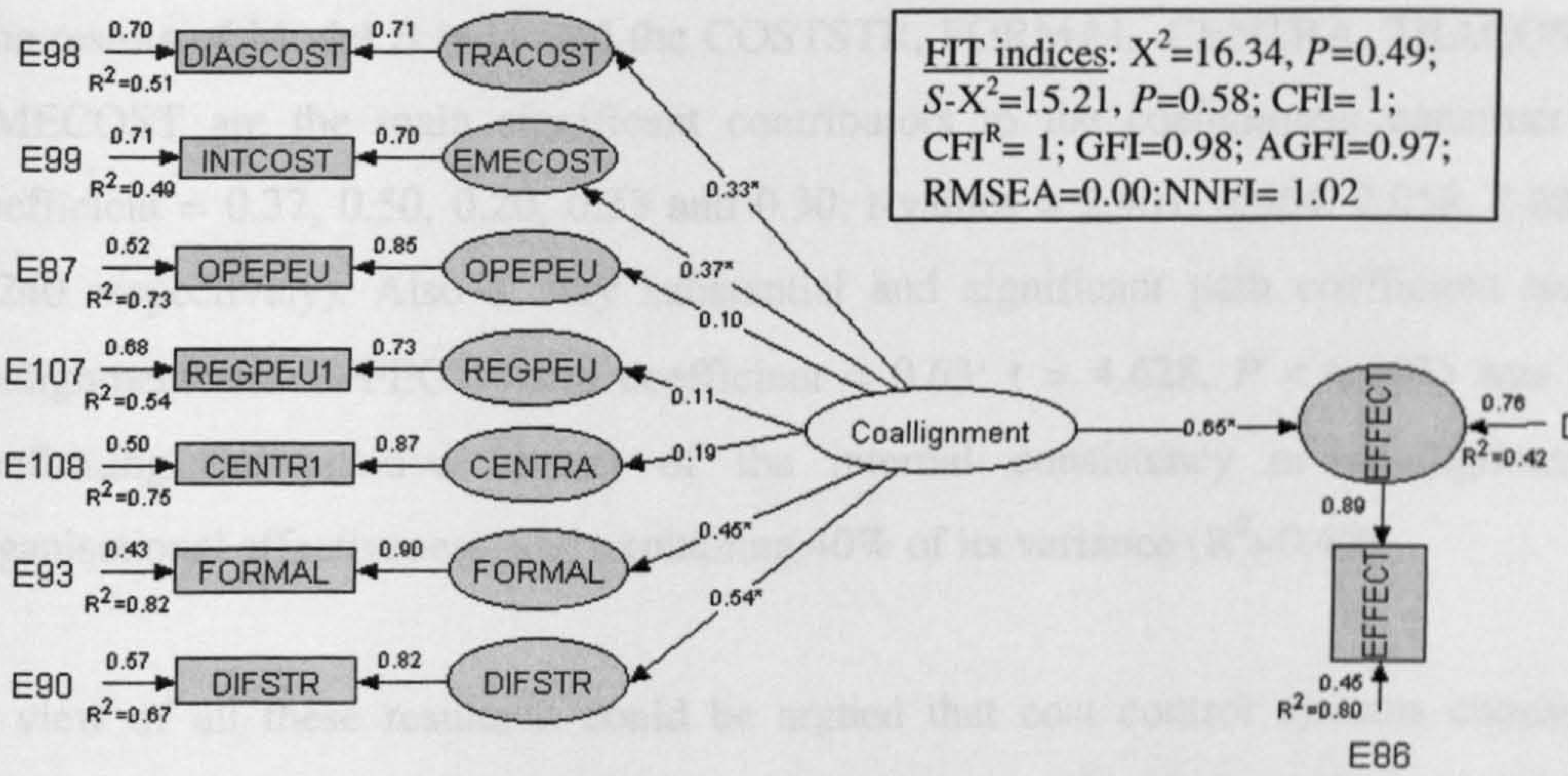
Figure 8.2 Coalignment model of budgetary usage

In view of all these results it could be argued that the interactive usage of budgets (as opposed to diagnostic usage of budgets) consistently contributes to coalignment in both models, which in turn result in higher organisational effectiveness.

8.5.3 Coalignment model of cost control systems

The third SEM analysis aims to investigate the impact of coalignment between the contextual factors and cost control systems on organisational effectiveness. Figure 8.3 represents the results of coalignment models for cost control systems (Models A and B).

Model A



Model B

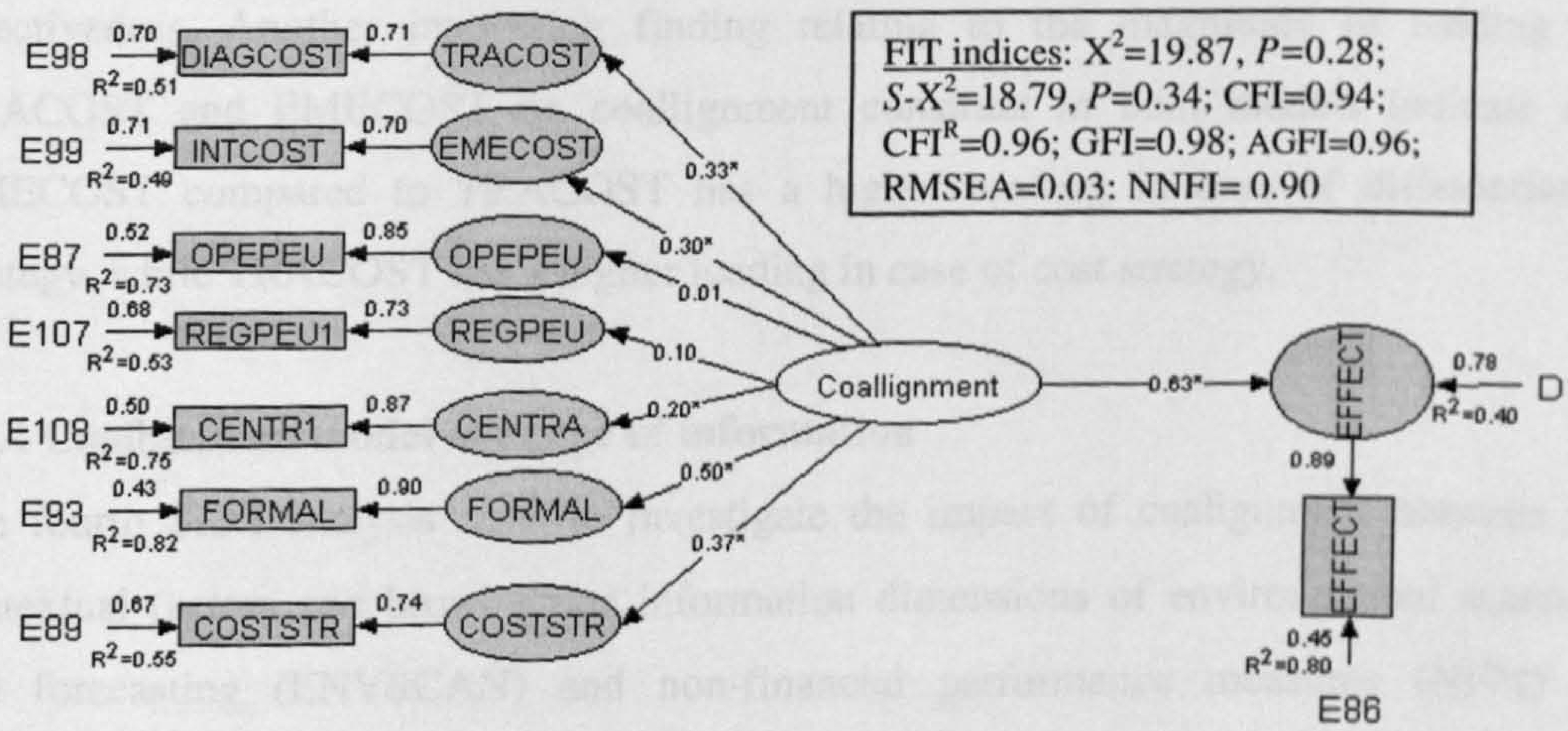


Figure 8.3 Coalignment model of cost control systems

As shown in Model A, the loading of DIFSTR, FORMAL, TRACOST and EMECOST on coalignment is significant (path coefficients = 0.54, 0.45, 0.33 and 0.37; t-values = 4.834, 4.416, 2.818 and 3.102 respectively). Thus, it is DIFSTR, FORMAL, TRACOST and EMECOST (as opposed to OPEPEU, REGPEU, and CENTRA) that contribute to coalignment in this model. In addition, the results of Model A show a highly significant path coefficient between coalignment and organisational effectiveness (path coeffecient = 0.65; t-value = 6.108, $P < 0.001$) which confirms the positive impact of coalignment, as this construct explains 42% of the variance in organisational effectiveness (R^2=0.42).

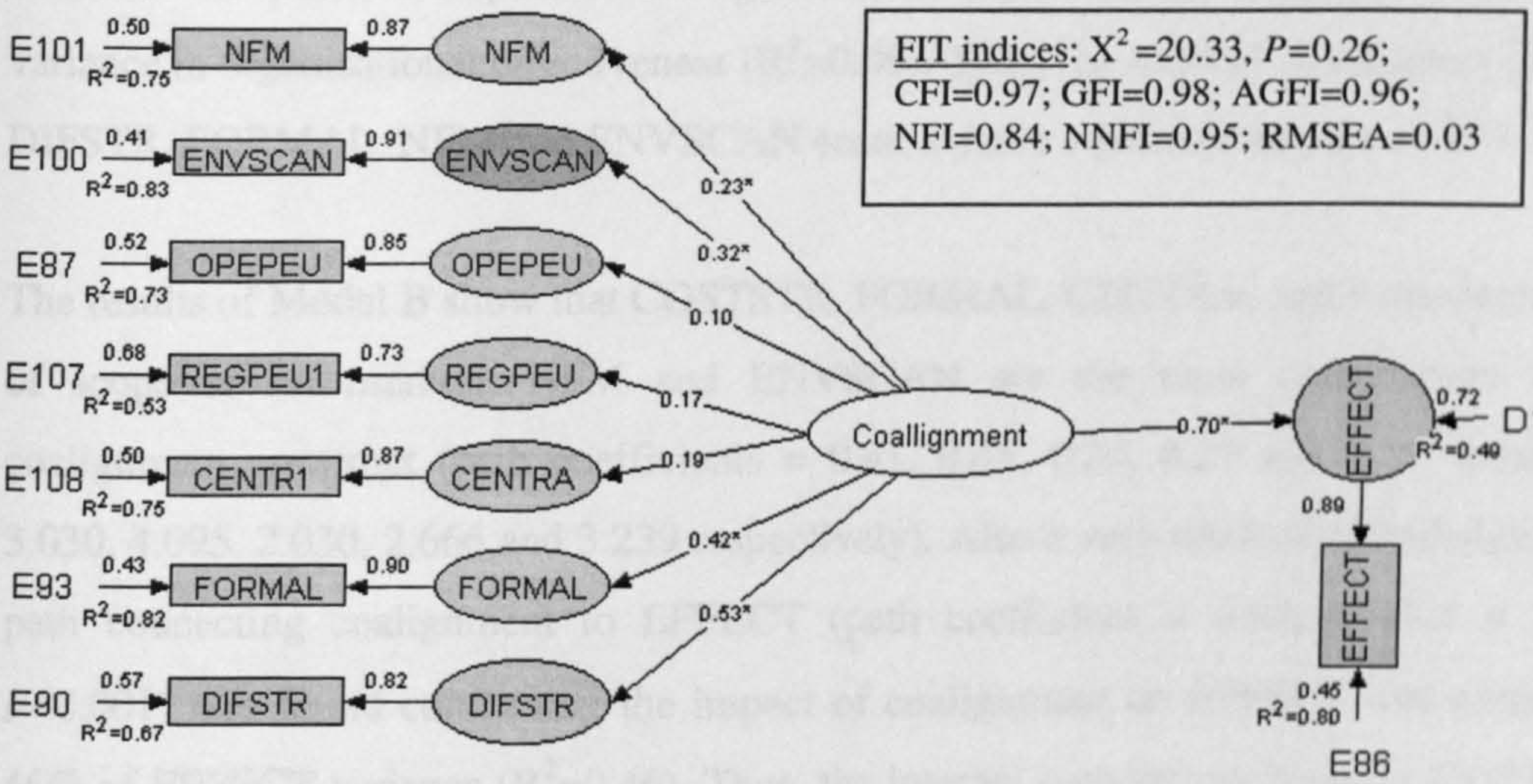
The results of Model B indicated the COSTSTR, FORMAL, CENTRA, TRACOST and EMECOST are the main significant contributors to the coalignment construct (path coefficient = 0.37, 0.50, 0.20, 0.33 and 0.30; t-values = 2.401, 3.964, 2.058, 2.620 and 2.240 respectively). Also a very substantial and significant path coefficient between coalignment and EFFECT (path coefficient = 0.63; t = 4.628, $P < 0.001$) was found confirming the positive impact of the internal consistency or coallignment on organisational effectiveness, and explaining 40% of its variance (R^2=0.40).

In view of all these results it could be argued that cost control systems consistently contribute to coalignment in both models, which in turn result in higher organisational effectiveness. Another interesting finding relating to the magnitude of loading for TRACOST and EMECOST on coallignment construct in both models indicate that EMECOST compared to TRACOST has a higher loading in case of differentiation strategy, while TRACOST has a higher loading in case of cost strategy.

8.5.4 Coalignment model of Scope of information

The fourth SEM analysis aims to investigate the impact of coalignment between the contextual factors and broad scope information dimensions of environmental scanning and forecasting (ENVSCAN) and non-financial performance measures (NFM) on organisational effectiveness (EFFECT). Figure 8.4 represents the results of coalignment models for scope of information (Models A and B). The goodness-of-fit measures shown in Figure 8.4 indicate that both models are acceptable and can be used for providing reliable parameter estimates as they all well exceeded their recommended cut-off values.

Model A



Model B

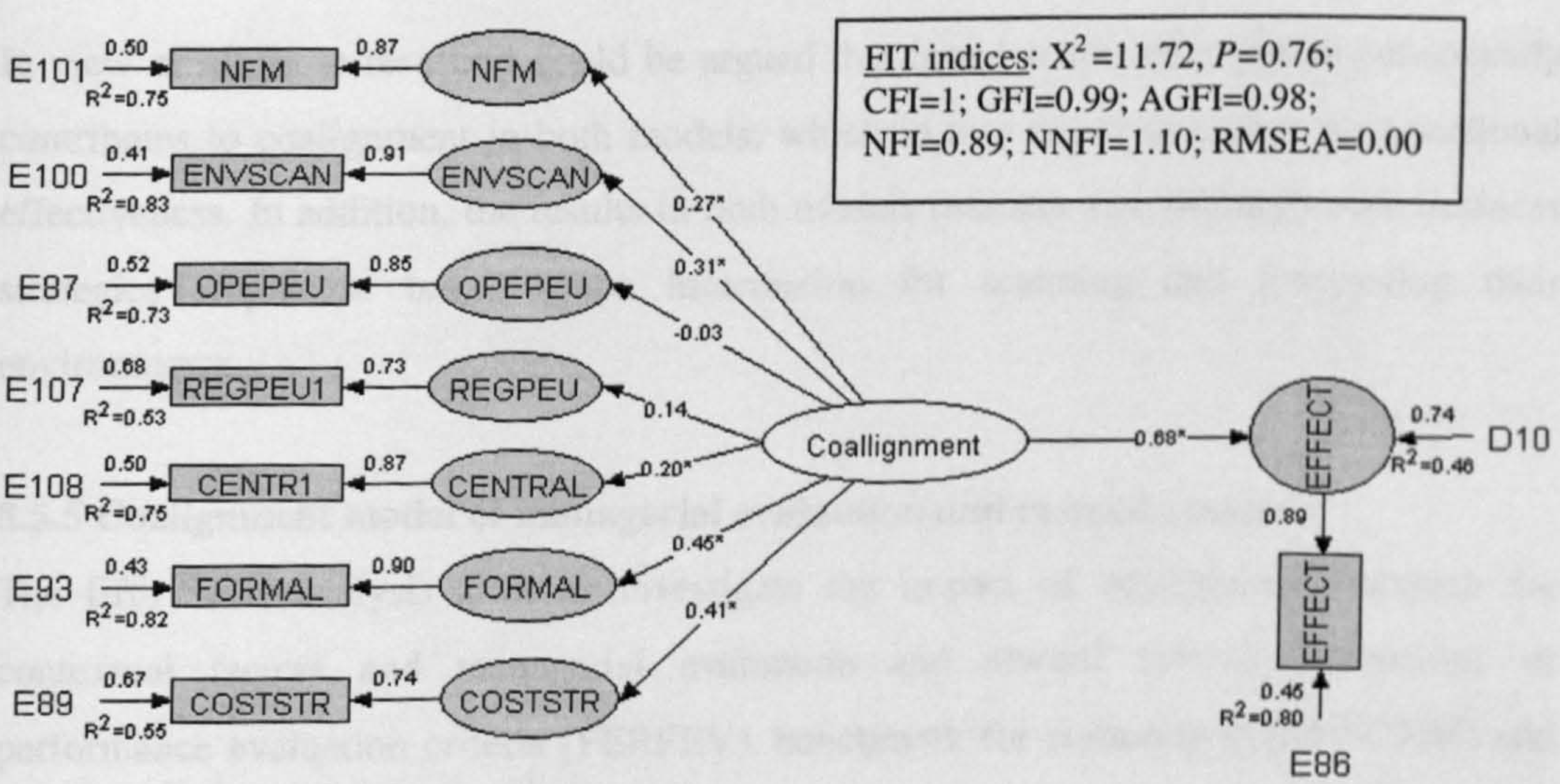


Figure 8.4 Coalignment model of scope of information

The results of Model A indicate that DIFSTR, FORMAL and both dimensions of scope NFM and ENVSCAN have significant loading on coalignment (path coefficients = 0.53, 0.42, 0.23 and 0.32; t-values = 4.916, 4.495, 2.400 and 3.462 respectively). In addition, the results of Model A show a highly significant path coefficient between coalignment and organisational effectiveness (path coefficient = 0.70, t-value = 6.329, $P<0.001$). This confirms the positive impact of coalignment, as this construct explains 49 % of the variance in organisational effectiveness ($R^2=0.49$). Thus, the internal consistency between DIFSTR, FORMAL, NFM and ENVSCAN seem to have a positive impact on EFFECT.

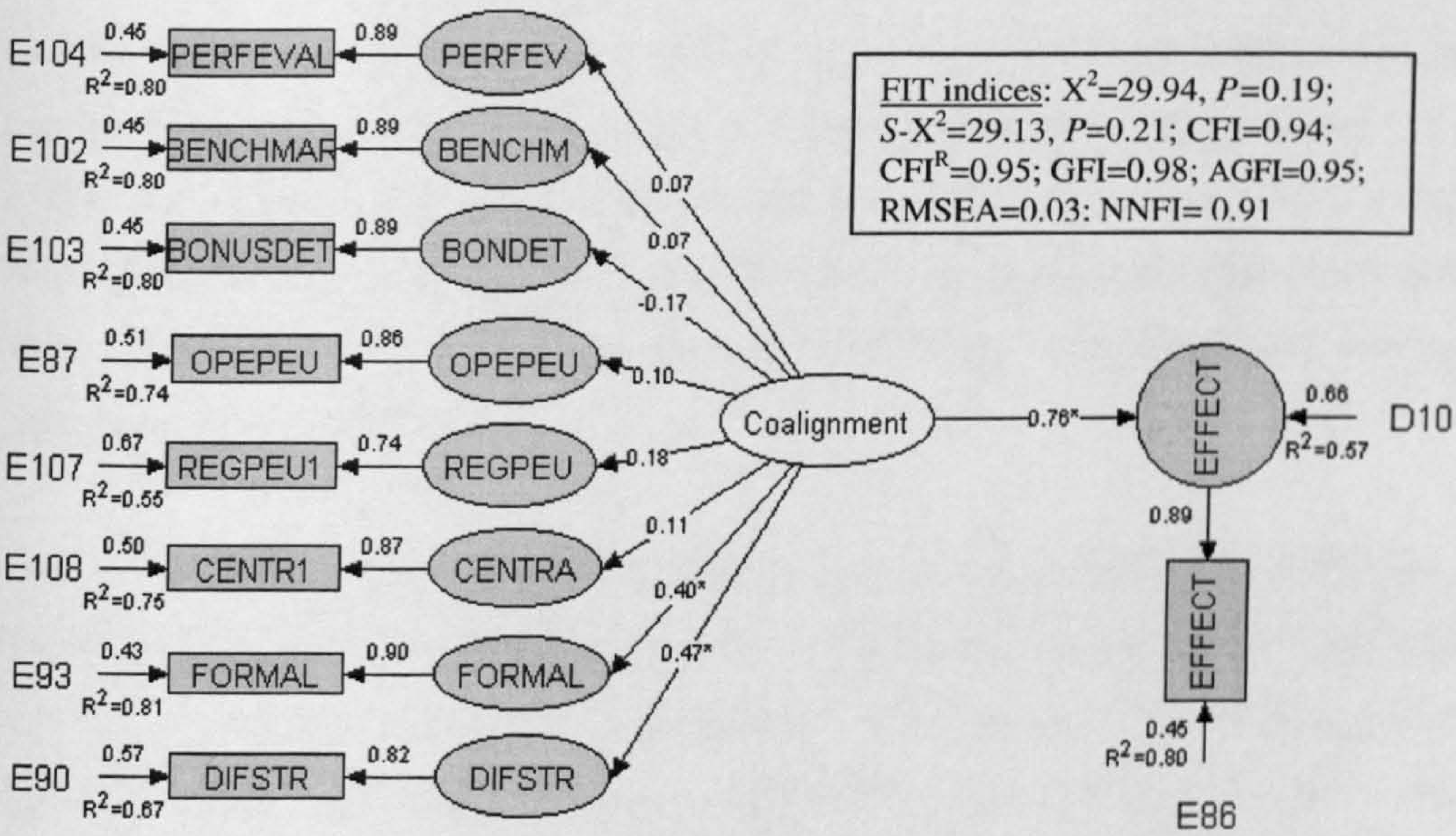
The results of Model B show that COSTSTR, FORMAL, CENTRA, and both dimensions of scope of information, NFM and ENVSCAN are the main contributors to the coalignment construct (path coefficients = 0.41, 0.45, 0.20, 0.27 and 0.31; t-values = 3.030, 4.095, 2.030, 2.666 and 3.239 respectively). Also a very substantial and significant path connecting coalignment to EFFECT (path coefficient = 0.68; t-value = 5.380, $P<0.001$) was found confirming the impact of coalignment on EFFECT and explaining 46% of EFFECT variance ($R^2=0.46$). Thus, the internal consistency between COSTSTR, FORMAL, CENTRA, NFM and ENVSCAN has a positive impact on EFFECT.

In view of all these results it could be argued that broad scope information consistently contributes to coalignment in both models, which in turn result in higher organisational effectiveness. In addition, the results in both models indicate that although both business strategies emphasise broad scope information for scanning and forecasting their environments.

8.5.5 Coalignment model of managerial evaluation and reward system

The fifth SEM analysis aims to investigate the impact of coalignment between the contextual factors and managerial evaluation and reward system dimensions of performance evaluation criteria (PERFEV), benchmark for comparison (BENCHM) and bonus determination criteria (BONDET) on organisational effectiveness (EFFECT).
Figure 8.5 represents the results of coalignment models for managerial evaluation and reward system (Models A and B).

Model A



Model B

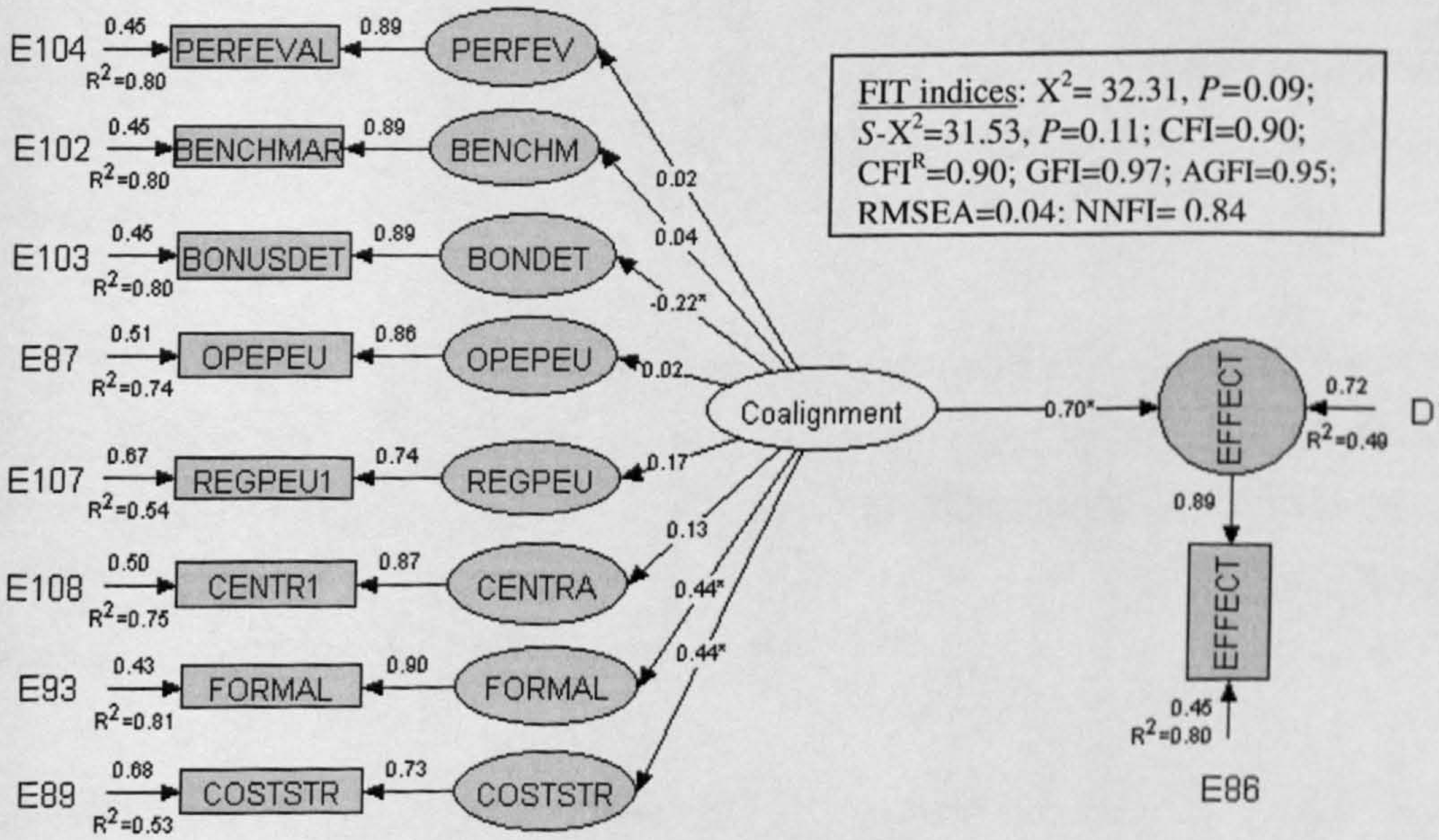


Figure 8.5 Coalignment model of performance evaluation and rewards system

The results of Model A indicated that only DIFSTR and FORMAL have significant loading on coalignment (path coefficients = 0.47 and 0.40; t-values = 4.037 and 3.757 respectively). In addition, the results of Model A show a highly significant path coefficient between coalignment and organisational effectiveness (path coefficient = 0.76, t-value = 5.796, $P<0.001$), which confirms the positive impact of coalignment, as this construct explains 57% of the variance in organisational effectiveness ($R^2=0.57$). With regard to managerial valuation and rewards dimensions the results show a negative substantial but not significant loading for BONDET on coalignment (path coefficient = -0.17; t-value = -1.585) while the loading of PERFEV and BENCHM was neither substantial nor significant.

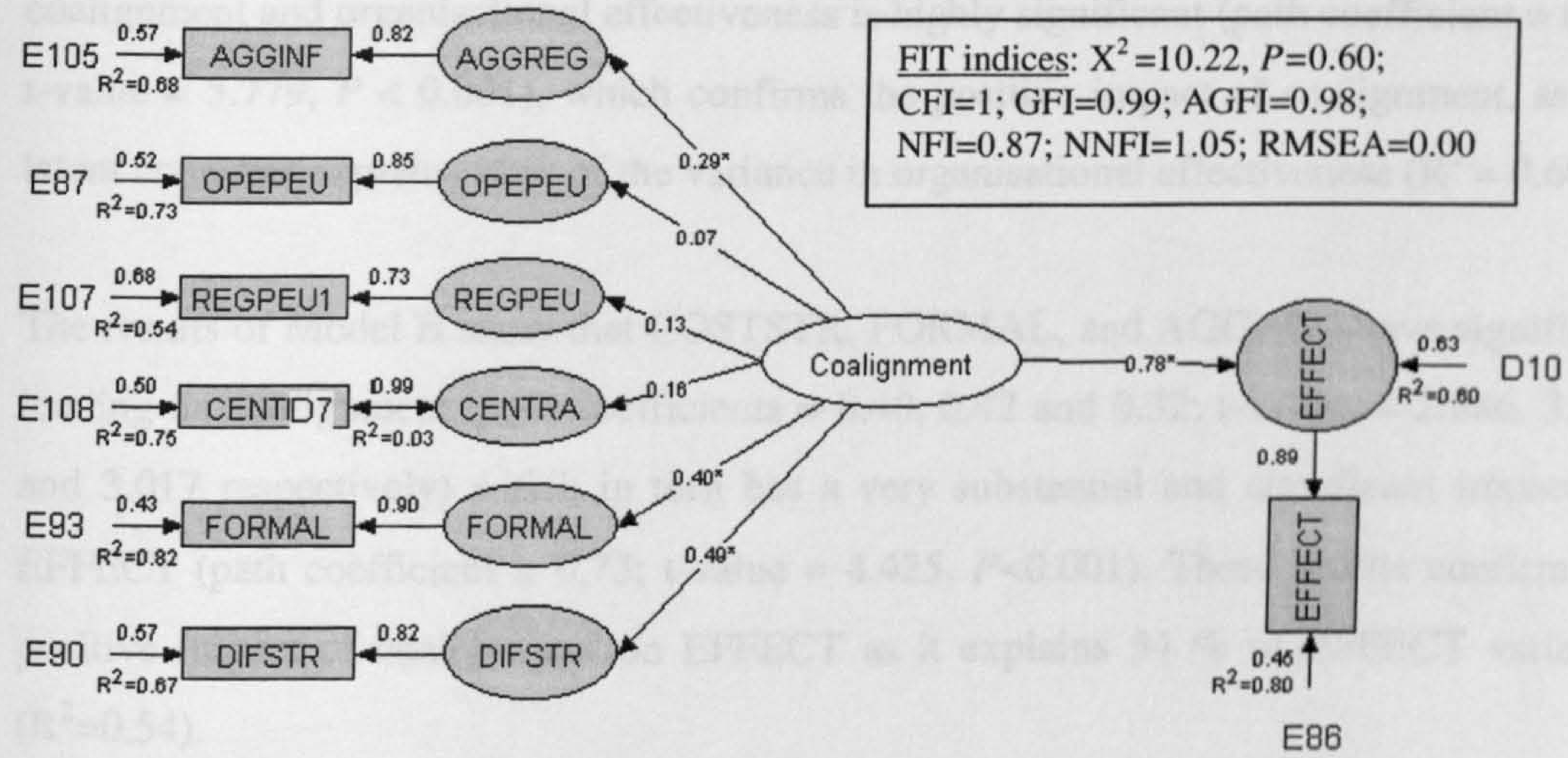
On the other hand, the results of Model B show that COSTSTR, FORMAL, and BONDET are the main contributors to the coalignment construct (path coefficients = 0.44, 0.44, -0.22; t-values = 2.645, 3.407 and –1.995 respectively) which in turn has a very substantial and significant impact on EFFECT (path coefficient = 0.70; t-value = 3.899, $P<0.001$). These results confirm the positive impact of coalignment on EFFECT as it explains 49% of the variance of EFFECT ($R^2=0.49$). Thus, the internal consistency between cost strategy, formalisation and reliance on objective criteria (formula-based) as opposed to subjective criteria would have a positive impact on organisational effectiveness.

In view of all these results it could be argued that both COSTSTR and DIFSTR (but to a lesser extent) tend to rely more on objective criteria as opposed to subjective criteria for determining managerial bonuses. In addition, internal consistency between low-cost strategy, formalisation and the use of objective criteria for determining managerial bonuses contributes to higher organisational effectiveness.

8.5.6 Coalignment model of aggregation of information

The sixth SEM analysis aims to investigate the impact of coalignment between the contextual factors and aggregation of information on organisational effectiveness. Figure 8.6 represents the results of coalignment models for budgetary usage (Models A and B).

Model A



Model B

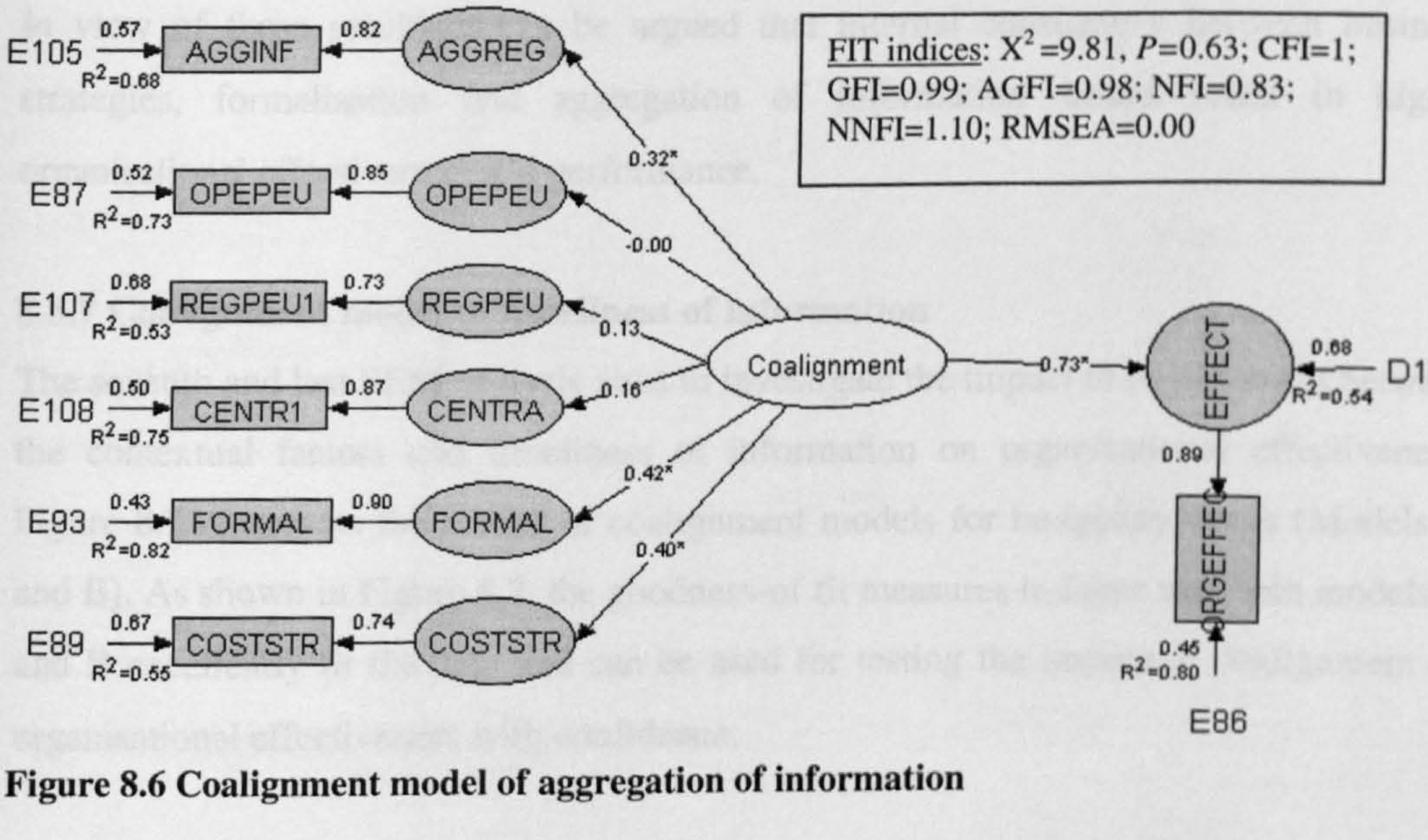


Figure 8.6 Coalignment model of aggregation of information

These results indicate that all goodness-of-fit measures well exceeded the recommended cut-off values for both models. Therefore, the hypothesised models fit the data very well and provide a direct test for the impact of coalignment on organisational effectiveness.

The results of Model A show that DIFSTR, FORMAL and AGGREG are the main contributors to the coalignment latent construct (path coefficients = 0.49, 0.40 and 0.29; t-values = 4.409, 4.183 and 2.886 respectively). In addition, the path coefficient between coalignment and organisational effectiveness is highly significant (path coefficient = 0.78, t-value = 5.779, $P < 0.001$), which confirms the positive impact of coalignment, as this latent construct explains 60% of the variance in organisational effectiveness ($R^2 = 0.60$).

The results of Model B show that COSTSTR, FORMAL, and AGGREG have significant loading on coalignment (path coefficients = 0.40, 0.42 and 0.32; t-values = 2.886, 3.486 and 3.017 respectively) which in turn has a very substantial and significant impact on EFFECT (path coefficient = 0.73; t-value = 4.425, $P<0.001$). These results confirm the positive impact of coalignment on EFFECT as it explains 54 % of EFFECT variance ($R^2=0.54$).

In view of these results it can be argued that internal consistency between business strategies, formalisation and aggregation of information would result in higher organisational effectiveness and performance.

8.5.7 Coalignment model of timeliness of information

The seventh and last SEM analysis aims to investigate the impact of coalignment between the contextual factors and timeliness of information on organisational effectiveness. Figure 8.7 represents the results of coalignment models for budgetary usage (Models A and B). As shown in Figure 8.7, the goodness-of fit measures indicate that both models A and B excellently fit the data and can be used for testing the impact of coalignment on organisational effectiveness with confidence.

The results of Model A show that the first order factors of DIFSTR, FORMAL and TIMINF have substantial and significant loading on the second-order latent factor of coalignment (path coefficients = 0.48, 0.39 and 0.46; t-values = 4.685, 4.340 and 4.718 respectively). In addition, the path between coalignment and EFFECT is very substantial and significant (path coefficient = 0.78; t-value = 6.765, $P<0.001$), thus, confirming the positive impact of internal consistency or coalignment between DIFSTR, FORMAL and AGGREG on EFFECT, as it explains 61% of EFFECT variance (R^2 =0.61).

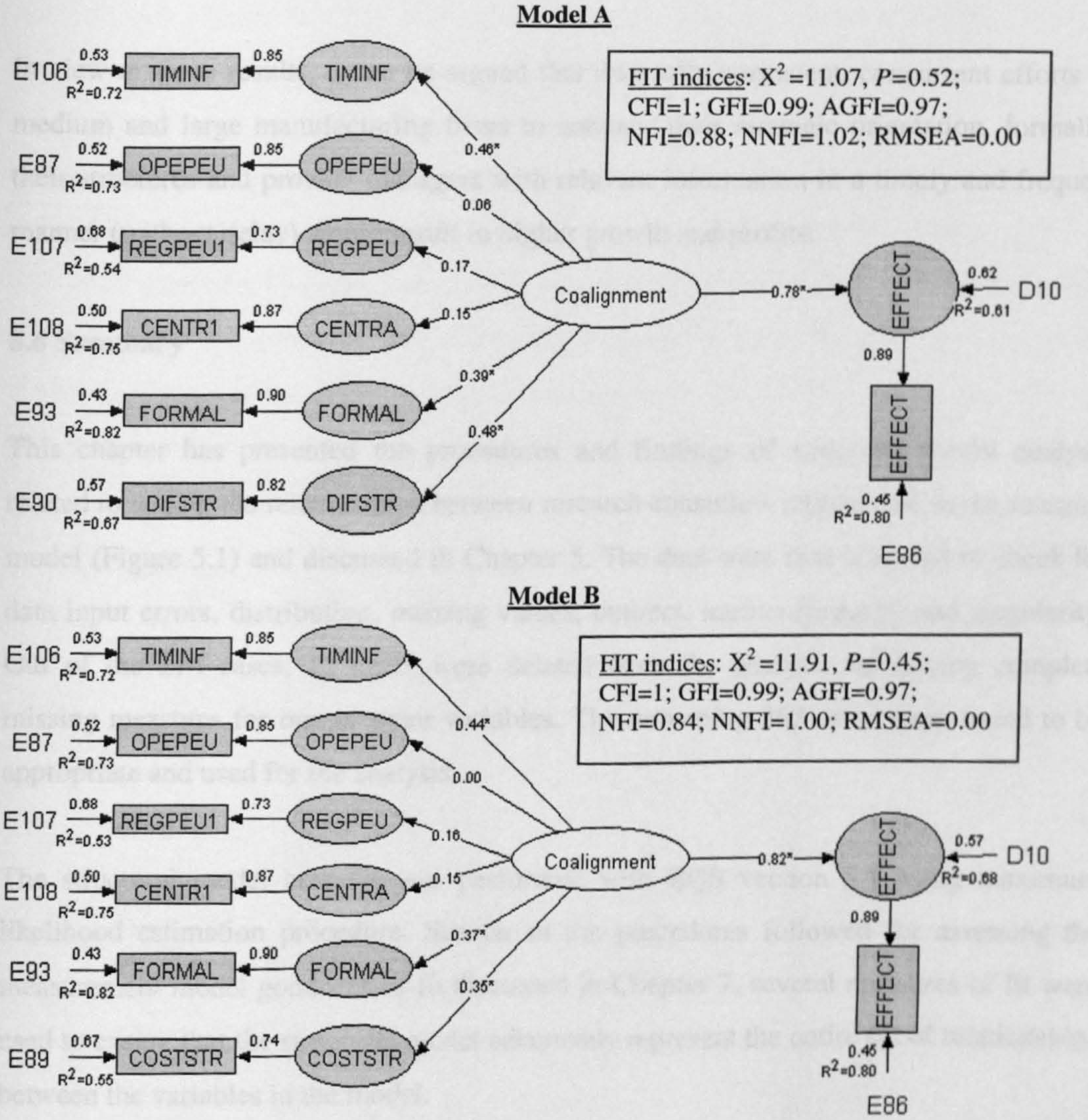


Figure 8.7 Coalignment model of timeliness of information

With regard to Model B, the results indicate that COSTSTR, FORMAL and TIMINF (as opposed to OPEPEU, REGPEU and CENTRA) have significant loading on coalignment (path coefficients = 0.39, 0.37 and 0.44; t-values = 2.978, 3.762 and 4.247 respectively). In addition, the results show a very substantial and significant path between coalignment and EFFECT (path coefficient = 0.81; t-value = 5.528, $P<0.001$), thus confirming the positive impact of coalignment between COSTSTR, FORMAL and TIMINF on EFFECT, which explain 66% of its variance ($R^2=0.66$).

In view of these results, it can be argued that internally consistent, concurrent efforts by medium and large manufacturing firms to enhance their strategic orientation, formalise their structures and provide managers with relevant information in a timely and frequent manner (without delay) would result in higher growth and profits.

8.6 Summary

This chapter has presented the procedures and findings of structural model analysis related to testing the relationships between research constructs represented in the research model (Figure 5.1) and discussed in Chapter 5. The data were first screened to check for data input errors, distribution, missing values, outliers, multicollinearity and singularity. Out of the 274 cases, 12 cases were deleted from the analysis for having complete missing measures for one or more variables. The remaining 262 cases were found to be appropriate and used for the analysis.

The structural model analysis was performed with EQS version 5.7 using maximum likelihood estimation procedure. Similar to the procedures followed for assessing the measurement model goodness-of-fit discussed in Chapter 7, several measures of fit were used to ensure that the structural model adequately represent the entire set of relationships between the variables in the model.

The complexity of the research model in terms of number of variables and parameters to be estimated and the limitations of sample size have led to adopting the summated scale approach. Nevertheless, measurement errors were controlled by fixing the error variance for each summated scale to (1-reliabilty coefficient) times scale variance. In addition, due to the complexity of the model, the analysis was conducted in two stages. The first stage of analysis focused on achieving the first two research objectives (i.e., investigating the direct and indirect relationships between the contextual variables and MCS attributes). Seven structural model analyses were conducted under this stage to investigate the direct and indirect effects of PEU dimensions, business strategy dimensions and structural dimensions simultaneously on each attribute of MCS seven general attributes.

The second stage of analysis was concerned with achieving the third research objective related to investigation of the implication of fit between PEU, business strategy, structure and MCS attributes on organisational effectiveness. Also seven separate structural model analyses were performed for each one of the seven attributes of MCS. A summary of the major findings that has emerged from these two stages of analysis and implications for theory and practice are discussed next in Chapter 9.

CHAPTER 9

CONCLUSIONS AND IMPLICATIONS

CHAPTER 9

Conclusions and Implications

9.1 Introduction

In an attempt to provide a better understanding of MCS design, this study has utilised the contingency theory approach to investigate the contingent relationships between environmental uncertainty, business strategy, organisational structure and various attributes of MCS simultaneously. In addition, this study has investigated the implications of fit or coalignment between these contextual variables and MCS attributes on organisational effectiveness, thus adopting a systems approach to fit recommended in the contingency literature.

This study is one of the first to incorporate the contextual variables of environment, strategy and structure in one model and investigate their effect simultaneously on MCS design. The benefit of examining the impact of these contextual variables simultaneously, rather than individually as has been the case in most previous MC contingency research, is that these contextual variables tend to be related. Consequently, when looked at individually, the relationships between particular contextual variables and MCS design are difficult to interpret. These relationships could reflect a causal connection between a particular contextual variable and MCS attribute, or alternatively, they could be spurious and merely reflect mutual relationships with other contextual variables. Thus, additional insights and greater confidence can be gained by considering these contextual variables together.

This study builds on the works of Simons (1987) and Chenhall and Morris (1986) in terms of developing a wider and comprehensive view of MCS design. Seven MCS attributes have been investigated in this study including tightness of budgetary control system practices, budgetary control system usage, cost control systems, broad scope information, managerial evaluation and rewards system, aggregation and timeliness of information.

In Chapter 1 it was pointed out that the major objectives of the research were to examine:

1. The direct relationships between the three contextual/contingent variables of: a) business strategy, b) environmental uncertainty, and c) organisational structure and various attributes of MCS simultaneously;
2. The indirect relationship between the two contextual variables of: a) business strategy, and b) environmental uncertainty, acting through organisational structure, on various attributes of MCS; and
3. Whether a fit or coallignment between the contextual variables and MCS attributes is associated with greater organisational effectiveness.

To achieve the research objectives, a cross-sectional survey employing a questionnaire method was adopted targeting 1000 medium and large manufacturing organisations in the UK. The data was collected from 274 organisations; but after data screening, the sample size retained for data analysis was 262. For purposes of analysis, the research utilised SEM multivariate statistical technique enabled by EQS 5.7 version software (Bentler, 1995). SEM is unique in its ability to test construct validity, control measurement error and investigate the structural relations simultaneously, thus providing greater confidence in the findings of this study compared to other multivariate statistical techniques. This represents an advance on previous MC contingency research.

SEM analysis was approached in two stages. The measurement model analysis was first performed utilising exploratory and confirmatory factor analysis to check the unidimensionality and validity of the measures used to capture the research constructs. The results that emerged from the measurement model analysis were presented in Chapter 7 and summarised in Table 7.21. These results confirmed the multidimensionality, rather than the unidimensionality of most of the constructs incorporated in the research model. Only the timeliness and aggregation of information attributes of the MCS were found to be of unidimensional nature.

The second stage of SEM analysis involved the structural model analysis to test the structural relations and achieve the research objectives. It was pointed out in Chapter 8 that due to the complexity of the research model, the structural model analysis was approached in two stages. The first stage of analysis aimed at achieving the first two research objectives relating to investigating the direct and indirect contingent relationships between the contextual variables and MCS attributes. The second stage aimed at achieving the third research objective relating to investigating the implications of fit between the contextual variables and MCS attributes on organisational effectiveness. A summary of the major findings emerging from these two stages of the structural model analysis is discussed next in this chapter. This chapter also discusses the implications of these findings for theory and practice, research limitations and avenues for further research as arising from this study.

9.2 Summary of major research findings

This section consists of three sub-sections. Sub-section 9.2.1 discusses the major findings that have emerged from the first stage of structural model analysis, which are relevant to achieving the first two research objectives. Sub-section 9.2.2 presents the major findings that have emerged from the second stage of structural model analysis relevant to achieving the third research objective. The implications of research findings to theory and practice are presented in Sub-section 9.2.3.

9.2.1 Direct/indirect relationship between the contextual variables and MCS attributes

Table 9.1 summarises the results relating to PEU direct and indirect effect on MCS attributes. These results suggest that different PEU dimensions have different effects on MCS design. More importantly, these results explain earlier results by illustrating the differential effects of PEU dimensions on MCS design. The results summarised in Table 9.1 show that PEU-operations has negative and significant effects on MCS attributes of low budgetary revision and diagnostic usage of budgets. These results indicate that when managers perceive high uncertainty in their operations environment (i.e., competitors' actions, customers' preferences and demand, technological changes, product attributes) they tend to update and change their budgetary targets more frequently in order to enhance their adaptiveness and responsiveness to the environmental uncertainty. Thus, in this situation, it is difficult to use budgets for performance evaluation and controlling behaviour since targets are subject to frequent change. These results are consistent with the arguments of earlier studies (Gordon and Miller, 1976; Waterhouse and Tiessen, 1978; Amigoni, 1978; Anthony and Govindarajan, 2001; Sharma, 2002) that under high PEU, more frequent revisions of budgets and less reliance on the budgets for control and performance evaluation purposes are expected. Furthermore, as Sharma (2002) point out, evaluating performance via budgets in highly uncertain conditions may be met with explanations that budget variances or shortfalls are due to unpredictable and uncontrollable factors.

Table 9.1 Summary of PEU effects on MCS attributes

	PEU-operations			PEU-regulations		
	Exp.	Dir.	Ind.	Exp.	Dir.	Ind.
1. Budgetary control practices						
Low budgetary revision	-	- **	+ ns	-	- ns	- ns
Budgetary importance	-	- ns	- ns	-	- ns	+ ns
2. Budgetary control usage						
Interactive budgetary usage	+	- ns	+ ns	+	+ **	- ns
Diagnostic budgetary usage	-	- **	+ ns	-	+ ns	- ns
3. Scope of information						
Scanning & forecasting information	+	- ns	+ ns	+	+ *	- *
Non-financial performance measures	+	- ns	+ ns	+	+ ns	- ns
4. Managerial evaluation & rewards						
Subjective bonus determination	+	+ ns	- ns	+	- ns	+ ns
Benchmarking for comparison	+	+ ns	- ns	+	+ *	- ns
Long-term, non-financial measures	+	+ ns	+ ns	+	+ **	- ns
5. Aggregation of information	+	+ ns	+ ns	+	+ ns	- ns
6. Timeliness of information	+	- ns	+ ns	+	+ **	- ns

Exp. = Expected; Dir. = Direct effect; Ind. = Indirect effect; ** $P < 0.01$; * $P < 0.05$; ns. = Not significant.

The results summarised in Table 9.1 also indicated non-significant relationships between PEU-operations and MCS attributes of scope, performance evaluation and rewards, aggregation and timeliness of information. Hence, contrary to the expectations, the non-significant results imply that there is no relationship between PEU-operations and these MCS attributes. These non-significant results are not consistent with earlier studies (Gordon and Narayanan, 1984; Chenhall and Morris, 1986, Chia, 1991; Gul and Chia, 1995) that have reported a significant direct relationship between PEU and MCS attributes such as scope and timeliness of information dimensions. However, these results are consistent with Amigoni's (1978) argument that MCSs are systems of order designed and implemented with reference to certain assumptions about organisational circumstances and environment. Amigoni further argues that if these assumptions are subject to continuous change, it becomes difficult for the formal MCSs to adapt accordingly and provide relevant information in a timely manner. This is also consistent with the argument that firms with increasingly uncertain environments may use informal rather than formal information and control systems for searching the external environment and controlling activities (Kren and Liao, 1988; Emmanuel, Otley and Merchant, 1990; Moores and Yuen, 2001; Sharma, 2002).

With regards to the effect of the second dimension of PEU, the results in Table 9.1 indicate that PEU-regulations has a significant positive effect on MCS attributes of interactive budgetary usage, scanning and forecasting, benchmarking and long-term, non-financial criteria for evaluating managerial performance and timeliness of information. These results suggest that when managers perceive high uncertainty in their general industry environment (e.g., unpredictable change in governmental regulations and actions) they tend to use their budgets interactively for short-term planning, co-ordination and communication purposes to enhance their awareness and responsiveness to environmental uncertainties. Moreover, when managers perceive high uncertainty in their general industry environment, they tend to use broad scope information on a more timely basis for scanning and monitoring any sudden changes in the environment before they become increasingly difficult to manage. Managers also tend to use external (i.e., benchmarking with competitors performance) and long-term non-financial performance measures more than internal (i.e., budgets or last year performance) and short-term financial measures for evaluating managerial performance. Thus, these results generally support earlier research findings (Gordon and Miller, 1976; Amigoni, 1978; Gordon and Narayanan, 1984; Chenhall and Morris, 1986; Sharma, 2002).

With regard to the indirect effect of PEU on MCS attributes, the results summarised in Table 9.1 also indicate that only one significant indirect effect was found between PEU-regulation and scope of information dimension of scanning and forecasting but in the inverse direction of the direct effect. This significant and inverse indirect effect may be attributable to the significant positive relationship between REGPEU and the structural dimension centralisation, which in turns has a substantial significant negative effect on scanning and forecasting. The absence of other significant indirect effects is probably attributable in general to the insignificant relationships between PEU dimensions and structure[1]. Thus, the results in Table 9.1 generally indicate that organisational structure has no mediating effect on PEU-MCS relationship.

[1] While PEU-regulation had a significant positive relationship with centralisation, centralisation did not have any other relevant significant relationship with MCS besides scanning and forecasting.

Table 9.2 summarises the results relating to the direct and indirect effects of business strategy on MCS attributes. These results indicate that both differentiation and low-cost strategies were significantly associated with interactive usage of budgets, scanning, benchmarking and timeliness of information. These results indicate that these MCS attributes are deemed important in low-cost strategies as well as in differentiation strategies to enable organisations to enhance learning and awareness of opportunities and threats in their competitive environment in a timely manner that would assist in developing strategies. Thus, the results of this study are not consistent with the common held belief in the contingency literature that different strategies require different MCS tools. However, they are consistent with Simons (1990, 1991, and 1995) argument that the reliance on accounting forms of control will not necessarily diminish in importance in different strategic circumstances, but that the emphasis or use may be different. They are also consistent with Amigoni's (1978) argument that different MCSs can be used for different purposes and therefore can be used in any company differently.

Table 9.2 Summary of business strategy effects on MCS attributes

	Differentiation strategy			Low-cost strategy		
	Exp.	Dir.	Ind.	Exp.	Dir.	Ind.
1. Budgetary control practices						
Low Budgetary Revision	-	- ns	- ns	+	- ns	- ns
Budgetary Importance	-	- ns	+ *	+	- ns	+ ns
2. Budgetary control usage						
Interactive budgetary usage	+	+ *	+ ns	+	+ *	+ ns
Diagnostic budgetary usage	-	+ ns	+ ns	+	+ ns	+ ns
3. Cost control systems						
Traditional cost systems	+	+ ns	+ *	+	+ ns	+ ns
Emergent cost systems	+	+ ns	+ ns	+	+ ns	- ns
4. Scope of information						
Environment scanning & forecasting	+	+ **	- ns	+	+ **	- ns
Non-financial performance measures	+	+ ns	+ *	+	+ ns	+ ns
5. Managerial evaluation & rewards						
Subjective bonus determination	+	+ ns	- ns	-	+ ns	- ns
Benchmarking for comparison	+	+ **	- ns	-	+ **	- ns
Long-term, non-financial measures	+	+ ns	- ns	-	- ns	- ns
6. Aggregation of information	+	+ ns	+ ns	-	+ ns	+ ns
7. Timeliness of information	+	+ **	+ ns	-	+ **	- ns

Exp. = Expected; Dir. = Direct effect; Ind. = Indirect effect; ns. = Not significant; * $P < 0.05$; ** $P < 0.01$.

The significant results summarised in Table 9.2 suggest that the interactive usage of budgets is desirable for both business strategies in order to reduce uncertainty and foster co-ordination and learning. This is consistent with Simons (1995) assertion that the interactive usage of budgets would inspire organisational learning and generate new ideas and strategies. This is also consistent with Abernethy and Brownell (1999, p.194) study which concluded that strategic change (measured along the defender/prospector continuum) and performance is more positive when the style of budget use is interactive compared to when it is diagnostic. In addition, the significant direct positive relationship between both business strategies, environmental scanning and benchmarking is consistent with Chenhall and Langfield-Smith's (1998, p.257) argument that benchmarking encourages best practices and assist in successfully developing business strategies. This is also consistent with the argument put forward by Bromwich (1990, p.28) that:

> There is a need to release management accounting from the factory floor to allow it also to aid directly in meeting these market challenges. Such a reorientation would permit management accounting additionally to focus on the firm's value added relative to its competitors.

The results of this study also indicate that differentiation and low-cost business strategies emphasise and use MCS but to a different extent. For instance, the results generally indicate that organisations employing a low-cost strategy emphasise MCS to a lesser extent than those employing differentiation strategy[2]. This finding is consistent with the arguments in the literature (e.g., Amigoni 1978; Simons 1987) that organisations that produce and sell one or few independent products (as in low-cost leaders or defenders) appear to use their control systems less intensively than those operating in many different markets with several products (as in differentiators or prospectors).

Contrary to the expectations, the results in Table 9.2 show no significant direct associations between business strategies and budgetary practices, cost control systems, non-financial performance measures, bonus determination, and aggregation of information. These results therefore do not provide any evidence to support the long held belief that tight budgetary practices, cost control and the use of objective criteria for determining bonus determination are more appropriate for businesses pursuing low-cost strategies than for differentiation

[2] This is evident from the magnitudes of the standardised coefficients presented in Chapter 8, Section 8.4 which generally indicate that the standardised coefficients for low-cost strategy and MCS attributes are smaller than those for differentiation strategy and MCS attributes.

strategy (Miles and Snow, 1978; Porter, 1980). In addition, the lack of finding a significant relationship between business strategy and non-financial performance measures is not consistent with the balanced scorecard approach that would require organisations to display several non-financial measures under different perspectives in order to implement their business strategies. However, these results seem to provide some support to Anthony and Govindrajan (2001) argument that not all non-financial measures are applicable to all strategies. Only those non-financial measures that reflect key success factors or key performance indicators that will determine the successful implementation of business strategies must be included in MCS reports. Thus, reporting only the critical non-financial performance measures is essential to give reinforcing rather than conflicting signals to managers. Thus, lack of finding significant results between business strategy and non-financial performance measures may be attributed to the measures used in this research to capture the non-financial performance measures construct where both internal efficiency measures and customers measures were aggregated in one scale.

However, the results in Table 9.2 indicate that differentiation strategy is indirectly associated with importance of meeting budgetary targets, traditional cost control systems and the use of non-financial performance measures through the structural dimension of formalisation. Thus, formalisation seems to mediate the relationship between differentiation strategy and these MCS attributes. These results are consistent with Baines and Langfield-Smith (2003) findings that differentiation strategy and the use of non-financial performance measures are indirectly rather than directly associated through organisational structure. These indirect relationships also provide some support and explanations to Simons (1987) contradictory findings that prospectors place higher importance on achieving budgetary targets and emphasise cost control systems to a greater extent than defenders by providing evidence by which this process takes place. The results of this study suggest that differentiators place higher importance on meeting budgetary targets not for evaluating and punishing poor performing managers, but in order to understand why variances occur, what corrective actions need to be taken in response to these variances. In this setting, the budgeting system is used interactively to advocate organisational learning.

Finally, with regard to organisational structure, Table 9.3 summarises the results relating to its direct effect on MCS attributes. These results indicate that different dimensions of organisational structure have different effects on MCS design. These results are consistent with earlier MC contingency studies that have reported that control in centralised organisations is less complex and relies less on MCS, whereas, formalised organisations place more emphasis on formal control systems for co-ordinating various sub-units activities (Gordon and Miller, 1976; Waterhouse and Tiessen, 1978; Amigoni, 1978). For instance, the results in Table 9.3 indicate that the structural dimension of centralisation has significant negative effects on the use of emergent cost control systems (activity-based and target costing systems) and the broad scope dimension of scanning and forecasting information. Table 9.3 also indicates that this structural dimension has a non-significant effect on the other attributes of MCS investigated in this study. These results are in line with Chenhall and Morris' (1986) arguments that in centralised as opposed to decentralised organisations, senior managers who impose direct control on various activities, and are more familiar with the overall operations of their business, have little time for analysis. Thus, their decisions tend to be intuitive and would rely less on formal management control and cost control systems.

Table 9.3 Summary of organisational structure effects on MCS attributes

	Centralisation		Formalisation	
	Expected	Direct effect	Expected	Direct effect
1. Budgetary control practices				
Low budgetary revision	N/A	- ns	N/A	+ ns
Budgetary importance	N/A	+ ns	N/A	+ **
2. Budgetary control usage				
Interactive budgetary usage	N/A	- ns	N/A	+ *
Diagnostic budgetary usage	N/A	- ns	N/A	+ ns
3. Cost control systems				
Traditional cost systems	N/A	+ ns	N/A	+ *
Emergent cost systems	N/A	- *	N/A	+ ns
4. Scope of information				
Environment scanning & forecasting	N/A	- **	N/A	+ ns
Non-financial performance measures	N/A	+ ns	N/A	+ *
5. Managerial evaluation & rewards				
Subjective bonus determination	N/A	+ ns	N/A	- *
Benchmarking for comparison	N/A	- ns	N/A	- ns
Long-term, non-financial measures	N/A	- ns	N/A	+ ns
6. Aggregation of information	N/A	- ns	N/A	+ *
7. Timeliness of information	N/A	- ns	N/A	+ ns

N/A = Not hypothesised/research question; ns. = Not significant; * $P < 0.05$; ** $P < 0.01$

This is also consistent with the literature (e.g., Khandwalla, 1972; Bruns and Waterhouse, 1975) that states that centralisation (formal authority) permits management to co-ordinate and control various organisational activities, thus placing less reliance on MCS compared with decentralised organisation.

The results in Table 9.3 also indicate that the structural dimension of formalisation has a significant positive effect on MCS attributes of budgetary importance, interactive budgetary usage, non-financial performance measures, and aggregation of information and a significant negative effect on using subjective criteria for bonus determination. These significant results suggest that formalised organisations seems to place more importance on budgets and use them interactively rather than diagnostically to reduce uncertainties in their business environment and signal any changes that may distracts their operations. In addition, these results also suggest that formalisation must be complemented with non-financial performance measures in order to deal with its negative effects. This is consistent with Agarwal (1999, p.363) argument that using non-financial performance measures is expected to reduce the negative effect of formalisation by increasing managers' flexibility to do what they deem appropriate to meet the specified goals, and in turn, increase their felt responsibilities and organisational commitment.

9.2.2 Implications of MCS fit on organisational effectiveness

Unlike previous MC contingency research that assumed a unidirectional direct link between MCS and organisational effectiveness, this study employed the systems approach of fit to achieve the third research objective concerned with examining the patterns of consistency among dimensions of PEU, strategy, structure and MCS and organisational effectiveness. Thus, consistent with the systems approach of fit, this study assumes that any one dimension is insufficient for achieving organisational effectiveness and that organisations that pay consistent attention to the internal consistency between PEU, business strategy, structure and MCS attributes will be more effective. Higher or second-order factor analysis in SEM was performed to test the systems approach as recommended by Venkatraman (1989 and 1990). The results of this analysis were presented in Chapter 8, Section 8.5 and the major findings are summarised in the following paragraphs.

The results from this analysis indicate that attaching higher importance to achieving budgetary targets and using objective formula-based criteria for bonus determination contribute to organisational effectiveness in organisations that formalise their activities and adopt a low-cost strategy rather than differentiation strategy (see Sub-sections 8.5.1 and 8.5.5 respectively). These results are consistent with the findings of earlier contingency studies (Miles and Snow, 1978; Porter, 1980; Govidarajan and Gupta, 1985; Govindarajan, 1988).

The results also indicate that MCS attributes of interactive budgetary usage, cost control systems, broad scope information, aggregation and timeliness of information contribute to organisational effectiveness in organisations that formalise their structures and employ a low-cost or differentiation strategy (see Sub-sections 8.5.2, 8.5.3, 8.5.4, 8.5.6 and 8.5.7 respectively). These results confirm some of the findings that have emerged from the first stage of analysis discussed earlier and provide additional insights regarding the use of cost control systems and non-financial performance measures. Consistent with Chenhall and Langfield-Smith (1998), the results suggest that both dimensions of cost control systems (traditional and emergent or advanced systems such as activity-based and target costing techniques) can be effective when used in combination thus redressing the shortcomings of each other. In addition, the findings that non-financial performance measures contribute to effectiveness with both business strategies are consistent with the line of argument that complementing financial with non-financial performance measures is required for all organisations to achieve organisational effectiveness (Tricker and Boland, 1982; Govindarajan and Gupta, 1985). Not adopting a systems approach to fit in this study would have resulted in concluding that using non-financial measures and cost control systems are not related to business strategy based on the insignificant results obtained in the first stage of analysis. The implications of the research findings to theory and practice are discussed next.

9.2.3 Implications of research findings for future research

The findings of this study raise several important implications for MC contingency researchers and practitioners. From a methodological point of view, the results of this study indicated that PEU, business strategy, structure and MCS constructs are multidimensional and therefore associated with each other in varying degrees. Thus, researchers studying these constructs should not simply conduct a reliability analysis of scale items but also they should demonstrate through factor analysis that the items load on one dimension prior to aggregating the items into a single scale. Various aspects of these abstract constructs may be more important under different economic and industrial contexts. Sharma (2002) argued that researchers are required to develop and refine constructs used in their studies prior to conducting their analysis. This is considered imperative in order to unravel some of the contradictory results found in MC contingency studies. The present study supports and provides further evidence for this argument.

For instance, the results that emerged from the measurement model analysis conducted in this study (discussed in Chapter 7) indicated that PEU is a multidimensional rather than a unidimensional construct, even though the latter has been widely used in earlier MC contingency studies. Each dimension of PEU was found to have different relationships with other constructs incorporated in the research model. For example, PEU-operations was found to have a significant positive relationship with differentiation strategy (as were hypothesised) but an inverse relationship was observed between PEU-regulations and differentiation strategy. In addition, PEU dimensions were found to have different effects on MCS attributes. Thus, if this study aggregated the items of PEU in one scale without verifying the construct validity and unidimensionality through factor analysis, the resulting scale would have passed the reliability assessment test. However, only weak relationships between PEU, business strategy and MCS attributes would have been reported.

Also given the multidimensional nature of business strategy (Miles and Snow, 1978; Porter, 1980), this study has considered business strategy as a multidimensional construct consisting of two separate dimensions that emerged from the measurement model analysis representing differentiation strategy and low-cost strategy. This is different from previous MC contingency studies that have typically measured strategy along a simple continuum where high scores indicated a differentiation or prospector strategy and low scores indicated a low cost or defender strategy (e.g., Govindarajan, 1988; Govindarajan, 1990; Van der Stede, 2000; Abernethy and Brownell, 1999; Chong and Chong; 1997). Although, this simple continuum is a useful indicator of business strategy, it misses the multidimensional nature of strategic choices because a low score on differentiation does not necessarily imply a high score on low-cost strategy. Thus, earlier MC contingency studies that have measured business strategy along a continuum were mainly investigating one dimension of business strategy (differentiation) rather than multiple dimensions (differentiation and low-cost strategy), thus, providing little evidence on the differential effects of business strategy on MCS design. Thus, future MC contingency researchers considering the multidimensional nature of business strategy and other constructs incorporated in their models would provide clearer results that would enhance understanding of effective MCS design.

Moreover, organisational structure was also examined in this study as a multidimensional construct consisting of two structural dimensions, centralisation and formalisation. Each structural dimension was found to have different relationships with other constructs in the research model. For instance, whereas centralisation was negatively associated with MCS attributes of emergent cost control systems and scanning and forecasting, formalisation was positively associated with most MCS attributes investigated in this study. In addition, these structural dimensions were not significantly correlated with each other. Thus, the operationalisation of the organic and mechanistic continuum through centralisation and formalisation in this study, as were used in other MC contingency studies (e.g., Gordon and Narayanan, 1984) is inadequate as these structural dimensions do not act as a proxy for organic and mechanistic organisations. Thus, future MC researchers incorporating organisational structure in their models must consider the multidimensional nature of this construct and the differential effects of different structural dimensions on MCS design.

This study also calls for increased scientific rigor in MC contingency research by implementing SEM for assessing constructs unidimensionality and validity. The study provides researchers with detailed procedures for testing construct validity and control measurement error that should provide a greater level of confidence in respect of future research. It also provides some guidance for future researchers regarding the evaluation and implementation of SEM. Also the study provides future MC researchers with broader conceptualisation of MCS which they can use and develop further in their studies so that broader view of MCS design can be achieved.

This study also raises another important implication relating to the different approaches of fit conceptualised in MC contingency studies. This study has used multiple approaches of fit, the bivariate approach and the systems approach to fit. This is consistent with Van de Ven and Drazin (1985, pp. 358-359) recommendation that:

> Studies should be designed to permit comparative evaluation of as many forms of fit as possible... and examining multiple approaches to fit in contingency studies and relating the findings to unique sample characteristics can greatly aid the development of mid-range theories.

Specifically, the use of multiple approaches to fit in this study has yielded useful insights and complementary results that could not have been derived if sole reliance was placed on either one of the approaches. As noted earlier, the results were not consistent across the two approaches. The results of the bivariate approach discussed in subsection 9.2.1 did not find significant relationships between business strategy and several MCS attributes including the importance of meeting budgetary targets, cost control systems, non-financial performance measures, bonus determination and aggregation of information. In contrast, the findings derived from the systems approach discussed in sub-section 9.2.2 supported these associations. Thus, sole reliance on the bivariate analysis might have led to the incorrect conclusion that business strategy has no association with these variables. In addition, the bivariate approach detected that PEU dimensions have significant effects on business strategy and on other MCS attributes discussed earlier in sub-section 9.2.1. Such results could not have been reached from a sole reliance on the systems approach. Thus, the bivariate and systems approaches should be used in a complementary manner in future research to enhance knowledge on MCS design. Also, the inconsistent and different results derived from the two approaches to fit shed some light on the seemingly contradictory results obtained from earlier MC contingency studies. Comparing the findings of the different MC contingency studies that have adopted different approaches to fit results in contradictory findings. Thus, some of the confusion in MC contingency findings may be attributable to not acknowledging the different approaches to fit employed in these studies.

Finally, this study has some useful practical implications not only for those responsible for MCS design, but also for senior managers in medium and large UK manufacturing companies. It provides senior managers responsible for the design of MCS with an increased understanding of organisational processes and key factors that must be considered for designing effective MCS. In view of the results of this study, it can be suggested that internally consistent, concurrent efforts by medium and large manufacturing firms to enhance their strategic orientation, formalise their structures and provide managers with relevant MC information in a timely manner may contribute to higher organisational effectiveness and survival.

9.3 Limitations and further directions for future research

Part of the strength of any research project lies in the recognition of its limitations. As with any research, this research is also subject to a number of limitations that warrant further discussion. These limitations present opportunities for future research. First, the findings of this study exclusively pertain to medium and large manufacturing organisations operating in the UK. Drury (2000) discuss that the design and use of MCS may differ by industry type and organisational size. Thus, the results of this study may not be generalisable to small manufacturing organisations or to other organisations operating in other industries such as services or retail. Future research will have to reveal whether the results are generalisable for small manufacturing organisations or other organisations operating in non-manufacturing industries. Also because the sample of manufacturing companies was drawn from the UK, the generalisability of the findings of this study over other national settings may not be valid. Thus, future research should attempt to replicate this study in other countries. Also this study is one of first in MC contingency literature to incorporate PEU, business strategy and the structural dimensions of centralisation and formalisation in one model and to investigate their effect simultaneously on MCS design. Thus, it is recognised that the only way to validate the findings of this study is by a process of replication. This provides another avenue for future research.

Second, as in any cross sectional surveys, this study has also encountered the common limitations of such methodology. Despite the advantages offered by the SEM method to test causality between research constructs as implied in the research model, these causal interpretations must be treated with caution due to the cross-sectional nature of this research. Thus, it is not possible to draw any firm conclusions about the directions of causality or rule out the possibility that causality operates in the opposite direction. It is possible for example that business strategy is antecedent of PEU (Fisher and Govindarajan, 1993; Chong and Chong, 1997). Smith and Langfield-Smith (2002) point out that causality can only be inferred in experimental designs, which allow manipulation of variables to produce effects on dependent variables, or time-series analysis where causes clearly precede effects in time.

Third, although this research has adopted a wider research model than previous contingency studies by incorporating multiple contextual variables, multiple dimensions of MCS and organisational effectiveness, model misspecification is still a concern[3]. The level of variance explained by the contextual variables in this study suggest the presence of other contextual variables that may have implications for MCS design and contribute to the interpretation of the findings. Some of the contextual variables that were not incorporated in the research model for manageability purposes include organisational size, culture and managerial style. Investigating the implications of these variables and other contextual variables on MCS design opens important avenues for future research.

Finally, another potential limitation relates to the fact that this research has investigated only formal MCS neglecting other informal control systems. It is well known that informal control systems can also play an important role in organisational control and it seems plausible that these systems have different roles in firms employing different strategies and facing different uncertainties in their environments. Thus, it is not possible to determine the interrelationships between such systems and formal MCS and the contextual variables. Addressing this limitation presents another opportunity for future research, and would shed some light on the findings of this study particularly those pertaining to the insignificant relationships of PEU and MCS attributes.

Despite the above limitations, this study is one of the first to examine empirically the relations between PEU, business strategy, structure and MCS design simultaneously, and to examine their fit or coalignment impact on organisational effectiveness. Also, this study is one of the first to utilise structural equation modeling in MC contingency research. It therefore has added to the limited body of knowledge in this area and has managed to fill some gaps in the existing MC contingency literature. This study also contributes to the body of knowledge by providing some guidance for future MC contingency researchers to implement SEM method for its great potentials for testing theories, controlling measurement error and validating research constructs. It is hoped that this research will motivate researchers to undertake further rigorous systematic studies in the area of MCS design in order to unravel some of the complexities of this important area of research.

[3] It should be noted here that SEM (used in this research) "assumes a closed system, namely that the variables that are important are included in the model. In other words, no other variables should by its inclusion change any of the paths of the model" (Maruyama, 1998, p.119).

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APPENDICES

University of
HUDDERSFIELD

Management control systems in UK manufacturing companies
(with special emphasis on factors influencing their effective design)

Questionnaire Survey

Dear participant:

Your response is extremely important to the success of this study and will be treated as "**strictly confidential**". The information shown in the top right hand corner will be used only to identify who has returned the questionnaire. It will not be disclosed to third parties under any circumstances. Please answer the questionnaire from the perspective of the business unit that most clearly defines where you work (e.g. a head office of a divisionalised company, a division of a divisionalised company, a non-divisionalised company, etc). Also please note that we have written these questions to be applicable to many types of businesses and not exactly apply to your situation. Never the less, please answer **all questions** as best as you can. However, if you are certain that your response would be misleading, please leave the specific question unanswered. When you have completed the questionnaire please return it in the enclosed addressed postage-paid envelope.

Thank you very much for your help and co-operation.

Professor Colin Drury
Huddersfield University Business School
Department of Accountancy and Finance
Queensgate
Huddersfield
HD1 3DH
E-mail: c.j.drury@hud.ac.uk
Tel. 01484 472840

Mr M A Dahiyat
Huddersfield University Business School
Department of Accountancy and Finance
Queensgate
Huddersfield
HD1 3DH
E-mail: m.dahiyat@hud.ac.uk
Tel. 01484 473794

SECTION A: ABOUT MANAGEMENT CONTROL SYSTEMS IN YOUR BUSINESS UNIT

Part 1. *The statements in this part relate to the budgetary control practices in your business unit. Using the scale below, please indicate the extent to which you agree or disagree with the statements by circling the appropriate number for each statement.*

Strongly disagree	Disagree	Slightly disagree	Neutral	Slightly agree	Agree	Strongly Agree
1	2	3	4	5	6	7

Budgetary practices							
A1. Changes to budget targets are made frequently within the annual budget year	1	2	3	4	5	6	7
A2. Changes to the budget targets require formal approval	1	2	3	4	5	6	7
A3. Budget revisions are allowed only in exceptional circumstances	1	2	3	4	5	6	7
A4. Meeting budget targets is of overriding importance	1	2	3	4	5	6	7
A5. Significant variances require written explanations	1	2	3	4	5	6	7
A6. Senior management normally sets the budget for lower levels	1	2	3	4	5	6	7
A7. Budgets are primarily considered to be a short-term planning tool rather than a tool for monitoring and controlling behaviour	1	2	3	4	5	6	7
A8. Budget variances are tolerated and used for learning and debating ongoing plans and actions	1	2	3	4	5	6	7
A9. The targets set within the budgets are extremely difficult for managers to achieve	1	2	3	4	5	6	7

Part 2. *Budgets can serve a variety of purposes. Using the scale below, please indicate the extent to which budgets are used in your business unit for each of the purposes specified below by circling the appropriate number.*

Not used At all			Used to a moderate extent			Used to a very high extent
1	2	3	4	5	6	7

Budgetary usage							
A10. Planning annual operations	1	2	3	4	5	6	7
A11. Co-ordinating activities of the various parts of business unit	1	2	3	4	5	6	7
A12. Communicating plans to managers	1	2	3	4	5	6	7
A13. Motivating managers to strive to achieve the targets	1	2	3	4	5	6	7
A14. A control device to control the activities of the business unit	1	2	3	4	5	6	7
A15. A mechanism for judging and evaluating managerial performance	1	2	3	4	5	6	7

Part 3. *Using the preceding scale used for part 2 above, please indicate the extent to which each of the following cost control practices are used in your business unit.*

Cost control							
A16. Use of cost centres for cost control	1	2	3	4	5	6	7
A17. Cost control by establishing standard costs and analysing variances	1	2	3	4	5	6	7
A18. Activity-based cost management	1	2	3	4	5	6	7
A19. Target costing	1	2	3	4	5	6	7
A20. Other (please specify)________________	1	2	3	4	5	6	7

Part 4. ***Using the scale below, please indicate the extent to which each of the following types of data are incorporated within periodic planning or control reports provided to middle and senior managers in your business unit, by circling one number for each statement.***

Not At all			To a moderate extent			To a considerable extent
1	2	3	4	5	6	7

Environmental scanning

A21. External data on opportunities and threats (e.g. data on competitors' actions, government regulations, emerging markets, shifts in the economy etc.)	1	2	3	4	5	6	7
A22. Forecasted external non-financial data (e.g. forecasts of market-demand, government regulations, competitors' actions, etc.)	1	2	3	4	5	6	7

Note: For the purpose of question A22, forecasts are defined as quantitative predictions about events where the influence of the business unit is limited

Non-financial performance measures

A23. Internal efficiency measures (e.g. Number or percentage measures relating to throughput time, inventory turnover, scrap/rework rates, frequency of late deliveries, etc.)	1	2	3	4	5	6	7
A24. Customer measures (e.g. Number or percentage measures relating to customer complaints, customer response times, sales returns, late deliveries, market shares etc.)	1	2	3	4	5	6	7
A25. Innovation and learning measures (e.g. Number or percentage measures relating to employee suggestions, new patents, new products, time to the market for new products etc.)	1	2	3	4	5	6	7
A26. Other non-financial measures (please specify) ________________	1	2	3	4	5	6	7

A27. ***Please rank in order of importance the measures listed in questions A23-A26, by inserting 1 to the most important, 2 to the next most important etc.***

Efficiency measures ____ Customer measures____ Innovation measures____ Other ____

Part 5. ***The questions in this part relate to managerial performance evaluation and incentives in your business unit.***
(In each of the following scales, please circle the appropriate number which best describes control practices in your business unit)

A28. ***For the purpose of evaluating managerial performance, please indicate the relative emphasis that is given to internal standards (e.g. comparison with budgets or performance of the previous year) compared with external standards (e.g. benchmarking with competitors or other divisions within the organisation) in your business unit.***

Benchmark for comparison

Exclusive emphasis is given to comparisons with internal standards	Significantly more emphasis is given to internal standards	Slightly more emphasis is given to internal standards	About the same emphasis is given to both standards	Slightly more emphasis is given to external standards	Significantly more emphasis is given to external standards	Exclusive emphasis is given to comparisons with external standards
1	2	3	4	5	6	7

A29. ***For the purpose of determining the amount of managerial bonuses, please indicate the relative emphasis that is given to objective criteria (i.e. based on strict formula criteria such as a % of business operating profit or meeting a target return on investment) compared with subjective criteria (i.e. based on superiors' judgement or discretion).***

Bonus Determination

Exclusive emphasis is given to objective criteria	Significantly more emphasis is given to objective criteria	Slightly more emphasis is given to objective criteria	About the same emphasis is given to both criteria	Slightly more emphasis is given to subjective criteria	Significantly more emphasis is given to subjective criteria	Exclusive emphasis is given to subjective criteria
1	2	3	4	5	6	7

A30. ***With regard to the performance criteria that are used to determine managerial bonuses, please indicate the relative emphasis that is given to short-term financial criteria (e.g. profits, return on equity, return on investment etc.) compared with long-term non-financial criteria (e.g. product development, market development, market share etc).***

Performance evaluation criteria

Exclusive emphasis is given to short-term financial criteria	Significantly more emphasis is given to short-term financial criteria	Slightly more emphasis is given to short-term financial criteria	About the same emphasis is given to both types of criteria	Slightly more emphasis is given to longer term non-financial criteria	Significantly more emphasis is given to longer term non-financial criteria	Exclusive emphasis is given to longer term non-financial criteria
1	2	3	4	5	6	7

Part 6. ***Control information can either be presented to senior managers, or can be extracted on-line, in different formats, levels of aggregation and reporting frequencies. Using the scale below, please indicate the extent to which you agree or disagree with each of the following statements, relating to the presentation and reporting control information to senior managers in your business unit (please circle one number for each statement).***

Strongly disagree	Disagree	Slightly disagree	Neutral	Slightly Agree	Agree	Strongly agree
1	2	3	4	5	6	7

Presentation of information

A31. Information provided in formats that enables senior managers to conduct 'what-if-analysis' (i.e. sensitivity analysis)	1	2	3	4	5	6	7
A32. Information available in formats that enable senior managers to distinguish between fixed and variable costs	1	2	3	4	5	6	7
A33. Information in formats that enable senior managers to distinguish between variances that are controllable and those that are uncontrollable by their subordinate managers	1	2	3	4	5	6	7
A34. Information available in formats to enable senior managers to evaluate and compare performance across different areas of business (e.g. across responsibility centres that are headed by subordinate managers who report directly to senior managers)	1	2	3	4	5	6	7
A35. Information provided in formats to enable senior managers to compare their area of responsibility with similar units in the industry (e.g. market share, profits, product attributes, prices, costs, etc.)	1	2	3	4	5	6	7
A36. Information provided on fluctuations (trends) in performance across different time periods (e.g. weekly, monthly, quarterly etc.)	1	2	3	4	5	6	7
A37. In general, a considerable amount of information is analysed and available in various formats to enable senior managers to evaluate and monitor key activities of the business unit	1	2	3	4	5	6	7

Timeliness and frequency of reporting

A38. Relevant information requested by senior managers to enable them to monitor and control activities is available immediately upon request	1	2	3	4	5	6	7
A39. Relevant information is provided automatically (on line) to senior managers upon its receipt into information systems or as soon as processing is completed	1	2	3	4	5	6	7
A40. There is no delay between the occurrence of an environmental event (e.g., shifts in the economy, competitors' actions, market demand, etc.) and reporting it to senior managers	1	2	3	4	5	6	7

A41. ***Please circle the appropriate number in the scale below to indicate how frequently management control reports are provided to senior managers in respect to those activities that is under their control.***

Infrequently (e.g. quarterly or longer)			Frequently (e.g. monthly)			Very frequently (e.g. daily)
1	2	3	4	5	6	7

A42. ***Please circle the appropriate number in the scale below to indicate how customised are management control reports that are provided to senior managers in your business unit.***

Not customised-standardised throughout the organisation			A small element of customisation			Highly customised to meet individual requirements
1	2	3	4	5	6	7

SECTION B: ABOUT YOUR BUSINESS UNIT

Part 1. ***The following general questions help us to categorise your business unit by type and activities. For each question, please either tick the appropriate box or write your answer in the space provided.***

B1. Please specify the approximate number of employees (full-time equivalents) currently employed in your business unit -------- employees

B2. Please specify the approximate annual sales turnover for your business unit for the last financial year £ -------million

B3. Please estimate the approximate annual average percentage of sales revenue that was derived from new products introduced during the last 3years -------- %

B4. In what type of business/industry is your company engaged? (please be specific: e.g. steel manufacturing) ------------------------------

Part 2. ***The following statements help us to develop a greater understanding of your business unit type. Using the scale below, please indicate for each item your estimate of the position of your business unit relative to its leading competitors in the following areas (please circle one number for each statement).***

Considerably lower 1	Lower 2	Slightly lower 3	About the same 4	Slightly higher 5	Higher 6	Considerably higher 7

B5. Product selling prices	1	2	3	4	5	6	7
B6. Manufacturing costs	1	2	3	4	5	6	7
B7. Average annual percentage of sales expenditure on R&D	1	2	3	4	5	6	7
B8. Product quality	1	2	3	4	5	6	7
B9. Brand image	1	2	3	4	5	6	7
B10.Product features	1	2	3	4	5	6	7

Part 3. ***The following statements describe three organisational types commonly observed in practice. Please select one type (A, B or C) that you believe most closely describes your business unit compared to others in the industry within which your unit operates. Please consider your business unit as a whole and note that the three types specified are generic and may not exactly represent your business unit. None of these types is inherently "good" or "bad".***

☐ **Type A:**

This type of organisation attempts to locate and maintain a secure niche in a relatively stable product or service area. The organisation tends to offer a more limited range of products or services than its competitors, and it tries to protect its domain by offering higher quality, superior service, lower prices, and so forth. Often this type of organisation is not at the forefront of developments in the industry, but concentrates instead on doing the best job possible in its market.

☐ **Type B:**

This type of organisation typically operates within a broad product-market domain that undergoes periodic redefinition. The organisation values being "first in" in new product and market areas even if not all these efforts prove to be highly profitable. The organisation responds rapidly to early signals concerning areas of opportunity, and these responses often lead to a new round of competitive actions.

☐ **Type C:**

This type of organisation attempts to maintain a stable, limited line of products or services, while at the same time tries to move out quickly to follow a carefully selected set of the more promising new developments in the industry. The organisation is seldom "first in" with new products or services. However, by carefully monitoring the actions of major competitors in areas compatible with its stable product-market base, the organisation can frequently be "second in" with a more cost-efficient product or service.

SECTION C: ABOUT YOUR INDUSTRY ENVIRONMENT

The following statements describe some of the factors that are constantly in the process of changing in the external environment. Using the scale below, for each factor, please circle the number that corresponds to the predictability or unpredictability of the rate of change within your business unit.

Highly Predictable rate of change	Fairly predictable	Slightly predictable	Neutral	Slightly unpredictable	Fairly unpredictable	Highly unpredictable rate of change
1	2	3	4	5	6	7

Cl Manufacturing technology	1	2	3	4	5	6	7
C2. Competitors' actions	1	2	3	4	5	6	7
C3. Customers' demand and taste	1	2	3	4	5	6	7
C4. Product attributes/design	1	2	3	4	5	6	7
C5. Raw material availability	1	2	3	4	5	6	7
C6. Labour union actions	1	2	3	4	5	6	7
C7. Government regulation	1	2	3	4	5	6	7

SECTION D: ABOUT YOUR BUSINESS UNIT INTERNAL ENVIRONMENT.

The statements in this section relate to the operating internal environment of your business unit. Using the scale below, please circle the appropriate response relating to the extent to which you agree or disagree with each of the following statements. Please note if any of the decisions specified in questions D1 - D6 are not applicable to your business unit enter the term 'not applicable' next to the question number.

Strongly disagree	Disagree	Slightly disagree	Neutral	Slightly agree	Agree	Strongly agree
1	2	3	4	5	6	7

D1. New product introduction decisions are made only at the highest management level	1	2	3	4	5	6	7
D2. Apart from minor investments, capital budgeting decisions are usually made only at the top management level	1	2	3	4	5	6	7
D3. Pricing policies are set only by top management	1	2	3	4	5	6	7
D4. Decisions to attempt penetration into new markets generally are made only by top management	1	2	3	4	5	6	7
D5. Decisions on major changes to (including new introduction of) manufacturing processes are made only at the top management level	1	2	3	4	5	6	7
D6. Personnel policy decisions are usually made by top management	1	2	3	4	5	6	7
D7. Rules and procedures in your business unit are very clearly documented.	1	2	3	4	5	6	7
D8. There is always an extensive reliance on rules and procedures to meet operating emergencies	1	2	3	4	5	6	7
D9. Violation of the documented procedures is not tolerated.	1	2	3	4	5	6	7

SECTION E: ABOUT YOUR BUSINESS UNIT PERFORMANCE

For each of the dimensions listed below, please indicate (i) how important you perceive each is in determining the success of your business unit as a whole and (ii) how well you perceive your business unit actually performed over the last three years relative to your competitors. Using the scales below, please circle the most appropriate responses respectively for (i) importance and (ii) performance for each of items E1 to E8.

	i) Importance							ii) Performance						
	Not Important		Uncertain			Vitally important		Poor			Average		Outstanding	
E1. Cash flow	1	2	3	4	5	6	7	1	2	3	4	5	6	7
E2. Market share	1	2	3	4	5	6	7	1	2	3	4	5	6	7
E3. Return on investment	1	2	3	4	5	6	7	1	2	3	4	5	6	7
E4. New product development	1	2	3	4	5	6	7	1	2	3	4	5	6	7
E5. Market development	1	2	3	4	5	6	7	1	2	3	4	5	6	7
E6. Cost reduction	1	2	3	4	5	6	7	1	2	3	4	5	6	7
E7. Research and development	1	2	3	4	5	6	7	1	2	3	4	5	6	7
E8. Personnel development	1	2	3	4	5	6	7	1	2	3	4	5	6	7

E9. Using the right hand scale above, please indicate the overall performance of your business unit compared to your competitors over the last three years.	1	2	3	4	5	6	7

SECTION F: QUESTIONS ABOUT YOURSELF

The following questions are designed to enable us to classify your answers. We reiterate that all information you provide is strictly CONFIDENTIAL and any information identifying the respondent will not be disclosed under any circumstances.

F1. Where are you located in the organisational structure? (Please tick one box)

☐ at group head office ☐ at divisional head office

☐ at an operating unit ☐ not applicable, no group structure

F2. Please insert your job title/position: -------------------------------

F3. How many years have you been in this current position? ----------- years

F4. Approximately, how many years of working experience do you have? ---------- years
(including experience prior to joining this business unit)

F5. Please indicate the level of your confidence in responding to the questions of this survey (circle one number in the scale).

Low Confidence level *1 2 3 4 5 6 7* ***High confidence level***

F6. Please check the label on the front of the questionnaire and ensure that your correct name, job title and company name and address is shown. Also please provide us with the following information which will only be used, in exceptional circumstances, to contact you directly in the event of a query.

Your E-mail .... Your telephone number ....

F7. Would it be possible for a short meeting to be arranged to discuss some of the issues raised by this questionnaire?

Meeting possible [ ] Meeting not possible [ ]

F8. Please tick the box if you want a copy of the aggregated results of this study ☐

No More Questions. ***Thank you for your assistance in completing this questionnaire. We would appreciate any comments or suggestions you may care to make about any subject mentioned in the questionnaire. You may use the space below, or use a separate sheet and return it with the completed questionnaire or separately***

Please use the enclosed addressed and prepaid envelope to return the questionnaire.

Appendix B: Questionnaire Covering Letter

University of
HUDDERSFIELD

Date:

Dear Mr

We are currently undertaking a research project at Huddersfield University Business school, which is also a major part of PhD dissertation of the second author. The project aims to study best practices in management control systems design, and determine the factors that influence their effectiveness in UK manufacturing companies. The importance of this research topic has been recognised by the Chartered Institute of Management Accountants, and by recent reports published by the National Statistics Office and the Confederation of British Industry. These reports revealed that manufacturing profitability in the UK had fallen to its lowest level in nearly a decade, and emphasised the need to implement better management techniques and practices, including the effective design of management control systems in order to gain a competitive edge in the market place.

Your name and your organisation is one of a small sample chosen to participate in our study. It was selected randomly from the entire population of UK manufacturing companies published by CIMA. The success of this study is dependent on obtaining high response rate from all organisations selected for this study. High response rate would enable us to use the appropriate analytical techniques, and the results will truly represent the whole manufacturing industry in the UK. Thus your participation by completing the enclosed questionnaire is extremely important. We undertake to assure you that all information provided by you will be used for academic purposes only and will be treated as "strictly confidential". Your name or your organisation will not be released under any circumstances, and the results will only be reported in aggregate form within summarised tabulations. If you desire, we will send you a report of our findings.

Finally, we'd like to reiterate that your participation in this study by completing the enclosed questionnaire is crucial for the success of this study, for the validity of its results and for the early completion of the Ph.D. dissertation. Thus, please do not neglect this letter, and complete the questionnaire and return it in the enclosed addressed, postage-paid envelope as soon as possible. Thanking you for your help and co-operation, and looking forward to receiving your response. In the mean time, if you have any question, please do not hesitate to contact either of us on one of the numbers listed below.

Yours Sincerely,

Professor Colin Drury ACMA, BA, MBA
Tel: 01484-2299 (direct) 01484 472840 (secretary)
E-mail: c.j.drury@hud.ac.uk

Mr. M. A. Dahiyat BA, MBA, Ph.D Candidate
Tel: 01484-473794
E-mail: m.dahiyat@hud.ac.uk

Appendix C: Questionnaire Reminder Letter

University of
HUDDERSFIELD

Date:

Dear

About four weeks ago, we sent you a letter requesting your participation in a research project to study best practices in management control systems design, and the factors that influence their effectiveness in UK manufacturing companies.

We realise that your busy schedule may have delayed your response to completing the questionnaire that was enclosed with the letter. However, we are writing to you again because of the significance of your participation to the successful completion of this study. Also your prompt response will facilitate the completion of Mr. Dahiyat's PhD dissertation, of which this study is a part.

As mentioned in our earlier letter, we assure you that any information provided by you will be treated with utmost confidence, as only aggregate results will be reported. There will be no linking of the individual responses, or the firm's name, to the published results and we undertake to ensure the confidentiality of all information received.

Your contribution to the success of this study and the completion of the PhD dissertation is greatly appreciated. We look forward to receiving your completed questionnaire preferably by the end of April if possible. If by some chance you did not receive the questionnaire, or misplaced it, please call either of us and we will gladly send you another one. Alternatively, you can obtain a printed copy from the website (http://www.hud.ac.uk/schools/hubs/mcssurvey.doc).

Yours Sincerely,

Colin Drury
Professor of accounting and Finance
Tel: 01484-472299 (direct) 01484 472840 (secretary)
E-mail: c.j.drury@hud.ac.uk

Mohamad Dahiyat
PhD Candidate
Tel: 01484-473794
E-mail: m.dahiyat@hud.ac.uk