BUDGETING SYSTEM STYLE OF USE, ORGANISATIONAL CULTURE AND COMPETITIVE ADVANTAGE IN HYPERCOMPETITIVE ENVIRONMENTS

A thesis submitted for the degree of

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By

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CERTIFICATE OF AUTHORSHIP / ORIGINALITY

I certify that the work in this thesis has not previously been submitted for a degree, nor has it been submitted as part of the requirements for a degree except as fully acknowledged within the text.

I also certify that the thesis has been written by me. Any help that I have received in my research work and the preparation of the thesis itself has been acknowledged. In addition, I certify that all information sources and literature used are indicated in the thesis.

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Matthew Peters

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ABSTRACT

Hypercompetitive environments have become more pervasive. This thesis addresses a gap in the literature by examining the effective use of budgeting systems and flexibility traits of organizational culture in hypercompetitive environments. Interactive use of budgeting systems has been positively linked to firm performance in 'high uncertainty' environments, but not hypercompetitive environments, which have greater intensity and unpredictability of change. Also, flexibility traits of organisational culture have been linked to firm performance in hypercompetitive settings, and to interactive use of management control systems in general.

Highly interactive budgeting systems have very frequent top management involvement driving intensive strategy reformulation. To examine the effective style of use of budgeting systems for hypercompetitive conditions, the frequency and intensity of interactive use were hypothesised to be two formative sub-dimensions of budgeting system style of use. Also, flexibility values of organisational culture were hypothesised as antecedent to these two interactive control sub-dimensions. The hypotheses predicted differing relationships between these constructs in hypercompetitive and moderately competitive environments.

A cross-sectional mail and web-based survey yielded 331 usable responses (a 31.1% response rate), with 32 firms in hypercompetitive environments, 259 firms in moderately competitive environments and 40 firms in stable environments. PLS structural equation modelling was used to test the theoretical model. Sub-group modelling based on the three categories of market competition was the main approach used to assess moderating effects.

Only partial support for the hypotheses was found. The predicted relationships between the two interactive control sub-dimensions were not supported, affirming the latent conceptualisation of interactive control in the extant literature. Market competition was found to positively moderate the effect of interactive budgeting system use on firm performance. It was also found that flexibility culture is an important antecedent of interactive budgeting systems use, and market competition positively moderates the effect of flexibility culture on interactive budgeting systems.

Dynamic capabilities theory was used to interpret the relationships, responding to appeals for a more action-oriented view of management control systems, and also providing a new perspective on management control systems and organisational learning. From the theory of dynamic capabilities, a strategically appropriate flexibility culture provides a valuable, rare, non-substitutable and inimitable resource-base, underlying an effective budgeting system capability with an isolating mechanism that confers competitive advantage. This study also contributes improved measurement scales for interactive control, and contributes empirical and theoretical insights to the under-researched organizational culture and management control systems contingency literature.

1.0 CHAPTER ONE - INTRODUCTION

1.1 Background and research questions

In the management control systems literature, structural contingency theory is the dominant research approach (Chapman, 1997; Chenhall, 2003). Budgets are the most pervasively researched form of management control system (Otley, 1999; Hansen and Van der Stede, 2004), and the two most prominent contingencies are environmental uncertainty and business strategy (Chenhall, 2003). Simons' (1990, 1991, 1994, 1995 and 2000) seminal work synthesised these two contingency factors, and offered a perspective on management control systems that transcended many of the general criticisms of structural contingency theory; specifically the concerns that structures are portrayed as static, acquiescent, reactive and passive (Pennings, 1992; Galunic and Eisenhardt, 1994).

Prior to Simons' work, the conventional view held that budgets were inappropriate under conditions of high environmental uncertainty and with high uncertainty business strategies (Ouchi, 1979; Chapman, 1997; Hartmann, 2000). Simons (1990) characterised this perspective as *diagnostic* control: "formal feedback systems used to monitor organizational outcomes and correct deviations from preset standards of performance" (Simons, 1994: 170). When used in a diagnostic style, management control systems are the "prototypical feedback systems used to track variances from preset goals and manage by exception" (Simons, 1994: 170). In contrast, Simons (1990) conceptualised an *interactive* style of use: characterised by recurring, frequent, regular and continual top manager attention to the budgeting system, for the "debate of underlying data, assumptions, and action plans" (Simons, 1991: 50), such that top managers "use the system to personally….involve themselves in the decisions of subordinates" (Simons, 1991: 49).

Using the contingency factors of low and high strategic uncertainty, Simons linked the two styles of use of budgeting systems to competitive advantage. Simons (1990, 1991, and 1994) observed that high-performing firms with high strategic uncertainties used budgets interactively to formulate and implement business strategies. On the other hand, Simons noted that high-performing firms with low levels of strategic uncertainty implemented existing strategies through diagnostic use of budgeting systems.[1] Whereas the interactive style of use contains a

[1] Simons used the term 'profit planning systems' to refer to "financial systems that report planned and actual revenues and expenses for each business by revenue and cost category - examples include annual profit plans or budgets, second-year forecasts, and strategic operating and financial plans" (Simons, 1995: 109). For parsimony, the term 'budgeting system' is used in the present thesis.

strategic choice thematic (Child, 1972), the diagnostic style reflects the static, acquiescent, reactive and passive traditional structural contingency perspective.

The low and high strategic uncertainty conditions described by Simons are typical of the traditional structural contingency model, in which technological and market change are seen as key determinants of the level of innovativeness required by the firm's structure and strategy (Burns and Stalker, 1961; Hage, 1965; Lawrence and Lorsch, 1967; Porter, 1980). However, recent strategic management literature has noted that conditions of more intensive uncertainty readily exist (e.g., Wiggins and Ruefli, 2005), and they require different organisational imperatives (Teece, Pisano and Schuen, 1997). Recognising this point, Chenhall (2003: 138) suggested that there are "rich research opportunities to investigate appropriate MCS design for settings that are uncertain and hostile and also complex". In the organisation studies literature, such conditions have been termed *hypercompetition* (D'Aveni, 1994), and they are posited to differ significantly from the *moderately competitive* conditions traditionally labelled as high strategic uncertainty (Volberda, 1996: 366; Eisenhardt and Martin, 2000).

Hypercompetitive settings challenge most previous conceptualisations of a firm's external environment (D'Aveni, 1994; Hanssen-Bauer and Snow, 1996; Brown and Eisenhardt, 1997 and 1998). In hypercompetitive conditions, existing industry structures may be overturned by technological innovations creating new opportunities (Schumpeter, 1950), such that industries exhibit a perpetual state of change and ferment (Bogner and Barr, 2000: 212). Hypercompetitive markets are characterised by "ambiguous industry structure, blurred boundaries, fluid business models, ambiguous and shifting players, nonlinear and unpredictable change" (Eisenhardt and Martin, 2000: 1115). In contrast, moderately competitive markets are characterised by "stable industry structure, defined boundaries, clear business models, identifiable players, linear and predictable change" (Eisenhardt and Martin, 2000: 1115).

The differing strategic requirements for success in hypercompetitive and moderately competitive conditions have been articulated in dynamic capabilities theory (Teece et al., 1997; Eisenhardt and Martin, 2000). This perspective views firms as heterogeneous bundles of operating capabilities and dynamic capabilities. Operating capabilities permit a firm "to earn a living by producing and selling the same product, on the same scale and to the same customer population" (Winter, 2003: 991). Dynamic capabilities are entrepreneurial processes that change operating capabilities so that they remain effective in changing markets (Teece et al., 1997; Eisenhardt and Martin, 2000). Dynamic capabilities rely on knowledge, and the creation of knowledge requires learning (Teece et al., 1997; Winter, 2000; Eisenhardt and Martin, 2000).

The systematic learning mechanisms that underlie dynamic capabilities are "second order" dynamic capabilities (Zollo and Winter, 2002: 340). Dynamic capabilities theory posits patterns of organisational learning that differ across the two contexts of moderate competition and hypercompetition (Eisenhardt and Martin, 2000). In moderately competitive markets, the emphasis is on variation learning, whilst in hypercompetitive markets the emphasis is instead on experiential learning (Eisenhardt and Martin, 2000). Learning mechanisms for variation learning are typically "complicated, detailed, analytic processes that rely extensively on existing knowledge and linear execution to produce predictable outcomes" (Eisenhardt and Martin, 2000: 1106). In contrast, for hypercompetitive markets, experiential learning is fostered by simple "unstable processes that rely on quickly created new knowledge and iterative execution to produce adaptive, but unpredictable outcomes" (Eisenhardt and Martin, 2000: 1111).

Interactive control also contains an organisational learning perspective. Simons (1991: 52) explained that the interactive and diagnostic styles of use "represent two extremes of a continuum of top management attention", and that the "amount of top management attention directed to a control system" determines the extent of interactive use (Simons, 1991: 49). The top manager uses the system to "guide organizational learning" (Simons, 1991: 50), because "participants throughout the organization respond to the interactive management control process to set agendas to challenge and assess new information" (Simons, 1991: 50). For firms in hypercompetitive market conditions, dynamic capabilities theory suggests that effective top managers would endeavour to adopt a style of budgeting system use that would guide experiential organisational learning. Given the apparent differences between moderately competitive and hypercompetitive settings, presumably such a style of use would be different from that required for promoting variation learning in moderately competitive settings. Thus, the following research question arises:

> ***Research question 1****: what is the most effective style of budgeting system use under hypercompetitive conditions?*

Hypercompetition is posited to be a new paradigm requiring new organizational forms that emphasise flexibility (Illinitch, D'Aveni, and Lewin, 1996; Craig, 1996; Smith and Zeithmal, 1996; Hanssen-Bauer and Snow, 1996). Whilst the hypercompetition literature is silent on the topic of formal control systems such as budgets, Volberda (1996) stressed the importance of the informal control mechanism of organisational culture. Volberda (1996) argued that successful firms in hypercompetitive settings need an organisational culture with dominating norms and values that promote flexibility. Consistent with this proposition, Fey and Denison (2003) found that organisational cultures that greatly valued flexibility were associated with greater firm

effectiveness in hypercompetitive settings (i.e., firms in Russia's highly turbulent transition economy).

In the organisation studies literature, organisational culture is generally seen from two perspectives: a managerially changeable variable or a fixed contextual factor that is largely inherited (Smircich, 1983). Proponents of the latter perspective conceptualise organisational cultures as historically constructed and constrained by inertia (Ouchi, 1979; Hannan and Freeman, 1984; Bloor and Dawson, 1994; Sorensen, 2002). Based on this perspective, proponents of resource-based theory have argued that a strategically appropriate organizational culture provides a source of competitive advantage (Barney, 1986 and 1991; Hambrick, 1987; Hansen and Wernerfelt, 1989; Reed and DeFillippi, 1990). Extending this notion, dynamic capabilities theory predicts that such a valuable, rare, non-substitutable and inimitable resource can be deployed by organisational capabilities – including (second order) dynamic capabilities (Barney, 1991; Teece et al., 1997; Eisenhardt and Martin, 2000; Zollo and Winter, 2002).

From the perspective of resource-based theory, management system packages (such as a budgeting system) are readily available in factor markets, and therefore by themselves cannot be a source of competitive advantage (Barney, 1991 and 2001). However, while numerous firms may possess a budgeting system, not all firms have an organisational culture that provides the social complexity for fully exploiting the technology (Wilkins, 1989; Barney, 1991). The dynamic capability and resource-based theories indicate that the performance effects of an effective second order dynamic capability of budgeting systems style of use might be facilitated by an underlying resource-base of an appropriate organizational culture (Barney, 1986 and 1991; O'Reilly and Chatman, 1996; Zollo and Winter, 2002). In particular, an organizational culture with high flexibility values might provide the social complexity (Teece et al., 1997; Barney, 1991; Makhija and Ganesh, 1997) required for organisational communication processes required for using a budgeting system in the style that promotes experiential learning in hypercompetitive settings.

In the management control systems literature, organisational culture is viewed as an important informal control mechanism (e.g., Flamholtz et al., 1985; Dent, 1991; Bhimani, 2003) that controls behaviour through a collective normative order rather than through explicit formal measures (Ouchi, 1979; O'Reilly and Chatman, 1996). Reflecting structural contingency theory and the organic organisational form (Burns and Stalker, 1961), most theoretical arguments in the management control systems literature are oriented by Ouchi's (1979) formal-informal dichotomy (e.g., Flamholtz et al., 1985; Birnberg and Snodgrass, 1988; Abernethy and Brownell, 1997). Premised on a diagnostic style of use, it is expected that organisational culture

will replace reliance on formal control systems rather than change the way that they are used (e.g., interactively). Additionally, the operationalisation of organisational culture has little engagement with the flexibility needed in highly uncertain and hypercompetitive contexts (Volberda, 1996 and 1998). One major exception to these two issues is a study by Henri (2006a).

Henri (2006a) found that firms with cultures that valued 'flexibility' (e.g., spontaneity, change, openness, adaptability and responsiveness) used performance measurement systems 'interactively' (to focus organisational attention, support strategic decision-making, and to legitimise actions). Although Simons (1994: 170) explicitly excluded "organizational culture" from the diagnostic-interactive concepts, as noted by Chenhall (2003: 131), the interactive style of use has an embedded informal control theme of flexible communication. Flexibility values promote "open and lateral channels of communication, and free flow of information" (Henri, 2006a: 80), which is highly consistent with the view that interactive control "generate(s) dialogue" (Simons, 1995: 151) in "a positive informational environment that encourages information sharing" (Simons, 1995: 158).

While Henri's (2006a) study sheds light on the relationship between flexibility values and style of use of management control systems, there are two key issues pertinent to the research problem of budgeting systems style of use in hypercompetitive settings. Firstly, the antecedents, consequences and contingency factors of budgeting systems could be different from those of the performance measurement systems examined by Henri (2006a). Secondly, Henri (2006a) did not investigate hypercompetitive settings, nor did he examine environmental uncertainty in a contingency sense. Thus, whilst organisational cultures with very high flexibility values are effective in hypercompetitive conditions (Volberda, 1996 and 1998; Fey and Denison, 2003), the extant literature is yet to link this relationship to the most effective style of budgeting system use. From a dynamic capabilities perspective, this relationship is potentially very important, because a strategically appropriate organisational culture provides a resource-base (Barney, 1986 and 1991), which firms might deploy as a critical component of a performance-enhancing budgeting system capability. These linkages prompt the following research question:

> ***Research question 2:*** *what is the role of flexibility values of organisational culture in the relationship between budgeting system style of use and firm performance in hypercompetitive conditions?*

1.2 Research contributions

1.2.1 Effective organisational control for hypercompetitive conditions

Based upon longitudinal industry performance data, Wiggins and Ruefli (2005) concluded that hypercompetition has become more common in more industries. Yet, very little research has examined specific organisational characteristics that lead to success in hypercompetitive environments (Hanssen-Bauer and Snow, 1996). The primary contribution of this study is a response to the above-mentioned gap identified by Chenhall (2003) to study effective management control systems (MCS) for such conditions. The contribution is an organisational control package that combines the key formal control system of budgeting with a key informal control mechanism of organisational culture (Otley, 1999; Volberda, 1996 and 1998). While this contribution could be located in the MCS-environment contingency literature stream, it also extends to the literature of MCS-strategy and MCS-organisational culture (Chenhall, 2003). Some contributions are made to the strategic management literature, via application of the theory of dynamic capabilities (DCT) and resource-based theory (RBT).

1.2.2 The MCS-strategy literature

Drawing upon themes from Hopwood (1987), the MCS-strategy literature was first reviewed by Dent (1990: 19), who called for research that allows "accounting and control systems a more pro-active role in shaping strategic, organizational and political circumstances as events unfold". Crucial to this dynamic, action-oriented view of control systems is that they are "implicated in wider processes of organizational perception, governance and strategic mobilization". By being "constitutive and not merely reflective of organizational endeavour", control systems may be suggestive of "new possibilities for organizational action, shaping the trajectory of organizational development" (Dent, 1990: 19-20).

Even though a number of MCS-strategy research streams have filled the intervening years, reviewers have continued to echo Dent's (1990) appeals for an action-oriented view of MCS. For example, literature on 'strategic controls' (Schreyogg and Steinmann, 1987; Goold and Quinn, 1990) and 'strategic management accounting' (Simmonds, 1981) has not identified how such 'strategic' information may be actioned or organisationally processed (Chapman, 1997; Bhimani and Langfield-Smith, 2007). And, while numerous studies have examined MCS as mechanisms for implementing strategy, many reviewers have noted that these studies do not include MCS in dynamic strategy formulation processes (e.g., Chapman, 1997; Langfield-Smith, 1997; Chenhall, 2003). In contrast, many reviewers have cited Simons' interactive control as an exceptional contribution to developing a dynamic action-orientated view of MCS

(e.g., Chapman, 1997; Langfield-Smith, 1997; Atkinson et al., 1997; Chenhall, 2003; Ahrens and Chapman, 2004; Bhimani and Langfield-Smith, 2007).

Since Simons' (1994: 187) call for "considerable more research" into interactive control systems, a wide variety of case- and survey-based research has been published.[2] Building on Simons' research, the present study makes several key contributions. Firstly, previous survey studies have not comprehensively operationalised interactive control, and the present thesis contributes comprehensive measurement scales with superior construct validity (Bisbe, Batista-Foguet and Chenhall, 2007). A second contribution is further empirical support for the contingent nature of successful interactive use in general (Simons, 1990, 1991, 1994 and 1995), and empirical validation of Simons' (1991 and 1995) specific observations for matching effective interactive use of budgeting systems with high(er) uncertainty conditions. As discussed in the remainder of this section, a third contribution is a theory synthesis that provides a refined, enhanced and DCT-infused version of interactive control processes. This contribution includes the resource-based capability themes from RBT.

DCT is an extension of RBT (Teece et al., 1997; Eisenhardt and Martin, 2000; Acedo, Barroso and Galan, 2006). Compared to the strategy archetype approaches that have dominated MCS-strategy research, these more recent theories now dominate the strategic management literature (Ramos-Rodriguez and Ruiz-Navarro, 2004; Newbert, 2007; Daneels, 2008). Although DCT and RBT have been disseminated through marketing, organisation studies, production operations and management literatures (Acedo, Barroso and Galan, 2006: 631), they have received limited application in the MCS literature. Two case studies have used DCT and RBT to assist the interpretation of newly implemented MCS (i.e., Coad and Cullen, 2006; Wouters and Wilderon, 2008). Two studies have incorrectly applied RBT logic, wrongly interpreting its fundamental tenets (i.e., Widener and Selto, 1999; Widener, 2006b).[3] Three studies have used

[2] Case studies of interactive control include: target cost management (Tani, 1995); non-financial MCS change (Vaivio, 1999); middle management use of MCS (Marginson, 2002); strategy change in management buy-outs (Bruining, Bonnet and Wright, 2004); introduction of a new performance measurement system (Tuomela, 2005); and interactive use within the context of an organisational control package (Frow, Marginson and Ogden 2005). These authors are often careful to stress the exploratory nature of their case studies. Survey-based studies of interactive control include: budgeting systems and strategic change in hospitals (Abernethy and Brownell, 1999); product innovation and budgeting systems, balanced scorecards and project management systems (Bisbe and Otley, 2004); and antecedents and consequences of performance measurement systems (Henri, 2006a and b; Widener, 2007).

[3] Widener and Selto (1999) draw upon RBT to discuss whether internal audit departments that are not a source of competitive advantage should be outsourced. This is inconsistent with RBT logic (e.g., Barney, 1991 and 2001). Many critical aspects of firms are not a source of competitive advantage but are required to enable them to stay 'in the game' (e.g., Teece, 2007). Widener (2006b) incorrectly implies that PMS influence (i.e., mediate) strategic resources (human capital, structural capital and physical capital) in their impact on a firm's performance. However, RBT logic instead argues that resources can be deployed for

RBT references to select variables for study in conjunction with MCS without using the explanatory logic of the theory itself (Widener, 2004 and 2006a; Henri, 2006b). In general, the MCS literature is yet to engage with major developments in the strategic management literature of the past decade.

The synthesis of Simons' interactive control theory with DCT logic makes a contribution in two parts. Firstly, responding to the above calls for a more action-orientated view of MCS, DCT has a dominant logic of action and change (Winter, 2000 and 2003; Zollo and Winter, 2002), thus facilitating a synthesis with Simons' interactive controls theory that has a stronger action-orientation embedded with themes of organisational change. The DCT synthesis also provides the MCS literature with a broad and expanded conceptualisation of organisation learning linked to interactive use of control systems, including the role of aspirations and path dependence in market competitiveness-matched cycles and patterns of organisational learning. Secondly, the synthesis is the first that explicates a MCS capability that confers competitive advantage in resource-based terms, and thus is the first to fully engage with the basic tenets of the RBT (and DCT) frameworks (Acedo, Barroso and Galan, 2006; Newbert, 2007).

1.2.3 The MCS-organisational culture literature

Despite the long-held importance of linkages between MCS and organisational culture (e.g., Gordon and Miller, 1976; Ouchi, 1977), they remain under-researched in the MCS contingency literature (Chenhall, 2003). This thesis makes two contributions, the first being empirical. While dozens of survey-based articles have examined MCS and national culture (see reviews by Harrison and McKinnon, 1998 and 1999; Chenhall, 2003), quantitative studies of organisational culture and MCS are still in their infancy (Bhimani, 2003; Norris and O'Dwyer, 2004; Henri, 2006a). This thesis contributes a flexibility culture operationalisation that brings to light new insights, in particular the importance of flexibility culture to the interactive use of budgeting systems.

The second contribution is to theory. Whilst case studies (e.g., Dent, 1991; Bhimani, 2003; Ahrens and Mollona, 2007) have added new insights, theory in contingency studies has largely echoed Ouchi's dichotomy arguments (e.g., Flamholtz, Das and Tsui, 1985; Abernethy and Brownell, 1997). Accordingly, Ahrens and Chapman (2004: 298) have called for research that helps "resolve the traditional dichotomy between mechanistic controls aimed at efficiency and organic controls aimed at flexibility". This study contributes a perspective that more closely

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value creation by capabilities. Unlike organisational culture, none of the resources in Widener's study can be used by a PM system or process.

integrates (rather than dichotomises) the key formal control system in most organisations (i.e., budgeting) with the important informal control mechanism of flexibility traits of organisational culture.

1.2.4 The strategic management literature

This thesis also contributes to the DCT and RBT literature. It has been argued that DCT remains underspecified, abstract, intractable (Daneels, 2008) and requiring much more empirical operationalisation (Williamson, 1999; Zollo and Winter, 2002; Newbert, 2007). In particular, compared to dynamic capabilities, the underlying learning mechanisms (i.e., second order dynamic capabilities) largely remain a 'black box' (Spender, 1996; Zollo and Winter, 2002; Turner and Makhija, 2006).[4] By conceptualising an MCS in dynamic capability terms, this thesis provides a specific example of a second order dynamic capability – one that motivates dynamic capabilities in general across an organisation.

Some debate on the scientific status of the RBT remains (Acedo, Barroso and Galan, 2006) and Newbert (2007) suggests that the theory has only received modest support overall. Despite its clear discussion in classic RBT works (e.g., Barney, 1991), only one study has examined market contingent performance effects of organisational culture (Hult, Ketchen and Arrfelt, 2007; Newbert, 2007). Additionally, the primary criticism of RBT is its static nature (Newbert, 2007). This study contributes empirical support to RBT, by shedding light on how a valuable, rare, non-substitutable and inimitable resource-base of flexibility culture can underlie effective dynamic capabilities. This relationship also provides a novel insight into the logic that links RBT and DCT – a problematic area within RBT (Priem and Butler, 2001; Eisenhardt and Martin, 2000).

1.3 Overview of the thesis

The remainder of this thesis is organised as follows.

Chapter Two is a literature review. It starts with the literature pertaining to hypercompetition and budgeting systems style of use, focussing on the contingencies of business strategy and environmental uncertainty. The chapter finishes with an assessment of the treatment of

[4] Examples of dynamic capabilities include: research and development, restructuring, post-acquisition integration processes, product development, strategic decision-making and alliancing (Eisenhardt and Martin, 2000; Zollo and Winter, 2002). Examples of second-order dynamic capabilities include: repeated practice, formal procedures, mistakes, pacing of experience, collective learning from face-to-face discussions and debate, performance evaluation processes, knowledge articulation and the creation of a manual or tool that embodies knowledge (Eisenhardt and Martin, 2000; Zollo and Winter, 2002).

organisational culture in the MCS literature, with an emphasis on flexibility values of organisational culture.

Chapter Three includes the hypotheses development. It starts with an overview of DCT. Two sets of hypotheses are developed, each of which contrasts hypercompetitive conditions with a baseline of moderately competitive conditions. The first set of hypotheses concerns the style of use of budgeting systems and firm performance. The second order dynamic capabilities-based explication predicts different relationships for two newly formulated constructs of style of use: frequency of interactive use and intensity of interactive use. The second set of hypotheses uses RBT and DCT themes to explicate relationships between the style of use constructs and flexibility values of organisational culture.

Chapter Four outlines the research method and design. A cross-sectional self-reported survey was employed with postal mail and internet formats. The statistical technique of partial least squares is selected for data analysis purposes and measurement scales are extensively developed and selected according to the functionality and requirements of this technique. The sampling and survey distribution strategies are developed, and pre-testing and pilot testing procedures described. Survey responses are filtered and assessed, resulting in a usable sample of 331 cases (an effective response rate of 31.1%).

Chapter Five presents the data analyses, results and findings. Extensive examinations of measurement reliability and validity are conducted. The structural model is then assessed to test the hypotheses. Further explorations of the structural model are conducted to provide supplementary insights into the hypothesised relationships. The findings are interpreted and discussed in depth, including implications and contributions to the literature.

Chapter Six presents the conclusions. The research study and contributions are summarised, limitations and possibilities for future research are discussed, and some pertinent implications for managerial practice are provided.

2.0 CHAPTER TWO – LITERATURE REVIEW

2.1 Introduction

This chapter has two main parts. The first is a review of the budgeting systems literature, focussing on the contingencies of business strategy and environmental uncertainty. The discussion contrasts the interactive style of use of budgeting systems with the traditional diagnostic style of use, discussing how they match the organisational imperatives particular to hypercompetitive conditions. The second part of this chapter discusses the examination of organisational culture in the MCS literature. Unlike the broader organisation studies literature, the MCS literature has only just begun to examine flexibility values of organisational culture.

2.2 Budgeting systems and hypercompetition

2.2.1 Introduction

Ouchi (1979: 833) considered control to be the central organisational "problem of obtaining cooperation among a collection of individuals or units who share only partially congruent objectives". Early organisation theorists treated control as a cybernetic process of testing, measuring and providing feedback (Thompson, 1967; Green and Welsh, 1988), and as a problem of information flows (Galbraith, 1973). Organisational control has been linked to managerial and organisational learning (e.g., Argyris, 1977; Hopwood, 1980; Dery, 1982; Simons, 1990; Makhija and Ganesh, 1997; Chapman, 1998), reflecting the view that "an entity learns if, through its processing of information, the range of potential behaviors is changed" (Huber, 1991: 89). In a similar vein, organisational control mechanisms also influence processes of knowledge management, by affecting how knowledge is acquired, disseminated, interpreted, and used to accomplish organisational goals (Turner and Makhija, 2006: 197).

Budgeting systems are the 'central plank' of a typical management control system (Otley, 1999).[5] In nearly all organisations, budgeting is the cornerstone of the management control process (Armstrong et al., 1996; Chenhall and Langfield-Smith, 1998; Ekholm and Wallin, 2000). This is largely due to the ability of budgets to weave together the disparate threads of an organisation into a comprehensive multi-purpose plan (Hansen et al., 2003: 95-96). Virtually

[5] Other formal control systems researched include: discounted capital budgeting (e.g., Larcker, 1981); strategic management accounting (e.g., Simmonds, 1981); strategic control systems (Goold and Quinn, 1990); the balanced scorecard (e.g., Kaplan and Norton, 1992); activity-based costing (e.g., Gosselin, 1997); economic value added (e.g., Slagmulder, 1997); benchmarking (e.g., Chenhall and Langfield-Smith, 1998); competitor-focussed accounting (e.g., Guilding, 1999); performance measurement systems (e.g., Ittner et al., 2003; Chenhall, 2005); performance management (e.g., Otley, 1999); and non-financial performance measures (e.g., Ittner et al, 2003).

every aspect of management accounting is implicated in budgeting (Covaleski et al., 2003), and budgeting is one of the most extensively researched topics in management accounting (Luft and Shields, 2003; Hansen and Van der Stede, 2004).

Budgeting research can be broadly classified as based on case study or cross-sectional contingency study. Some case studies have investigated budgeting practices in conditions of high uncertainty, and also in hypercompetitive-like conditions (e.g., Marginson, 2002; Grant, 2003; Frow, Marginson and Ogden, 2005). Case studies with a sociological orientation display a strategic choice thematic; they portray a dynamic, action-orientated role for budgeting (e.g., Hopwood, 1987; and Boland and Pondy, 1983). These studies do not, however, assess the optimality of a particular style of use of budgeting. In contrast, the fit-performance relationship is at the heart of the contingency theory paradigm. Notwithstanding selection approaches to fit, interaction and systems contingency frameworks consider that the achievement of fit between some level of the structural variable (e.g., style of budgeting systems use) to each level of the contingency variable (e.g., environmental uncertainty/business strategy) leads to higher performance, whereas misfit leads to lower performance (Van de Ven and Drazin, 1985; Donaldson, 2001: 7).[6]

In the MCS literature, the two main contingency factors are environmental uncertainty and business strategy (Langfield-Smith, 1997; Chenhall, 2003). Higher levels of environmental change and complexity present firms with higher environmental uncertainty (Duncan, 1972; Galbraith, 1973; Dess and Beard, 1984).[7] High uncertainty business strategy archetypes are also

[6] Selection approaches to fit are congruent propositions in which a simple unconditional association is hypothesised to exist. Contingent propositions are more complex; they empirically test whether the relationship between two or more independent variables is associated with a dependent variable (i.e., performance). Van de Ven and Drazin (1985) incorporated congruence and contingency forms into three types of fit. (1) The selection approach to (congruence) fit outlines universal laws of relationship, with the implied assumption of congruence resulting in higher organisational effectiveness. Fit is the assumed premise underlying the congruence between structure and context. The "invisible hand" of the market is seen to select the optimal fit. (2) The interaction approach to (contingency) fit seeks to explain variations in organisational performance from the interaction of organisational and contextual variables. Fit is the (contingent-based) interaction of pairs of organisational-structure factors and the effect on performance. The performance variable is emphasised more so than the fit. (3) The systems approach to (contingency) fit seeks to examine contingencies among multiple dimensions of organisational context, structure and performance. Fit is the (contingent-based) internal consistency of multiple contingencies and multiple structural characteristics, and the effects on performance.

[7] In the MCS contingency literature, a variety of conceptualisations and dimensions of the external environment have been adopted. In reviewing the MCS literature, Chenhall (2003) and Chapman (1997 and 1998) used the general synthesising term of 'environmental uncertainty' in the sense offered by Galbraith (1973 and 1977), who synthesised the seminal structural contingency studies (e.g., Burns and Stalker, 1961; Hage, 1965; Lawrence and Lorsch, 1967). This conceptualisation is consistent with Duncan (1972: 314), who defined the environment as "the totality of physical and social factors that are taken directly into consideration in the decision-making behavior of individuals in the organization", and found that greater uncertainty was derived from a combination of environmental complexity and change.

typically deployed in high uncertainty environments. In the budgeting literature, four high uncertainty business strategy archetypes have been studied: prospector (Miles and Snow, 1978), differentiator (Porter, 1980 and 1985), entrepreneurial (Miller and Friesen, 1982) and build (Gupta and Govindarajan, 1984).[8] However, compared to hypercompetitive settings, high uncertainty environments and business strategies are only moderately competitive (Volberda, 1996: 366). As will be discussed in the next section, hypercompetitive environments are subject to more intense and unpredictable change and require strategies that are more dynamic.

2.2.2 Hypercompetition as a contingency factor

The mechanistic-organic metaphor is the basis of structural contingency theory (Burns and Stalker, 1961; Hage, 1965; Lawrence and Lorsch, 1967). Whereas low uncertainty environments are seen to require mechanistic structures (hierarchical, centralised, and formalised), high uncertainty environments instead require organic structures (participatory, decentralised, informal). When viewed from the perspective of hypercompetition, such high uncertainty environments have only moderate levels of competitive activity; they are dynamic and have incremental change (Eisenhardt, 1989; Jones, 2003).[9] In contrast, hypercompetitive conditions have continuous dynamism overlaid by sharp, discontinuous and radical change (Eisenhardt, 1989; Jones, 2003). Hypercompetition is not merely a sped-up version of traditional competition, and so firms "require new organizational forms" and different "dominating norms and values" (Hanssen-Bauer and Snow, 1996: 414; Volberda, 1996: 360).

[8] Four main strategic business unit strategy archetypes have been adopted in the MCS literature: the prospector-analyser-defender archetypes (Miles and Snow, 1978), the low cost-focus-differentiator archetypes (Porter, 1980 and 1985), the entrepreneurial-conservative archetypes (Miller and Friesen, 1982), and the build-hold-harvest-divest strategic mission taxonomy (Gupta and Govindarajan, 1984).

Miles and Snow's (1978) prospector-analyser-defender taxonomy classifies firms according to their rate of product-market innovations. Prospectors are leaders in introducing product-market change. Defenders emphasise efficiency and stability rather than product-market innovation. Desbarro et al. (2005) provided evidence that prospectors tend to operate in more uncertain environments.

Porter (1980 and 1985) provided the differentiation-focus-low cost strategic taxonomy. Competitive advantage can be gained from differentiating products from those of competitors, or from having overall industry cost leadership in the industry. Differentiation and low cost strategies are mutually incompatible. A focus strategy aims at gaining competitive advantage in a specific market or product. Miller (1988) found that differentiators are associated with uncertain environments.

Miller and Friesen (1982) developed the entrepreneurial-conservative taxonomy based on the levels of product and technological innovation and associated risk taking. Entrepreneurial firms have greater levels of product and technological innovation and associated risk taking, which presumably relate to more uncertain environments.

Gupta and Govindarajan (1984) developed the strategic mission taxonomy of build-hold-harvest-divest based on the trade-off between market share growth and short-term earnings maximisation. Highest levels of uncertainty are inherent in 'build' firms.

[9] Consistent with Eisenhardt (1989), Brown and Eisenhardt (1997 and 1998) and Eisenhardt and Bourgeois (1988), Eisenhardt and Martin (2000) use the term 'high-velocity' to refer to 'hypercompetition'. For consistency, the present thesis uses the term 'moderately competitive' where Eisenhardt and Martin (2000) used 'moderately dynamic'.

Consistent with contingency theory arguments, these contrasts with typical high uncertainty environments strongly suggest that hypercompetitive settings provide a significantly different context for budgeting practices.

Similarly, hypercompetition requires a different view of strategy – one suited to extremely vigorous competitive action and engagement with discontinuous change rather than incremental innovation (Volberda, 1996; Young, Smith and Grimm, 1996; Craig, 1996). Strategy theorists have tended to view the competitive environment as relatively static, with technology evolving in a systematic and predictable fashion (Craig, 1996). Hypercompetition changes technology at various points along the value chain, challenging firms to compete in completely new ways (Schumpeter, 1934; Thomas, 1996). In contrast to the high uncertainty strategy archetypes adopted in the budgeting contingency literature (i.e., prospector, differentiator, entrepreneurial and build), hypercompetition reflects Schumpeter's theory of 'creative destruction' (Schumpeter, 1934, 1942 and 1950; Craig, 1996; Young, Smith and Grimm, 1996; Wiggins and Ruefli, 2005).[10] Hypercompetition involves "constant disequilibrium" (D'Aveni, 1994), and requires strategies for non-trivial transformations to create new and complex organisational capabilities (Craig, 1996). These sharp contrasts imply that optimal styles of budget use may differ for hypercompetition strategies – budgeting practices would need to support the development of significantly new and technologically complex organisational capabilities.

2.2.3 High uncertainty contexts and the traditional budgeting literature

The budgeting literature has predominantly focussed on a style of use of budgeting systems that is seen as inappropriate in high uncertainty contexts (e.g., Chapman, 1997; Otley, 1999; Hartmann, 2000; Hansen et al., 2003). Budgets have typically been characterised as feedback systems for monitoring outcomes and correcting deviations from preset performance standards (Anthony, 1965; Ouchi, 1979; Makhija and Ganesh, 1997). This traditional 'static' style of use argues that when conditions are changing, preset performance standards will become outdated and inappropriate. Simons (1987a and 1990) termed this style of use 'diagnostic', and it has also been labelled as Reliance on Accounting Performance Measures (Chapman, 1997; Hartmann, 2000).

[10] Schumpeter (1934 and 1950) argued that the drivers of economic development are the differences between firms, particularly in terms of the adoption of new technology. Technology is a key aspect in the difference between firms as it manifests in the cost of production or in the quality and/or marketing of products. Schumpeter (1950: 83) attributes firm differences to "the fundamental impulse that keeps the capitalist engine in motion … the new consumer goods, the new methods of production or transportation, the new markets, the new forms of industrial organization". Schumpeter professes that, "Capitalism, then, is by nature a form or method of economic change and not never is but never can be stationary" (Schumpeter, 1950: 82).

Reliance on Accounting Performance Measures (RAPM) is the largest research stream in the MCS contingency literature (Briers and Hirst, 1990; Hartmann, 2000). RAPM refers to "the extent to which superiors rely on, and emphasize those performance criteria that are quantified in accounting and financial terms, and prespecified as budget targets" (Harrison, 1993: 319). The RAPM paradigm has consistently been informed by the role theory framework (Hartmann, 2000), confining the unit of analysis to the level of manager. The focus has typically been limited to a manager's work-related factors of budget participation, standard tightness, job-related tension, job satisfaction, and standard based incentives (Hartmann, 2000; Shields, Feng and Kato, 2000).

In an early RAPM study, Hirst (1983) found that the appropriateness of accounting performance measures was low when uncertainty was high. Govindarajan (1984) found a similar relationship, which was more pronounced in more effective business units (Hartmann, 2000). In a strategy contingency study, Van der Stede (2000) found that differentiators (higher uncertainty) were less likely to be associated with RAPM than low-cost firms (lower uncertainty). Govindarajan (1988) also found that RAPM was more appropriate for low-cost firms (lower uncertainty) than for differentiators (higher uncertainty). Govindarajan and Gupta (1985) predicted RAPM to be less appropriate for build strategies (higher uncertainty), but found no support.

The RAPM research stream portrays accounting performance measures as inappropriate in high uncertainty conditions. Under uncertain conditions, accurate *ex-ante* setting of targets and *ex-post* evaluation are not possible, leading to the conclusion that budgets are not useful in high uncertainty settings because they cannot be used to implement the controllability principle (Hartmann, 2000). Premised on this perspective of budgeting, two other streams of literature developed: broader scope MCS information and forecasting (Chapman, 1997). For broader scope MCS information, increased uncertainty has been found to require more external data, more non-financial data, and increased reporting frequency (e.g., Gordon and Miller, 1976; Chenhall and Morris, 1986; Gordon and Narayanan, 1984; Gul and Chia, 1994; Chong, 1996; Chong and Chong, 1997). Similarly, forecasting information has been found to be more prevalent in firms in high uncertainty conditions (e.g., Waterhouse and Tiessen, 1978; Chenhall and Morris, 1986). In particular, Jones (1985) observed firms in very high uncertainty environments to supplement the traditional annual budget by rolling budgets and interim forecasts of year-end performance.

In itself, the foregoing literature does not suggest a style of use of budgeting systems suitable for uncertain conditions, let alone for the more intensive conditions of hypercompetition. The

RAPM theoretical logic, based on controllability and predictability, would suggest that the traditional, feedback style of budgets would be even less appropriate in hypercompetitive conditions. And extending the corollary argument suggests that other, broader scope MCS information and forecasting would be of even greater use for decision-making in hypercompetitive conditions. In sum, this line of logic suggests that in hypercompetitive conditions, rather than being used for control purposes, the budgeting system becomes relegated to a passive source of input information for decision-making (Chenhall, 2003). These conclusions are premised on a highly formal characterisation of budgeting – one that overplays the mechanistic metaphor of organisational structure. Even though the organic form of organisation generally posits reliance on informal structural elements in uncertain conditions (Burns and Stalker, 1961; Lawrence and Lorsch, 1967), formal layers of structure (such as budgets) may have some use greater than mere passive information sources. The formal-informal elements of the mechanistic-organic organisational forms are not a binary dichotomy, but a matter of emphasis or degree (e.g., Ahrens and Chapman, 2004).

Two studies have blended informal layers of structure with formal budgets. Chenhall and Morris (1995) found that tight budget controls were used by both effective conservative and entrepreneurial firms. In the effective entrepreneurial firms, the tight budget controls were, however, used in combination with organic communication and decision making. Chapman (1998) also examined the inclusion of budgeting and forecasting information in related organic, organisational communication processes. Chapman's (1998) case studies related the high-performance of a firm in a high uncertainty context to ongoing informal communications between accountants and a range of managerial and operational personnel. Forecasting information supplemented budgeting information, with accountants involved in ongoing processes of communication for "the ongoing determination of appropriate courses of action" (Chapman, 1998: 764). Importantly, the overall budgeted level of performance was a persistent aspiration, with forecasts of new courses of action supplanting the specific input-output configuration anticipated by the budget. [11] These two studies are important for showing that, in the more intensely uncertain conditions of hypercompetition, informal structural elements are required for organisational processing of forecasting and budgeting information.

Chapman's (1998: 737) study contributes a contingency-based view that investigates how "formal accounting techniques might be bound up with wider organizational activities" geared towards action and change. In contrast, the line of studies based on simpler mechanistic versus organic notions display the weaknesses typical in the more general literature, where the

[11] Simons (1987b) also observed prospector firms to use forecasted targets rather than budgeted targets, and to employ informal communication to transmit control information.

tendency has also been to portray structures as static, acquiescent, and passive (Wood, 1979; Pennings, 1992; Galunic and Eisenhardt, 1994). As is evident in the specific example of the RAPM style of budgeting, contingency theorists in general have tended to consider change to be largely unproblematic, leaving the evolution and progress of ideas untreated (Wood, 1979). The organisational imagery is one of a reactive, environmentally conditioned entity, where the lack of motivation, values and preferences of human elements of organisational structure avoids action-orientated thinking (Pennings, 1992). Thus, high uncertainty conditions – and possibly hypercompetitive conditions – may instead be better served by an alternative style of budgeting systems use: one with greater theoretical grounding of key concepts and richer, more complex linkages to the formal and informal processes by which organisations adapt and change (Miller, 1981; Tosi and Slocum, 1984).

In response to similar concerns about the interaction of strategy and MCS, Simons (1990) adopted a strategic choice perspective (Child, 1972) with the conceptualisation of the interactive style of use of budgets (and other formal control systems). In contrast to the traditional, feedback style of use (which Simons labelled as diagnostic), the interactive style of control is an active managerial technique for engaging with high uncertainty settings. As discussed in the following sections, whilst the diagnostic and interactive labels can be portrayed as distinct styles of use, they also "represent two extremes of a continuum of top manager attention" (Simons, 1991: 52).

2.2.4 Interactive style of use of budgeting systems

Similar to the RAPM literature, Simons' (1990, 1991 and 1994) field studies suggest that high performing firms with low strategic uncertainties (e.g., low cost or defender archetypes in stable environments) use budgeting systems diagnostically. Annual budgets are prepared and presented by staff specialists to meet the financial goals set by top management – who then use them to manage by exception the implementation of the intended strategies, by tracking variances from the preset goals (Simons, 1994 and 1995).[12] On the other hand, high performing firms with high strategic uncertainties (e.g., differentiator or prospector archetypes in highly uncertain environments) instead used budgeting systems interactively. Interactive control systems are "formal systems used by top managers to regularly and personally involve themselves in the decision activities of subordinates. Any diagnostic control system can be made interactive by continuing and frequent top management attention and interest. The

[12] Simons (1990: 59-60) wrote that diagnostic control is the traditional notion of MCS, synonymous with ex post monitoring "output control" (Ouchi, 1977), "performance control" (Mintzberg, 1979), or "results control" (Merchant, 1985). Simons (1995: 60) claimed, "virtually all writing on management control systems refers to diagnostic control systems".

purpose of making a control system interactive is to focus attention and force dialogue and learning throughout the organization" (Simons, 1994: 170-171). Interactive use requires the re-forecasting of future states based on current information, such that the process triggers revised action plans (Simons, 1995). Whereas diagnostic control systems are for implementing top-down intended strategies, interactive control systems are also used to stimulate the formulation of new, bottom-up strategies.

Simons (1990, 1991, and 1994) used contingency frameworks, and linked the style of use of budgeting systems to the formulation and implementation of strategy archetypes. Competitive advantage in firms with low strategic uncertainty was observed in high performing firms that used budgets diagnostically to implement strategy. On the other hand, competitive advantage in firms with high strategic uncertainty was observed in high performing firms that used budgets interactively to both formulate and implement strategy. In sum, Simons' diagnostic-interactive budgeting model combines the key elements of a contingency approach, namely: organisational processing of the information; the contingency factors of environmental uncertainty and business strategy; and systematic linkages to firm performance.

As a mode of use of formal control systems, interactive use is singularly noteworthy for embodying a strategic choice thematic – an action orientation whereby managers are seen to have discretion over the choice of environment, product offerings, production facilities, diversification, new technologies, and markets (Child, 1972; Pennings, 1992). Interactive control is a process-based view, based primarily on the strategy processes of formulation and implementation, as well as more generally on the structural contingency derivative of information processing theory (Galbraith, 1973). Furthermore, the top manager is a critical element of a strategic choice perspective (Schreyogg, 1980; Pennings, 1992), and so is the inclusion of multiple layers of human structure. It cannot be assumed that top management can impose the 'correct design' upon the organisation's participants, because they will not share goal consensus or possess a rational outlook for its implementation (Wood, 1979). In relation to the traditional budgeting literature, interactive control integrates the information for decision-making and forecasting topics into the organisational processes of strategy formulation and implementation for fostering adaptation and change. These strengths suggest that an interactive use of budgeting systems would be useful also for managing organisational change and adaptation in hypercompetitive settings. However, the model was developed in the range of market conditions ranging from stable (i.e., low strategic uncertainty) through to moderately

competitive (i.e., high strategic uncertainty).[13] Hypercompetitive conditions were outside the scope of settings examined by Simons.

2.2.5 Interactive style of use and hypercompetition

Building on Simons' diagnostic-interactive conceptualisation, two survey-based studies provide evidence weakly related to hypercompetitive conditions. Abernethy and Brownell (1999) found that organisational performance was enhanced when hospitals used budgets interactively (moderating effect) as part of the process of managing strategic change (operationalised as movements from defender positions to prospector positions). Anecdotally, some of the hospitals were introducing a variety of new and complex technology-based services, and so some of the data might be sourced from conditions that were somewhat hypercompetitive. In the second study, Bisbe and Otley (2004) surveyed medium-sized, mature Spanish manufacturing firms, and found that the relationship between product innovation and firm performance was moderated by interactive use of budgets. Again however, the extent to which the sample related to hypercompetitive conditions cannot be determined.

Three case studies have also documented the diagnostic-interactive use of budgeting systems in 'hypercompetitive' settings.[14] Marginson (2002) observed a firm in the UK telecommunications sector to have 'moderately' interactive use of performance measures, including budgets. For example, "certain measures would be prioritized at different periods in time, while others were merely noted" (Marginson, 2002: 1026). Grant (2003) studied the corporate use of formal planning systems in eight of the world's largest oil companies, and observed that the corporate planning process became less formal and rigid, with increased emphasis placed on performance targets, and decreased reliance on forecasts (Grant, 2003). Attention shifted to the setting and monitoring of performance targets, and plans were deployed with the intent of achieving a standard of performance rather than detailed expectations of resource usage (Grant, 2003).

[13] Simons' diagnostic-interactive controls model was largely established in his 1990 study, and then confirmed through the 1991 and 1994 studies. In the 1990 study, the firm with high strategic uncertainties was a 'prospector' (Miles and Snow, 1978), a 'differentiator' (Porter, 1980), 'performance-maximising' (Abernathy and Utterback, 1978), or 'entrepreneurial' (Mintzberg, 1973). Strategic uncertainties concerned product innovation, marketing tactics, market share and new markets. Even though the firm frequently competed in "rapidly changing environments" (Simons, 1990: 132) with over 100 operating companies worldwide, Simons (1990: 132) noted that the "features of most products are updated and improved on a regular basis". This strongly suggests that the typical market conditions were characterised by incremental change, making them 'moderately competitive markets' (cf. Eisenhardt and Martin, 2000). Rather than needing to develop new operating capabilities – as required in hypercompetitive settings – existing operating capabilities were largely sufficient to produce outputs that were incrementally different.

[14] Notably, whilst the conditions described in the three studies have been interpreted as 'hypercompetitive', none of the studies refer to this term themselves.

These observations also suggest a moderately interactive style of budgeting system use at the corporate level. In the third case study, Frow, Marginson and Ogden (2005) observed a poor performing firm in globalised markets with rapid technological change and short product life cycles. This firm also appears to have had a 'moderately interactive' style of budgeting system use. During quarterly budget reviews, members would "understand and communicate information about the ever changing business environment, competition and customer needs" (Frow et al., 2005: 279).

In terms of a best-fit perspective, the accumulated surveys and case studies only weakly or ambiguously relate the diagnostic-interactive conceptualisation to hypercompetitive conditions. Although the two survey studies have linkages to firm performance, the extent of representation of hypercompetitive type firms is unknown and probably small (i.e., Abernethy and Brownell, 1999), or none at all (i.e., Bisbe and Otley, 2004). Whilst the focal firms in the three case studies appeared anecdotally to have 'moderately interactive' budgeting system use in hypercompetitive conditions, firm performance implications cannot be inferred (Marginson, 2002; Grant, 2003; Frow et al., 2005). At best, the literature suggests that a highly interactive style of use may not be the best fit for hypercompetitive settings. However, the studies do not provide discussion or explanation relevant to developing an argument as to why this would be the case. This is in contrast to Simons' (1987a and 1990) theoretical exposition, which provides a contrary perspective when extended to encompass hypercompetitive levels of strategic uncertainty.

Simons' (1987a and 1990) model was based on the theoretical frameworks of information processing theory (Galbraith, 1973) and organisational learning (Hedberg, 1981; Argyris and Schon, 1978). Information processing theory posits greater uncertainty to require greater organisational information processing (Galbraith, 1973). Simons (1990: 128) defined control systems as "information-based routines", and argued that firms with high strategic uncertainty required interactive use of budgeting systems, because such markets entailed complex, changing value chains that required the broad and detailed range of information provided by such control systems (Simons, 1991 and 1995). In contrast, firms with low strategic uncertainty only required diagnostic use of budgeting systems. Simons (1991: 52) explained that "although this research design treats systems as either interactive or diagnostic, these labels represent two extremes of a continuum of top management attention". Therefore, following Simons' arguments, the diagnostic to interactive continuum should correlate positively with a low to high strategic uncertainty spectrum. Extending this argument into a hypercompetitive setting, which entails even higher strategic uncertainty, would suggest an even greater level of interactive use.

A similar proposition is made by extending the concepts of organisation learning used by Simons, who explained that interactive control "guides organizational learning" as organisation participants respond to information attended to by the top manager (Simons, 1991: 50). Whereas diagnostic control is a single-loop style of learning that aims to keep a process within desired bounds, interactive control contains double-loop learning processes that can lead to questions about the very basis upon which the plans have been constructed (Simons, 1995; Argyris and Schon, 1978). Simons' theory posits interactive control to involve greater organisational information processing, which in turn leads to greater double-loop learning. Extending this theory into hypercompetitive market conditions suggests that greater interactive use of formal control systems would be required to foster even greater levels of double-loop learning.

In summary, an interactive style of budgeting provides a specific alternative model to the traditional diagnostic style of use. Simons (1994) conceptualised the two styles as opposite ends of a continuum of top manager attention. The traditional RAPM theoretical logics of controllability and predictability deem diagnostic use to be inappropriate in high uncertainty settings (Hartmann, 2000). Consistent with this traditional view, an extrapolation of Simons' synthesis of information processing and organisational learning theories leads to the proposition that a highly interactive style of control provides the best fit with hypercompetitive conditions. These theoretical propositions are, however, in contradiction with the – albeit weak, ambiguous and limited – literature that instead suggests a 'moderately interactive' style of use may be associated with hypercompetitive conditions (i.e., Abernethy and Brownell, 1999; Bisbe and Otley, 2004; Marginson, 2002; Grant, 2003; Frow et al., 2005).

Finally, as an additional research opportunity, Simons' conceptualisation of interactive control excluded hypercompetitive conditions. Given that hypercompetition is posited to require new forms of organising (Hanssen-Bauer and Snow, 1996; Illinitch et al., 1996), successful firms may require a style of use that does not fit the conventional uni-dimensional meaning of 'moderately interactive use' or 'highly interactive use'. For example, the frequency and intensity of interactions may not necessarily covary in all contexts. To this point, Bisbe et al. (2007) note that construct conceptualisation for interactive control should be multidimensional and should explicitly consider context-specific issues – such as hypercompetition. Additionally, they note that no evolution of the interactive control concept has yet been targeted, and they provide a robust basis for developing a more valid and comprehensive measurement approach for interactive control (as undertaken in Chapters Four and Five of this thesis).

2.2.6 Budgeting systems and hypercompetition – conclusion

To conclude this section, in addition to limitations in the literature relating to understanding the effective style of use of budgeting systems under hypercompetitive conditions, there is a gap in terms of a suitable theory for explicating such a relationship. This gap is based on the view that hypercompetitive conditions are not merely a more extreme linear extension of moderately competitive conditions (Volberda, 1996), but instead require different approaches to organising (Hanssen-Bauer and Snow, 1996). Effectiveness in hypercompetitive settings may require a context-specific style of budgeting system use – one that may require different dimensional combinations of interactive control. Hence, this gap extends to the conceptualisation of interactive control itself. Bisbe et al. (2007) argue that interactive control is an ambiguous construct that requires enhanced meaning. They argue that, at the current stage of research, it is reasonable to expect future studies to explicitly identify multiple dimensions when conceptualising and operationalising interactive control systems.

2.2 Organisational culture – flexibility values

2.2.1 Introduction

Whilst the literature is silent on the topic of style of use of formal control systems in hypercompetitive contexts, Volberda (1996) stressed the importance of the informal control mechanism of organisational culture. Volberda (1996 and 1998) argued that successful firms in hypercompetitive settings need an organisational culture with dominating norms and values that promote flexibility. Indeed, organisational flexibility is a recurring theme in the hypercompetition literature (Craig, 1996; Hanssen-Bauer and Snow, 1996; Illinitch, D'Aveni and Lewin, 1996; Smith and Zeithmal, 1996). In the MCS literature, even though many scholars have argued for the importance of linkages between organisational culture and the design and use of formal control systems, very few studies have examined flexibility dimensions of organisational culture.

This second part of Chapter Two has four sections. The first provides definitions and key perspectives of organisational culture in general. The second section reviews the interface between MCS and organisational culture, demonstrating the predominance of Ouchi's (1979) concept of 'clans'. The third section focuses on Henri's (2006a) study of flexibility organisational culture and the style of use of performance measurement systems. The fourth section reviews the literature of organisation studies, highlighting the positive relationship between flexibility organisational culture and firm performance in hypercompetitive settings (Fey and Denison, 2003).

2.2.2 Organisational culture – definition and key perspectives

Since the 1970s, organisational culture has been the subject of many books, journal articles and discussion in the business press (see for example, O'Reilly and Chatman, 1996). Organisational culture is defined as "a system of shared values (that defines what is important) and norms that define appropriate attitudes and behaviors for organizational members (how to feel and behave)" (Chatman and O'Reilly, 1996: 160). Organisational culture is an important informal control mechanism that targets values, attitudes, and behaviours – which when relevant to desirable organisational outcomes, can be positive for organisational effectiveness (O'Reilly and Chatman, 1996; Sorensen, 2002).

Organisational cultures are historically and socially constructed, holistic and difficult to change (Ouchi, 1979; Bloor and Dawson, 1994). They are path-dependent (Barney, 1986 and 1991), constrained by inertia, and they reflect the imprinting of a firm's early environmental conditions (Hannan and Freeman, 1984; Sorensen, 2002). These static views are in contrast to those where organisational culture is a variable that can be moulded, shaped and changed to suit managerial purposes (Smircich, 1983).

In contrast to metaphorical views often taken in case studies, contingency-based approaches assume organisational culture to be a measurable characteristic of organisations, and, rather than seeking to interpret the meaning of different organisational cultures, they focus on the consequences for organisational behaviour, processes and performance (Smircich, 1983; Sorensen, 2002). This view has been adopted in the MCS literature, where it is recognised that, while cultural artefacts such as myths and rituals are organisation specific, organisational values and norms vary by organisation (Bhimani, 2003; Harrison and Mckinnon, 1999; Henri, 2006a).

2.2.3 Organisational culture and MCS

Dent (1991) noted that budgeting is not purely a technical-rational issue. It is instead bound up in a wider organisational context, of which organisational culture is an important factor (Hopwood, 1987; Flamholtz et al., 1985). Sunder (2002: 182) surmised that "if members of a firm expect budgets and production targets to be met, achieving such goals is the culture of the firm." Lebas and Weigenstein (1986: 270) argued that organisational culture "conditions" the way budgeting systems are designed and used. More generally, Norris and O'Dwyer (2004) argued that values and norms should be congruent with the design and use of formal control systems, or else they may meet with resistance and eventually fail (Flamholtz, 1983; Markus and Pfeffer, 1983).

Ouchi's (1979) seminal ideas of 'clan' controls have been highly influential in the MCS literature. Clan controls are the informal socialisation mechanisms that take place in an organisation and that facilitate shared values, beliefs, and understanding among organisational members (Ouchi, 1979). Ouchi (1979) argued that in high uncertainty situations an organisational culture (i.e., a 'clan') is more effective than formal modes of control (i.e., that rely on measurement). This formal-informal dichotomy mirrors that of the structural contingency literature discussed earlier, viewing high uncertainty settings as being better served by informal controls rather than formal ones. Premised on a diagnostic style of use, it is expected that organisational culture will replace reliance on formal control systems in such circumstances, rather than change the way that the formal systems are used (e.g., interactively).

Bourn and Ezzamel (1986) applied Ouchi's (1979) theory to argue that 'clan' controls would be more effective than a hierarchical control system (i.e., a diagnostic style of budgeting) in the UK National Health System. Flamholtz et al. (1985) presented a model of organisational control in which a firm's core formal control system is embedded in a context of organisational culture and the external environment. However, typical of much of the MCS literature in this area, the model largely reiterates Ouchi's (1979) views, does not consider a non-diagnostic style of use, and inadequately specifies organisational culture.

A variety of case studies have linked organisational culture to budgeting system characteristics. Dent (1991) observed how a newly implemented MCS helped manage the change of an organisation's culture. Bhimani (2003) examined how the perceived success of a new MCS was influenced by organisational culture factors, including flexibility values. These two studies are unusual in the MCS literature for depicting a context where organisational culture change was a key focus of top management's strategic agenda. In another case study, Norris and O'Dwyer (2004) observed dysfunctional tensions between informal controls and formal control systems.

The MCS literature has only recently begun to conduct quantitative studies of organisational culture (Bhimani, 2003; Henri, 2006a). Goddard (1997a and b) surveyed local government organisations, and found very small correlations between assorted budgeting related behaviours and a variety of miscellaneous measures of organisational culture. Birnberg and Snodgrass (1988) applied Ouchi's (1979) arguments and found that organisations with cultures that favoured informal communications had less diagnostic use of budgeting systems. Abernethy and Brownell (1997) found that reliance on personnel forms of control (Perrow, 1970; Ouchi, 1979), had a significantly more positive managerial performance effect than RAPM (i.e., diagnostic style of use of budgeting systems) when task uncertainty was highest.

In summary, organisational culture is largely depicted as a fixed contextual factor that is antecedent to the design and use of MCS. Most theoretical discussions echo Ouchi's (1979) uncertainty dependent dichotomy between (diagnostic) formal and informal controls. Extant case studies have not addressed high uncertainty or hypercompetitive contexts, and have not examined styles of MCS use. Quantitative studies have been either simplistic (Goddard, 1997a and b) or based on Ouchi's (1979) informal-formal dichotomy (Birnberg and Snodgrass, 1988; Abernethy and Brownell, 1997). Thus, in conjunction with a predisposition towards a diagnostic style of use, the operationalisation of organisational culture has had little engagement with the flexibility values needed in highly uncertain and hypercompetitive contexts (Volberda, 1996 and 1998). One major exception is the study by Henri (2006a) reviewed in the next section.

2.2.4 Flexibility organisational culture and style of use of MCS

Henri (2006a) adopted the control and flexibility dimensions of organisational culture from the competing values framework (Quinn and Kimberley, 1984). Control type cultures value predictability, stability, formality, rigidity and conformity. Flexibility type cultures value spontaneity, change, openness, adaptability and responsiveness (Quinn and Kimberley, 1984). Henri (2006a) studied the effects of these two types of organisational culture on performance measurement systems (PMS). Henri (2006a) found that the top managers of flexibility type firms used PMS 'interactively' (i.e., to focus organisational attention, support strategic decision-making, and to legitimate actions), whereas a 'diagnostic' style (i.e., monitoring) was associated with neither control nor flexibility type firms.

Henri (2006a) explained that flexibility values drive interactive use because flexibility values promote open and lateral channels of communication and free flow of information throughout the organisation (Burns and Stalker, 1961). Similar themes were provided by Simons (1987b and 1995) – even though he explicitly excluded "culture" from his model (Simons, 1994: 170).[15] Simons posited that interactive control "generate(s) dialogue" (Simons, 1995: 151) in "a positive informational environment that encourages information sharing" (Simons, 1995: 158). Such an environment is also required for interactions at lower organisational levels, given Simons' (1995: 97) footnote that, even though an interactive control system is limited by definition to a system that is an important and recurring agenda addressed by the highest levels of management, similar interactive processes may also occur at lower organisational levels.

[15] It should be noted that Simons (1994 and 1995) also examined belief systems. These are formal documents, such as mission statements and statements of purpose, used by top managers to define, communicate, and reinforce basic values, purpose, and direction.

Consistent with this suggestion, Henri (2006a) argued that organisational culture affects most aspects of organisational interactions, including those at all levels of management (Barley, 1983; Chatterjee, Lubatkin, Schweiger and Weber, 1992).

Whilst Henri's (2006a) study is useful in shedding light on the effects of flexibility values on the nature of use of PMS, the strength of the relationships would be different for budgeting systems style of use. PMS are comprised of multiple formal control systems, and include measures that "can be financial, non-financial, internal or external, short or long term as well as ex post or ex ante" (Henri, 2006b: 533). Individual systems within a PMS are likely to have different antecedents, consequences and contingency factors (e.g., Marginson, 2002; Bisbe and Otley, 2004). Simons did not explicitly discuss PMS, but based on five specific MCS (i.e., project management systems, budgeting systems, brand revenue systems, intelligence systems and human development systems), he observed that the style of use of each differed depending on contextual factors (Simons, 1991 and 1995). Thus, there is a gap in the literature for examining the effects of flexibility values upon the style of use of budgeting systems.

2.2.5 Organisational culture, flexibility and hypercompetition

In the literature of organisation studies, various operationalisations of flexibility values have been found to be effective in high uncertainty settings (Gordon, 1985; Kotter and Heskett, 1992; Denison and Mishra, 1995). Moreover, similar findings have shown that even greater levels of flexibility values have a similar benefit in hypercompetitive-like environments. Fey and Denison (2003) found flexibility traits (of involvement and adaptability) to be associated with greater firm effectiveness for firms in Russia's highly turbulent transition economy (hypercompetitive macro-market environment), more so than compared to firms in the less dynamic American economy (moderately competitive macro-market environment).

Fey and Denison (2003) operationalised flexibility values using the Denison Organizational Culture Survey, which has been progressively developed by Denison and colleagues (Denison, 1984, 1990 and 1996; Denison and Mishra, 1995; Denison and Neale, 1996). Unlike the flexibility measures from the competing values framework used by Henri (2006a), the Fey and Denison (2003) operationalisation has proven validity across moderately competitive and hypercompetitive-like conditions. Additionally, in line with 'flexibility' being a fairly heterogeneous term in the literature (Volberda, 1998), there are differences between the two frameworks, particularly in terms of hypercompetitive settings. The Denison flexibility concepts resonate more strongly with many of the imperatives articulated in the hypercompetition literature (e.g., involvement and adaptability).

2.3 Chapter conclusion

Even though it appears that an organisational culture with very high flexibility values might be effective in hypercompetitive conditions (Fey and Denison, 2003), the extant literature is unable to link this relationship to the most effective style of use of budgeting systems, mainly because it is not clear what style of use is effective in hypercompetitive conditions. This review reveals two main gaps in the literature.

The first gap concerns the effective style of use of budgeting systems in hypercompetitive conditions. The review has demonstrated that Simons' (1990, 1991, 1994, 1995 and 2000) conceptualisation of a continuum of diagnostic-interactive style of use provides a basis for investigating this research problem. Additionally, a multidimensional conceptualisation may provide an evolved understanding of the nature of the styles of use constructs (Bisbe et al., 2007).

The second gap concerns the effects of flexibility values on the effective style of use of budgeting systems in hypercompetitive conditions. Even though it has been argued in the MCS literature that organisational culture and formal control systems are key interdependent components of organisational control, the focus has largely been limited to a diagnostic style of use with overly simplistic notions of organisational culture. This gap offers the opportunity to build on Henri's (2006a) study and investigate how budgeting systems style of use is affected by the flexibility values that are needed in highly uncertain and hypercompetitive contexts (Volberda, 1996 and 1998).

3.0 CHAPTER THREE – HYPOTHESES DEVELOPMENT

3.1 Introduction

This chapter develops a theoretical model directed to the gaps in the literature identified in the previous chapter. Hypotheses are developed that relate budgeting system style of use and flexibility traits of organisational culture to firm performance. Building on the conclusions in Chapter Two, Simons' (1990 and 1995) diagnostic-interactive continuum provides the basis of the budgeting systems style of use construct, and Fey and Denison's (2003) flexibility traits (i.e., involvement and adaptability) provide the organisational culture construct.

Dynamic capabilities theory (DCT) provides the broad, conceptual framework for explicating the relationships in terms of 'second order dynamic capabilities'. DCT is distinctive in providing relevant theoretical themes specific to hypercompetitive settings. Additionally, the DCT framework articulates different organisational imperatives for success in moderately competitive market conditions. In order to establish hypercompetition as being different in terms of the performance impacts of budgeting systems and related organisational culture issues, hypotheses for each of the relationships are also developed for the context of moderately competitive conditions.

3.2 Theoretical framework

3.2.1 Dynamic capabilities theory

DCT is an extension of resource-based theory (RBT), which predicts that firms can deploy valuable, rare, non-substitutable and inimitable (VRNI) resources to achieve competitive advantage by implementing unique, distinctive, and difficult to replicate value-creating strategies (Wernerfelt, 1984; Eisenhardt and Martin, 2000). Resources are deployed via operating capabilities or dynamic capabilities (Winter, 2003). Operating capabilities permit a firm "to earn a living by producing and selling the same product, on the same scale and to the same customer population" (Winter, 2003: 991). Left unchanged, the production outputs from operating capabilities will lose value in a changing market, and so firms require dynamic capabilities for extending, modifying or creating operating capabilities (Teece et al., 1997).

Dynamic capabilities are a firm's managerial and organisational processes for learning and change, and they are shaped by the firm's resource-base, fixed assets and evolutionary path (Teece et al., 1997). Eisenhardt and Martin (2000: 1107) define dynamic capabilities as "the firm's processes that use resources – specifically the processes to integrate, reconfigure, gain

and release resources – to match and even create market change. Dynamic capabilities thus are the organisational and strategic routines by which firms achieve new resource configurations as markets emerge, collide, split, coevolve and die."

Dynamic capabilities rely on organisational learning to develop and create the knowledge that underlies operating capabilities (Teece et al., 1997). When dynamic capabilities systematically foster organisational learning matched with the level of market competitiveness, they confer competitive advantage in the form of Schumpeterian rents (Teece et al., 1997; Eisenhardt and Martin, 2000). Schumpeterian rents are inherently entrepreneurial; they are derived from innovation and risk-taking in uncertain environments (Schumpeter, 1950; Rumelt, 1987), and are short term only (Mahoney and Pandian, 1992).

In contrast, the RBT emphasises 'Ricardian rents' (Ricardo, 1817) and 'quasi-rents'. Ricardian rents (scarcity value) flow from the superior productivity of valuable and rare (VR) resources (Peteraf, 1993; Madhok and Tallman, 1998). Quasi-rents (association value) arise from non-substitutable and inimitable (NI) firm-specific resources (Peteraf, 1993; Madhok and Tallman, 1998). Quasi rents are 'path dependent' (development is time-consuming), 'socially complex' (cannot be purchased), and 'causally ambiguous' (difficult to observe performance linkages) (Barney, 1991).

3.2.2 Second order dynamic capabilities

'Second order dynamic capabilities' are the systematic learning mechanisms that underlie dynamic capabilities (Collis, 1994; Zollo and Winter, 2002). The patterns of organisational learning that they foster are required to match the pattern of market change. Moderately competitive markets, characterised by a "stable industry structure, defined boundaries, clear business models, identifiable players, linear and predictable change", require an emphasis on variation styled organisational learning (Eisenhardt and Martin, 2000: 1115). In contrast, hypercompetitive markets, characterised by "ambiguous industry structure, blurred boundaries, fluid business models, ambiguous and shifting players, nonlinear and unpredictable change", require an emphasis on experiential styled organisational learning (Eisenhardt and Martin, 2000: 1115).

If budgeting systems act as second order dynamic capabilities and are effective in this role, they would do so by fostering the market matched style of organisational learning, and thereby be part of the entrepreneurial processes that create Schumpeterian rents. Following the diagnostic-interactive arguments of Simons (1990, 1995 and 2000), the level of involvement of the top manager determines the nature of organisational learning fostered by a budgeting system. The

top manager leads and shapes the organisational learning processes that foster the entrepreneurial function of coevolving the firm with changing market conditions (Teece, 2007; Rosenbloom, 2000).

Ongoing learning can be enormously difficult for organisations (Hanssen-Bauer and Snow, 1996), such that relevant VRNI resources can help foster the market matched styles of organisational learning (Eisenhardt and Martin, 2000; Amit and Schoemaker, 1993). A strategically appropriate organisational culture is potentially one such VRNI resource (Barney, 1986 and 1991; Hansen and Wernerfelt, 1989). By influencing organisational processes of information dispersal and communication, the social complexity feature of organisational culture aids organisational learning processes by facilitating joint contributions to complex problems (Barney, 1991; Makhija and Ganesh, 1997; Teece et al., 1997).

Second order dynamic capabilities motivate learning via the aspirations they contain – when aspirations are not met, overt learning responses are motivated by the perceived need to improve in order to address the performance gap (Winter, 2000). In this vein, the anticipatory information in budgeting systems is aspirational. The plans for action in anticipatory information represent strategic choices (Simons, 1990; Child, 1972), and variances illuminate the progress of implementation efforts (Anthony, 1965). Faced with the requirement to coevolve operating capabilities with market change, organisations need to solve complex learning problems related to whether and how to change plans and/or implementation efforts. Complex strategic choices such as these benefit from intrinsically social joint contributions involving repeated interactions amongst people over time (Teece et al., 1997; Winter, 2000). By implicating multiple layers of human structure (Wood, 1979) embodied with facilitating norms and values (i.e., organisational culture), budgeting systems can be used to enable both top-down and bottom-up participation in strategic choices.

3.3 Hypotheses – budgeting systems style of use and firm performance

The top manager is a critical element of a strategic choice perspective (Schreyogg, 1980; Pennings, 1992). Simons (1991: 52) explained that the interactive and diagnostic styles of use "represent two extremes of a continuum of top management attention", and the "amount of top management attention directed to a control system" determines whether the system is interactive (Simons, 1991: 49). When used interactively, the top manager leads recurring processes that require the frequent and regular attention of all levels of management for the continual challenge and debate of action plans that are of strategic importance (Simons, 1991 and 1995). In contrast, when used diagnostically, budgets are prepared and presented by staff specialists to meet the financial goals set by top management, who subsequently use them to

manage by exception the implementation of the intended strategies by tracking variances from the preset goals (Simons, 1994 and 1995).

This is a unidimensional view of interactive control (Bisbe et al., 2007). The synthesis of DCT with Simons' arguments in the upcoming hypotheses development sections argues instead for a two-dimensional view, consisting of: (1) interaction frequency; and (2) interaction intensity.

'Interaction frequency' is how often managers use the system interactively. A diagnostic frequency occurs when managers discuss system information infrequently (e.g., annually or half-yearly). In contrast, high interaction frequency occurs when managers are frequently and regularly involved in discussions based on system information (e.g., fortnightly or monthly).Between these two extremes, moderate interaction frequency involves quarterly or bi-monthly management attention to budgeting system information.

'Interaction intensity' is the degree to which interactions are characterised by challenge and debate of strategically important action plans. A diagnostic (low) intensity occurs when senior management do not use the system to discuss changing action plans. In contrast, high intensity occurs when senior managers use interactions to actively promote and support strategic change. Between these two extremes, moderate interaction intensity involves discussion of incremental business changes.

In the following two sections, it is hypothesised that the level of market competition moderates the relationship between the style of use of budgeting systems and firm performance. In other words, there is no universal relationship between style of use and firm performance. This contingent relationship builds on the four sets of literature that were discussed in the previous chapter. Firstly, Simons (1990, 1991, and 1994) observed that high-performing firms with high strategic uncertainties used budgeting systems interactively, whilst high-performing firms with low levels of strategic uncertainty used budgeting systems diagnostically. Secondly, rather than finding a sole relationship between degrees of interactive use and firm performance, prior research has found moderating effects with strategic uncertainty related variables. Abernethy and Brownell (1999) found an interaction effect between the extent to which budgeting systems were used interactively and strategic change, and Bisbe and Otley (2004) found a similar interaction effect with product innovation. Thirdly, the RAPM literature has established a contingent relationship between environmental uncertainty and the use of budgeting systems (e.g., Govindarajan, 1984; Van der Stede, 2000). Lastly, in contrast to the 'diagnostics' role required for low uncertainty, Hopwood (1980) and Chapman (1998) have argued that budgeting systems need to play more of a 'learning machine' role under higher uncertainty conditions.

3.3.1 Moderately competitive markets

Change in moderately competitive markets is highly frequent, but relatively predictable and incremental (Volberda, 1996; Eisenhardt and Martin, 2000). To be effective in these conditions, 'variation learning' produces linear change, meaning current events resemble past events, and the similarities along the path of experience permit learning to rely heavily on leveraging existing knowledge (Teece et al, 1997; Eisenhardt and Martin, 2000). Variation learning has overlaps with exploitation, which "includes such things as refinement, choice, production, efficiency" (March, 1991: 71), and also with 'incremental learning', which is cumulative and relies on local search for new knowledge within the "neighbourhood of existing knowledge" and so does not "fundamentally depart from the current knowledge" (Helfat and Raubitschek, 2000: 967).

For a budgeting system to stimulate variation learning, it follows that the style of use needs to foster path-dependent outcomes. Path-dependence requires a detailed and complicated understanding of current operating capability knowledge (Eisenhardt and Martin, 2000), so that it can be leveraged to formulate anticipatory information and related action plans that are directed towards linear, incremental change. A detailed and complicated understanding of the status quo will enable those in the interactive processes to effectively anticipate change by 'learning before doing' (Eisenhardt and Martin, 2000). 'Learning before doing' requires stable, structured and well-ordered processes in which managers analyse situations in the context of their existing knowledge (Eisenhardt and Martin, 2000).

The frequency of interactive use of budgeting information must match the highly frequent change that characterises moderately competitive markets. A diagnostic or moderate level of interaction frequency will not keep up with the emphasis on frequent market changes. Instead, a high level of interaction frequency might enable the organisation to collectively re-forecast future states and revise action plans in a pattern that embeds incremental updates in operational aspirations and know-how, and thereby keeps pace with the frequent market changes. Variation learning will be fostered by continuous evolution of aspirationally motivated, anticipatory information and associated action plans. Later variance information will have a path-dependent quality, because the associated anticipatory information is merely incrementally out-of-date. Otherwise, variation learning efforts may be smothered by an ambiguous blend of underdeveloped aspirations with operational shortcomings. Large positive variances that fail to provide enough information to foster variation learning, or large negative variances that raise defences that block learning may accumulate (Eisenhardt and Martin, 2000).

Whilst the highly frequent market changes in moderately competitive markets are hypothesised to require high interaction frequency, the relatively incremental and predictable nature of the changes requires only a moderate level of interaction intensity. Rather than entailing extensive debate and challenge of significant potential strategic business priorities, effective interactions are likely to be more moderate in intensity. In conjunction with the high frequency of interactions, moderate interaction intensity will foster continuous incremental adaptation because variation learning requires interactions to have a linear and analytical orientation, as opposed to an intensely speculative and expansive focus. In so doing, discussions of incremental adjustments to operating know-how effectively re-use existing knowledge and produce path-dependent change (Eisenhardt and Martin, 2000). A moderate level of interaction intensity therefore will support the requirement for managers to leverage the status quo rather than experiment with discontinuous change.

3.3.2 Hypercompetitive markets

Hypercompetitive markets also have a highly frequent rate of change, but the emphasis is instead on the nonlinear and unpredictable nature of change (Volberda, 1996; Eisenhardt and Martin, 2000). In these situations, the learning emphasis is 'selection' – only selections of 'experiences' provide effective learning opportunities for the creation of new knowledge (Eisenhardt and Martin, 2000). Organisational learning is patterned by an experiential emphasis, similar to exploration, which "includes things captured by terms such as risk taking, experimentation, play, flexibility, discovery, innovation" (March, 1991: 71). Experiential learning is also akin to step function learning, which involves "fundamental changes to core or integrative knowledge" (Helfat and Raubitschek, 2000: 966-967). The outcome of step function learning is significantly new knowledge, which, at a minimum, includes products, markets and technologies (Helfat and Raubitschek, 2000).

Effective experiential learning mechanisms provide general guidance, and they define priorities to "keep managers focused on broadly important issues without locking them into specific behaviors or the use of past experience" (Eisenhardt and Martin, 2000: 1111). Experiential learning typically occurs through search processes characterised by on-line experimentation with a modest set of alternatives (Gavetti and Levinthal, 2000). The set of alternatives are in the neighbourhood of current activity (March and Simon, 1958; Cyert and March, 1963), and so experiential search is often characterised as a process of local search (Gavetti and Levinthal, 2000). Such processes require at least partial implementation of an alternative in order to evaluate its efficacy – actions are tried, their outcomes experienced, and subsequent revisions to the prior actions may occur (Levitt and March, 1988; Gavetti and Levinthal, 2000).

To foster experiential learning from a budgeting system, the style of use needs to provide general guidance and define priorities. Aspiration levels and associated anticipatory information need to be used to 'seed' processes of local experiential search and also 'constrain' the processes from wandering to less attractive regions of the neighbourhood (cf., Gavetti and Levinthal, 2000: 133). The appropriate style of use needs to guide – and thereby prioritise and constrain – the scarce attention of operating managers as they experience localised processes of 'learning by doing' (Eisenhardt and Martin, 2000: 1112). 'Learning by doing' is fostered by simple learning mechanisms that structure the attention and sense making for decentralised and specialised knowledge creation (Levinthal and March, 1993; Eisenhardt and Martin, 2000).

As noted above, in hypercompetitive markets the emphasis is on radical and unpredictable change (Volberda, 1996; Eisenhardt and Martin, 2000). In these circumstances, a diagnostic level of interaction frequency will be ineffective, because top management involvement and entrepreneurial leadership is required to "focus attention and force dialogue and learning" (Simons, 1994: 170-171) in a way that supports experiential search processes. High interaction frequency is also inappropriate, because the highly complex and changing knowledge that underlies operating capabilities needs time to develop (March, 1991) before the debate of action plans can be adequately informed. Variance information needs time to accumulate, because difficulty and confusion is caused by attempting to learn from small data samples (Levinthal and March, 1993). These imperatives imply the need for a moderate level of interaction frequency, so that the periods between interactions allow sufficient time to pass so that discernible outcomes are available for comparison to aspirations and anticipatory information.

A moderate level of interaction frequency permits sufficient time to elapse for top management involvement to decipher and select which existing elements of operating capabilities should be discarded and which should be generalised and leveraged further (cf. Eisenhardt and Martin, 2000). These same imperatives imply the requirement for high levels of interaction intensity. Processes for deciphering and selection require extensive challenge and debate, extensive investigation of progress made, revision of action plans and consideration of multiple options. Additionally, in hypercompetitive markets, top managers need to provide the vision and guidance for reconfiguration and transformation of operating capabilities (Helfat and Raubitschek, 2000; Teece, 2007). The development of this integrative knowledge requires intensive interactions to undertake extensive experiential learning as actual events unfold and unplanned occurrences and obstacles arise. The radical nature of change requires that interactions are necessarily intense in order to redefine and reprioritise significant business changes.

In summary, high interaction frequency in conjunction with moderate interaction intensity will foster analytical and linear development of operating capabilities (i.e., learning before doing). Such a pattern of use will motivate variation learning, which matches the frequent and incremental nature of change in moderately competitive market conditions. On the other hand, moderate interaction frequency and high interaction intensity will instead provide guidance and prioritisation for local, specialised development of operating capability knowledge (i.e., learning by doing). Such a pattern of use will foster guided, experiential learning, which matches the non-linear and unpredictable nature of change in hypercompetitive market conditions. DCT predicts that competitive advantage (i.e., Schumpeterian rents) stems from variation learning in moderately dynamic markets, and experiential learning in hypercompetitive markets (Teece et al., 1997' Eisenhardt and Martin, 2000;).

Therefore, it can be predicted that *within the range of market conditions from moderately competitive to hypercompetitive*:

> **Hypothesis 1 (a):** *market competitiveness negatively moderates the effect of budgeting systems' interaction frequency on firm performance* (i.e., firm performance in moderately competitive markets is highest with high interaction frequency, whilst firm performance in hypercompetitive markets is highest with moderate interaction frequency).
>
> **Hypothesis 1 (b):** *market competitiveness positively moderates the effect of budgeting systems' interaction intensity on firm performance* (i.e., firm performance in moderately competitive markets is highest with moderate interaction intensity, whilst firm performance in hypercompetitive markets is highest with high interaction intensity).

3.4 Hypotheses – effects of flexibility traits of organisational culture

Organisational culture is "a system of shared values (that defines what is important) and norms that define appropriate attitudes and behaviors for organizational members (how to feel and behave)" (O'Reilly and Chatman, 1996: 160). Organisational cultures are historically and socially constructed, holistic and difficult to change (Ouchi, 1979; Bloor and Dawson, 1994). They are path-dependent (Barney, 1986 and 1991), constrained by inertia, and they reflect the imprinting of a firm's early environmental conditions (Hannan and Freeman, 1984; Sorensen, 2002).

From the perspective of RBT, an organisation's culture can be a VRNI resource (Barney, 1986 and 1991; Hambrick, 1987; Hansen and Wernerfelt, 1989; Reed and DeFillippi, 1990). An organisational culture that is conducive to the market-matched style of organisational learning will be 'valuable' in fostering Schumpeterian rents. An organisational culture can be 'rare'

because of path dependencies based on unique personalities and history, 'non-substitutable', and is largely 'inimitable' because systematic efforts to socially engineer a flexibility culture are most likely beyond the capabilities of most firms (Barney, 1986 and 1991). From the perspective of DCT, an organisational culture can be a VRNI resource used by (second order) dynamic capabilities (O'Reilly and Chatman, 1996). Such a VRNI resource can confer competitive advantage (Barney, 1986 and 1991), in this case indirectly in the form of Schumpeterian rents through the style of use of the budgeting system.

An antecedent relationship is supported by the empirical studies in the MCS literature, which show that organisational culture has a direct effect on the design and use of formal control systems (e.g., Bourn and Ezzamel, 1986; O'Connor, 1995; Goddard, 1997a and b; Henri, 2006a). As discussed in Chapter Two, these studies did not include market competitiveness related constructs. In the broader literature of organisational studies, Fey and Denison (2003) found that high levels of flexibility culture were required for higher firm performance in hypercompetitive conditions, whilst only moderate levels were required for higher firm performance in moderately competitive conditions.

The flexibility trait of organisational culture consists of two values: (1) 'involvement', which has the primary focus of internal integration, and (2) 'adaptability', which has the primary focus of external change (Fey and Denison, 2003). Involvement refers to employee empowerment, organising around teams, and development of human capability. High levels of involvement lead to greater participation and create a sense of ownership and responsibility, from which grows a greater commitment to the organisation and a growing capacity to operate under conditions of autonomy. Adaptability refers to the responsiveness of the organisation to external changes. Adaptable organisations are customer-driven, take risks and learn from their mistakes, and have experience with and capability at creating change (Fey and Denison, 2003). Greater adaptability is required to accept trial and error in the learning processes, to promote the questioning and changing of assumptions, and to normalise less structured courses of action that are required to promote innovation and experimentation.

Flexibility values influence the focus of employee attention, and they shape the interpretation of events and guide attitudes and behaviours (O'Reilly and Chatman, 1996). Information and communication processes embody and reflect cultural values (Trice and Beyer, 1984; Brown and Starkey, 1994). Strategic choices are also influenced by the effects of organisational culture on information and communication processes (Gagliardi, 1986; Dutton and Duncan, 1987; Pant and Lachman, 1998). Values influence the information and communication processes that

characterise styles of use of management control systems (Henri, 2006) by filtering the attention and judgements of individuals (Birnberg and Snodgrass, 1988).

The (flexibility) values of organisational culture affect practically all aspects of organisational interactions, including those at the top management level (Hambrick and Mason, 1984; Chatterjee et al., 1992; Pant and Lachman, 1998). Flexibility values influence interactive control processes at both the upper and subordinate levels (Simons, 1990; Henri, 2006a) and facilitate creative conflict between top-down and bottom-up emergent strategy processes (Simons, 1995). From a learning perspective, these interactions utilise new and existing information in a creative and cognitive way (Daft and Weick, 1984; Fiol and Lyles, 1985; Makhija and Ganesh, 1997). The social complexity feature of organisational culture influences organisational information and communication processes. These processes aid organisational learning by facilitating collective problem solving (Barney, 1991; Makhija and Ganesh, 1997; Teece et al., 1997).

3.4.1 Moderately competitive markets

Hypothesis 1 proposed that firm performance in moderately competitive conditions is expected to be highest with a combination of high interaction frequency and moderate interaction intensity. Such a style of use relies on variation learning for choosing anticipatory information and action plans, which in turn motivates incremental, path-dependent processes of variation learning within operating capabilities. Following Fey and Denison's (2003) findings of a relationship between higher firm performance and moderate levels of flexibility traits in moderately competitive settings, moderate levels of flexibility can be linked to the combination of high interaction frequency with moderate interaction intensity.

Variation learning in moderately competitive market settings has extensive re-use of existing knowledge for frequent, incremental path-dependent change (Eisenhardt and Martin, 2000). With low levels of flexibility, attitudes and behaviours would too strongly protect the status quo by inhibiting adaptation and stifling employee involvement in collective change-focussed efforts. On the other hand, high levels of flexibility would over-promote divergent adaptation possibilities and employee responsibility, and thereby be detrimental to the need to leverage the status quo. Thus, moderate levels of flexibility will instead provide values that are aligned with the requirement to involve employees in pre-planned, linear courses of adaptive action.

Moderate levels of flexibility will drive information and communication processes embodied with strategic-choice themes of frequent and incremental change. Moderate levels of flexibility have an adaptability orientation that values change and risk-taking only in conjunction with top

management endorsement. Also, employee involvement is only present to the degree that responsibility, commitment, empowerment and participation are accorded path- development ends. These values imply a drive for high interaction frequency, so that top and lower managements can actively discuss and decide upon incremental decisions and collectively 'learn before doing'. High interaction frequency will be an outcome of moderate levels of flexibility traits, because attitudes and behaviours will ensure anticipatory information and associated action plans need to contain frequently updated endorsement from top management.

On the other hand, moderate levels of flexibility will pre-dispose the organisation to moderate levels of interaction intensity. The reasons for this relationship revolve around how the attitudes of restrained adaptation and limited employee involvement constrain the contribution of bottom-up development to strategic choices. With an aversion to both divergent change and liberal employee involvement, moderate flexibility values will foster only mildly intensive questioning and changing of assumptions, and will discourage inclinations to contribute divergent ideas and information. The interactions will value information content that is consistent with a relatively low risk aversion, and communication styles will embody attitudes and behaviours that largely redevelop existing strategic choices.

Therefore, it can be predicted that *within the range of market conditions from moderately competitive to hypercompetitive:*

> **Hypothesis 2 (a):** *flexibility traits of organisational culture have a negative effect on budgeting system interaction frequency.*

3.4.2 Hypercompetitive markets

Hypothesis 1 proposed that firm performance in hypercompetitive conditions is expected to be highest with a combination of moderate interaction frequency and high interaction intensity. Such a style of use relies on selection learning for choosing anticipatory information and guiding action plans, which then acts to guide processes of local experiential learning within operating capabilities. Following Fey and Denison's (2003) findings of a relationship between higher firm performance and high levels of flexibility traits in hypercompetitive settings, high levels of flexibility can be linked to the combination of moderate interaction frequency with high interaction intensity.

Selection learning in hypercompetitive conditions is difficult, because it is challenging to decipher which experience should be generalised from the extensive situation-specific knowledge that occurs (Eisenhardt and Martin, 2000). With low levels of flexibility, attitudes and behaviours would strongly inhibit adaptation and discourage employees from involving

themselves in effecting change. Similarly, moderate levels of flexibility traits would inadequately encourage employees to engage with discontinuous change. Thus, high levels of flexibility will instead provide values that are aligned with the requirements to emphasise step-function change and transformative reconfiguration.

High levels of flexibility compel information provision and communication processes that are embodied with strategic-choice themes of discontinuous change. High levels of flexibility normalise relatively unstructured courses of action for promoting innovation and experimentation. The degree of structure demanded from a budgeting system will be just enough for it to provide guidance for decentralised search activities. High flexibility values encourage employees to explore risky change that is guided by top management vision. These values imply a drive for moderate interaction frequency, so that the relatively infrequent top management involvement provides a strategic-choice framework that guides and promotes semi-autonomous innovation and experimentation. Moderate interaction frequency will be an outcome of high levels of flexibility traits, because attitudes and behaviours will ensure that anticipatory information and associated action plans foster decentralised change and learning.

On the other hand, high levels of flexibility will push the organisation toward high levels of interaction intensity. This is because the values that strongly promote adaptation and employee involvement will liberalise the interface for blending top-down and bottom-up strategic choices. The interactions will value information content that is not averse to risk-taking, and communication styles will embody attitudes and behaviours that encourage broad scale employee involvement in developing non-linear strategic choices. With a desire for both divergent change and extensive employee participation and responsibility, high flexibility values will compel intensive questioning and changing of assumptions, and will encourage the debate and challenge of divergent ideas and activities.

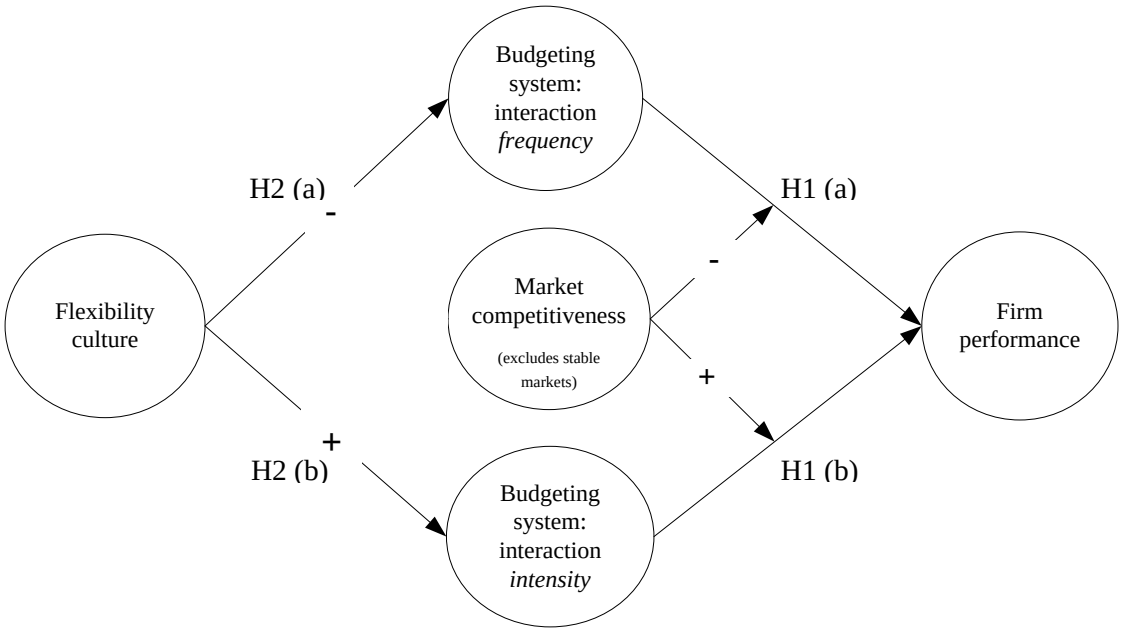
Therefore, it can be predicted that *within the range of market conditions from moderately competitive to hypercompetitive:*

> **Hypothesis 2 (b):** *flexibility traits of organisational culture have a positive effect on budgeting system interaction intensity.*

3.5 Chapter conclusion

This chapter developed two pairs of hypotheses. Firstly, H1 (a) and H1 (b) predict relationships between two dimensions of interactive use of a budgeting system, i.e., frequency and intensity. The relationships are contingent upon market competitiveness within the range of moderately competitive and hypercompetitive markets. Secondly, H2 (a) and H2 (b) predict relationships between flexibility culture and the two dimensions of interactive use of a budgeting system. The relationships are bound within the range of moderately competitive and hypercompetitive markets (i.e., they do not apply to stable market conditions). Figure 3.1 displays the hypotheses figuratively.

Figure 3.1 – Theoretical model: impacts of flexibility culture, style of budgeting system use and market competitiveness on firm performance



4.0 CHAPTER FOUR – RESEARCH METHOD AND DESIGN

4.1 Introduction

This chapter scopes, discusses and justifies the research method used to collect and analyse data to test the hypotheses. A cross-sectional self-reported survey was employed. Data analysis for testing the hypotheses was performed using partial least squares (PLS). Measurement scales are justified for the theoretical constructs. After a detailed review of the extant literature, new scales for budgeting system style of use are developed. Scales for market competitiveness, flexibility culture and firm performance are adapted from the literature and justified. The unit of analysis, target respondents, sampling controls and survey distribution strategy are developed and justified. The questionnaire was pre-tested and pilot tested. Non-response bias testing was performed and descriptive statistics are reported for the final usable sample.

4.2 Cross-sectional self-reported survey

Very few Australian firms operate under hypercompetitive conditions. In order to meet requirements for statistical power and population representativeness, the target sample includes publicly-listed and privately held firms. Public data for both publicly-listed and privately held firms is not available for all of the four theoretical constructs: i.e., style of use of budgeting systems; flexibility culture; perceived market competitiveness; and the industry relative approach to firm performance. Therefore, typical of the vast majority of large scale quantitative research in management accounting, the research design will use data from a self-administered survey (Van der Stede et al., 2005). Ideally, data would be collected over multiple time periods so as to enable firmer conclusions concerning the causality of the relationships. Such a longitudinal design is impractical however, as it would lead to a myriad of logistical and cost barriers. Thus, like 98% of survey-based articles in management accounting research, the data will be cross-sectional (Van der Stede et al., 2005).

When appropriately constructed and administered, self-administered surveys can be a source of large-scale, high-quality data (Diamond, 2000). As discussed in the following sub-sections, to ensure high-quality data, pre-testing was conducted, follow-up procedures were used to increase response rates, and non-response bias testing was used to assess data quality (Dillman, 2000; Van der Stede et al., 2005).

4.3 Approach to data analysis – partial least squares (PLS)

4.3.1 Justification for using PLS

Structural equation models (SEM) are second-generation multivariate statistical techniques (Fornell, 1982). In contrast to first-generational techniques, such as regression and cluster analysis, SEM permit the explicit inclusion of measurement error, and the incorporation of unobservable and abstract constructs (Fornell, 1982). Bagozzi (1980) identified four key benefits of SEM: (1) the assumptions, constructs, and hypothesised relationships in a model are made explicit; (2) theoretical precision is enhanced, because SEM require clear definitions of constructs, operationalisations, and functional relationships; (3) SEM permit a more complete representation of complex theories; and (4) SEM provide a formal framework for constructing and testing both theories and measurement models.

There are two types of SEM: covariance-based and partial least squares (Chin, 1998). Co-variance SEM are best suited to theory-oriented confirmatory analysis, whilst PLS is primarily intended for predictive analysis in situations of high complexity with less strict statistical assumptions (Wold, 1982; Chin, 1998). Co-variance SEM require multivariate normality, whilst PLS is 'distribution free' (Wold, 1982). In co-variance based SEM it is assumed that measures have random error, whilst in PLS it is assumed that observed variances are useful (Anderson and Gerbing, 1988). Information estimation in co-variances SEM is more efficient than in PLS (Fornell and Bookstein, 1982). PLS is better suited to more complex models with smaller sample sizes (Fornell and Bookstein, 1982; Wold, 1982; Chin, 1998).

Chin (1998) provided three situations in which PLS is more appropriate than co-variance SEM. Based on these, PLS is proposed to be the more appropriate data analysis approach for this study:

1) PLS is more appropriate if the research phenomena are relatively new, such that the theoretical model or measures are not yet well formed, thus requiring flexibility in the modelling stage. In this study, the budgeting systems style of use construct is being measured with a new set of scales and structural model configuration, thus potentially requiring flexibility during the data analysis stage for eliciting the optimal measurement approach. In addition, the market competitiveness construct has not been operationalised previously.
2) PLS is more appropriate when the data conditions relating to normal distribution, independence, or sample size are not met. In particular in this study, the number of

responses from firms in hypercompetitive settings is expected to be relatively small, and PLS is particularly suited to small sample sizes (Chin and Newsted, 1999).

3) PLS is more appropriate when the model is relatively complex, with a large number of measures or constructs. In this study, the proposed model contains second-order constructs with a large number of measures.

A PLS model is analysed and interpreted in two stages: (1) the measurement model, and (2) the structural model (Anderson and Gerbing, 1988; Hulland, 1999). The measurement model defines how each block of indicators relates to its latent variable. An "auxiliary theory" (Edwards and Bagozzi, 2000: 155) must be used to specify the epistemic relationships between constructs, dimensions and indicators (Jarvis et al., 2003). As discussed in the next sub-section, these epistemic relationships can be either reflective or formative. The structural model depicts the relationship among latent variables based on substantive theory (Chin, 1998). As discussed in sub-section 4.3.3, the epistemic relations of multidimensional constructs can be either latent or emergent (Jarvis et al., 2003; Bisbe et al., 2007).

4.3.2 Measurement model: reflective or formative indicators

For measurement models, there are two types of epistemic relationships: reflective and formative.

1) Reflective indicators are typical of the classical true score test theory and factor analysis models, in which all indicators are seen to measure the same underlying phenomenon (i.e., latent variable). Changes in the level of the phenomenon should be reflected in changes in all the indicators in the same direction, and the magnitude by which an indicator shifts relative to a shift in the underlying phenomenon is based on how well the indicator taps into the latent variable (Chin, 1998). Indicator loadings show the proportional amount of variance for which the latent variable is able to account, and consequently, indicators with low loadings imply that they have little relationship in terms of shared variance (correlation) with the latent variable component score.
2) Formative indicators are not necessarily correlated, and they do not measure the same underlying phenomenon (Chin, 1998). Rather, "formative indicators are viewed as the cause variables that provide the condition under which the latent variable is formed" (Chin, 1998: 306). The latent variable is viewed as an effect rather than a cause of the indicator responses, and therefore examinations of correlations or internal consistency are inappropriate and illogical (Fornell and Bookstein, 1982; Bollen and Lennox, 1991). The interpretation of latent variables with formative indicators is based on the

indicator weights, which provide information about the makeup and relative importance for each indicator in the formation of the component (Chin, 1998). As summarised in Table 4.1 below, Jarvis et al. (2003) provided comprehensive guidance for determining whether a measurement model should be reflective or formative.

Table 4.1 – Comparison of formative and reflective measurement models

	Formative model	**Reflective model**
1) Direction of causality from construct to measure implied by the conceptual definition	Direction of causality is from items to construct	Direction of causality is from construct to items
Would changes in the indicators/items cause changes in the construct or not?	Changes in the indicators should cause changes in the construct	Changes in the indicators should not cause changes in the construct
Would changes in the construct cause changes in the indicators?	Changes in the construct do not cause changes in the indicators	Changes in the construct do cause changes in the indicators
2) Interchangeability of the indicators/items	Indicators need not be interchangeable	Indicators should be interchangeable
Do the indicators share a common theme?	Indicators need not share a common theme	Indicators should share a common theme
Would dropping one of the indicators alter the conceptual domain of the construct?	Dropping an indicator may alter the conceptual domain of the construct.	Dropping an indicator should not alter the conceptual domain of the construct
3) Covariation among the indicators	Not necessary for indicators to covary with each other	Indicators are expected to covary with each other
Should a change in one of the indicators be associated with changes in the other indicators?	Not necessarily	Yes
4) Nomological net of the construct indicators	Nomological net for the indicators may differ	Nomological net for the indicators should not differ
Are the indicators/items expected to have the same antecedents and consequences?	Indicators are not required to have the same antecedents and consequences	Indicators are required to have the same antecedents and consequences

Source: Jarvis et al. *(2003)*

4.3.3 Multidimensional constructs

The epistemological relationships for multidimensional relationships mirror those of unidimensional constructs. The two alternative types are latent models and emergent models.

1) Latent multidimensional models assume the construct exists at a deeper and more embedded level of abstraction than its constitutive dimensions (Bisbe et al., 2007). The dimensions are different forms manifested by the higher-order construct (Law et al., 1998). The causal relationships flow from the construct to the dimensions, and thus a change in the construct results in a change in the dimensions (Jarvis et al., 2003; Bisbe et al., 2007). Dimensions should covary, and are essentially interchangeable; and so a sample, rather than a census, of dimensions is required (Jarvis et al., 2003).
2) Emergent multidimensional models exist at the same level of abstraction as their dimensions and are defined as combinations of their dimensions (Law et al., 1998; Bisbe et al., 2007). The dimensions are the defining characteristics of the construct, and thus a change in the dimensions results in a change in the construct (Jarvis et al., 2003; Bisbe et al., 2007). Dimensions should not necessarily covary, and are not interchangeable. Leaving out constitutive dimensions of the higher-order construct may provoke serious specification problems, and thus a census of dimensions is required, not a sample (Jarvis et al., 2003; Bisbe et al., 2007).

For modelling latent and aggregate multidimensional variables in PLS, Chin et al. (2003) outlined a procedure based on the hierarchical component model suggested by Wold (cf. Lohmöller, 1989). A higher-order factor is directly measured by the observed variables from the lower-order dimensions. This procedure works best with equal numbers of indicators for each construct (Chin, 1997). The repeated indicators at the higher-order level are always modelled as reflective (Wold, 1982). The hierarchical component model can also be a basis from which PLS can calculate latent variable scores to be successively used as indicators for the second order construct. Chin and Gopal (1995: 50) used this latent variable based indicator approach, commenting that each manifest variable is "optimally weighted and combined using the PLS algorithm to create a latent variable score. The resulting score more accurately reflects the underlying construct than any of the individual items by accounting for the unique factors and error measurements that may also affect each item."

4.3.4 Moderating relationships in PLS: three approaches

The theoretical model developed in Chapter Three hypothesises a moderating relationship, whereby the relationship between the style of use of a budgeting system (the independent variable) and firm performance (the dependent variable) depends on market competitiveness (the moderating variable). Generally, there are three possible methods to test a moderating relationship in a latent variable situation (Jöreskog, 1998).

1) In the ‘product indicator method’, a multiplicative interaction variable is produced by multiplying values of all items measuring the moderating variable with values of all items measuring the independent variable (Schumacker, 2002). In a second step, the multiplicative interaction variable is added to the structural model for assessment. The significance of the path coefficient between the interaction variable and the dependent variable can show the moderating relationship. Chin et al. (2003) recently developed and demonstrated this method with PLS, and showed that a sample size of at least 150 is required per four indicators. This method requires the independent and moderating variables to be measured reflectively (Chin et al., 2003).
2) In the ‘product latent variable score method’, the moderating variable and independent variable use latent variable scores as indicators (Bollen, 1995; Jöreskog, 1998). As with the product indicator method, in the second step, an interaction variable is created by multiplying the latent score of the moderating variable with the other interacting variable. Using a version of co-variance based SEM, Schumacker (2002: 49) applied the first and second methods on the same data set, found the results were almost the same, and concluded that “the latent variable score approach was easier to implement… and has utility when testing more complex structural equation interaction models”.
3) In the ‘sub-group method’, the moderating variable is used to split the total sample into sub-groups. Comparing the path differences across the sub-groups allows for the interaction effects to be assessed. This approach is the simplest and most straightforward, but requires the latent construct to be separated to form the sub-groups (Jöreskog, 1998).

Given that the theoretical model and measures for budgeting systems style of use and market competitiveness are yet to be empirically examined, some degree of flexibility may be needed in the modelling stage. Conceivably, all three approaches may be useful. However, it is proposed that the primary method for testing the moderating relationships will be the sub-group method. The budgeting system style of use construct is hypothesised to require formative measurement model specification, and the product indicator approach has not been developed for formatively measured models (Chin et al., 2003). Thus, the dataset will be segmented into sub-groups based on market competitiveness, and separate PLS models will be compared to test for the moderation effects.

4.4 Measurement scales

In the following section, the measurement scales adopted and developed for operationalising the constructs in the PLS model are discussed and justified. The epistemological relationships between constructs and indicators are specified and justified. The feedback received during pre-testing is discussed where relevant. There are four sub-sections, pertaining to each of the theoretical constructs: (1) style of budgeting systems use (BUDSTYLE); (2) market competitiveness (MARKCOMP); (3) flexibility culture (FLEXCULT); and (4) firm performance (FIRMPERF).

4.4.1 Style of use of budgeting systems (BUDSTYLE)

In Chapter Three the theoretical model conceptualised budgeting systems style of use (BUDSTYLE) with two dimensions: (1) interaction frequency, and (2) interaction intensity. In the following section, the structural and measurement model requirements for this BUDSTYLE concept are discussed. Sub-section one summarises the key definitional features of interactive control from the extant literature. Drawing from the extant definitions, sub-section two defines interaction intensity and interaction frequency. As discussed in Chapter Two, Bisbe et al. (2007) argued that interactive control should be measured as a multidimensional construct. Sub-section three examines the multidimensional framework proposed by Bisbe et al. (2007), which forms the basis of the measurement approach developed for the BUDSTYLE operationalisation in sub-section five. The Bisbe et al. (2007) framework does not include questions for operationalising the observable indicators, and sub-section five provides a comprehensive review of existing measurement scales. Sub-section six outlines the set of survey questions that were developed based on the extant literature and through pre-testing procedures, and finally, discusses the fundamental differences between the extant meaning of 'interactive control' and the BUDSTYLE concept in terms of structural and measurement model considerations.

4.4.1.1 Definitions: diagnostic and interactive styles of use

Simons (1991: 52) explained that the interactive and diagnostic styles of use "represent two extremes of a continuum of top management attention", and the "amount of top management attention directed to a control system" determines whether the system is interactive (Simons, 1991: 49). When used interactively, the top manager leads recurring processes that require the frequent and regular attention of all levels of management for the continual challenge and debate of action plans that are of strategic importance (Simons, 1991 and 1995). In contrast, when used diagnostically, budgets are prepared and presented by staff specialists to meet the

financial goals set by top management, who subsequently use them to manage by exception the implementation of the intended strategies by tracking variances from the preset goals (Simons, 1994 and 1995).

The above comments capture the salient definitional features discussed by Simons. A comprehensive review of definitions from the interactive control literature (Davila, 2000; Van der Stede, 2001; Marginson, 2002; Bisbe and Otley, 2004; Widener, 2007; Bisbe et al., 2007) is provided in Appendix A. All the definitions reflect Simons' seminal work, departing from each other in matters of emphasis only. In particular they all adopt Simons' (1990: 137) argument that "the personal involvement of top managers…is the defining characteristic of interactive control". This key theme is used in the definitions of interaction frequency and interaction intensity developed in the next sub-section.

4.4.1.2 Definitions: interaction intensity and interaction frequency

As noted in the theoretical model developed in Chapter Three, BUDSTYLE has two dimensions: (1) interaction frequency, and (2) interaction intensity. These two dimensions are chiefly based on the level of involvement of top management, in terms of frequency and intensity. Based on a synthesis of the work of Simons and Bisbe et al. (2007), these two constructs are defined as:

1) *Interaction frequency* is how often managers use the system interactively. At the lowest level, a diagnostic frequency occurs when managers discuss system information infrequently. At the other end of the continuum, high frequency occurs when managers are frequently and regularly involved in discussions based on system information.
2) *Interaction intensity* is the degree to which interactions are characterised by challenge and debate of strategically important action plans. At the lowest level, a diagnostic intensity occurs when senior management do not use the system to discuss changing action plans. At the other end of the continuum, high intensity occurs when senior managers use interactions to actively promote and support strategic change.

4.4.1.3 Multidimensional framework of Bisbe et al. (2007)

In contrast to the unidimensional measurement approaches in the literature, Bisbe et al. (2007) proposed a multidimensional approach to operationalising interactive control. They conducted a thematic analysis of Simons' literature, resulting in five properties by which interactive control systems may be "tentatively defined" (Bisbe et al., 2007: 797). The five dimensions are: (1) an intensive use by top management; (2) an intensive use by operating management; (3) a

pervasiveness of face-to-face challenges and debates; (4) a focus on strategic uncertainties; and (5) a non-invasive, facilitating and inspirational involvement of the top manager.

Referring to the criteria outlined by Jarvis et al. (2003), Bisbe et al. (2007) conclude that interactive control should be modelled as a five-dimensional, emergent construct (i.e., formative second order). This specification is because: (1) the five properties do not share a common theme or single theoretical concept and thus do not necessarily covary; (2) interactive use exists at the same conceptual level as the dimensions; (3) interactive use is not an unobservable higher-order abstraction that underlies the dimensions, but instead exists as a combination of the dimensions; (4) the separate dimensions define and form the interactive construct, rather than being driven by a higher-order latent construct; and (5) the dimensions do not necessarily share the same consequences and antecedents, given their distinct nature. Bisbe et al. (2007) argue that all indicators should be reflective. This is because: (1) each indicator is a manifestation of its dimension; (2) the dimensions are at a higher level of abstraction, and are reflected by their own series of observable indicators; and (3) the indicators within each dimension can be conceptually expected to covary in a predictable pattern. This conceptualisation is diagrammed in Figure 4.1 below.

Figure 4.1 – Bisbe et al. (2007): proposed interactive control operationalisation

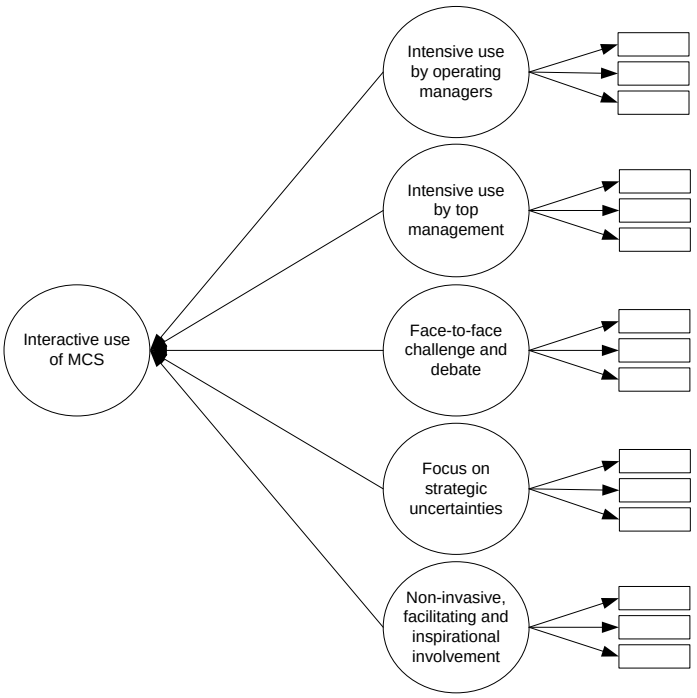


Table 4.2 below shows the overlaps of the five proposed dimensions with the two BUDSTYLE constructs. There is a straightforward match with four of the Bisbe et al. (2007) dimensions. The fifth dimension, leadership style, does not match. Bisbe et al. (2007) argue that all five

dimensions should be included in measurement models, even when not theoretically relevant to a particular research objective, because the omission of an essential facet would lead to concept misspecification. Acknowledging they offer the five dimensions as being only "tentatively defined" (Bisbe et al., 2007: 797) and as a "basis for future research" (Bisbe et al., 2007: 795), it is noteworthy that there is no strong indication in the literature that leadership style is an essential facet of interactive control. Simons does not emphasise this facet as a critical dimension and no other study has referred explicitly to leadership style (Abernethy and Brownell, 1999; Bisbe and Otley, 2004; Van der Stede, 2001; Davila, 2000; Henri, 2006a and b; Widener, 2007). This point is even more pertinent given that Bisbe et al. (2007) also argue that measurement models must be based upon a specific agreed-upon meaning and domain. For these reasons, leadership style was not included in the measurement model.

Table 4.2 – Overlaps of the Bisbe et al. (2007) framework with BUDSTYLE

	Interaction Frequency	Interaction Intensity
1 *An intensive use by top management* - refers to the frequency of senior management involvement in the system.	X	
2 *An intensive use by operating management* - refers to the frequency of operating management involvement in the system.	X	
3 *A pervasiveness of face-to-face challenges and debates* - refers to the communication medium for interactions.		X
4 *A focus on strategic uncertainties* - refers to the information content of discussions – strategic uncertainties are changes in critical competitive dynamics and internal competencies.		X
5 *A non-invasive, facilitating and inspirational involvement* - refers to the leadership style of the top manager.	?	?

4.4.1.4 Four dimensional measurement model

Based mainly on the Bisbe et al. (2007) framework, with some refinements from the pre-testing procedures discussed in a later sub-section, the two BUDSTYLE dimensions can now be defined in measurement model terms.

1) 'Interaction frequency' has two sub-dimensions:

    a) 'senior management interaction frequency': refers to the frequency with which senior management interact with peers to discuss system information.
    b) 'senior and middle management interaction frequency': refers to the frequency with which senior management interact with subordinate managers to discuss system information.

2) ‘Interaction intensity’ has two sub-dimensions:

    a) ‘the degree of face to face challenge and debate’: refers to the communication medium used for interactions. At the lowest level, diagnostic intensity involves limited face-to-face discussion of system information. At the other end of the continuum, high interactive intensity means that senior managers extensively and collectively debate and challenge the action plans of subordinates.
    b) ‘the degree of focus upon strategic uncertainties’: refers to the content of the communications. At the lowest level, diagnostic intensity occurs when strategic changes are not discussed in the context of system information. At the other end of the continuum, high interactive intensity occurs when top managers focus attention on altering the direction of the business.

4.4.1.5 Interactive use – existing measurement approaches

Bisbe et al. (2007) do not provide questions that operationalise the observable indicators for the multidimensional approach. The measurement scales from the published literature are reviewed in the next sub-section, with the purposes of: (1) informing the development of survey questions for operationalising the observable indicators, and (2) understanding how existing empirical analyses support the dual construct conceptualisation of BUDSTYLE. There are two different existing measurement scale approaches: three studies have treated diagnostic use and interactive use as separate constructs (Henri, 2006a and b; Widener, 2007), and four studies have used continuum-based questions to gauge the level of interactive use of a single management control system (Abernethy and Brownell, 1999; Davila, 2000; Van der Stede, 2001; Bisbe and Otley, 2004).

Henri (2006b) and Widener (2007)

Two studies have used measurement scales that separately gauge diagnostic and interactive use. Henri (2006b) and Widener (2007) examined performance measurement systems, which comprise multiple MCS including budgeting systems. It is possible to conceptualise the use of a single MCS, such as a budgeting system, using this approach. For example, the system might receive interactive use at quarterly intervals, with diagnostic use in the intervening periods. However, a continuum ranging from diagnostic to interactive is far more consistent with the definitions applied in this thesis. The interaction frequency and interaction intensity definitions are based on “two extremes of a continuum of top management attention” (Simons, 1991: 52) – thus it is upon these theoretical elements that measurement conceptualisation should ultimately rest.

Both studies used some of the same questions, albeit Henri (2006b) had two more for diagnostic use and Widener (2007) had six extra questions for interactive use, as shown in Table 4.3.[16] There are some problems with the interpretations of the questions. For questions 3 to 11, Henri (2006b) found two factors (diagnostic use and interactive use), whilst Widener (2007) found just the single factor (diagnostic use). Henri (2006b) found a correlation between diagnostic and interactive use of 0.64, and for Widener (2007) the correlation was 0.63. These correlations suggest that the two construct models may be unreliable. This could be due to the quality of the measurement scales. For example, items 1 to 4 (i.e., track progress towards goals, monitoring of results, comparing outcomes to expectations, and reviewing key measures) are also key sources of information for attention in an interactive style of use. Interactive use still uses this information, albeit in a different manner.[17] Also noteworthy is the exclusion of any reference to involvement of top management in questions 1 to 11. This key element of interactive use is, however, generally present in the extra six questions used by Widener (2007) to fully operationalise interactive use. Consistent with the definitions of interactive use outlined earlier, these two points suggest that questions need to explicitly reference senior management involvement.

[16] Both studies had reasonably similar samples, ruling out the explanation that the differences may be caused by contextual differences in the samples. Widener's (2007) sample firms had an average of 1,334 employees and comprised manufacturing firms (44%), service firms (27%), mining firms (8%), financial services firms (8%) transportation firms (7%), retailers (4%) and wholesalers (2%). Henri's (2006b) sample firms had an average of 796 employees, and were comprised of manufacturing firms (100%).

[17] Simons (1995: 108) noted, "As in a diagnostic system, actual results are compared with expectations, but any significant discrepancy – positive or negative – triggers a search for understanding". To elaborate, this information would not be used for management by exception (i.e., diagnostically), but rather would be carried in dialogue concerning how actual performance impacted upon strategic uncertainties. This might then lead to the triggering of new action plans, which then become embedded in new forecasts, and so forth until the next interactions occur.

Table 4.3 – Analysis of measurement data: Henri (2006b) and Widener (2007)

		Cronbach alpha / factor loading			
		Henri (2006b)		**Widener (2007)**	
		Diagnostic	Interactive	Diagnostic	Interactive
		0.79	**0.87**	**0.96**	**0.84**
1	Track progress towards goals	1.00			
2	Monitor results	0.80			
3	Compare outcomes to expectations	0.87		0.76	
4	Review key measures	0.83		0.78	
5	Enable discussions in meetings of superiors, subordinates and peers		0.95	0.91	
6	Enable continual challenge and debate underlying data, assumptions and action plans		0.91	0.92	
7	Provide a common view of the organisation		1.12	0.94	
8	Tie the organisation together		1.02	0.90	
9	Enable the organisation to focus on common issues		1.01	0.95	
10	Enable the organisation to focus on critical success factors		0.78	0.93	
11	Develop a common vocabulary in the organisation		1.04	0.80	
12	Top management pays little day-to-day attention to the performance measurement system				0.82
13	Top management relies heavily on staff specialists in preparing and interpreting information from the performance measurement system				0.59
14	Operating managers are involved infrequently on an exception basis with the performance measurement system				0.54
15	Top management pays day-to-day attention to the performance measurement system				0.82
16	Top management interprets information from the performance measurement system				0.60
17	Operating managers are frequently involved with the performance measurement system				0.62

Bisbe and Otley (2004)

As displayed in Table 4.4, Bisbe and Otley (2004) used four continuum-based questions to measure the level of interactive use of a budgeting system. Item 1 predominantly captures interaction intensity, even though there is a subtle reference to "continually". Items 2 to 4 generally capture interaction frequency. Thus, item 1 reflects just interaction intensity, while items 2 to 4 reflect just interaction frequency. In support of the two dimensional BUDSTYLE construct, item 1 loaded on a separate factor to the remaining three.

Table 4.4 – Analysis of measurement data: Bisbe and Otley (2004)

		Interaction Frequency	Interaction Intensity	Cronbach Alpha / Factor Loading
				0.77
1	The main aim of budget tracking is (1) to ensure that previously established objectives are met vs. (7) to force us to continually question and revise the assumptions upon which we base our plans.		X	0.10 (excluded)
2	(1) Only when there are deviations from planned performance are budget tracking reports the main subject for face-to-face discussion with my executive team vs. (7) Whether there are deviations from planned performance or not, budget tracking reports are the main subject for face-to-face discussion with my executive team.	X		0.83
3	(1) I pay periodic or occasional attention to budgets (e.g. setting objectives, analysing periodic tracking reports vs. (7) I pay regular and frequent attention to budgets. I use them permanently.	X		0.86
4	(1) For many managers in my company, budgets require periodic or occasional attention, but not permanent attention vs. (7) In my company, budgets require permanent attention from all managers.	X		0.79

Abernethy and Brownell (1999)

As displayed in Table 4.5, Abernethy and Brownell (1999) used four continuum-based questions to measure the level of interactive use of budgeting systems. As indicated in columns two and three of the table, item 1 reflects both the interaction frequency and interaction intensity constructs. Items 2 and 3 only reflect interaction frequency, and item 4 reflects only interaction intensity. This analysis provides further, albeit limited, support for the two dimensional conceptualisation of BUDSTYLE.

Table 4.5 – Analysis of measurement data: Abernethy and Brownell (1999)

	Interaction Frequency	Interaction Intensity	Cronbach Alpha / Factor Loading
			0.59
1 I often use budgeting information as a means of questioning and debating the ongoing decisions and actions of departmental/clinical managers.	X	X	Not reported
2 The budget process is continuous – it demands regular and frequent attention from managers at all levels.	X		Not reported
3 There is a lot of interaction between top management and department/unit managers in the budget process.	X		Not reported
4 I use the budget process to discuss with my peers and subordinates changes occurring in the hospital.		X	Not reported

Davila (2000)

As displayed in Table 4.6, Davila (2000) used a single continuum-based question to measure the level of interactive use. The question was repeated six times for six separate types of MCS information. The single item reflects only the interaction frequency construct, meaning that the interaction intensity component was excluded from the effort to capture 'interactive use'. This argument is further borne out by other data not shown in the table. Davila (2000) also measured "frequency of information updating" using a five-point scale of frequencies of (1) weekly or less, (2) twice a month, (3) monthly, (4) quarterly, and (5) longer than quarterly. For each of the six types of MCS information, the "interactive" measures from the question in the table below loaded on the same factor as the "frequency of information updating". Overall, these scales only capture the 'frequency' dimension of interactive use.

Table 4.6 – Analysis of measurement data: Davila (2000)

		Interaction Frequency	Interaction Intensity	Cronbach Alpha / Factor Loading
1	'The information was used to monitor the project, but it was not discussed with my team except when it reported events that fell below plans or expectations' (diagnostic system) and 'the information was used constantly in the interactions with my team. Frequently it was the main topic of our conversation' (interactive system)	X		Not applicable

Van der Stede (2001)

As displayed in Table 4.7, Van der Stede (2001) used six continuum-based questions to measure the level of interactive use of a budgeting system. Item 1 weakly reflects both interaction frequency and interaction intensity, and blends them. Item 2 reflects both interaction frequency and interaction intensity, and also blends them. Item 3 taps interaction frequency. Item 4 weakly addresses interaction intensity. Items 5 and 6 clearly only reflect interaction frequency and have very low loadings, potentially because the overall factor is a blend of weak measures that combine both interaction frequency and interaction intensity. Overall, these scales blend the two dimensions of interactive use, and capture it more at the corporate level than the business unit level.

Table 4.7 – Analysis of measurement data: Van der Stede (2001)

		Interaction Frequency	Interaction Intensity	Cronbach Alpha / Factor Loading
				0.75
1	Corporate superiors call me in to discuss budget deviations in face-to-face meetings	X	X	0.74
2	My corporate superiors, myself, and my own subordinates often form a team to discuss and solve budgeting matters	X	X	0.71
3	Budget matters are discussed regularly with my corporate superior even if there are no negative budget deviations to report	X		0.64
4	I consult with my corporate superior on how to achieve my budget		X	0.54
5	Indicate the typical frequency with which you communicate with the corporate parent for formal budget-related issues	X		0.44
6	Indicate the typical frequency with which you communicate with the corporate parent for informal budget-related issues	X		0.43

In concluding this section, two extant measurement approaches were critically evaluated. First, two studies have operationalised diagnostic and interactive use separately (Henri, 2006b; Widener, 2007). Each study has a high correlation between the two constructs, contrary to top management involvement. Additionally, questions used for diagnostic use in one study are used for interactive use in the other study. Hence, these measurement approaches are problematic. Second, other studies use questions that seek to gauge a continuum of diagnostic to interactive use. These scales are consistent with the conceptualisation of interactive use being based on top management involvement. Abernethy and Brownell (1999), Davila (2000), Van der Stede (2001), and Bisbe and Otley (2004) have each used unique approaches that were shown to only partially tap the two dimensions of interactive use, and to blend them in some cases. Additionally, it is apparent that the scales do not cover the lower level dimensional measures: in particular there is an absence of questions that cover the 'senior and middle management interaction frequency' sub-dimension, and 'the degree of focus upon strategic uncertainties' sub-dimension.

4.4.1.6 Measurement scales and dual construct structural model

Given the lack of appropriate scales for operationalising the four measurement dimensions, a new set of scales was developed. Section 4.6.2.1 describes the development process and pre-testing procedures undertaken. Table 4.8 shows the final questions used in the survey. There are four questions for each of the two sub-dimensions of the interaction frequency construct. For the interaction intensity construct, pre-testing revealed that the two sub-dimensions were ambiguous and so the decision was made to start with five measures to mitigate the risk of potentially having less than four reliable indicators per sub-dimension, as advised by Chin et al. (2003: 203). In the survey, respondents were asked to… "Please indicate the degree to which you agree or disagree with the following statements regarding profit planning in your business unit ('Strongly Disagree' = 1 through to 'Strongly Agree' = 9)". In the survey, the questions were randomly ordered to avoid auto-correlation effects.

Table 4.8 – Questionnaire items for BUDSTYLE

Construct *Dimension* Code	Question
Interaction frequency (FREQ)	
Senior management interaction frequency (SNR-FRQ)	
snrfrq1	Senior managers meet and discuss profit planning information very frequently (e.g., weekly)
snrfrq2	Senior managers are continually involved in profit planning activities
snrfrq3	Senior managers constantly interact with peers in profit planning activities
snrfrq4	Senior managers very often attend presentations of profit planning information
Senior and middle management interaction frequency (MID-FRQ)	
midfrq1	Middle managers constantly interact with senior managers in profit planning activities
midfrq2	Middle managers very often present profit planning information to senior managers
midfrq3	Middle and senior managers meet and discuss profit planning information very frequently (e.g., weekly)
midfrq4	Middle managers are continually involved in profit planning activities with senior managers
Interaction intensity (INTENS)	
The degree of face to face challenge and debate (CHALL)	
chall1	Profit planning meetings always have extensive challenge and debate of underlying assumptions
chall2	Profit planning meetings always investigate progress made for delivering on expectations
chall3	Every profit planning meeting involves intensive review and revision of action plans
chall4	Profit planning meetings always include consideration of multiple alternatives and scenarios
chall5	Every profit planning meeting has in-depth discussion of why results differ from expectations
The degree of focus upon strategic uncertainties (STRAT)	
strat1	Significant business development opportunities are a key focus in every profit planning meeting
strat2	Strategic business changes are always assessed in profit planning meetings
strat3	Business critical threats are always an important discussion point in profit planning meetings
strat4	Strategic business imperatives are redefined and reprioritised in every profit planning meeting
strat5	The sustainability of our business strategies is a key theme in profit planning meetings

The BUDSTYLE conceptualisation predicts that the effective match of the interaction frequency and interaction intensity variables would be asymmetrical for both moderately competitive and hypercompetitive market conditions, as shown in Figure 4.2.

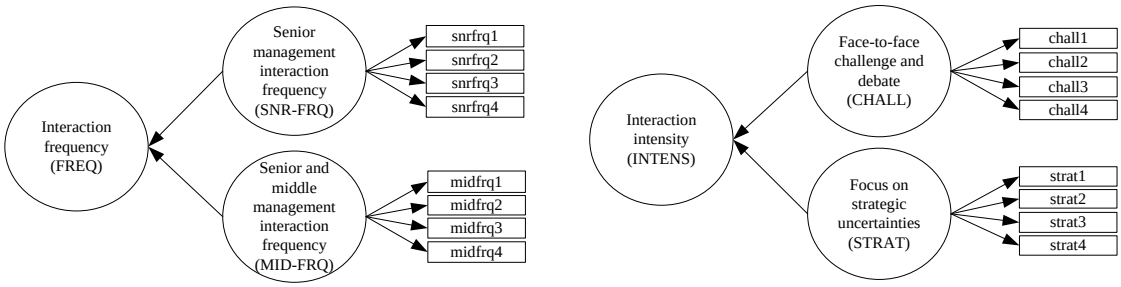
Figure 4.2 – Asymmetrical dimensions of BUDSTYLE

		Interaction Intensity		
		Low	Moderate	High
Interaction frequency	Low	(Stable markets)		
	Moderate			Hypercompetitive
	High		Moderately competitive	

The BUDSTYLE theoretical predictions mean that interaction frequency (FREQ) and interaction intensity (INTENS) do not algebraically combine to form an overall abstract concept. It is not theoretically meaningful to combine them as a higher-order latent variable. Instead, there are

two emergent constructs, FREQ and INTENS, each of which has a direct relationship with firm performance. In addition, the two constructs are predicted to have different relationships with the organisational culture traits of flexibility, requiring the paths in the PLS model to be directed to the individual constructs rather than a profile of the two (e.g., Law et. al, 1998). Notwithstanding this dual construct difference, the other arguments provided by Bisbe et al. (2007) still apply, and thus the two constructs are emergent (i.e., formative second order) with reflective indicators. Figure 4.3 below shows the anticipated measurement model for BUDSTYLE. As was discussed in section 4.3.3, in PLS this could be operationalised using either the hierarchical component approach or the latent variable indicator approach.

Figure 4.3 – Dual construct model for budgeting systems style of use (BUDSTYLE)



4.4.2 Market competitiveness (MARKCOMP)

There are three states of market competitiveness to be gauged. 'Hypercompetitive markets' have "ambiguous industry structure, blurred boundaries, fluid business models, ambiguous and shifting players" (Eisenhardt and Martin, 2000: 1115). 'Moderately competitive markets' have "stable industry structure, defined boundaries, clear business models, identifiable players" (Eisenhardt and Martin, 2000: 1115). 'Stable markets' (non-competitive markets) are "static, simple and predictable" (Volberda, 1996: 366).

The literature does not provide a fully-developed approach for measuring the three states of market competitiveness. Instead, scale development requires a synthesis of the perceived environmental uncertainty (PEU) literature with elements of the hypercompetition literature. The measures developed follow a number of studies that have developed PEU based measures that were idiosyncratic to the particular research endeavor (e.g., Lindsay and Rue, 1980; Smart and Vertinsky, 1984; Dwyer and Welsh, 1985; Miller and Droge, 1986; Daft, Sormunen and Parks, 1988).

This section has five sub-sections. Sub-section one overviews the four dimensions of the external environment commonly measured via questionnaire in the perceived environmental

uncertainty (PEU) literature. Sub-section two maps the three states of market competitiveness to the four PEU dimensions. Sub-section three identifies the relevant environmental sectors to which these dimensions should be applied. Sub-section four adapts existing PEU scales to include the relevant environmental dimensions and sectors for gauging market competitiveness. Sub-section five outlines the translation of the measures from the scales into the three sub-groups of market competitiveness.

4.4.2.1 Perceived environmental uncertainty—- overview

PEU measures are widely used in the management accounting literature (Chenhall, 2003), strategic management literature (e.g., Garg, Walters and Priem, 2003), and the management literature (e.g., Priem, Love and Shaffer, 2002). Proponents of the PEU perspective argue that firms respond to the environment as it is interpreted by the decision makers, and that its unperceived characteristics do not affect either the decisions or the actions of management (e.g., Miles, Snow and Pfeffer, 1974; Hambrick and Snow, 1977; Daft and Weick, 1984; Miller, 1988). For example, in the retail industry, managers of Wal-mart would likely perceive their environment to be much more stable than the managers of a retail firm in start-up phase (Boyd, Dess and Rasheed, 1993). This view is supported by the empirical evidence of Miles, Snow and Pfeffer (1974), who showed that, within the same objective environment, there were organisations whose top managers perceived little or no change and uncertainty in the environment as well as organisations whose top managers perceived continuous change and uncertainty in the environment.

PEU is generally a function of two macro dimensions: dynamism and complexity (Duncan, 1972). Dynamism generally refers to the extent to which environmental forces range from static to changing (Burns and Stalker, 1961; Thompson, 1967; Duncan, 1972). There are three sub-dimensions of dynamism: rate of change, intensity of change, and unpredictability of change (Child, 1972; Jurkovich, 1974; Volberda, 1998). In addition to dynamism, a number of scholars have stressed the importance of considering complexity in environmental assessments (e.g., Dill, 1958; Lawrence and Lorsch 1967; Thompson, 1967; Khandwalla. 1977).

1) 'Rate of change' (i.e., frequency) refers to the rapidity of changes that occur in the organisation's environment (Dill, 1958; Burns and Stalker, 1961). The rate of change can range from low to high (Jurkovich, 1974; Volberda, 1998). When the rate of change is high, external activities and events shift rapidly, so decision makers do not have accurate information about them (Daft, Sormunen and Parks, 1988).
2) 'Intensity of change' refers to the size of change (Volberda, 1998), or the level of stability among changes (Jurkovich, 1974). The intensity of change increases when the proximity of

the change to current circumstances decreases (Abernathy and Clark, 1985), which can range from stable, through incremental (continuous change) to radical (discontinuous change) (e.g., Tushman and Anderson, 1986; Henderson and Clark, 1990; Hill and Rothaermel, 2003).

3) 'Unpredictability' reflects the extent to which cause-effect relationships concerning competitive forces are incomplete (Thompson, 1967). As noted by Volberda (1998), in unpredictable environments, developments within environmental sectors have multiple effects with ramifications in different directions at varying distances into the future. The unpredictability dimension can range from predictable to unpredictable. When predictable, past experiences can be readily extrapolated into the future (e.g., seasonal factors). When unpredictable, data may simply not be available, the future may be seen as having trend breaks or discontinuities, or product life cycles may be ambiguous and feedback loops may be long in duration (Volberda, 1998).
4) 'Complexity' was conceptualised by Child (1972: 3) as "the heterogeneity of and range of an organization's activities which are relevant to an organization's operations". The greater the number of factors (sectors) a manager perceives as relevant to decision-making, and the greater the differences and interdependencies among those factors, the more complex the external environment (Jurkovich, 1974; Miller and Friesen, 1983; Lawrence, 1981; Dess and Beard, 1984). Complexity can range from simple to complex (Duncan, 1972; Jurkovich, 1974; Volberda, 1998).

4.4.2.2 Perceived market competitiveness

The above four dimensions of the environment have been referred to in the hypercompetition literature to differentiate between the three states of market competitiveness, as follows.

1) 'Hypercompetitive markets' are fundamentally unpredictable, and may also be dynamic and complex (Volberda, 1996). Eisenhardt and Martin (2000) similarly noted that the rate of change is high (occurring frequently), the intensity of change is radical (nonlinear), and unpredictably is relatively high.
2) 'Moderately competitive markets' are dynamic and/or complex, but largely predictable (Volberda, 1996). Eisenhardt and Martin (2000) similarly noted that the rate of dynamism is high (occurring frequently), the intensity of dynamism is incremental and unpredictability is relatively low.
3) 'Stable markets' are "static, simple and predictable" (Volberda, 1996).

Table 4.9 shows how these arguments enable a systematic approach to using PEU concepts to gauge the three states of market competitiveness. The change rate and complexity dimensions

are not distinguishing features of the three states of market competition, because they do not differ for the moderate and hypercompetition sub-groups. In contrast, the change intensity and unpredictability dimensions vary systematically with the three states of market competition. For change intensity and unpredictability, respectively: the low/low levels correspond to stable markets, incremental/medium levels correspond to moderately competitive conditions, and radical/high levels correspond to hypercompetitive conditions.

Table 4.9 – Dimensions of PEU and market competitiveness

	Change rate (i.e., frequency)	**Change intensity**	**Unpredictability**	**Complexity**
Stable	Low	Low	Low	Simple
Moderately competitive	High	Incremental	Medium	Simple-to-complex
Hypercompetitive	High	Radical	High	Simple-to-complex

Adapted from: Volberda (1996) and Eisenhardt and Martin (2000).

This two-dimensional approach to market competitiveness is consistent with the theoretical arguments developed in Chapter Three, where unpredictability and radicalness of changes were the two key dimensions of the environment. Even though, ex ante, the intensity of change and unpredictability dimensions are the only two distinguishing features of market competitiveness, the rate of change and complexity dimensions were included in the survey instrument. Given that this is a new approach to measuring the environment, complexity and rate of change were included to enable supplementary testing – as will be detailed in Chapter Five.

Before discussing scales for capturing the environmental dimensions, in the next sub-section the environmental sectors to which they apply are discussed and selected. The PEU literature often applies frameworks (e.g., Duncan, 1972; Miles and Snow, 1978; Daft et al., 1988) to split the environment into sectors. Not all sectors are strategically important however, and the next step identifies those to be included in the measurement model.

4.4.2.3 Strategically important environmental sectors

Consistent with PEU logic, Daft, Sormunen and Parks (1988) argued that sectors of the environment impact individual firms to varying degrees: in a sector of high importance, external problems or opportunities greatly affect the organisation's performance. As overviewed in this section, the hypercompetition literature suggests three sectors are particularly important in gauging the environment; technology, customers and competitors

(e.g., Eisenhardt and Martin, 2000; Ang and Cummins, 1997; Bogner and Barr, 2000). Daft et al. (1988: 137-138) provided the following definitions of the three sectors:

1) 'The technological sector' includes the development of new production techniques and methods, innovation in materials and products, and general trends in research and science relevant to the respondent's firm.
2) 'The customer sector' refers to those companies or individuals that purchase the products made by the respondent's firm, and include companies that acquire the products for resale, as well as final customers.
3) 'The competitor sector' includes the companies, products, and competitive tactics: companies that make substitute products, products that compete with the respondent's firm and other companies in the same industry.

'Technology' is a key sector of uncertainty in hypercompetitive conditions (e.g., McNamara, Vaaler and Devers, 2003; Wiggins and Ruefli, 2005; Siggelkow and Rivkin, 2005). Some illustrative examples of changes in technology that underpin hypercompetition were provided by Arend (1999: 32): steam to diesel-electric locomotives; fountain to ballpoint pens; fossil fuel to nuclear power plants; safety to electric razors; propeller to jet aircraft; and leather to polymeric plastics. Further examples included the developments in the underlying technology in the industries of: photolithography; xerography; personal tape-machines; and jet-engines. More recent examples of technological innovations underlying hypercompetitive industries include biopharmaceuticals (Rothaermel, 2001), biotechnology (Liebeskind et al., 1996), and digital communications (Bogner and Barr, 2000).

The 'customer' and 'competitor' sectors also undergo significant change in hypercompetitive conditions (e.g., Eisenhardt and Martin, 2000). For example, Ang and Cummins (1997) studied hypercompetition in the US commercial banking sector, which was based on new and continually shifting product and geographic markets, frequent entry of unexpected competitors, radical redefinition of market boundaries, and short product life cycles. Bogner and Barr (2000) investigated the digital communications industry, which has sequentially and over an extended period of time experienced the entry of new competitors with different customer offerings (Bogner and Barr, 2000). Craig (1996) studied the Japanese beer industry as it went through an outbreak of hypercompetition, which saw a tenfold increase in new product development.

Thus, measures of market competitiveness should include the technological, customer and competitor sectors. However, Daft et al. (1988) included and defined three more sectors. The 'regulatory sector' includes federal and provincial legislation and regulations, city or community policies, and political developments at all levels of government. The 'economic

sector' includes economic factors such as stock markets, rate of inflation, foreign trade balance, federal and provincial budgets, interest rates, unemployment, and economic growth rate. The 'sociocultural sector' comprises social values in the general population, the work ethic, and demographic trends such as an increasing number of women in the work force. In the hypercompetition literature, only the regulatory sector has been directly discussed as one of importance.

Globalisation is another driver of hypercompetition (e.g., D'Aveni, 1994; Smith and Zeithaml, 1996; Gimeno and Woo, 1996; Siggelkow and Rivkin, 2005). However, changes in regulation (and globalisation) manifest themselves in the sectors of competitors, customers and technology. Significant changes in deregulation and globalisation will require firms to compete intensively in the sectors of technology, customers and competitors (e.g., Ang and Cummins, 1997; Bogner and Barr, 2000).

The exclusion of additional sectors from the measurement model is also justified by reference to the more general environment-orientated literature. Seminal literature suggests that the most appropriate industry characteristics for measuring an environment are its product-market (i.e., customer and competitor sectors) and technological characteristics (Burns and Stalker, 1961; Tosi et al., 1973; Child, 1974; Beard, 1978; Bourgeois, 1985). Many studies in the management and strategic management literatures only use scales that encompass these three sectors: for example, those that have adopted the scales first used by Miller and Friesen (1983) and Miller and Droge (1986). Furthermore, in the strategic management literature, of all the six sectors outlined by Daft et al. (1988), the technology, customer and competitor sectors have been generally found to be perceived as being of the greatest strategic importance (e.g., Daft et al., 1988; Auster and Choo, 1993; Sawyerr, 1993; Elenkov, 1997; May et al., 2000).

4.4.2.4 Scale selection and development

Having identified the four PEU dimensions and the three strategically relevant sectors, this sub-section is concerned with adoption of a suitable measurement instrument. As Volberda (1998) notes, there is no published instrument that captures all four dimensions of PEU, and many instruments have blended some of the dimensions.[18] Thus, some scale development work is required. Initial consideration was given to adapting the perceived strategic uncertainty

[18] There are a number of examples of this issue. First, several studies have adopted Duncan's (1972) framework, but have conceptualised environmental uncertainty using a range of different underlying definitions, ranging from predictability through dynamism and complexity and controllability (Buchko, 1994). In the MCS literature, a predominant number of MCS studies have adapted Duncan's PEU framework, and are illustrative of this issue (e.g., Ferris, 1977; Waterhouse and Tiessen, 1978; Govindarajan, 1984; Chenhall and Morris, 1986; and Gul and Chia, 1994).

approach used in the environmental scanning literature. However, those measures have blended the two dimensions of rate of change and unpredictability into one measure, and do not address intensity of change (e.g., Daft et al., 1988; Sawyerr, 1993; Elenkov, 1997; May, Stewart and Sweo, 2000). Consideration was also given to adopting elements of the approach of Milliken (1987), who differentiated between three types of uncertainty (state uncertainty, effect uncertainty, and response uncertainty). Based on Milliken's arguments, Gerloff et al. (1991) developed a survey instrument. However it is unsuitable for this research because it does not overlap with the four dimensions of PEU.

Having exhausted these two main PEU approaches, an exhaustive review of the other PEU literature was conducted. Based on this search, the scales of Desarbo et al. (2005) are the most substantially complete in separately covering each of the four dimensions. Moreover, their scales apply the dimensions to each of the three sectors of interest. Compared to any other PEU scale, their approach is best suited to the specific needs of this research. Three modifications were, however, still necessary. They are detailed in Appendix B, which shows both the original and adapted questions. In summary: eleven measurement items were excluded. They included double-ups of the four relevant dimensions, and items pertaining to more general environmental dimensions. No measures for complexity were included, and so these were added based on the definition of "the number and diversity of events occurring in environmental sectors outside the operations of your company". Desarbo et al (2005) excluded measures for intensity of change and predictability of change for the competitor sector, and so the questions for the market sector were re-worded to suit the competitor sector. Table 4.10 shows the adapted questions included in the survey.

Table 4.10 – Questionnaire items for MARKCOMP

Construct	
Dimension	
Code	Question
Market environment sector	
markrate	In our kind of business, customers' product preferences change quite a bit over time
markint	We cater to many of the same customers that we used to in the past
markpred	It is very difficult to predict any customer changes in this market place
MARKCOMPl	There are many, diverse market events that impact our business' operations
Technology environment sector	
techrate	The technology in our industry is changing rapidly
techint	Many new product ideas have been made possible through technological breakthroughs in our industry
techpred	It is very difficult to forecast where the technology in our industry will be in two to three years
techcompl	There are many, diverse technological events that impact our business' operations
Competitor environment sector	
comprate	One hears of new competitive moves almost every day
compint	Our competitors are the same as those from the past
comppred	It is very difficult to predict any changes in who might be our future competitors
compcompl	There are many, diverse competitor events that impact our business' operations

4.4.2.5 Sub-group modelling based on market competitiveness

As has been discussed, rather than include MARKCOMP as a latent variable in the PLS model, the scales will instead be used to segment the dataset. Three segments are of interest: hypercompetitive, moderately competitive and stable. A similar three-way profile approach was conducted by Priem et al. (1995), who explored the moderating role of environmental dynamism by splitting their sample into high, medium and low dynamism groups.

As discussed in sub-section 4.4.2.2, the three sub-samples are based on 'unpredictability of change' and 'intensity of change'. In the theoretical arguments in Chapter Three, no weighting was given to either of these two dimensions, and thus for measurement purposes they will be treated as equal contributors to market competitiveness. The hypercompetition literature does not provide guidance for weighting environmental sectors, hence they are assumed to be of equal importance. Based on these assumptions, a simple system of addition and averaging can be used to determine sub-group membership.

In the survey, the following introduction was given to the scales for MARKCOMP… "These questions concern the impacts of external factors in the primary markets your business unit currently serves. Please indicate the degree to which you agree or disagree with the following statements regarding your business unit ('Strongly disagree' = 1, 'Strongly agree' = 9)". Given

the three sectors and two dimensions, there are six measures.[19] The average of the six measures determines sub-group membership. These averages can have a theoretical range from one to nine. An average of 3.0 and below corresponds to a stable market. An average that is greater than 3.0 but less than 6.0 corresponds to a moderately competitive market. An average that is greater than 6.0 corresponds to a hypercompetitive market.

4.4.3 Flexibility culture (FLEXCULT)

4.4.3.1 Organisational culture

Organisational culture is defined as "a system of shared values (that defines what is important) and norms that define appropriate attitudes and behaviors for organizational members (how to feel and behave)" (O'Reilly and Chatman, 1996: 160). Quantitative studies take organisational culture to be a measurable characteristic of organisations (Smircich, 1983), and in the MCS literature, it is recognised that while cultural artefacts such as myths and rituals are organisation specific, organisational values and norms vary by organisation (Harrison and McKinnon, 1999; Bhimani, 2003; Henri, 2006b).

4.4.3.2 The Denison Organizational Culture Survey

Based on an extensive literature review, two approaches to quantitative measurement of the organisational culture traits of flexibility were identified. In the MCS literature (Bhimani, 2003; Henri, 2006b) the competing values framework has been used (Quinn and Kimberley, 1984). From this perspective, flexibility type cultures value spontaneity, change, openness, adaptability and responsiveness (Quinn and Kimberley, 1984; Henri, 2006b). In the broader organisational studies literature, flexibility has been conceptualised and measured in terms of the two sub-dimensions of adaptability and involvement (Denison and Mishra, 1995; Fey and Denison, 2003).

As noted in Chapter Three, there were two main reasons why the decision was made to adopt Fey and Denison's (2003) adaptability/involvement approach for this research. First, unlike the competing values framework, the construct has proven validity in both moderately competitive and hypercompetitive-like conditions. In a survey of American firms (a moderately competitive macro-environment) and Russian firms (a highly turbulent transition economy), factor analysis displayed good convergent and divergent validity, with relatively low cross loadings and Cronbach alphas above 0.70 (Fey and Denison, 2003). Secondly, the measures come from the

[19] Notably, two questions were reverse coded (market intensity and competitor intensity). They have been converted for all foregoing analysis and discussion.

Denison Organizational Culture Survey, which has been progressively developed by Denison and colleagues (Denison, 1984, 1990 and 1996; Denison and Mishra, 1995; Denison and Neale, 1996). The survey has been widely published in management journals, and validated in numerous instances and settings. Thus, the specific dimensions of adaptability and involvement were embedded in the theoretical argumentation in Chapter Three.

In addition to the flexibility dimension, the Denison Organizational Culture Survey includes a 'strength' dimension, which is formed by the lower-level traits of mission and consistency. Flexibility and strength are conceptualised as being mutually exclusive: the culture of an individual firm emphasises flexibility or strength. Notwithstanding a profile approach (Law et al., 1998), it would not make theoretical sense to algebraically combine these two constructs into a latent variable 'organisational culture'. Thus, there is no requirement to include the strength dimension in the measurement model. This is in line with numerous other MCS studies that have adopted only selected dimensions of cultural frameworks (e.g., Soeters and Schreuder, 1988; O'Connor, 1995; Awasthi et al., 1998; Lau and Tan, 1998; Henri, 2006b). Accordingly, the strength traits are outside the scope of this research, and are excluded from the survey.

4.4.3.3 Flexibility culture

The flexibility trait of organisational culture consists of two dimensions: involvement and adaptability. Involvement has the primary focus of internal integration, whereas adaptability has the primary focus of external change. The 'involvement' trait of organisational culture refers to the degree to which the organisation empowers employees, organises around teams, and develops human capability. Involvement is characterised by executive, managerial and employee commitment, and their feelings of a strong sense of ownership. The 'adaptability' trait of organisational culture refers to the responsiveness of the organisation to external changes..."adaptable organizations are driven by their customers, take risks and learn from their mistakes, and have capability and experience at creating change" (Fey & Denison, 2003: 688).

Fey and Denison (2003) reported a correlation of 0.53 between involvement and adaptability, and given that Denison and Mishra (1995) refer to the distinct theoretical attributes of external orientation and internal integration respectively, they are modelled as formative relationships. Each of these two dimensions has three sub-dimensions, and there are three measurement items per sub-dimension, making a total of eighteen measurement items. The three sub-dimensions of adaptability are: creating change, customer focus, and organisational learning – for which Fey and Denison (2003) reported factor loadings above 0.80 and a Cronbach alpha above 0.70. The three sub-dimensions of involvement are: employee empowerment, team orientation, and

capability development – for which Fey and Denison (2003) reported factor loadings above 0.75 and a Cronbach alpha above 0.70.

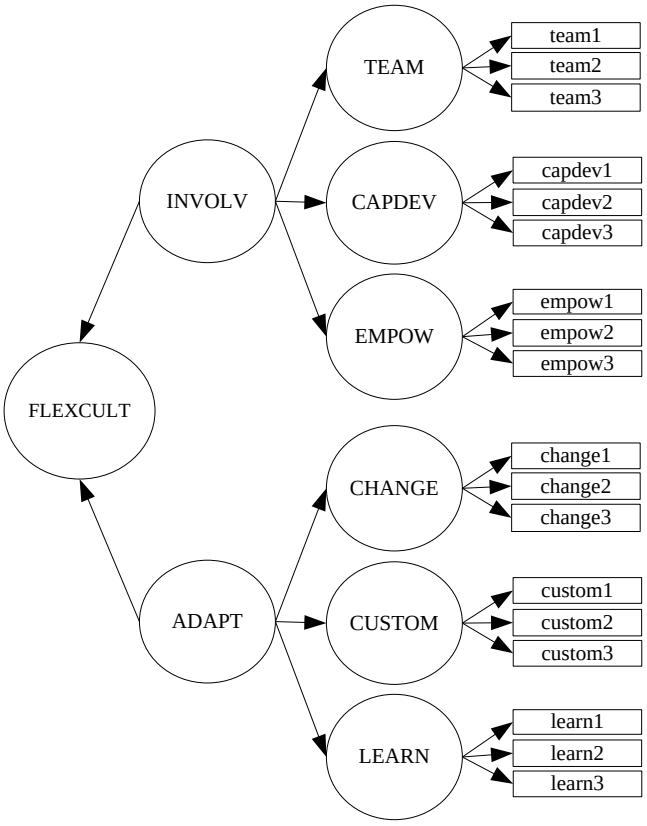
Table 4.11 shows the 18 questions. In the survey, respondents were asked to… "Please indicate the degree to which you agree or disagree with the following statements regarding your business unit ('Strongly disagree' = 1, 'Strongly agree' = 9)".

As was discussed in section 4.3.3, in PLS higher order models can be operationalised using either the hierarchical component approach or the latent variable indicator approach. Rather than adopt an unnecessarily overly-complicated third order model using hierarchical components, the more parsimonious approach of the latent variable indicator approach will be used. Figure 4.4 shows the hierarchical component model from which the latent variable scores will be calculated.

Table 4.11 – Questionnaire items for FLEXCULT

Construct Dimension Code	Question
Involvement (involv)	
team1	Working in this organization is like being part of a team
team2	This organization relies on horizontal control and coordination to get work done, rather than hierarchy
team3	Teams are the primary building blocks of this organization
capdev1	This organization is constantly improving compared with its competitors in many dimensions
capdev2	This organization continuously invests in the skills of employees
capdev3	The capability of people is viewed as an important source of competitive advantage
empow1	Decisions are usually made at the level where the best information is available
empow2	Information is widely shared so that everyone can get information he or she needs when it is needed
empow3	Everyone believes that he or she can have a positive impact
Adaptability (adapt)	
change1	This organization is very responsive and changes easily
change2	This organization responds well to competitors and other changes in the external environment
change3	This organization continually adopts new and improved ways to work
custom1	Customer comments and recommendations often lead to changes in this organization
custom2	Customer input directly influences our decisions
custom3	The interests of the final customer rarely get ignored in our decisions
learn1	We view failure as an opportunity for learning and improvement
learn2	This organization encourages and rewards those who take risk
learn3	We make certain we coordinate our actions and efforts between different areas in this organization

Figure 4.4 – Measurement model for flexibility traits of organisational culture (FLEXCULT)



4.4.4 Firm performance (FIRMPERF)

Dynamic capabilities theory views competitive advantage in the form of Schumpeterian rents (Teece et al., 1997; Eisenhardt and Martin, 2000). Schumpeterian rents are inherently entrepreneurial: they are derived from innovation and risk-taking in uncertain environments (Schumpeter, 1950; Rumelt, 1987). However, these concepts cannot be measured by the research design, and so the generally accepted consequence of superior performance is used (Wiggins and Ruefli, 2005). Based on the strategic management literature (e.g., Arend, 2003), competitive advantage is operationalised in terms of superior performance, which is measured as relative to the industry average. Relative measures also fulfil the requirement of controlling for differences in performance that are due to industry, environment, and strategy effects (Govindarajan and Fisher, 1990; Garg, Walters and Priem, 2003).

Measures of firm performance can be broadly classed as objective or subjective. As discussed at the beginning of this chapter, all data will be self-reported, which rules out the possibility of using archival sources of objective firm performance data. Self-reported objective data could however be sought, but this would be inconsistent with the conceptualisation of firm

performance in industry relative terms, because industry level data would be incomplete due to non-respondent firms that were privately held. Thus, the research design uses self-reported subjective measures. Such measures have nonetheless been found to correlate reasonably with objective measures of firm performance (e.g., Venkatraman and Ramanujam, 1987; Dess et al., 1997; Ravichandran and Lertwongsatien, 2005).

In the MCS literature, it has been argued that the measurement of firm performance must recognise that different firms have different organisational imperatives and associated performance indicators (e.g., Govindarajan and Gupta, 1985; Kaplan and Norton, 1996). Many studies have addressed this issue by using Govindarajan's (1984) instrument (e.g., Govindarajan and Gupta, 1985; Govindarajan, 1988; Govindarajan and Fisher, 1990; Abernethy and Guthrie, 1994; Chenhall and Langfield-Smith, 1998; Baines and Langfield-Smith, 2003; Bisbe and Otley, 2004). This instrument has two parts. The first part has ten different subjective measures of performance outcomes: return on investment, profit, cash flow from operations, cost control, development of new products, sales volume, market share, market development, personnel development and political-public affairs. The second part assesses the importance weighting the firm gives to each dimension.

In its original form (i.e., Govindarajan, 1984), the first part of the instrument sought the ten performance outcomes relative to corporate objectives. More recent adaptations have instead sought the performance outcomes in terms of relativity to competitors. Given the requirement to use industry relative terms, the adapted version of the instrument would be needed. However, it is thought that many respondents may not be sufficiently knowledgeable or informed about the performance of competitors on some of the ten measures. In particular, it is unlikely that respondents will have an understanding of their competitors' performances in terms of return on investment, cash flow from operations, cost control, personnel development and political-public affairs. During pre-testing, many participants confirmed the validity of this concern: they simply did not know how their competitors were performing on many of these more specific measures.

4.4.4.1 Scale selection and development

Instead of adopting a broad range that includes relatively unreliable measures, a fine-tuned focus on the most salient and most reliable measures was employed. Profitability and market performance are widely recognised as the two most important indicators of financial performance (e.g., Varaiya, Kerin and Weeks, 1987; Capon, Farley and Hoenig, 1990; Kaplan and Norton, 1996; Slater and Olson, 2000). Suitable scales for these two performance

dimensions were developed by Babakus et al. (1996), and used more recently in the strategy literature by Slater and Olson (2000).

For market performance, the scales measure two sub-dimensions: 1) sales growth and 2) market share. Profitability is measured across a simple 'profitability' measure. Two measures that have been used in other studies, namely, return on investment and return on assets, were explicitly excluded because balance sheets are typically not available at the SBU level (Slater and Olson, 2000). As shown in Appendix C, the original scales capture these measures in terms of both competitor comparisons and business unit objectives. The business unit objective based scales were excluded for this study because firm performance is conceptualised in industry-relative terms. The competitor comparisons are rephrased to be in comparison to competitors because this is more consistent with the industry-relative conceptualisation.

Thus, firm performance was measured with three separate measures: profitability, market share and sales growth. Following Slater and Olson (2000), respondents were asked to consider performance over the past two years. This is consistent with the notion that hypercompetitive shifts may be relatively transient in nature (D'Aveni, 1994; Thomas, 1996; Teece et al. 1997).

In the survey, as shown in Table 4.12, respondents were firstly asked to consider competitor relative performance, as follows… "Please relate the situation in your business unit over the last two years. Relative to your competitors, how has your business unit performed for the following three areas of performance ('Much Worse' = 1, 'Much Better' = 9)". Secondly, respondents were asked to weight the three performance indicators, as follows… "In order to better account for the relevance of each of the above areas of performance to your business unit, please divide 100% among the three performance areas in terms of their relative importance to achieving the strategy pursued by your business unit."

Table 4.12 – Questionnaire items for FIRMPERF

Construct *Dimension* Code	Question
Performance relative to competitors (FIRMPERF)	
sales	Sales growth - relative to your major competitors
markshar	Market share - relative to your major competitors
profit	Profitability - relative to your major competitors
Weighting	
sales%	Sales growth: % importance to your business strategy
Markshar%	Market share: % importance to your business strategy
profit%	Profitability: % importance to your business strategy

4.4.4.2 Multiple potential PLS measurement model approaches

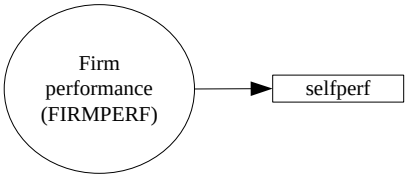
Based on the six survey measures, there are three possible measurement model approaches. This is because the use of PLS raises the question: does PLS provide a better weighting scheme than the self-reported weights? The PLS weighting system works on all cases – not just by individual case. Ultimately, this is an empirical question, and will be determined in the data analysis and PLS modelling stages. At that point, care will be taken to assess the best approach, taking into consideration sub-group differences. This is appropriate because firms that emphasise innovation (e.g., firms in hypercompetitive environments and/or with organisational culture traits of high flexibility) may have strong relationships with performance indicators related to growth rather than profitability (Fey and Denison, 1995; Eisenhardt and Martin, 2000).

Of the three possible measurement model approaches, the first is similar to the traditional MCS studies cited above, in which a single weighted composite score is calculated and used as a single indicator for FIRMPERF. The second and third approaches are both PLS weighted, with one having three reflective indicators and the other having three formative indicators. These approaches are discussed in the following two sub-sections.

4.4.4.3 Self-weighted, single indicator approach

This approach is concordant with the proposition in the MCS literature that firms have idiosyncratic strategies that require individual assessment of the relative importance of each of the three performance indicators. A single score is calculated as the weighted average of the three performance indicator scores and their relative weights (selfperf). Figure 4.5 below shows how this is included in the PLS model.

Figure 4.5 – Measurement model: self-weighted composite approach to firm performance (FIRMPERF)

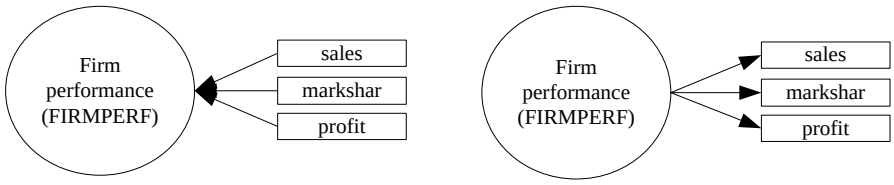


4.4.4.4 Multiple indicator approaches – reflective and formative

These two approaches are discordant with the proposition that firms have idiosyncratic strategies that require individual assessment of the relative importance of each of the three

performance indicators. Instead, PLS would weight the three performance indicators at the total population level. It is not clear whether the three indicators would be formative or reflective. Consistent with the formative relationships, various studies have found profitability and market performance to be two distinct factors (e.g., Slater and Olson, 2000; Baum and Wally, 2003; Spanos and Lioukas, 2001; and Ravichandran and Lertwongsatien, 2005). On the other hand, a number of studies have found these relationships to be better modelled as reflective (e.g., Tippins and Sohi, 2003; Johansson and Yip, 1994). This is ultimately an empirical matter to be resolved by assessing the R^2 and potential multicollinearity between the relative measures.

Figure 4.6 – Measurement model: multi-indicator approaches to firm performance (FIRMPERF)



4.5 Sample construction

This section has six sub-sections: the first defines the unit of analysis; the second outlines the minimum firm size requirement; the third outlines the target respondents; the fourth discusses two sampling controls; the fifth discusses the control variable for firm size; and the sixth outlines the approach used to select the target sample.

4.5.1 Unit of analysis

The unit of analysis is the 'firm', which, following Bisbe and Otley (2004) and Henri (2006a) is a fully autonomous entity or a subunit or division of a larger firm. This includes both independent companies with no subsidiaries, and strategic business units (SBU) of multi-business corporations. Notwithstanding these definitions, during pre-testing it was clear that practitioners affiliated best with the term 'business unit', even though two pre-testers much preferred the term 'business division' or 'division'. To reduce ambiguity, all three terms are briefly introduced at the beginning of the questionnaire, after which the term 'business unit' is used in the questions. Where the role of a respondent spans across multiple business units, the questionnaire asks them to consider only the largest single business unit.

4.5.2 Target respondents

The target respondents were members of the senior management team. Pre-testing revealed that this was best defined as the top manager of the business unit and his/her direct reports. This is consistent with Henri (2006a) and other upper echelon management studies (e.g., Carpenter and Fredrickson, 2001) that have defined the top management team to encompass the top two tiers of an organisation's management, including chief executive officer/general manager, chief operating officer, chief financial officer, and the next highest management tier of a firm (senior vice-presidents). Planning managers were also included as target respondents because of their visibility of senior management's use of the budgeting and forecasting system. The following descending preferential order was used for guiding the development of the list of target respondents by individual firms: CEO, CFO, business unit general manager, senior manager, and planning manager.

4.5.3 Sampling controls: top manager tenure and firm life-cycle stage

Three sampling controls are used.

1) 'Minimum firm size': following Henri (2006a and b), two criteria were used to determine the minimum size of firms for the population: (1) sales of at least $20 million AUD annually, and (2) at least 150 people employed. Bisbe and Otley (2004) used similar criteria in their study of interactive use of MCS: (1) sales of at least $30 million AUD and 200 employees. Such firms are large enough to ensure that organisational and strategy related variables apply (Miller, 1988) and that formal control systems are in place (Bouwens and Abernethy, 2000). Consistent with structural contingency theory, where size affects the degree of formalisation (e.g., Donaldson, 2001), control in small, single business firms, can be managed through largely informal, personally-orientated mechanisms such as direct supervision and oral communications (Merchant, 1981). Large organisations, however, require formal controls to organise information flows and to coordinate communication (Lawrence and Lorsch, 1967; Merchant, 1981).
2) 'Top manager tenure' of at least one year is required, based on Simons' (1994) observations of newly appointed top managers who temporarily used management control systems highly interactively in order to learn the business for themselves.
3) 'Firms will be required to have passed the start-up phase of their life-cycle, which will be set at three years'. Simons (1995) noted that the implementation and use of formal

control systems is staged over the life cycle of the firm – diagnostic and interactive use of formal control systems occurs after the start-up phase.

4.5.4 Control variable in PLS structural model: number of employees (SIZE)

The PLS model will include a construct of 'firm size', using the natural log of employees (e.g., Sarkar, Echambadi and Harrison, 2001; Henri, 2006a and b). Hundreds of studies have found that the size of the firm can systematically influence organisational practices because it is a surrogate for organisational complexity (Baum and Wally, 2003). Further, size is a frequent correlate of firm performance (Garg, Walters and Priem, 2003).

4.5.5 Target sample selection

To research effective control mechanisms and relationships for hypercompetitive settings, the hypotheses require comparison to moderately competitive settings so that relative differences can underpin the analysis and findings. Including data from firms in stable market conditions will further facilitate this approach and also enable findings and conclusions across the full spectrum of market competitiveness. Hence, the target sample is all three categories of market competition, i.e., hypercompetition, moderate competition and stable markets.

Given that relatively few firms operate under hypercompetitive conditions, it was anticipated that a random sampling approach to target sample selection, while being adequate for moderate competition and stable markets, would provide too few hypercompetitive type firms. A stratified sampling approach was instead employed. As detailed in this section, this non-probability sampling approach had a strong focus on identifying firms identified a priori as likely to be operating in a hypercompetitive market. Mostly however, the target firms were expected to fall into the much more common moderately competitive or stable market categories. Hence, even though the target sample selection strategy targeted firms operating under hypercompetitive conditions, it was considered that most firms would operate in less competitive settings, thus fulfilling the requirement to have data for all three categories of market competition.

There are two general approaches that could have been used for a priori selection of the target firms: objective and subjective. Objective measurement approaches typically rely on archival sources and include indicators such as growth in industry sales and concentration ratios (e.g., Child, 1975; Bourgeois, 1985). Two published studies have treated the topic of hypercompetition using industry performance data in the Compustat Industry Segment database (Wiggins and Ruefli, 2005; McNamara, Vaaler and Devers, 2003). These studies observed

changes over time in sales, capital expenditures and asset values. While this approach is suitable for observing macro-level shifts in competition, it does not highlight specific industry segments upon which to base the target sample. For this reason a subjective method was employed instead.

Subjective measurement approaches use perceptual judgements made by organisation members or key informants (Duncan, 1972; Milliken, 1987). Three equities research analysts were engaged to guide the target sample selection. These informants were selected because of their general coverage of all the industries included in the Australian Stock Market. They were contacted by telephone and the purpose and background of the study was explained. They were then emailed two files. The first file was a one-page description of the characteristics of hypercompetition, as shown in Appendix D. The second file listed 175 industries, which had been chosen by the researcher from the 978 industries that comprise the four digit SIC classification system. The 175 industries were chosen by the researcher based on the same one-page description of the characteristics of hypercompetition, and the much shorter list was integral to gaining the participation of the three time-poor equities research analysts.

The informants were asked to nominate which of the 175 industries exhibited characteristics of hypercompetition. In total, the three equities research analysts identified 40 unique industries.[20]

Based on the 40 industries, the mailing list provider Dun and Bradstreet supplied 669 firms, each of which was chosen to fit the previously discussed minimum size criteria of 150 employees and $20 million AUD in annual sales revenue. The name and mailing address of a

[20] The list of the 40 industries identified by equities research analysts as likely to contain hypercompetitive type firms is as follows: (The number shown in brackets is how many of the equities research analysts selected the particular industry as likely to contain hypercompetitive firms.) computer and computer software stores (3); iron ores (2); copper ores (2); household audio and video equipment (2); telephone and telegraph apparatus (2); radio and television broadcasting and communications equipment (2); radio, television and consumer electronics stores (2); mortgage bankers and loan correspondents (2); commodity contracts brokers and dealers (2); loan brokers (2); child day care services (2); metal mining services (1); uranium-radium-vanadium ores (1); crude petroleum and natural gas (1); natural gas liquids (1); drilling oil and gas wells (1); oil and gas field exploration services (1); biological products, except diagnostic substances (1); motors and generators (1); guided missiles and space vehicles (1); guided missile and space vehicle propulsion unit parts (1); foreign trade and international banking institutions (1); personal credit institutions (1); short-term business credit institutions, except agricultural (1); miscellaneous business credit institutions (1); motion picture and video tape production (1); telephone communications, except radiotelephone (1); photographic equipment and supplies (1); camera and photographic supply stores (1); motion pictures (1); mining machinery and equipment, except oil and gas field machinery and equipment (1); oil and gas field machinery and equipment (1); airports, flying fields and airport terminal services (1); packing and crating (1); transportation services (1); pharmaceutical preparations (1); explosives (1); national commercial banks (1); non-depository credit institutions (1); air transportation, scheduled (1); commercial banks, not elsewhere classified (1); communications (1); and video tape rental (1).

single senior manager from each firm was provided. Given the small number of firms provided by Dun and Bradstreet, a second provider, IncNet, was enlisted.

The IncNet database differs from Dun and Bradstreet in three main ways: it uses keywords rather than four digit SIC codes; it has multiple contacts for most firms; and email addresses are able to be provided for most contacts. IncNet were provided with the names of the 669 firms supplied by Dun and Bradstreet, and also with 71 keywords related to hypercompetitive type firms that the most experienced of the three equities analysts chose from the total 304 used in the IncNet database.[21]

Based on this input, IncNet provided a total of 1,283 firms. Only 229 of these were duplicates of the 669 from the Dun and Bradstreet list. Thus, the total number of firms was 1,723. Given the selection approach taken, all 1,723 firms were identified a priori as possibly of the hypercompetitive type. However, discussions with the three equity analysts further advanced the belief that there are very few firms that fit the hypercompetition criteria. They shared the sentiment that within an industry, they could often only think of a few firms that were undergoing the radical type of change that characterises a hypercompetitive setting. Thus, it is reasonable to conclude that the majority of the target sample would be likely to self report themselves in the moderately competitive category.

Adding to the concern about a low number of hypercompetitive type firms in the target sample, response rates encountered during pilot testing suggested a great degree of difficulty in eliciting responses from CFOs. As discussed in the later section on pilot testing, it was very difficult to get the attention of CFOs. To alleviate the risks of insufficient responses from hypercompetitive type firms, a multi-contact approach was taken. IncNet provided a maximum of three contacts per firm from the following four rank-ordered categories: CEO, CFO, general manager, and planning manager. Tables 4.13 and 4.14 summarise the multiple firm contacts

[21] The following list is the keywords identified by the equities research analyst for identifying hypercompetitive type firms in the IncNet database: aerospace; air freight; airline; airport; aquaculture; aviation; bank; banking & finance; base metals; beverages; biotechnology; boats; building products; building society; chemicals; communications; computer peripherals; computers; credit union; distribution; domestic equipment; e-commerce; electrical appliances; electronics; exploration; exporter; fashion accessories; finance; finance company; gold; health care; high technology; horticulture; hospitals; hydraulic; importer; industrial components; industrial equipment; industrial supplies; information technology; infrastructure; internet search engine; internet service provider; logistics; manufacturing; medical; mining; oil & gas; open-cut mining; optical products; other financial intermediaries; packaging; pharmaceuticals; pharmacy; photographic; photographic equipment; plastic products; pneumatic; portal; precious metals; primary industry; research & development; rubber products; scientific; software; telecommunications; underground mining; water treatment; weapons; website development; and wine.

and roles of the target respondents. The method for removing duplicate responses from the dataset is described in section 4.8.1.

Table 4.13 – Multiple target contacts per firm

Mail-list provider	Firms	Contacts	Single contact firms	Double contact firms	Triple contact firms	Average contacts per firm
Dun and Bradstreet	440	440	1	0	0	1.0
IncNet	1,283	2,921	20	960	327	2.3
Total	**1,723**	**3,361**	**21**	**960**	**327**	**2.0**

Table 4.14 – Roles of the target contacts

Role	Dun and Bradstreet (440 firms)	IncNet (1,283 firms)	Combined	Percent
CEO / Managing Director	153	1,054	1,207	35.9%
CFO / Finance Director	102	563	665	19.8%
Director	62	114	176	5.2%
Finance Manager	20	228	248	7.4%
Financial Controller	71	293	364	10.8%
General Manager	7	328	335	10.0%
Head Of Department	1	39	40	1.2%
Other	8	75	83	2.5%
Planning Manager		73	73	2.2%
Senior Finance Manager	13	67	80	2.4%
Senior Manager – Other	3	87	90	2.7%
Total	**440**	**2,921**	**3,361**	**100.0%**

4.6 Survey design and distribution

In this section the mail and internet modes used to administer the surveys are discussed and justified. Pre-testing and pilot testing procedures are described. Lastly, the overall distribution strategy utilising multiple contact rounds is outlined and justified.

4.6.1 Mixed-mode survey: mail and internet

Dillman's (2000) Total Design Method (TDM) has been used to enhance response rates to MCS surveys (Van der Stede et al., 2005). After carefully considering the TDM, three data collection approaches were considered. First, telephone contact is supposed to be a highly effective way to enhance response rates for business oriented surveys (Dillman, 2000). Second, mail survey methodologies are elaborately documented in the TDM. Third, Dillman (2000) suggests that an internet based survey can be less expensive and more rapidly implemented than a mail based one. As will be discussed in a later section, during the pilot testing phase, it

became clear that most senior managers are not readily contactable by telephone. This left the mail and internet as alternatives. Consistent with Dillman's (2000) endorsement of a mixed-mode design with a multi-contact strategy, a combination of mail and internet surveys was deployed.

A pure internet survey approach was considered risky, because the literature is yet to document effective strategies or response rate expectations, particularly when targeting senior managers in large firms. Additionally, as discussed in the previous section, email addresses were not available for all respondents and it was envisaged that those respondents may prefer a traditional format questionnaire. At the same time, a pure mail survey approach was also considered risky, because the higher costs meant fewer contacts and reminders could be made. During pilot testing, a number of executive assistants suggested mailing a copy of the survey, because their executives had email inboxes that were "over-full". On the other hand, during the pre-testing and pilot testing, some participants revealed a preference for using the internet to respond. For these reasons, both formats were used.

4.6.2 Questionnaire pre-testing

Content validity "reflects the degree to which the measurement instrument spans the domain of the construct's theoretical definition" (Rungtusanatham, 1998: 11). Domain experts are good candidates to review initial questionnaires to ensure that they represent the full domain of the constructs (Straub, 1989). To this end, suitably experienced practitioners and academics were enlisted to check the content validity of the questionnaire. They checked the clarity of the terminology, wording of the questions and layout of the questionnaire. This pre-testing occurred in three phases.[22] The profiles of the pre-testing participants for all three phases are shown in Appendix E.

4.6.2.1 Pre-testing phase one

Five experienced practitioners were engaged in this phase. Over the course of two weeks, individual participants were engaged twice in face-to-face meetings. The cycle started with the least experienced and worked through to the most experienced practitioner. The cycle was then repeated in a similar order, so that earlier feedback-driven changes could be checked off with the individual participants. The face-to-face format was particularly effective in observing reactions to terminology and wording (Babbie, 1994; Dillman, 2000).

[22] In line with UTS ethics requirements, none of the pre-testing or pilot testing data was used in any further data analysis.

This first phase was used to determine the order of presentation of the questions. Following the advice of Dillman (2000), three easy questions, two of which concerned the respondent themself, were put at the very beginning. The BUDSTYLE questions were also placed towards the beginning, given that they are the key drawcard of interest of the survey. In the first phase, no material issues were identified with the wording and ordering of questions for the sections for FLEXCULT, MARKCOMP, FIRMPERF and the supplementary information. This is unsurprising given that the questions are largely sourced from prior studies. In contrast, participants contributed greatly to the initial development of the questions for BUDSTYLE.

Building on the analysis of extant measurement approaches for interactive control conducted in section 4.4.1, a basic set of questions was drawn from Simons' work and other extant survey questions, with some elaboration and modification where required. Each question was developed by adapting an original quotation or citation from the extant literature. Pre-testing participants were taken through the definitions of the four dimensions and were asked to critique the wording of each question. It became clear through the first stage of pre-testing that many questions were initially long-winded, double barrelled and poorly structured. After each session, changes to the questions were made, and by the tenth session the questions were ready for phase two of pre-testing, as shown in Appendix F.

Several key terminology outcomes were achieved in the first stage of pre-testing. Many participants advised that the term 'senior managers' was more recognisable than 'top managers', and that 'middle managers' was a more common term than 'operating managers'. Senior managers were defined as 'the business unit top manager and his/her direct reports' and middle managers as 'below the senior management team'. In addition, it became clear that definitions were required to clarify that the management levels related to the business unit in question. Of all the terms, by far the most ambiguous was 'budgeting and forecasting', which some respondents considered to also encompass capital expenditures, balance sheets and cash flow statements. Consistent with Simons (1995)[23], the term 'profit-planning' was adopted for the questionnaire, and the included definition was developed and re-tested until it was considered comprehensive and clear by later stage pre-testing participants. The term 'profit-planning system' was removed and replaced with 'profit-planning information' to avoid the perception that the questions were about the technological nature of the system itself (e.g., a

[23] As footnoted earlier, even though the parsimonious term 'budgeting system' has been used in this thesis, Simons discussed the broader concept of a 'profit planning system'. These are "financial systems that report planned and actual revenues and expenses for each business by revenue and cost category – examples include annual profit plans or budgets, second-year forecasts, and strategic operating and financial plans" (Simons, 1995: 109). Furthermore, an interactive budgeting system requires an accompanying forecasting system, because interactive control requires "re-forecasting" (Simons, 1995: 108-109).

spreadsheet system or a more advanced database configuration). It was not until near the end of pre-testing that the definition of profit-planning included in the survey was finalised, being:

- A profit-plan outlines the planned sales revenues, expenses and net income – usually by month.
- Profit-plans are typically set annually (e.g., as part of the annual budget) and may be updated with forecasts.
- Profit-planning is an activity that undertakes and compares budgeted, forecasted and actual revenues and expenses by revenue and cost category.

4.6.2.2 Pre-testing phase two

In this phase, eight new participants pre-tested a single early version of the internet survey instrument. Three of the participants (including two academic supervisors) provided numerous useful suggestions and question-specific feedback. The other five participants responded to the survey questions. The data from these five participants was used to assist in the development of the questions for BUDSTYLE. At the end of this phase, four BUDSTYLE questions were eliminated, consistent with feedback that many of the questions seemed "to be asking the same thing." As noted above, Appendix F shows the data collected and development of the questions through this pre-testing phase, and also through pre-testing phase three.

4.6.2.3 Pre-testing phase three

In this phase, the final mail survey and cover letter were developed and pre-tested. Eight new practitioners pre-tested the questions for the budgeting style construct, five via the internet and three face-to-face using the mail survey. Based on the recommendations of Dillman (2000), the mail survey was formatted into an A3 booklet, with instructions and layout designed to make the task appear brief, and to reduce the physical and mental effort required. The cover letter and survey were presented to three newly enlisted practitioners and to two academic supervisors. Consistent with the recommendations of Dillman (2000), various amendments were made to increase the level of interest from prospective respondents. Three key outcomes occurred in this final phase of pre-testing.

Two participants from the *same* business division had very different interpretations of the meaning of "very frequently". Accordingly, adjustments were made to all of the questions concerning frequency of use, anchoring them with labels such as "continually", "constantly", and "very often" and by clarifying "very frequently" to mean "more than weekly". It became clear that a similar style of hard anchoring was required for the questions that concern

'challenge and debate of strategic uncertainties'. The questions were amended to strongly stress these themes as common occurrences in typical instances of interactive use. The amended questions address the 'average' level of debate and challenge of strategic uncertainties, rather than the mere occasional occurrence. This change was triggered by the high number of participants who responded with fairly strong agreement to the pilot tests. The data highlighted four possible sub-dimensions for the interaction frequency dimension: (1) senior managers interacting with peers; (2) senior managers interacting with peers and subordinates; (3) middle managers interacting with middle managers; and (4) middle managers interacting with peers and subordinates. Consistent with the theoretical arguments developed in Chapter Three, the questions were refined to clearly pertain to: (1) senior managers interacting with peers; and (2) senior managers interacting with peers and subordinates. These choices are consistent with the arguments of Simons (1995), and are also reasonably consistent with the arguments of Bisbe et al. (2007).

4.6.3 Questionnaire pilot testing

The pre-testing and pilot-testing were largely conducted in parallel. All of the internet sourced pre-testing data was collected during the pilot testing. Whilst the pre-testing focused on the wording and layout, the pilot-testing focussed on developing an effective survey administration strategy. In particular, the piloting was intended to identify the best way to engage time-poor CEOs and CFOs. Other objectives included the refinement of the internet survey layout and instructions, and also for the researcher to develop an understanding of the functionality of the QuestionPro software. Two stages of pilot testing were conducted.

In the first stage of pilot testing, a random sample of 61 Australian publicly listed firms was sourced from the DatAnalysis database. It was envisaged that it would be difficult to engage with time-poor CEOs and CFOs from large firms, particularly those operating in hypercompetitive settings. Dillman (2000) recommends that when targeting businesses, making contact by telephone can provide the best response rates. A research assistant attempted to telephone the CFO of each of the 61 firms and to invite them to receive an email with a link to the internet survey. At this stage the research assistant had only the name of the firm and the firm's main line phone number. After getting through the switchboard operator, the research assistant encountered the executive assistant to the CFO in 34 cases, and the CFO or another senior officer in seven cases. In only three cases was the CFO's email address provided. In 36 cases the email was instead sent to the executive assistant. A total of four internet surveys were completed from this first phase of pilot testing.

There are two ways to calculate a response rate. The four responses represent a 6.6% response rate in terms of the total 61 firms. In terms of the 39 emails sent, it is a response rate of 10.3%. From this work, it was concluded that telephoning is a time-consuming and expensive way of procuring responses. Senior managers, such as CFOs, are difficult to cold call by telephone, and the executive assistant in most cases was a formidable 'gatekeeper'. CFOs are very often in meetings and are not available to take phone calls. At the end of this pilot phase, the decision was made to switch to a mail and internet survey mixed mode approach for round two of pilot testing.

In stage two of pilot testing, the focus switched to the usability of the internet survey. Seven newly enlisted practitioners completed the survey remotely, and then emailed feedback. Most of the feedback was positive, although a few specific comments were made concerning specific questions and the instructions provided at the end of the survey for requesting the executive summary report. At this stage it was noted that the average time taken to complete the survey was around 10 minutes (as provided by the QuestionPro software) – this information was included in the cover letter.

A copy of the final mail questionnaire is shown in Appendix G. Screenshots of the internet questionnaire are shown in Appendix H. Copies of each of the cover letters for the mail-outs are shown in Appendix I. Copies of the email notes are shown in Appendix J. A copy of the postcard is shown in Appendix K.

4.6.4 Multiple contact rounds

In accordance with Dillman's (2000) recommendations, target respondents were contacted with a mixed-mode, multi-contact strategy. A number of other techniques were also used to increase response rate: high-quality printing; inclusion of reply paid envelopes; and respondent anonymity.[24] A special email account was used (profit-planning.research@uts.edu.au). Respondents were offered only one inducement – an executive report on the survey findings (as shown in Appendix F). No pens or financial incentives were included because the budget funds were put to better value production by increasing the target sample size and number of target respondents and overall re-contacts.

[24] By keeping the responses anonymous, formal ethics approval from UTS was not be required because "…students (including Doctoral and Master's by research students) will not require formal ethics approval when…the research is anonymous (i.e., the identity of the subject/participant is unknown to the researcher and therefore names cannot be recorded)" (www.gsu.uts.edu.au/policies/hrecguide.html). UTS ethics requirements were also met by excluding any input from pre-testing and pilot testing participants in the data analysis stages.

As shown in Table 4.15, in the first round, all target respondents were surface mailed a cover letter, questionnaire, survey completion notification postcard and self addressed envelope. No email contacts were made in the first round so that every respondent would have at least one paper based version of the questionnaire in case that was their preferred format. This also provided the opportunity to include a signed cover letter, giving greater initial personalisation than the email mode. All mail outs also included the address of the internet questionnaire. From the second round onward, target respondents were emailed where possible, with surface mail re-contacting made only for those for whom an email address was not held. Over the following six weeks the emailed target respondents were re-contacted another four times, and the mail based targets another three times. At the beginning of each successive round, target respondents were removed from the lists if they had sent back a postcard or email signalling that they had already responded. All other target respondents from the same organisation were also removed at that time. Target respondents were also removed if they communicated by postcard or email that they would not be able to respond because they were on leave, too busy, or had forwarded the questionnaire to someone else in their organisation. Where an organisation had a no-survey policy, all other target respondents from that organisation were also removed. A total of 10,928 contacts were made: 4,550 by mail and 6,378 by email.

Table 4.15 – Multiple contact rounds

Mail firms (Dun and Bradstreet)	Mail/email firms (IncNet)
Round 1	
12th Nov 2007 – 440 mail-outs: • cover letter (with internet questionnaire address) • paper questionnaire • self addressed envelope • postcard	12th Nov 2007 – 2,921 mail-outs: • cover letter (with internet questionnaire address) • paper questionnaire • self addressed envelope • postcard
Round 2	
21st Nov 2007 – 440 mail-outs: • thank you / first reminder cover letter (with internet questionnaire address) • paper questionnaire • self addressed envelope • postcard	19th Nov 2007 – 2,921 emails: • thank you / first reminder cover note • link to internet questionnaire
Round 3	
3rd Dec 2007 – 391 mail-outs: • second reminder cover letter (with internet questionnaire address) • paper questionnaire • self addressed envelope • postcard	3rd Dec 2007 – 2,011 emails: • second reminder cover note • link to internet questionnaire
Round 4	
13th Dec 2007 – 358 mail-outs: • final reminder cover letter (with internet questionnaire address) • paper questionnaire • self addressed envelope • postcard	11th Dec 2007 – 1,814 emails: • third reminder cover note • link to internet questionnaire
Round 5	
	18th Dec 2007 – 1,632 emails: • final reminder cover note • link to internet questionnaire

4.7 Survey responses – data quality, cleansing and descriptive statistics

The remainder of this chapter examines the responses received from the survey. The extent to which the results can be generalised depends on two main factors: non-response bias and response rate (Van der Stede et al., 2005). Non-response bias is the primary determinant of data quality, and refers to the extent to which the respondents are systematically different from the non-respondents. Response rates are also very important criteria for assessing data quality. Even when response rates are low (e.g., less than 20%), results are still generalisable if there is a low non-response bias (Van der Stede et al., 2005).

Duplicate responses were removed from the dataset. Response-bias testing was performed on the total dataset excluding duplicates. The effective response rate was calculated and assessed.

Responses that did not fit the sampling criteria or that had missing data (i.e., unusable responses) were cleansed from the dataset. The consequent usable dataset was thereby established for testing the measurement models and structural models in the following chapter.

4.7.1 Removing duplicate responses

The process of eliminating duplicate responses was fairly straightforward. Since responses were anonymous, duplicates were identified by analysing response data details. In the case of internet responses, this was simply a matter of comparing the IP address (e.g., 144.135.0.96). Where a duplicate was found, the response of the least senior manager was removed. This process identified 17 duplicate responses and one triplicate response. In addition to these 18 removed responses, two mail responses were identified as duplicates. These were identified by combing through the internet and mail response database and eye-balling potential duplicates. Whilst it was more difficult to identify duplicates in the mail data, it is reasonable to expect a low number because of the target sample profile discussed earlier. Except for the first mail-out, where all target respondents were included, the later rounds included only the Dun and Bradstreet sourced firms, all of whom only had a single target contact per firm. The duplicates were much more likely to occur in the emailed target respondents, as these were all the IncNet sourced firms, most of which had more than one target respondent. In all, 20 duplicate responses were identified and eliminated.

4.7.2 Non-response bias testing

Two types of non-response bias testing were conducted: early versus late respondents, and target responses versus actual responses (Dillman, 2000; Van der Stede et al., 2005). Both are assessed in the following two sub-sections. The tests are based on the total response sample less duplicates (i.e., 20 cases), leaving 546 cases, some of which were incomplete. These analyses were conducted in SPSS 15.0 for Windows.

4.7.2.1 Response bias testing – early versus late responses

Tests of early versus late respondents are based on the idea that late respondents are more likely to resemble non-respondents than do early respondents (Moore and Tarnai, 2002). If there are no significant differences between late and early respondents, it is less likely that respondents differ from non-respondents. An analysis of the response receipt pattern showed that the number of responses received in the first half of the survey distribution time was almost identical to those received in the second half. The midpoint of the data collected is used to distinguish early respondents from late respondents, which are then compared using

independent sample t-tests. Two sets of tests were performed: (1) based on the theoretical constructs and (2) based on the descriptive variables.

Table 4.16 reports the results from the testing based on the theoretical constructs. (Number of employees and business unit revenue have been included in this table because they are critical sampling criteria.) The scores used are simple composites of each measure from the survey; with the exception of firm performance, which is the weighted average using the relative importance measures. Four outliers for business unit revenue were removed (12.455bn; 15.000bn; 15.569bn; 20.000bn) leaving the maximum at $10.0bn. Three outliers for number of employees were removed (35,000; 37,000; 40,000) leaving 10,000 as the new maximum. These outliers were removed because they were extreme and inclusion would distort the tests by biasing the mean scores.

As reported in Table 4.16, except for three minor exceptions, there are no significant differences between the early and late respondents in terms of the key variables of interest in this study. The three exceptions are:

1) at a significance value of 0.05, 'interactive use – senior manager frequency' had a mean difference of 0.29.
2) at a significance level of 0.10, 'interactive use – challenge and debate' had a mean difference of 0.24.
3) at a significance level of 0.10, the composite of all four interactive use dimensions, 'interactive use – composite' had a mean difference of 0.23.

However, given that the Likert scales range from 1 to 9, these three mean differences are very small, being just three percent. Overall these results suggest that the respondent sample does not substantially differ from the non-respondent sample in terms of the key theoretical variables.

Table 4.16 – Non-response bias with theoretical constructs

Variable	N	Mean	Std. Dev.	Mean difference	T-value	Df	Sig. (2-tailed)
Number of employees							
Early respondents	267	763	1,282	-88	-0.72	515	0.472
Late respondents	267	851	1,539				
Business unit revenue							
Early respondents	238	$497.1m	$1,031.0m	$121.0m	-1.02	416	0.309
Late respondents	237	$618.1m	$1,513.4m				
Level of market competition							
Early respondents	273	4.39	1.10	-0.14	-1.53	544	0.128
Late respondents	273	4.54	1.08				
Business unit performance - weighted							
Early respondents	273	6.13	1.48	-0.17	-1.34	544	0.182
Late respondents	273	6.30	1.51				
Flexibility culture							
Early respondents	273	6.39	1.21	0.10	0.96	541	0.335
Late respondents	273	6.29	1.31				
Interactive use - strategic uncertainties							
Early respondents	273	6.16	1.44	0.17	1.25	528	0.213
Late respondents	273	5.99	1.72				
Interactive use - middle manager frequency							
Early respondents	273	5.57	1.76	0.22	1.41	541	0.160
Late respondents	273	5.35	1.89				
Interactive use - senior manager frequency							
Early respondents	273	6.32	1.57	0.29	1.99	530	0.047
Late respondents	273	6.02	1.84				
Interactive use - challenge and debate							
Early respondents	273	6.17	1.38	0.24	1.80	522	0.072
Late respondents	273	5.93	1.71				
Interactive use - composite							
Early respondents	273	6.05	1.34	0.23	1.83	527	0.068
Late respondents	273	5.82	1.61				

Table 4.17 reports the results from the testing based on the descriptive variables. For most of the descriptive variables there is surprisingly little difference between the early and late respondents. Overall, these results strongly suggest that there is no reason to believe that the respondent sample differs from the non-respondent sample based on the descriptive variables.

Table 4.17 – Non-response bias with descriptive variables

Descriptive measure	N - Early responders	N - Late responders	Difference	% Difference
Respondent's tenure with business unit				
Less than one year	15	15	0	0.00%
More than one year	258	258	0	0.00%
Total	**273**	**273**	**0**	**0.00%**
Respondent's managerial level				
Senior management	239	238	1	0.37%
Middle management	34	31	3	1.10%
Other		4	-4	-1.47%
Total	**273**	**273**	**0**	**0.00%**
Top manager tenure with business unit				
Less than 1 year	28	31	-3	-1.10%
1 - 2 years	43	40	3	1.10%
2 - 3 years	40	30	10	3.66%
3 + years	162	172	-10	-3.66%
Total	**273**	**273**	**0**	**0.00%**
Profit-planning performance last year				
Below budget.	90	77	13	4.76%
On budget.	54	63	-9	-3.30%
Better than budget.	126	133	-7	-2.56%
Total	**270**	**273**	**-3**	**-1.10%**
Role of respondent				
CEO / Managing Director	51	57	-6	-2.20%
CFO / Finance Director	75	74	1	0.37%
Director	6	6	0	0.00%
Finance Manager	20	15	5	1.83%
Financial Controller	33	25	8	2.93%
General Manager	24	28	-4	-1.47%
Head Of Department	6	4	2	0.73%
Other	6	23	-17	-6.23%
Planning Manager	9	14	-5	-1.83%
Senior Finance Manager	22	15	7	2.56%
Senior Manager - Other	17	10	7	2.56%
Total	**269**	**271**	**-2**	**-0.73%**
Age of business unit				
Less than 2 years	7		7	2.56%
2 - 3 years.	10	5	5	1.83%
Greater than 3 years	255	268	-13	-4.76%
Total	**272**	**273**	**-1**	**-0.37%**
Type of ownership				
Listed on the Australian Stock Exchange.	80	74	6	2.20%
Privately held in Australia.	75	114	-39	-14.29%
Foreign owned.	115	85	30	10.99%
Total	**272**	**273**	**-1**	**-0.37%**
Industry				
Agriculture, Forestry and Fishing	8	8	0	0.00%
Mining	18	17	1	0.37%
Construction	15	16	-1	-0.37%
Manufacturing	102	68	34	12.45%
Public Administration	12	23	-11	-4.03%
Wholesale Trade	36	29	7	2.56%
Retail Trade	12	21	-9	-3.30%
Finance, Insurance and Real Estate	17	33	-16	-5.86%
Services	40	48	-8	-2.93%
Transport, Communications, Electric, Gas & Sanitary Services	11	10	1	0.37%
Total	**271**	**273**	**-2**	**-0.73%**

4.7.2.2 Response bias testing – secondary data

The second type of non-response bias testing compares response characteristics to the survey population, using secondary data. Number of employees and business unit revenue had been provided by the mail-list providers for each target firm. For number of employees, three

outliers were removed (42,540; 126,100; 165,000), leaving a maximum of 40,000 (which was the highest response case). For business unit revenue, nine outliers were removed (21.260bn; 23.186bn; 25.510bn; 28.422bn; 28.564bn; 29.578bn; 31.953bn; 34.304bn; 37.406bn), leaving the new maximum of 20.0bn (which was the highest response case). These outliers were removed because they were extreme and inclusion would distort the tests by biasing the mean scores.

Table 4.18 reports the results. At a marginal significance level of 0.10, both have mean differences. The actual respondent firms have 300 less employees than the mean employment of firms in the total target population. The actual respondent firms had $176.0m more revenue than the mean revenue of firms in the total target population. However, there is strong evidence to suggest that the secondary data from the mail-list providers for the total target population is highly inaccurate. As will be discussed in the next sub-section, 150 of the 546 firms self-reported as being smaller than the minimum size criteria provided to the two mail providers. Thus, no conclusions can be drawn from these results.

Table 4.18 – Non-response bias assessment – target versus actual respondents

Variable	N	Mean	Std. Dev.	Mean difference	T-value	Df	Sig. (2-tailed)
Number of employees							
Actual respondents	537	1,011	3,073	-300	-1.95	934	0.052
Target respondents	1720	1,311	3,226				
Business unit revenue							
Actual respondents	479	$684.4m	$1,907.9m	$176.0m	1.87	649	0.062
Target respondents	1714	$508.4m	$1,487.9m				

4.7.3 Useable sample and response rate

Table 4.19 reports the responses received. Of the 1,723 original target firms, 57 were no longer in existence or not contactable, leaving 1,666 as the adjusted number of target firms. After removing 20 duplicates, 546 firms responded, representing a total response rate of 32.8% of the 1,666 firms. 28 invalid responses were then removed: 12 respondents had been in their business unit for less than one year and were deemed to be insufficiently knowledgeable to answer the questions accurately; two respondents were not sufficiently senior or exposed to profit planning; and 14 responses had incomplete data. This left 518 responses, representing a 31.1% effective response rate. These 518 responses included 187 firms that were invalid according to the three sampling controls discussed in section 5.4.3: 150 firms had less than $20 million AUD revenue or 150 employees; in 25 firms, top management tenure was less than one year; and 12 firms had a life-cycle point of less than three years. While a response rate could be calculated excluding these 187 invalid firms, such a measure would mistakenly ignore all the

firms in the target sample of 1,666 that would not meet the three sampling controls criteria. 187 of the 518 respondent firms (36%) were invalid, and assuming that this proportion is representative of the total target population of 1,666, for purposes of reporting a response rate, the effective response rate of 31.1% is comparable to other studies. The usable percentage is 19.9%, being the 331 useable firms as a percentage of the 1,666 target firms.

Table 4.19 – Useable sample and response rate

	Number of target firms
1,723	Original number of target firms
-55	*less:* return to sender Dunn and Bradsteet supplied firms
-2	*less:* return to sender and 100% email bounced IncNet supplied firms
1,666	adjusted number of target firms
	Responses
244	Mail survey responses
322	Web survey responses
566	Sum of mail and web survey responses
-20	*less:* duplicates
546	adjusted number of respondent firms
32.8%	Total response rate
	Invalid responses
-12	*less:* responders who had been in their business unit for less than 1 year
-2	*less:* responders not sufficiently senior or exposed to profit planning
-14	*less:* responses with incomplete data
518	adjusted number of respondent firms
31.1%	Effective response rate
	Sampling controls
-150	*less:* firms with less than $20m revenue or 150 employees
-25	*less:* firms with top management tenure of less than 1 year
-12	*less:* firms with a life of less than 3 years
-187	Total number of firms that misfit the sampling criteria
331	Useable sample
19.9%	Useable percentage

In comparing the effective response rate to other similar studies, three categories of surveys are relevant:

1) In terms of management accounting survey-responses, the average rate over 1982-2001 was 55% (Van der Stede et al., 2005). However, over 1992-2001 it was only 48%, adding to concerns that response rates to surveys are declining (Van der Stede et al., 2005).
2) For top management survey-responses, it has been suggested that the average response rates in business related research is the range of 15% to 20% (Reinartz et al., 2004). However, Bisbe and Otley (2004) surveyed CEOs' use of control systems in medium sized Spanish manufacturing firms and achieved a response rate of 48%. In contrast, in another similar study, Henri (2006a and b) achieved a response rate from upper echelons of management of only 24%, and this was presented as being similar to other comparable upper echelons of management studies (e.g., Lee, Lee and Pennings, 2001; Baines and Langfield-Smith, 2003).
3) It has been suggested that Australian firms are less likely to respond than firms in other nations included in the response rates referred to above. For example, Brown, Booth and Giacobbe (2004) achieved a response rate of 12.5%.

The prior literature thus indicates an expected response rate of between 15% and 55%. However, these studies did not explicitly target a large section of hypercompetitive type industries. It is expected that the response rate from hypercompetitive type firms would be lower than from firms in less competitive settings, because the time-poor managers in hypercompetitive settings already have greater issues demanding their attention. Given these considerations, the 31.1% response rate is considered more than satisfactory.

4.7.4 Descriptive data for the useable sample

Tables 4.20 and 4.21 report descriptive data for the 331 useable responses. Table 4.20 reports information that describes the survey participants, i.e., the respondents themselves. The most salient points are: 89.8% of respondents were from senior management; 68.3% of respondents had been in their business unit for longer than three years; and CFO / Finance Director was the highest respondent role type (27.5%). Table 4.21 reports information that describes the firms. The most salient points are: most business units were foreign owned (42.3%); the two most represented industries were Manufacturing (33.8%) and Services (17.8%); and 49.8% of firms achieved better-than-budget performance last year.

Table 4.20 – Descriptive data for respondents in the useable sample

Management level of respondents	Frequency	Percent
Senior Management	299	89.8%
Middle Management	32	10.2%
Total	331	100.0%

Tenure within business unit by respondents	Frequency	Percent
Greater than one year	331	100.0%
Total	331	100.0%

Role of respondents	Frequency	Percent
CFO / Finance Director	91	27.5%
CEO / Managing Director	86	26.0%
General Manager	35	10.6%
Financial Controller	30	9.1%
Senior Finance Manager	26	7.9%
Finance Manager	20	6.0%
Senior Manager - Other	13	3.9%
Planning Manager	12	3.6%
Other	10	3.0%
Director	5	1.5%
Head Of Department	3	0.9%
Total	331	100.0%

Table 4.21 – Descriptive data for firms in the useable sample

Tenure within business unit by top manager	Frequency	Percent
1 - 2 years	61	18.4%
2 - 3 years.	44	13.3%
3 + years.	226	68.3%
Total	331	100.0%
Age of business unit	Frequency	Percent
Greater than 3 years	331	100.0%
Total	331	100.0%
Business unit ownership	Frequency	Percent
Foreign owned.	140	42.3%
Privately held in Australia.	107	32.3%
Listed on the Australian Stock Exchange.	84	25.4%
Total	331	100.0%
Industry classification	Frequency	Percent
Manufacturing.	112	33.8%
Services.	59	17.8%
Wholesale Trade.	29	8.8%
Finance, Insurance and Real Estate.	25	7.6%
Public Administration.	24	7.3%
Mining.	23	6.9%
Construction.	20	6.0%
Retail Trade.	16	4.8%
Agriculture, Forestry and Fishing.	12	3.6%
Transportation, Communications, Electric, Gas & Sanitary Services.	11	3.3%
Total	331	100.0%
Profit planning performance last financial year	Frequency	Percent
Better than budget.	165	49.8%
Below budget.	102	30.8%
On budget.	64	19.3%
Total	331	100.0%

4.8 Chapter conclusion

This chapter presented the research methodology. A mixed-mode, cross-sectional self-reported survey was used to collect the data that will be used to test the hypotheses with PLS in the next chapter. Measurement scales for the budgeting system style of use construct were developed, and scales were adapted and justified for market competitiveness, flexibility culture and firm performance. A stratified sampling approach was employed using subject matter experts to help identify firms that were likely to self-report themselves as of the hypercompetitive type. The unit of analysis, target respondents, sampling controls and survey distribution strategy were presented. The questionnaire pre-testing and pilot testing processes were described.

The internet and mail-survey strategy yielded a 31.1% response rate. Non-response bias testing suggests that the respondents do not materially differ from the non-respondent population. After removing firms that did not meet the sampling controls criteria, a useable sample of 331 firms remained. Based on the response rate and non-response bias testing, the sample is of sufficient quality to provide dependable and generalisable inferences from the testing to be performed in the next chapter.

5.0 CHAPTER FIVE – DATA ANALYSES, RESULTS AND FINDINGS

5.1 Introduction

This chapter develops and assesses PLS models to test the theoretical model in confirmatory and exploratory modes. PLS models are typically analysed and interpreted in two stages: (1) the measurement model and (2) the structural model (Anderson and Gerbing, 1988; Hulland, 1999). In the first stage, the measurement model is evaluated for reliability and validity. In this case, in order to resolve particular issues, the measurement model stage is split into two steps: (1) exploratory and (2) confirmatory. In the second stage, the structural model is evaluated to assess the relationships hypothesised. PLS is also particularly flexible and well suited to exploratory supplementary tests of the theoretical model. This chapter contains seven segments.

1) Section 5.2 derives the three MARKCOMP sub-groups (i.e., hypercompetitive, moderately competitive and stable). This enables subsequent reliability and validity assessments to be performed by sub-group, so that context-specific issues may be raised.
2) Section 5.3 provides the first assessment of measurement reliability and validity. Common method variance is also assessed.
3) Sections 5.4, 5.5 and 5.6 conduct exploratory measurement model assessment for BUDSTYLE, FLEXCULT and FIRMPERF. Descriptive analysis, correlation analysis and factor analysis are used to explore the reliability and validity of the measurement models predicted in Chapter Four. The final measurement models are substantiated with PLS modelling.
4) Section 5.7 performs confirmatory measurement model testing and structural model testing across the three sub-groups.
5) Sections 5.8, 5.9, 5.10, 5.11, and 5.12 conduct exploratory testing of the theoretical model. Six supplementary models are examined: modelling using low and high categories of the moderately competitive sub-group; sensitivity analyses of the formation of the MARKCOMP sub-groups and also as a continuous variable; the mediation effects of BUDSTYLE on the relationship between FLEXCULT and FIRMPERF; moderating effects using product indicator models; and the effects of the control variable SIZE.
6) Section 5.13 summarises the results, drawing out the most salient findings from the extensive set of procedures undertaken in sections 5.2 to 5.12.
7) Section 5.14 discusses the results and develops theoretical explanations and implications.

Except where otherwise stated, SPSS 15.0 for Windows was used to perform calculations of descriptive statistics, correlation analyses, factor analyses, and Kolmogorov-Smirnov goodness-

of-fit tests. All PLS modelling was performed in SmartPLS 2.0.[25] Table 5.1 shows the significance levels used in all analyses: correlation analyses use the 2-tailed critical t-values; and causal path relationships between the constructs use 1-tailed critical t-values.

Table 5.1 – Significance levels

	t-value	
Significance level	2-tailed test	1-tailed test
90%	1.645	1.282
95%	1.96	1.645
99%	2.576	2.326

5.2 MARKCOMP: formation of sub-groups

Table 5.2 reports descriptive statistics (frequency, mean and standard deviation) for the six measures that in aggregate form the construct MARKCOMP. The aggregate measure is also reported in the table. There is a large degree of variance and heterogeneity in the measures. For MARKCOMP, the average of 4.44 is very close to the middle of the theoretical range from 1.0 to 9.0.

Table 5.2 – Descriptive statistics for MARKCOMP measures

n=331	1	2	3	4	5	6	7	8	9	Mean	Std. Dev.
markint	57	110	80	40	21	8	7	5	3	2.86	1.63
markpred	13	29	74	61	45	47	43	16	3	4.53	1.88
techint	7	25	34	42	39	46	62	48	28	5.64	2.17
techpred	16	44	43	46	47	39	53	25	18	4.89	2.22
compint	20	68	79	40	32	32	28	21	11	4.13	2.17
comppred	11	45	69	44	43	48	42	24	5	4.59	2.03
MARKCOMP	1	10	58	99	87	61	15	0	0	4.44	1.14

As was discussed in section 4.4.2.5, to operationalise the MARKCOMP construct, the six measures are aggregated and averaged, giving the theoretical range from 1.0 to 9.0. The total sample is split into three sub-samples, where: (a) firms in stable conditions are those scoring less than or equal to 3.0; (b) firms in moderately competitive conditions are those scoring greater than 3.0 and less than 6.0; and (c) firms in hypercompetitive conditions are those scoring 6.0 or greater. The scores and sub-group break-up of the 331 cases are graphed in

[25] Authors: Ringle, Christian Marc/Wende, Sven/Will, Alexander. Title: SmartPLS. Release: 2.0 (beta). Internet: http://www.smartpls.de Organisation: University of Hamburg. City: Hamburg, Germany. Year: 2005.

Figure 5.1. This yielded: 40 stable type firms (12.1%); 259 moderately competitive type firms (78.2%); and 32 hypercompetitive type firms (9.7%). Notably, there is a fairly even distribution across the range of MARKCOMP scores.

Figure 5.1 – Histogram showing MARKCOMP sub-groups

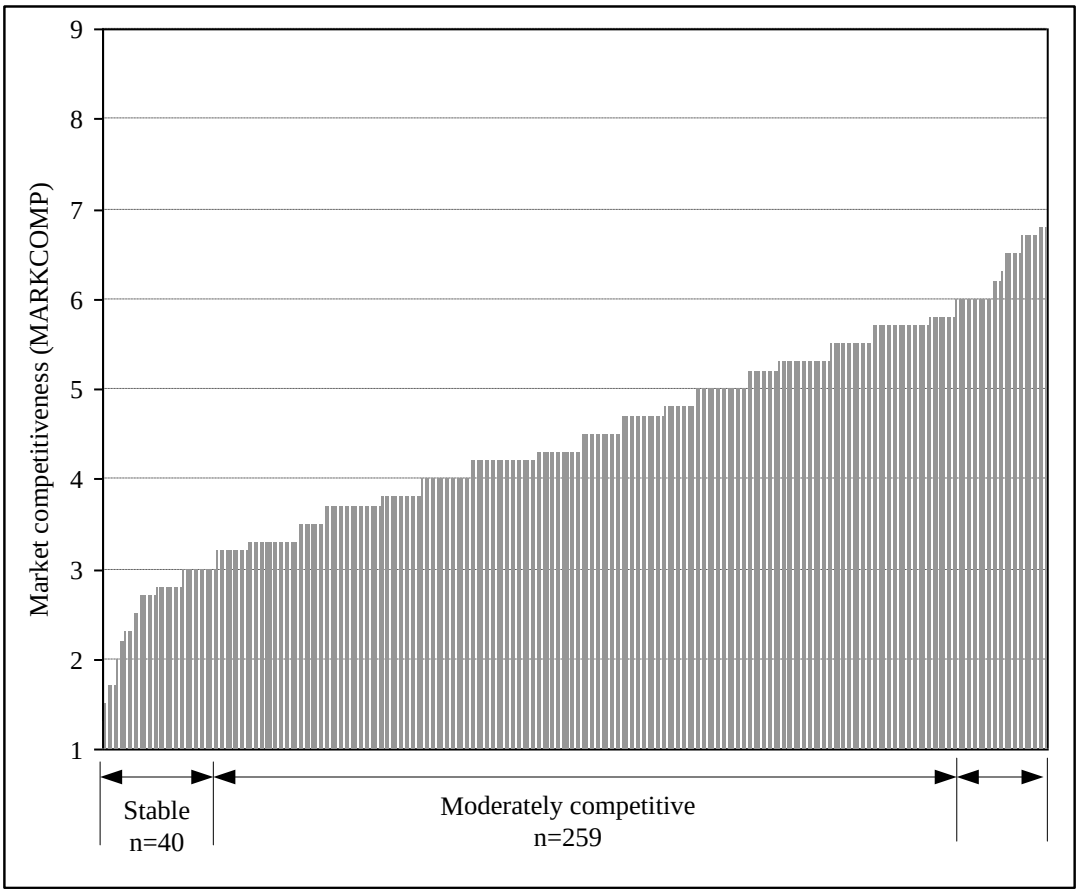


Table 5.3 shows the correlation matrix for the six measures including the aggregate measure MARKCOMP. Reflecting the high variability and heterogeneity evident in the descriptive statistics, there is a broad range of correlations, and many are small and insignificant at the 0.10 level. The key correlates of the MARKCOMP measure are: techpred (0.78), comppred (0.63), techint (0.58), markpred (0.57), compint (0.47) and markint (0.27).

Table 5.3 – Correlation matrix of MARKCOMP measures

n=331	markint	markpred	techint	techpred	compint	comppred
markpred	-0.04					
techint	-0.08	***0.20***				
techpred	0.04	***0.45***	***0.48***			
compint	***0.19***	-0.04	0.07	***0.14***		
comppred	-0.01	***0.36***	***0.16***	***0.40***	***0.17***	
MARKCOMP	***0.27***	***0.57***	***0.58***	***0.78***	***0.47***	***0.63***

2-tailed significance levels: ***0.01*** ; *0.05* ; *0.10* .

Table 5.4 reports an exploratory factor analysis of the six MARKCOMP measures. Consistent with the correlation analysis, two measures load on a second factor, i.e., markint and compint. Given that these were the only measures reverse coded in the survey, they are possibly unreliable due to method error. A series of sensitivity tests in Section 5.9 alleviates this potential concern, showing the MARKCOMP method as robust and therefore appropriate for operationalising the market competitiveness construct.

Table 5.4 – Exploratory factor analysis of MARKCOMP measures

n=331	Factor 1 loading	Factor 2 loading	Commu-nalities
markint	-0.10	**0.75**	0.57
markpred	**0.71**	-0.14	0.52
techint	**0.63**	-0.06	0.41
techpred	**0.84**	0.12	0.71
compint	0.13	**0.77**	0.61
comppred	**0.66**	0.18	0.46

5.3 First assessment of reliability and validity: all cases and constructs

Reliability and validity are two criteria to assess measurement quality. Reliability is the degree of stability of repeated observations of the same phenomenon, i.e., internal consistency of measures of the same unidimensional construct (Hair et al., 1998; Bisbe et al., 2007). Reliable measures report the same results repeatedly. Poor reliability leads to ambiguous findings, because the results may be drawn from measurement error.

Whereas reliability refers to the quality and consistency of the measurement model, validity refers to what should be measured (Bisbe et al., 2007). Convergent validity and discriminant validity empirically examine measured scores against theory-based expectations (Bisbe et al., 2007). Convergent validity assesses the degree to which two measures of the same concept are

correlated, and discriminant validity assesses the degree to which a measure diverges from other theoretically dissimilar measures (Hair et al., 1998).

Chin and Gopal (1995) suggest correlation analysis of the raw data as a first approximation of measurement reliability and validity. Exploratory factor analysis is also used in this first assessment of reliability and validity and to also assess common method variance. The focus of this section is on inter-construct correlations and factor loadings only. Separate analyses are conducted for each of the individual constructs in later sections.

5.3.1 Correlation analysis of all cases and constructs

Appendix M shows a correlation matrix of all cases and all measures of the theoretical constructs (i.e., BUDSTYLE, FLEXCULT, MARKCOMP and FIRMPERF). In terms of reliability and validity, reflective measures for a given construct should correlate highly with each other and not with those of any other construct, and formative measures should at least not correlate highly with those of another construct. The following discussion of 'average correlations' is fairly simplistic, but nonetheless provides a useful starting point for assessment. The 18 BUDSTYLE measures have an average correlation with the 18 FLEXCULT measures of 0.29. The 18 BUDSTYLE measures have an average correlation with the three FIRMPERF measures of 0.21. The 18 FLEXCULT measures have an average correlation with the three FIRMPERF measures of 0.29. All these low 'average correlations' provide no evidence of multicollinearity at the construct level, and thus provide favorable initial assessments of reliability and validity.

5.3.2 Exploratory factor analysis of all cases and constructs

Factor analysis can confirm these correlation-based assessments. In addition, the possibility of common method variance exists because all construct measures were collected in a single survey instrument answered by a single respondent (Podsakoff and Organ, 1986). Following Tsang (2002), Harman's single-factor test was applied to all the indicators of the theoretical constructs. Exploratory factor analysis (EFA) was used to explore the possible underlying factor structure. Principal components analysis (PCA) was employed, with varimax rotation and Kaiser's criterion (i.e., eigenvalues greater than one). As is evident from Table 5.5, all constructs loaded on separate factors, as opposed to a single factor, and the first factor did not account for the majority of the variance. Thus common method variance is not apparent.

Reliability and validity can be further assessed against the criteria outlined by Hair et al. (1998). They recommend examining communality and removing items less than 0.45, and examining loadings and removing items: (1) that do not load together with other same construct

items (for reflective indicators); (2) with values less than 0.50; and (3) that load on more than one factor (i.e., loadings larger than 0.50 on at least two factors). The communalities and factor loadings all successfully meet these reliability and validity criteria. There is one very minor exception in the case of the FLEXCULT indicator learn2 – which has a loading of 0.43. This is a moot point, and in section 5.5 it is shown to load adequately on the FLEXCULT construct in a separate factor analysis.

No measures have outliers, as might be expected with Likert scales and a sample of this size. However, factor analysis assumes multivariate normality, and Kolmogorov-Smirnov goodness-of-fit tests showed that none of the measures has normal distributions. Whilst the lack of normal distributions is not a problem for the distribution free PLS modelling procedure (Wold, 1982; Chin, 1998), it does present a limitation to all the factor analyses performed in this study. Notwithstanding this concern, the exploratory factor analysis provides further favourable first stage assessments of measurement reliability and validity.

Table 5.5 – Exploratory factor analysis of all main indicators

n=331				Factor 1 loading	Factor 2 loading	Factor 3 loading	Factor 4 loading	Factor 5 loading	Factor 6 loading	Factor 7 loading	Factor 8 loading	Factor 9 loading	Commu-nalities
BUDSTYLE	FREQ	snrfrq	snrfrq1	0.15	0.20	**0.73**	0.05	0.06	-0.03	0.03	-0.05	0.10	0.65
			snrfrq2	0.27	0.45	**0.58**	0.02	0.02	-0.03	0.02	-0.17	0.00	0.63
			snrfrq3	0.31	0.48	**0.53**	0.05	0.08	0.03	-0.03	0.01	-0.04	0.64
			snrfrq4	0.20	0.43	**0.51**	0.06	0.11	0.01	-0.10	-0.08	0.06	0.53
		midfrq	midfrq1	0.19	0.16	**0.84**	0.12	0.02	0.06	0.04	0.02	0.00	0.78
			midfrq2	0.03	0.25	**0.73**	0.03	0.01	0.19	0.02	0.03	-0.09	0.67
			midfrq3	0.14	0.20	**0.76**	0.07	0.16	0.02	0.05	0.07	0.08	0.70
			midfrq4	0.17	0.30	**0.72**	0.03	0.11	0.15	0.07	0.07	-0.02	0.73
	INTENS	chall	chall1	0.23	**0.56**	0.31	0.06	0.05	-0.01	-0.10	-0.21	0.07	0.54
			chall2	0.29	**0.53**	0.49	-0.02	0.04	0.06	-0.02	-0.09	-0.03	0.62
			chall3	0.06	**0.65**	0.37	0.05	0.14	0.09	0.18	-0.07	0.03	0.64
			chall4	0.21	**0.61**	0.26	0.12	0.18	0.05	0.02	-0.12	0.10	0.56
			chall5	0.20	**0.59**	0.41	-0.03	0.17	0.02	0.00	-0.27	0.13	0.67
		strat	strat1	0.20	**0.57**	0.25	0.17	0.05	0.12	0.05	0.08	-0.22	0.54
			strat2	0.20	**0.67**	0.19	0.09	0.06	0.09	0.13	0.12	-0.35	0.70
			strat3	0.31	**0.65**	0.22	0.10	0.07	0.00	0.03	0.12	-0.12	0.62
			strat4	0.04	**0.63**	0.24	0.13	0.22	0.09	0.12	0.04	0.28	0.63
			strat5	0.23	**0.73**	0.11	0.11	0.03	0.08	0.13	0.10	0.09	0.65
FLEXCULT	involv	team	team1	**0.77**	0.12	0.23	0.04	0.17	0.12	-0.04	-0.18	0.01	0.76
			team3	**0.74**	0.12	0.18	0.07	0.03	0.16	-0.02	-0.19	0.03	0.69
			team2	**0.62**	0.14	0.08	0.20	-0.01	0.04	0.11	-0.09	0.03	0.47
		capdev	capdev1	**0.62**	0.19	0.10	0.37	0.25	0.18	0.01	0.08	0.00	0.66
			capdev2	**0.68**	0.18	0.04	0.10	0.06	0.32	0.05	0.11	-0.01	0.62
			capdev3	**0.69**	0.20	0.05	0.24	-0.07	0.27	-0.05	0.02	0.07	0.69
		empow	empow2	**0.68**	0.28	0.20	-0.03	0.22	0.08	0.02	0.13	0.00	0.65
			empow1	**0.60**	0.21	0.23	0.13	0.34	-0.02	0.15	0.10	-0.11	0.63
			empow3	**0.68**	0.22	0.17	0.09	0.24	0.07	-0.02	0.04	-0.05	0.61
	adapt	change	change1	0.32	0.20	0.10	0.10	**0.78**	0.18	0.08	0.06	0.02	0.82
			change2	0.39	0.16	0.12	0.17	**0.69**	0.23	0.03	0.00	-0.02	0.77
			change3	0.46	0.15	0.14	0.05	**0.59**	0.28	0.12	0.03	-0.09	0.72
		custom	custom1	0.26	0.10	0.12	0.05	0.28	**0.78**	0.13	-0.06	0.05	0.81
			custom2	0.22	0.08	0.10	0.13	0.17	**0.85**	0.04	-0.08	0.04	0.85
			custom3	0.40	0.09	0.05	0.11	0.06	**0.66**	0.03	-0.10	-0.06	0.64
		learn	learn2	0.42	0.16	0.22	0.23	**0.43**	0.08	0.16	-0.03	0.08	0.59
			learn1	**0.56**	0.16	0.16	0.16	0.36	0.10	0.05	0.01	0.01	0.65
			learn3	**0.70**	0.14	0.17	0.01	0.19	0.06	0.11	-0.10	-0.04	0.62
MARKCOMP			markint	-0.08	-0.02	-0.02	0.02	0.06	-0.16	-0.01	**0.81**	0.10	0.72
			markpred	-0.03	0.20	-0.06	0.02	0.30	-0.12	**0.64**	-0.23	0.10	0.64
			techint	0.16	-0.01	0.07	0.09	-0.05	0.26	**0.69**	0.12	-0.20	0.72
			techpred	0.04	0.06	0.05	0.03	0.05	0.04	**0.84**	0.09	0.13	0.75
			compint	-0.01	-0.01	0.11	-0.10	-0.03	0.03	0.03	0.43	**0.64**	0.69
			comppred	0.05	0.10	0.03	-0.06	0.01	0.02	0.52	-0.14	**0.55**	0.62
PERF			sales	0.22	0.11	0.07	**0.86**	0.07	0.11	-0.01	-0.01	-0.02	0.83
			markshar	0.14	0.16	0.07	**0.88**	0.06	0.07	-0.01	-0.04	-0.03	0.84
			profit	0.24	0.11	0.11	**0.72**	0.16	0.07	0.12	0.05	-0.08	0.68

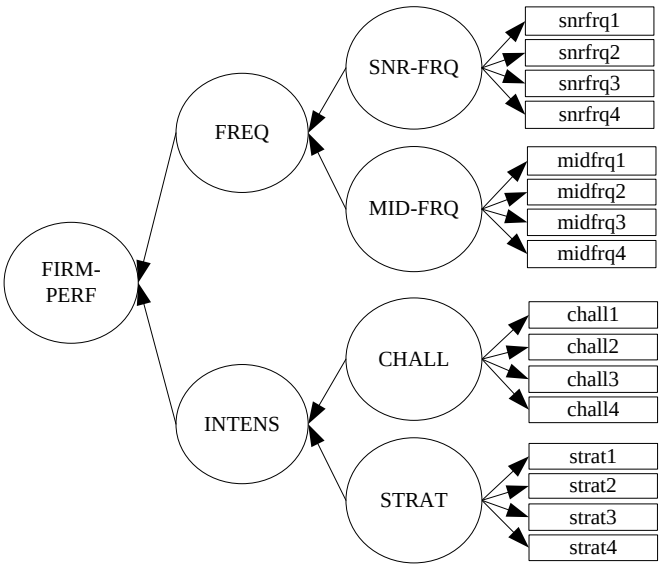
5.4 BUDSTYLE measurement: reliability and validity analysis

This section explores the epistemology of the BUDSTYLE construct. There are five sub-sections. First, descriptive statistics are reported. Second, a correlation matrix of all indicators is presented. Third, factor analysis is used for data reduction, resulting in four indicators for each of the four dimensions. Then factor analysis is used in confirmatory and exploratory modes to assess the fit of the data to the a priori BUDSTYLE dual construct emergent model. These analyses suggest a potential multicollinearity problem that questions the validity of the a priori BUDSTYLE conceptualisation. Fourth, focused PLS modelling is used to explore the multicollinearity issues. Based on the empirical outcomes, four alternative measurement model configurations for BUDSTYLE are assessed. Fifth, correlation analysis and factor analysis are used to further examine the most effective ex post BUDSTYLE model.

Given the context-specificity of the predicted BUDSTYLE model, analyses are performed at the MARKCOMP sub-group level where possible. Descriptive statistics, correlation analysis and PLS analysis are at the sub-group level. For factor analysis however, while there are many alternative arbitrary 'rules of thumb', there is near-universal agreement that sample sizes must be greater than 50 (e.g., Marsh and Hau, 1999). Thus, factor analysis can only be performed at the total sample level (i.e., n = 331).

The predicted dual construct emergent second order BUDSTYLE model from Chapter Four is reproduced in Figure 5.2.

Figure 5.2 – Hypothesised dual construct BUDSTYLE model



5.4.1 Descriptive statistics

Table 5.6 shows descriptive statistics (means, standard deviation, minimum and maximum) for the BUDSTYLE measures, by sub-group and at the total sample level. Generally, across all the sub-groups there are moderately-high scores of around 6.0 out of the theoretical maximum of 9.0. Within each sub-group and for the total sample, there is strong consistency between the item scores. The hypercompetitive type firms have higher average scores than do moderately competitive type firms. Stable type firms have slightly lower average scores than moderately competitive type firms. The standard deviations and minimum and maximum measures suggest the variances in the scores to be satisfactory for PLS modelling purposes.

Table 5.6 – Descriptive statistics for BUDSTYLE measures

	All firms n=331				Hypercompetitive n=32				Moderately competitive n=259				Stable n=40			
Indicator	Mean	Std. Dev.	Min.	Max.	Mean	Std. Dev.	Min.	Max.	Mean	Std. Dev.	Min.	Max.	Mean	Std. Dev.	Min.	Max.
snrfrq1	5.74	2.51	1	9	6.41	2.30	1	9	5.71	2.53	1	9	5.40	2.55	1	9
snrfrq2	6.91	1.86	1	9	7.34	1.70	1	9	6.88	1.83	1	9	6.78	2.13	2	9
snrfrq3	6.41	1.91	1	9	6.56	1.81	2	9	6.47	1.87	1	9	5.90	2.18	1	9
snrfrq4	6.32	2.01	1	9	6.53	1.72	3	9	6.29	2.05	1	9	6.30	1.96	1	9
midfrq1	5.91	2.14	1	9	6.16	2.16	1	9	5.94	2.11	1	9	5.50	2.31	1	9
midfrq2	5.87	2.05	1	9	5.78	1.91	2	8	5.92	2.02	1	9	5.63	2.37	1	9
midfrq3	4.89	2.28	1	9	5.44	2.24	2	9	4.86	2.25	1	9	4.63	2.47	1	9
midfrq4	5.59	2.05	1	9	6.09	1.80	2	9	5.58	2.02	1	9	5.23	2.41	1	9
chall1	6.15	1.85	1	9	5.94	2.02	2	9	6.17	1.83	1	9	6.25	1.92	2	9
chall2	6.84	1.64	1	9	7.00	1.57	3	9	6.84	1.68	1	9	6.68	1.47	3	9
chall3	5.81	1.92	1	9	6.13	2.00	2	9	5.85	1.88	1	9	5.33	2.04	1	9
chall4	5.85	1.86	1	9	6.00	1.98	2	9	5.86	1.82	1	9	5.68	2.06	1	9
chall5	6.53	1.93	1	9	6.75	1.81	3	9	6.54	1.90	1	9	6.33	2.19	1	9
strat1	6.56	1.80	1	9	6.53	1.85	3	9	6.56	1.85	1	9	6.65	1.48	2	9
strat2	6.37	1.91	1	9	6.50	1.97	1	9	6.36	1.91	1	9	6.30	1.94	1	9
strat3	6.53	1.94	1	9	6.34	2.35	1	9	6.61	1.90	1	9	6.18	1.84	1	9
strat4	5.21	2.12	1	9	6.19	2.04	1	9	5.16	2.09	1	9	4.75	2.22	1	9
strat5	6.57	1.89	1	9	7.28	1.67	2	9	6.60	1.84	1	9	5.83	2.16	2	9

5.4.2 Correlation analysis

Table 5.7 shows a correlation matrix for the BUDSTYLE measures, by sub-group and at the total sample level. For ease of interpretation, the matrix includes gridlines that separate the indicators into respective constructs. Four observations are apparent. Firstly, the inter-item correlations are reasonably consistent across each of the four sub-groups. This suggests that there may not be a great deal of context-specificity in how the measures form higher level dimensions. Secondly, except for the stable sub-group, the inter-item correlations are consistently of a medium size (i.e., in the range of 0.45 to 0.65) and show a high degree of statistical significance. Thirdly, it appears that the intra-construct correlations are generally similar in size to the inter-construct correlations. Fourthly, the hypercompetitive and stable sub-

groups have some inter-item discrepancies that suggest that some indicators are not equally reliable in all contexts. Notwithstanding these minor concerns, the correlation matrix demonstrates that there may be a major concern with the predicted dual construct emergent model of BUDSTYLE. If the inter-construct correlations are too similar and too high, an emergent multidimensional construct may be empirically invalid.

Table 5.7 – BUDSTYLE correlation matrix by MARKCOMP sub-group

All; n=331 Hyper; n=32 Mod comp; n=259 Stable; n=40		snrfrq1	snrfrq2	snrfrq3	snrfrq4	midfrq1	midfrq2	midfrq3	midfrq4	chall1	chall2	chall3	chall4	chall5	strat1	strat2	strat3	strat4
snrfrq2	All	***0.61***																
	Hyper	***0.58***																
	Mod comp	***0.59***																
	Stable	***0.68***																
snrfrq3	All	***0.47***	***0.58***															
	Hyper	***0.42***	***0.56***															
	Mod comp	***0.48***	***0.59***															
	Stable	***0.45***	***0.54***															
snrfrq4	All	***0.45***	***0.54***	***0.58***														
	Hyper	*0.30*	*0.43*	***0.75***														
	Mod comp	***0.47***	***0.55***	***0.60***														
	Stable	*0.41*	***0.57***	*0.41*														
midfrq1	All	***0.67***	***0.61***	***0.56***	***0.48***													
	Hyper	***0.68***	***0.79***	***0.70***	***0.52***													
	Mod comp	***0.67***	***0.60***	***0.53***	***0.47***													
	Stable	***0.64***	***0.58***	***0.63***	***0.51***													
midfrq2	All	***0.42***	***0.41***	***0.47***	***0.46***	***0.63***												
	Hyper	*0.43*	***0.60***	***0.73***	***0.77***	***0.59***												
	Mod comp	***0.41***	***0.36***	***0.42***	***0.44***	***0.62***												
	Stable	***0.47***	***0.61***	***0.55***	*0.43*	***0.71***												
midfrq3	All	***0.70***	***0.47***	***0.54***	***0.42***	***0.65***	***0.55***											
	Hyper	***0.55***	***0.50***	***0.54***	*0.41*	***0.53***	*0.42*											
	Mod comp	***0.69***	***0.45***	***0.52***	***0.44***	***0.63***	***0.56***											
	Stable	***0.81***	***0.55***	***0.61***	0.29	***0.78***	***0.59***											
midfrq4	All	***0.44***	***0.54***	***0.63***	***0.55***	***0.66***	***0.68***	***0.61***										
	Hyper	*0.34*	*0.46*	***0.84***	***0.64***	***0.63***	***0.66***	***0.57***										
	Mod comp	***0.45***	***0.53***	***0.59***	***0.55***	***0.64***	***0.67***	***0.61***										
	Stable	*0.43*	***0.61***	***0.67***	***0.52***	***0.79***	***0.77***	***0.60***										
chall1	All	***0.38***	***0.52***	***0.41***	***0.40***	***0.42***	***0.40***	***0.35***	***0.44***									
	Hyper	***0.58***	***0.52***	*0.43*	*0.45*	*0.46*	*0.48*	*0.36*	0.25									
	Mod comp	***0.36***	***0.52***	***0.43***	***0.41***	***0.44***	***0.39***	***0.35***	***0.49***									
	Stable	*0.42*	***0.56***	*0.29*	*0.30*	*0.31*	*0.38*	*0.41*	*0.36*									
chall2	All	***0.46***	***0.61***	***0.59***	***0.54***	***0.54***	***0.54***	***0.45***	***0.54***	***0.46***								
	Hyper	***0.53***	***0.72***	***0.68***	***0.59***	***0.57***	***0.76***	***0.50***	***0.59***	*0.48*								
	Mod comp	***0.46***	***0.62***	***0.58***	***0.54***	***0.53***	***0.50***	***0.44***	***0.53***	***0.48***								
	Stable	*0.34*	***0.48***	***0.62***	***0.52***	***0.55***	***0.65***	***0.50***	***0.58***	*0.33*								
chall3	All	***0.44***	***0.51***	***0.51***	***0.40***	***0.42***	***0.44***	***0.48***	***0.49***	***0.47***	***0.53***							
	Hyper	0.16	0.20	***0.60***	*0.34*	*0.35*	0.21	*0.35*	*0.44*	*0.35*	*0.45*							
	Mod comp	***0.45***	***0.54***	***0.49***	***0.43***	***0.44***	***0.45***	***0.48***	***0.50***	***0.47***	***0.55***							
	Stable	***0.50***	***0.58***	***0.51***	***0.29***	*0.36*	***0.53***	***0.54***	*0.42*	***0.60***	***0.46***							
chall4	All	***0.42***	***0.47***	***0.52***	***0.54***	***0.37***	***0.33***	***0.42***	***0.42***	***0.48***	***0.45***	***0.48***						
	Hyper	***0.57***	***0.58***	***0.77***	***0.58***	***0.64***	***0.65***	*0.45*	***0.75***	*0.44*	***0.70***	*0.37*						
	Mod comp	***0.39***	***0.48***	***0.52***	***0.55***	***0.33***	***0.29***	***0.40***	***0.39***	***0.49***	***0.43***	***0.50***						
	Stable	***0.46***	*0.31*	*0.33*	***0.49***	*0.38*	*0.32*	***0.53***	*0.37*	***0.47***	*0.40*	***0.44***						
chall5	All	***0.44***	***0.61***	***0.54***	***0.50***	***0.47***	***0.45***	***0.43***	***0.50***	***0.52***	***0.65***	***0.62***	***0.49***					
	Hyper	*0.48*	***0.50***	***0.77***	*0.45*	***0.59***	***0.60***	*0.33*	***0.65***	***0.54***	***0.64***	***0.53***	***0.73***					
	Mod comp	***0.42***	***0.60***	***0.53***	***0.49***	***0.47***	***0.40***	***0.43***	***0.48***	***0.50***	***0.67***	***0.61***	***0.45***					
	Stable	***0.52***	***0.70***	***0.47***	***0.54***	***0.39***	***0.60***	***0.44***	***0.47***	***0.62***	***0.53***	***0.70***	***0.53***					
strat1	All	***0.29***	***0.49***	***0.46***	***0.37***	***0.38***	***0.35***	***0.35***	***0.40***	***0.48***	***0.47***	***0.46***	***0.42***	***0.35***				
	Hyper	0.13	*0.41*	*0.47*	***0.49***	0.27	*0.45*	*0.30*	*0.32*	*0.39*	***0.61***	***0.58***	*0.39*	*0.35*				
	Mod comp	***0.30***	***0.52***	***0.48***	***0.37***	***0.41***	***0.33***	***0.36***	***0.43***	***0.51***	***0.47***	***0.47***	***0.47***	***0.37***				
	Stable	*0.32*	*0.38*	*0.42*	0.25	*0.31*	***0.46***	*0.37*	*0.28*	*0.40*	*0.31*	*0.41*	0.16	0.20				
strat2	All	***0.31***	***0.44***	***0.49***	***0.38***	***0.35***	***0.37***	***0.31***	***0.41***	***0.41***	***0.49***	***0.54***	***0.43***	***0.44***	***0.51***			
	Hyper	*0.39*	*0.41*	***0.78***	***0.54***	*0.45*	***0.55***	***0.48***	***0.61***	*0.41*	***0.69***	***0.67***	***0.71***	***0.57***	***0.61***			
	Mod comp	***0.29***	***0.42***	***0.49***	***0.35***	***0.33***	***0.32***	***0.28***	***0.41***	***0.43***	***0.48***	***0.53***	***0.42***	***0.42***	***0.52***			
	Stable	*0.34*	***0.56***	*0.29*	***0.44***	*0.37*	***0.49***	*0.41*	0.25	*0.32*	*0.42*	***0.50***	*0.27*	***0.47***	*0.43*			
strat3	All	***0.36***	***0.48***	***0.59***	***0.43***	***0.40***	***0.35***	***0.37***	***0.41***	***0.43***	***0.52***	***0.45***	***0.54***	***0.45***	***0.51***	***0.58***		
	Hyper	*0.38*	***0.62***	***0.67***	*0.42*	*0.47*	***0.65***	*0.33*	*0.44*	*0.41*	***0.75***	*0.47*	***0.60***	***0.68***	***0.58***	***0.74***		
	Mod comp	***0.34***	***0.48***	***0.62***	***0.43***	***0.39***	***0.31***	***0.36***	***0.44***	***0.46***	***0.52***	***0.46***	***0.55***	***0.46***	***0.50***	***0.57***		
	Stable	***0.50***	***0.44***	*0.33*	***0.48***	*0.37*	*0.34*	***0.52***	0.26	*0.29*	*0.27*	*0.37*	***0.48***	0.25	***0.57***	***0.50***		
strat4	All	***0.35***	***0.39***	***0.41***	***0.43***	***0.34***	***0.33***	***0.43***	***0.49***	***0.45***	***0.39***	***0.57***	***0.51***	***0.51***	***0.42***	***0.37***	***0.42***	
	Hyper	0.22	0.06	***0.69***	***0.56***	0.26	*0.42*	0.27	***0.64***	0.25	*0.44*	***0.54***	***0.56***	***0.62***	0.23	***0.68***	*0.44*	
	Mod comp	***0.35***	***0.46***	***0.38***	***0.46***	***0.36***	***0.34***	***0.45***	***0.52***	***0.51***	***0.41***	***0.61***	***0.50***	***0.50***	***0.49***	***0.38***	***0.45***	
	Stable	*0.39*	0.21	*0.38*	0.15	*0.29*	0.23	*0.39*	0.20	*0.40*	0.21	*0.31*	***0.53***	***0.49***	0.18	0.05	*0.26*	
strat5	All	***0.34***	***0.40***	***0.47***	***0.39***	***0.31***	***0.28***	***0.36***	***0.34***	***0.40***	***0.48***	***0.53***	***0.51***	***0.53***	***0.41***	***0.53***	***0.53***	***0.56***
	Hyper	0.13	0.25	***0.64***	***0.50***	*0.35*	*0.40*	*0.43*	***0.43***	0.21	*0.41*	***0.65***	***0.36***	*0.42*	*0.38*	***0.60***	***0.60***	***0.57***
	Mod comp	***0.38***	***0.51***	***0.50***	***0.49***	***0.36***	***0.34***	***0.37***	***0.42***	***0.52***	***0.57***	***0.55***	***0.56***	***0.62***	***0.46***	***0.57***	***0.57***	***0.57***
	Stable	0.13	-0.06	0.19	-0.20	-0.02	-0.03	*0.28*	-0.16	0.03	0.00	*0.31*	*0.33*	0.10	0.18	*0.28*	*0.33*	*0.43*

2-tailed significance levels: ***0.01*** ; *0.05* ; *0.10* .

5.4.3 Factor analyses

5.4.3.1 Data reduction; chall4 and strat4

As was discussed in section 4.4.1.6, the survey included four questions for each of the snrfrq and midfrq sub-dimensions, and five questions for each of the chall and strat sub-dimensions. Given the newness and more difficult conceptual nature of the two latter dimensions, the intention has been to remove the least reliable question from each and be left with four highly reliable indicators per dimension. Equal numbers of indicators per sub-dimension are preferable because it better facilitates the hierarchical component model for higher-order constructs (Chin, 1997) that will be used later in this Chapter. Exploratory factor analysis using Principal Components Analysis with varimax rotation and Kaiser normalisation was performed. As shown in Table 5.8 below, chall4 and strat4 had the lowest factor loadings and communalities, and so they are made redundant from here onwards. Based on the correlation matrix reported in Table 5.7, these two measures do not appear to have context specific properties.

Table 5.8 – Factor analysis to drop chall4 and strat4 indicators

n=331	Factor 1 loading	Commu-nalities
chall1	0.74	0.55
chall2	0.80	0.63
chall3	0.79	0.63
chall4	0.73	0.53
chall5	0.85	0.72

n=331	Factor 1 loading	Commu-nalities
strat1	0.74	0.55
strat2	0.78	0.62
strat3	0.80	0.64
strat4	0.71	0.51
strat5	0.80	0.63

5.4.3.2 Factor analyses of BUDSTYLE

Table 5.8 below reports the results from a confirmatory factor analysis model (CFA) of the BUDSTYLE items. Principal components analysis (PCA) was used, because it is most appropriate when the dataset exhibits high inter-factor correlations (Netemeyer et al., 2003). Varimax rotation with Kaiser normalisation was used to improve the interpretation of the factor loadings (Child, 1990). The model was specified with four factors, in line with the prediction of four emergent dimensions with reflective measurement blocks. Table 5.9 reports the results. The four factor model is not supported for three reasons: (1) the items for snrfrq and midfrq have highest loadings spread over multiple factors; (2) factor 3 is a mixture of items for snrfrq and midfrq, and (3) two items have loadings of 0.50 or above on more than one factor (i.e., snrfrq4 and midfrq4) and thus do not meet the criteria outlined by Hair et al. (1998).

Table 5.9 – Confirmatory factor analysis: four factor analysis of BUDSTYLE

n=331	Factor 1 Loading	Factor 2 Loading	Factor 3 Loading	Factor 4 Loading	Commu-nalities
snrfrq1	0.12	0.30	0.15	**0.87**	0.88
snrfrq2	0.28	**0.56**	0.28	0.44	0.66
snrfrq3	0.44	0.37	**0.47**	0.29	0.63
snrfrq4	0.18	0.50	**0.52**	0.16	0.58
midfrq1	0.17	0.21	0.56	**0.62**	0.78
midfrq2	0.18	0.18	**0.80**	0.23	0.75
midfrq3	0.22	0.13	0.37	**0.76**	0.79
midfrq4	0.24	0.24	**0.77**	0.28	0.79
chall1	0.38	**0.49**	0.24	0.16	0.47
chall2	0.32	**0.60**	0.44	0.17	0.69
chall3	0.44	**0.55**	0.17	0.28	0.60
chall5	0.19	**0.83**	0.24	0.19	0.82
strat1	**0.76**	0.10	0.26	0.13	0.67
strat2	**0.76**	0.27	0.18	0.08	0.68
strat3	**0.73**	0.26	0.18	0.17	0.67
strat5	**0.57**	0.53	-0.05	0.18	0.64

Given the lack of support for the four factor model, exploratory factor analysis (EFA) was performed. As reported in Table 5.10, EFA produced two factors. Table 5.10 also reports the results of a two factor model that uses CFA, which Netemeyer et al. (2003) suggest can be used to validate EFA results. The EFA and CFA models are very similar. The two factors are unambiguously: (1) FREQ and (2) INTENS. All the snrfrq and midfrq items load highest on the FREQ factor, and all the chall and strat items load highest on the INTENS factor. In terms of the criteria outlined by Hair et al. (1998), all items have communality above 0.45, and all items have loadings greater than 0.50. However, three items have loadings greater than 0.50 on both factors (i.e., snrfrq2 = 0.52, snrfrq3 = 0.53 and chall2 = 0.51). As discussed below, this could be a result of multicollinearity between items of FREQ and INTENS.

Table 5.10 – Factor analysis: two factor analysis of BUDSTYLE

	EFA			CFA		
n=331	Factor 1 loading	Factor 2 loading	Commu-nalities	Factor 1 loading	Factor 2 loading	Commu-nalities
snrfrq1	**0.76**	0.21	0.61	**0.76**	0.21	0.62
snrfrq2	**0.59**	0.52	0.62	**0.59**	0.52	0.61
snrfrq3	**0.56**	0.55	0.49	**0.56**	0.55	0.62
snrfrq4	**0.55**	0.43	0.76	**0.55**	0.43	0.49
midfrq1	**0.84**	0.22	0.58	**0.84**	0.22	0.76
midfrq2	**0.72**	0.25	0.67	**0.72**	0.25	0.58
midfrq3	**0.79**	0.20	0.67	**0.79**	0.20	0.67
midfrq4	**0.75**	0.33	0.46	**0.75**	0.33	0.67
chall1	0.34	**0.58**	0.62	0.34	**0.58**	0.46
chall2	0.51	**0.60**	0.57	0.51	**0.60**	0.62
chall3	0.38	**0.65**	0.57	0.38	**0.65**	0.57
chall5	0.45	**0.61**	0.51	0.45	**0.61**	0.57
strat1	0.22	**0.68**	0.62	0.22	**0.68**	0.51
strat2	0.16	**0.77**	0.60	0.16	**0.77**	0.62
strat3	0.23	**0.74**	0.59	0.23	**0.74**	0.60
strat5	0.15	**0.75**	0.60	0.15	**0.75**	0.59

The factor analyses do not confirm the four dimensional dual construct emergent conceptualisation hypothesised in Chapter Three, and instead suggest a two dimensional structure consisting of FREQ and INTENS. There are, however, four potential problems with these conclusions. Firstly, a potential multicollinearity problem was evident in the correlation matrix and the three cross-loaded items, and this is an issue because factor analysis can produce suboptimal solutions when there is a high degree of collinearity (Netemeyer et al., 2003). Secondly, simulations comparing factor analysis with SEM using simulated data indicate that, at least in some circumstances, factor analysis may not identify the correct number of latent variables (Kline, 1998). Thirdly, the factor analysis assumption of multivariate normality does not hold, as was discussed earlier in section 5.3.2. Fourthly, given the context-specificity of the predicted BUDSTYLE model, conclusive analyses need to be performed at the sub-group level. The epistemology of the BUDSTYLE construct is, to some extent, predicted to vary by sub-group. But factor analysis can only be performed at the total sample level (n = 331) because the sub-sample sizes for hypercompetition (n = 32) and stable (n = 40) are less than the near-universally agreed minimum requirement of 50 (e.g., Marsh and Hau, 1999).

The factor analysis problems necessitate further exploratory analysis. The following section performs focused PLS modelling. Given that the tests of the theoretical model will take place in a PLS context, it provides the ultimate statistical context for exploring the optimal

measurement model structure. In addition, PLS does not require normal distributions (Wold, 1982; Chin, 1998), and so more credence can be placed on PLS analyses. Most importantly, the ability of PLS to function with small sample sizes also enables sub-group analyses to assess potential context-specific dimensional issues.

5.4.4 PLS analyses

The PLS set-up is discussed later in section 5.7, which also contains more detailed discussion of the PLS procedure and estimates. This section has two sub-sections. The first sub-section provides sub-group level assessment of potential multicollinearity problems between the two BUDSTYLE constructs. Multicollinearity can present significant modelling error risks. If there is a high degree of collinearity the validity of the predicted dual construct conceptualisation is highly questionable. The second sub-section performs sub-group level assessment of the empirical structure of the BUDSTYLE construct. In its entirety, this section assesses all potential options for the optimal measurement model configuration for BUDSTYLE, in terms of: (1) single or dual construct; (2) emergent or latent lower-order dimensions; and (3) hierarchical or latent variable based indicators.

5.4.4.1 Assessing multicollinearity in the dual construct models

Multicollinearity can result in several well-known problems in econometric models with observable variables: (1) the model coefficients may have incorrect signs; (2) coefficients may change severely as a result of minor changes in the data; and (3) normal significance tests can provide conflicting solutions (Jagpal, 1982). Severe multicollinearity has been shown to lead to implausible and unstable results in PLS (Jagpal, 1982). SEM simulations by Grewal et al. (2004) showed improper solutions when high multicollinearity occurred in combination with low measure reliability, small sample size, and low explained variance in endogenous constructs.

A number of methods can help identify when multicollinearity can be problematic. Grewal et al. (2004) suggest inspecting: (1) the correlation matrix of the predictor variables; (2) the correlation matrix of the path coefficients; (3) the signs of the path coefficients; (4) the correlation matrix of the determinants of the predictor variables; and (5) variance inflation factors (Kaplan, 1994). The first three of these can be used by comparing the correlations of the two constructs with path estimates from PLS. The fourth technique will be used in the next section. The fifth technique can be potentially misleading given the major conclusion of Mason and Perrault (1991: 268) that the "deleterious effect of a given level of multicollinearity should be viewed in conjunction with other factors known to affect estimation accuracy". Thus,

multicollinearity will be examined at the sub-group level by comparing correlations with PLS path estimates, while taking into account sample sizes and R^2 measures. As per Figure 5.2, the hierarchical dual construct model with the endogenous construct FIRMPERF provides the PLS estimates.

Table 5.11 – Assessing BUDSTYLE multicollinearity: correlations versus PLS paths

			FREQ	INTENS	R^2
All; n=331	Correlation:	INTENS	***0.74***		
	Correlation:	FIRMPERF	***0.28***	***0.34***	
	PLS path:	FIRMPERF	0.05	0.30***	0.12
Hyper; n=32	Correlation:	INTENS	***0.77***		
	Correlation:	FIRMPERF	***0.60***	***0.62***	
	PLS path:	FIRMPERF	0.32*	0.37*	0.43
Mod. Comp; n=259	Correlation:	INTENS	***0.75***		
	Correlation:	FIRMPERF	***0.27***	***0.34***	
	PLS path:	FIRMPERF	0.05	0.30***	0.11
Stable; n=40	Correlation:	INTENS	***0.73***		
	Correlation:	FIRMPERF	0.10	0.15	
	PLS path:	FIRMPERF	-0.03	0.17	0.02

2-tailed significance levels: ***0.01*** ; *0.05* ; *0.10* .

1-tailed significance levels: ***0.01 ; **0.05 ; *0.10.

Table 5.11 reports the analyses. In the first instance, there is no evidence of context-specificity in terms of asymmetry between correlations of the FREQ and INTENS constructs across the market contexts. The correlations between FREQ and INTENS are very similar across the sub-groups, i.e.: all cases (0.74, $p < 0.01$); hypercompetitive (0.77, $p < 0.01$); moderately competitive (0.75, $p < 0.01$); and stable (0.73, $p < 0.01$). Moreover, within each sub-group, there is very little asymmetry between the correlations for FREQ and FIRMPERF, and INTENS and FIRMPERF. These initial observations do not support the hypothesised asymmetrical relations between those two sets of variables. This will be discussed in greater depth later in this thesis.

In the second instance, comparing the correlations with the PLS path estimates shows evidence of multicollinearity problems. In the regression equations used in PLS (Chin, 1998), multicollinearity leads to inaccurate estimates of coefficients – but these problems can be offset by a high R^2 and a large sample size (Mason and Perrault, 1991). For the total sample (n = 331),

even though the correlation of FREQ with FIRMPERF (0.28, $p < 0.01$) is close to that of INTENS with FIRMPERF (0.34, $p < 0.01$), the path estimates are very different ($b = 0.05$, $p > 0.10$ and $b = 0.30$, $p < 0.01$ respectively), despite the high sample size, but with a low R^2 (0.12). A very similar pattern and situation is evident in the moderately competitive sub-group (n = 259). For the stable sub-group, the insufficient sample size (n = 40) and small effect size means the PLS path estimates are not interpretable. In contrast, the hypercompetition sub-group displays an accurate pattern: the correlations (0.60, $p < 0.01$ and 0.62, $p < 0.01$) and path estimates ($b = 0.32$, $p > 0.05$ and $b = 0.37$, $p < 0.05$) are in proportion, and the path estimates are both significant. Given the small sample size (n = 32), this error free result is likely due to the relatively strong R^2 (0. 43).

The analyses exhibit the same problems demonstrated in SEM modelling by Grewal et al. (2004), where correlations in the range of 0.70 to 0.80 present serious risks of Type II error when sample size and explained variance are small. The exception was the hypercompetitive sub-group, in which the results disprove the emergent conceptualisation because of: (1) the strong correlation between FREQ and INTENS and; (2) the correlations and paths between those two sub-constructs and FIRMPERF are virtually the same. While this does not support the dual construct conceptualisation for the hypercompetition context, the erroneous results for the other sub-groups appear to be due to multicollinearity, which again would most likely disprove the dual construct emergent conceptualisation. The next section provides further support for these conclusions by: (1) inspecting the correlations between the components of various BUDSTYLE model options across the sub-groups; and (2) exploring and confirming the optimal measurement model for use in later structural model testing.

5.4.4.2 Empirical assessment of single construct models

To further assess multicollinearity and to explore the epistemology of BUDSTYLE, 16 different PLS models were specified. Four different types of model were calculated for each of the four samples. Given the issues identified with the dual construct conceptualisation, single construct models are the sole focus. The first two types were an emergent model and a latent model, both using hierarchical components, which use repeated indicators to operationalise the BUDSTYLE second order dimension (Wold, 1982: 40-42; Chin and Gopal, 1995: 50). The second two types were a formative model and a reflective model both using latent variable scores as indicators, with latent variable scores computed by sub-group level from the emergent or latent model respectively. Thus, the latent variable scores were calculated for each separate sub-group (Carte and Russell, 2003).

Table 5.12 – PLS modeling of alternative BUDSTYLE structures

	Hierarchical models				Latent variable indicator models			
	Emergent		Latent		Formative		Reflective	
All; n=331	Path	R^2	Path	R^2	Path	R^2	Path	R^2
BUDSTYLE → FIRMPERF	0.33***	0.11	0.33***	0.11	0.39***	0.15	0.34***	0.12
BUDSTYLE components	Path		Path		Weight		Loading	
LVsnrfrq	0.29***		0.91***		0.02		0.89***	
LVmidfrq	0.30***		0.86***		0.26		0.82***	
LVchall	0.29***		0.90***		-0.26		0.90***	
LVstrat	0.27***		0.82***		1.01***		0.87***	
Hyper; n=32	Path	R^2	Path	R^2	Path	R^2	Path	R^2
BUDSTYLE → FIRMPERF	0.65***	0.43	0.65***	0.42	0.69***	0.45	0.66***	0.43
BUDSTYLE components	Path		Path		Weight		Loading	
LVsnrfrq	0.26***		0.95***		-0.10		0.94***	
LVmidfrq	0.29***		0.91***		0.35		0.90***	
LVchall	0.27***		0.92***		0.66		0.92***	
LVstrat	0.28***		0.87***		0.17		0.87***	
Mod. Comp; n=259	Path	R^2	Path	R^2	Path	R^2	Path	R^2
BUDSTYLE → FIRMPERF	0.32***	0.11	0.32***	0.10	0.39***	0.15	0.33***	0.11
BUDSTYLE components	Path		Path		Weight		Loading	
LVsnrfrq	0.29***		0.91***		0.29		0.90***	
LVmidfrq	0.29***		0.85***		0.09		0.81***	
LVchall	0.29***		0.91***		-0.42*		0.90***	
LVstrat	0.28***		0.84***		1.04*		0.88***	
Stable; n=40	Path	R^2	Path	R^2	Path	R^2	Path	R^2
BUDSTYLE → FIRMPERF	0.13	0.02	0.13	0.02	0.47	0.22	0.26	0.07
BUDSTYLE components	Path		Path		Weight		Loading	
LVsnrfrq	0.30***		0.93***		-1.53		0.75***	
LVmidfrq	0.37***		0.89***		1.19		0.80***	
LVchall	0.29***		0.86***		0.06		0.72***	
LVstrat	0.20***		0.72***		0.78		0.90***	

1-tailed significance levels: ***0.01 ; **0.05 ; *0.10.

Table 5.12 reports the 16 PLS models.[26] Firstly, reviewing the emergent model column, the four sub-dimensions have near-equal path weights, both within and across sub-groups. With the exception of the stable sub-group, the paths from each of the four sub-dimensions into BUDSTYLE range from 0.26 to 0.30. Secondly, reviewing the latent model column, the four sub-dimensions have near-equal path weights, both within and across sub-groups. With the exception of the stable sub-group, the paths range from 0.82 to 0.95. In addition, by sub-group, the emergent and latent models have identical paths to FIRMPERF and near-identical R^2 values for FIRMPERF. Thus, notwithstanding the discrepancies for the stable sub-group, the emergent

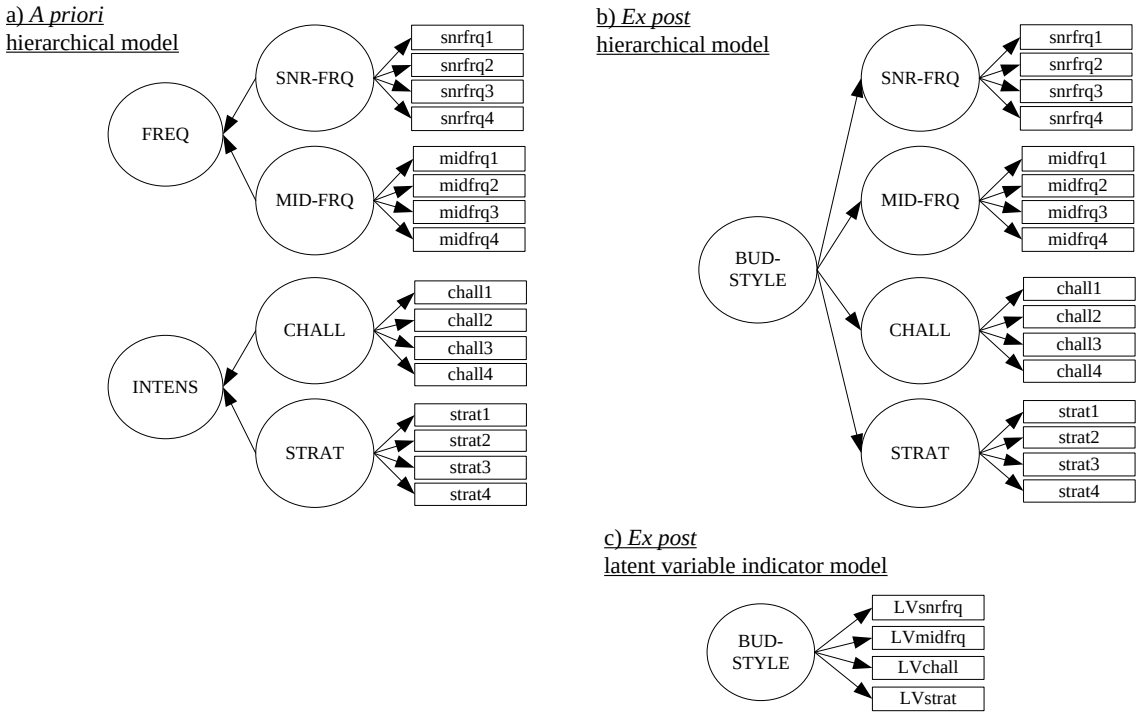
[26] For completeness, internal composite reliability, Cronbach alpha and average variance extracted should also be presented. To avoid partial repetition, they are instead presented in the context of the whole structural modelling stage.

and latent models have virtually no differences in the way they operationalise the BUDSTYLE latent variable scores.

The latent variable (LV) based indicator models present different results. For the formative models, the weights represent the regression estimates from a multiple regression (Chin, 1998). Because of the multiple regression procedure, lack of multicollinearity is important – formative models may be moot if the estimates for the measurement model are unstable (Chin, 1998: 307). Looking at the weights across all the sub-groups, many are not significant, some have negative signs, and they range greatly within each model. Clearly, these improper solutions are a result of multicollinearity (Grewal et al., 2004). On the other hand, the estimates for reflective indicators represent the component loadings, which are from simple regression between the indicator and the LV score (Chin, 1998). In contrast, reflective models assume reasonably high collinearity between the indicators (Chin, 1998; Jarvis et al., 2003). Thus, the data does not fit a formative mode, but strongly supports a reflective mode.

The next step is the choice of a measurement model for use in the structural model testing in later sections. Even though the formative models have the highest structural path estimates, they are invalid because of the high incidence of improper solutions due to multicollinearity. The reflective models present almost identical solutions to the more complicated hierarchical emergent and latent type models. The fact that the emergent model provides proper solutions is a moot point – the most empirically valid hierarchical model is the latent one, because of the substitutability of the four sub-dimensions and high degree of inter-sub-dimension correlation. Thus, the choice comes down to either the latent model or the reflective model. The reflective latent variable approach is adopted, because it is more parsimonious and facilitates a product indicator moderation model (which was previously less suited to the dual construct conceptualisation). Figure 5.3 shows the a priori and ex post models for BUDSTYLE.

Figure 5.3 – BUDSTYLE models: predicted versus empirically validated



5.5 FLEXCULT measurement: exploratory reliability and validity analysis

Based on the findings of Fey and Denison (2003), FLEXCULT was predicted to be a third-order construct, made up of two emergent dimensions (INVOLV and ADAPT), each of which has three latent first-order constructs with three respective reflective indicators. Thus, INVOLV has three indicators for each first-order construct (team, capdev and empow) and ADAPT has three indicators for each first-order construct (change, custom and learn).

5.5.1 Descriptive statistics

Table 5.13 shows descriptive statistics (means, standard deviation, minimum and maximum) for the FLEXCULT measures, by MARKCOMP sub-group and at the total sample level. Generally, across all the sub-groups there is a moderately-high level of average scores on all items (i.e., 6.0 to 7.0). Within each sub-group and for the total sample, there is consistency between the average scores across the items. The hypercompetitive and moderately competitive sub-groups have similar average indicator scores, whilst the average scores for the stable sub-group are marginally lower. The standard deviations and minimum and maximum measures suggest the variances in the scores are all satisfactory for PLS modelling purposes.

Table 5.13 – Descriptive statistics for FLEXCULT measures

	All firms n=331				Hypercompetitive n=32				Moderately competitive n=259				Stable n=40			
Indicator	Mean	Std. Dev.	Min.	Max.	Mean	Std. Dev.	Min.	Max.	Mean	Std. Dev.	Min.	Max.	Mean	Std. Dev.	Min.	Max.
team1	7.11	1.68	1	9	7.00	1.55	2	9	7.18	1.64	1	9	6.78	1.99	2	9
team2	6.22	1.91	1	9	6.31	2.05	1	9	6.30	1.88	1	9	5.65	1.92	2	9
team3	7.07	1.64	1	9	7.16	1.55	3	9	7.08	1.63	1	9	6.98	1.80	2	9
capdev1	6.60	1.57	1	9	6.78	1.56	2	9	6.63	1.56	1	9	6.23	1.67	2	9
capdev2	6.53	1.66	1	9	6.78	1.70	2	9	6.56	1.55	1	9	6.15	2.20	1	9
capdev3	7.44	1.47	1	9	7.44	1.68	2	9	7.44	1.42	1	9	7.43	1.68	2	9
empow1	6.59	1.64	1	9	6.97	1.62	2	9	6.60	1.61	1	9	6.23	1.80	2	9
empow2	6.50	1.68	1	9	6.91	1.51	2	9	6.48	1.70	1	9	6.33	1.65	2	9
empow3	6.54	1.57	1	9	6.75	1.27	4	9	6.54	1.57	1	9	6.35	1.81	2	9
change1	5.82	1.91	1	9	6.38	1.88	1	9	5.84	1.88	1	9	5.20	1.98	2	9
change2	6.35	1.72	1	9	6.50	1.92	1	9	6.42	1.63	1	9	5.78	2.06	2	9
change3	6.38	1.66	1	9	6.72	1.85	2	9	6.41	1.60	1	9	5.93	1.83	2	9
custom1	6.47	1.69	1	9	6.78	1.70	2	9	6.52	1.56	2	9	5.90	2.32	1	9
custom2	6.60	1.65	2	9	6.63	1.84	2	9	6.63	1.61	2	9	6.40	1.81	2	9
custom3	6.92	1.59	1	9	6.75	1.74	2	9	6.98	1.51	1	9	6.70	1.98	2	9
learn1	5.99	1.75	1	9	6.25	1.65	2	9	6.02	1.70	1	9	5.63	2.07	1	9
learn2	5.61	1.92	1	9	6.50	1.68	2	9	5.61	1.86	1	9	4.93	2.23	1	9
learn3	6.27	1.67	1	9	6.38	1.70	2	9	6.32	1.64	1	9	5.83	1.87	2	9

5.5.2 Correlation analysis

Table 5.14 shows a correlation matrix for the FLEXCULT measures, by MARKCOMP sub-group and at the total sample level. Four observations are apparent. Firstly, the inter-item correlations are reasonably consistent within each sub-group. Secondly, the correlations are consistently of a medium size (i.e., in the range of 0.45 to 0.65) and show a high degree of statistical significance. Thirdly, the stable sub-group has some discrepancies that suggest that some indicators are not equally reliable in all contexts. Fourthly, the intra-construct correlations are generally similar in size to the inter-construct correlations. This last point suggests that FLEXCULT may not empirically fit the predicted two-dimensional emergent structure.

Table 5.14 – Correlation matrix for FLEXCULT measures

All; n=331 Hyper; n=32 Mod comp; n=259 Stable; n=40		team1	team2	team3	capdev1	capdev2	capdev3	empow1	empow2	empow3	change1	change2	change3	custom1	custom2	custom3	learn1	learn2
team2	All	***0.52***																
	Hyper	***0.71***																
	Mod comp	***0.55***																
	Stable	0.25																
team3	All	***0.82***	***0.47***															
	Hyper	***0.92***	***0.66***															
	Mod comp	***0.81***	***0.50***															
	Stable	***0.80***	0.17															
capdev1	All	***0.56***	***0.49***	***0.52***														
	Hyper	***0.54***	***0.52***	***0.60***														
	Mod comp	***0.62***	***0.50***	***0.56***														
	Stable	*0.28*	*0.40*	*0.28*														
capdev2	All	***0.50***	***0.38***	***0.48***	***0.60***													
	Hyper	***0.80***	***0.69***	***0.79***	***0.71***													
	Mod comp	***0.52***	***0.36***	***0.49***	***0.57***													
	Stable	*0.28*	*0.27*	*0.30*	***0.65***													
capdev3	All	***0.51***	***0.42***	***0.52***	***0.57***	***0.67***												
	Hyper	***0.84***	***0.72***	***0.85***	***0.66***	***0.86***												
	Mod comp	***0.57***	***0.41***	***0.54***	***0.59***	***0.68***												
	Stable	0.07	0.25	0.19	*0.40*	***0.52***												
empow1	All	***0.53***	***0.47***	***0.42***	***0.53***	***0.45***	***0.43***											
	Hyper	***0.54***	***0.54***	***0.60***	***0.74***	***0.57***	***0.61***											
	Mod comp	***0.51***	***0.46***	***0.40***	***0.49***	***0.41***	***0.45***											
	Stable	***0.59***	***0.47***	***0.45***	***0.62***	***0.54***	0.22											
empow2	All	***0.58***	***0.42***	***0.54***	***0.53***	***0.56***	***0.53***	***0.63***										
	Hyper	***0.57***	***0.46***	***0.63***	***0.74***	***0.68***	***0.71***	***0.77***										
	Mod comp	***0.58***	***0.44***	***0.53***	***0.52***	***0.58***	***0.57***	***0.61***										
	Stable	***0.61***	0.26	***0.60***	*0.42*	*0.41*	0.15	***0.66***										
empow3	All	***0.62***	***0.43***	***0.53***	***0.53***	***0.52***	***0.52***	***0.60***	***0.63***									
	Hyper	***0.72***	***0.67***	***0.61***	***0.54***	***0.59***	***0.70***	***0.66***	***0.63***									
	Mod comp	***0.59***	***0.41***	***0.51***	***0.56***	***0.54***	***0.56***	***0.57***	***0.63***									
	Stable	***0.73***	***0.41***	***0.59***	***0.40***	***0.43***	*0.28*	***0.70***	***0.64***									
change1	All	***0.45***	***0.31***	***0.37***	***0.51***	***0.40***	***0.31***	***0.51***	***0.46***	***0.48***								
	Hyper	***0.46***	*0.34*	***0.49***	***0.78***	***0.63***	***0.55***	***0.74***	***0.72***	***0.50***								
	Mod comp	***0.43***	***0.34***	***0.34***	***0.48***	***0.35***	***0.30***	***0.47***	***0.41***	***0.47***								
	Stable	***0.53***	0.07	***0.42***	***0.46***	***0.43***	0.21	***0.58***	***0.55***	***0.54***								
change2	All	***0.52***	***0.28***	***0.42***	***0.57***	***0.41***	***0.41***	***0.52***	***0.47***	***0.49***	***0.78***							
	Hyper	***0.60***	***0.46***	***0.56***	***0.73***	***0.63***	***0.68***	***0.70***	***0.71***	***0.66***	***0.86***							
	Mod comp	***0.51***	***0.27***	***0.39***	***0.58***	***0.40***	***0.42***	***0.47***	***0.43***	***0.44***	***0.76***							
	Stable	***0.55***	0.12	***0.46***	***0.44***	*0.29*	0.19	***0.59***	***0.56***	***0.62***	***0.81***							
change3	All	***0.53***	***0.35***	***0.47***	***0.54***	***0.49***	***0.38***	***0.54***	***0.56***	***0.48***	***0.69***	***0.67***						
	Hyper	***0.70***	*0.43*	***0.71***	***0.68***	***0.64***	***0.68***	***0.75***	***0.73***	***0.65***	***0.79***	***0.86***						
	Mod comp	***0.51***	***0.38***	***0.44***	***0.53***	***0.45***	***0.38***	***0.52***	***0.53***	***0.46***	***0.65***	***0.62***						
	Stable	***0.50***	0.09	***0.47***	***0.49***	***0.57***	0.17	***0.47***	***0.60***	***0.51***	***0.78***	***0.73***						
custom1	All	***0.40***	***0.28***	***0.35***	***0.40***	***0.45***	***0.38***	***0.33***	***0.37***	***0.37***	***0.45***	***0.49***	***0.51***					
	Hyper	***0.63***	*0.45*	***0.66***	***0.65***	***0.62***	***0.67***	***0.69***	***0.65***	***0.62***	***0.77***	***0.75***	***0.84***					
	Mod comp	***0.41***	***0.30***	***0.35***	***0.41***	***0.48***	***0.47***	***0.29***	***0.34***	***0.38***	***0.40***	***0.49***	***0.49***					
	Stable	0.22	0.06	0.20	0.23	0.25	-0.09	*0.27*	*0.37*	0.25	***0.43***	*0.32*	*0.40*					
custom2	All	***0.37***	***0.28***	***0.37***	***0.40***	***0.42***	***0.39***	***0.26***	***0.31***	***0.30***	***0.36***	***0.40***	***0.44***	***0.80***				
	Hyper	***0.61***	*0.43*	***0.61***	***0.61***	***0.57***	***0.65***	***0.58***	***0.62***	***0.51***	***0.71***	***0.70***	***0.80***	***0.88***				
	Mod comp	***0.40***	***0.28***	***0.39***	***0.37***	***0.40***	***0.41***	***0.22***	***0.26***	***0.31***	***0.31***	***0.38***	***0.39***	***0.83***				
	Stable	0.05	0.12	0.12	*0.39*	*0.39*	0.09	0.23	*0.36*	0.15	*0.34*	0.25	*0.37*	***0.68***				
custom3	All	***0.43***	***0.32***	***0.41***	***0.39***	***0.46***	***0.45***	***0.35***	***0.30***	***0.37***	***0.34***	***0.38***	***0.40***	***0.57***	***0.62***			
	Hyper	***0.74***	***0.57***	***0.76***	***0.72***	***0.78***	***0.78***	***0.49***	***0.54***	***0.57***	***0.59***	***0.59***	***0.66***	***0.76***	***0.75***			
	Mod comp	***0.42***	***0.25***	***0.40***	***0.31***	***0.37***	***0.41***	***0.27***	***0.25***	***0.33***	***0.28***	***0.37***	***0.36***	***0.56***	***0.62***			
	Stable	*0.30*	***0.49***	0.24	***0.54***	***0.63***	***0.41***	***0.62***	***0.46***	***0.44***	***0.47***	0.25	***0.38***	***0.51***	***0.54***			
learn1	All	***0.49***	***0.37***	***0.45***	***0.53***	***0.52***	***0.49***	***0.52***	***0.46***	***0.48***	***0.51***	***0.46***	***0.47***	***0.38***	***0.33***	***0.40***		
	Hyper	***0.49***	***0.52***	***0.59***	***0.61***	***0.52***	***0.51***	***0.60***	***0.58***	***0.49***	***0.58***	***0.52***	***0.55***	***0.64***	***0.57***	***0.57***		
	Mod comp	***0.49***	***0.35***	***0.45***	***0.50***	***0.46***	***0.50***	***0.47***	***0.45***	***0.47***	***0.47***	***0.43***	***0.42***	***0.37***	***0.31***	***0.32***		
	Stable	***0.46***	*0.33*	***0.39***	***0.65***	***0.73***	***0.45***	***0.71***	***0.43***	***0.53***	***0.61***	***0.54***	***0.61***	*0.28*	0.23	***0.65***		
learn2	All	***0.45***	***0.33***	***0.40***	***0.48***	***0.41***	***0.42***	***0.44***	***0.44***	***0.43***	***0.51***	***0.49***	***0.47***	***0.34***	***0.33***	***0.32***	***0.62***	
	Hyper	***0.67***	***0.46***	***0.76***	***0.66***	***0.64***	***0.66***	***0.50***	***0.54***	***0.47***	***0.51***	***0.53***	***0.56***	***0.63***	***0.56***	***0.71***	***0.62***	
	Mod comp	***0.41***	***0.33***	***0.34***	***0.44***	***0.36***	***0.42***	***0.41***	***0.42***	***0.41***	***0.47***	***0.46***	***0.44***	***0.30***	***0.30***	***0.23***	***0.61***	
	Stable	***0.58***	0.24	***0.53***	***0.54***	***0.48***	*0.34*	***0.51***	***0.47***	***0.49***	***0.60***	***0.54***	***0.54***	*0.32*	*0.32*	***0.53***	***0.66***	
learn3	All	***0.60***	***0.44***	***0.54***	***0.51***	***0.48***	***0.51***	***0.54***	***0.54***	***0.49***	***0.40***	***0.44***	***0.51***	***0.33***	***0.29***	***0.40***	***0.56***	***0.46***
	Hyper	***0.77***	***0.54***	***0.80***	***0.49***	***0.62***	***0.71***	***0.53***	***0.54***	***0.64***	***0.47***	***0.59***	***0.73***	***0.69***	***0.60***	***0.62***	***0.61***	***0.66***
	Mod comp	***0.61***	***0.44***	***0.57***	***0.52***	***0.46***	***0.54***	***0.50***	***0.57***	***0.46***	***0.38***	***0.42***	***0.52***	***0.35***	***0.30***	***0.35***	***0.55***	***0.46***
	Stable	***0.43***	*0.29*	0.23	***0.47***	***0.44***	0.20	***0.71***	*0.36*	***0.55***	***0.39***	***0.41***	0.24	0.03	-0.01	***0.44***	***0.57***	*0.35*

2-tailed significance levels: ***0.01*** ; *0.05* ; *0.10* .

5.5.3 Factor analysis

Further to the concerns raised by the correlation matrix, factor analysis does not support the predicted two dimensional emergent structures. Confirmatory factor analysis (CFA) revealed that only one of the first-order constructs (custom) loaded on the second factor. Exploratory factor analysis (EFA) instead presented three theoretically unsupported factors. The results are reported in Table 5.15. However, as was discussed in section 5.4.3.2, the limitations of factor analysis in this instance are fourfold: (1) multicollinearity produces suboptimal outcomes; (2) the multivariate normality assumption is violated; (3) SEM can produce widely different results and; (4) given the context-specificity of the predicted BUDSTYLE model, conclusive analyses need to be performed at the sub-group level. As was the case for the ex post verification of the BUDSTYLE measurement model, the following section addresses these issues through the use of focused PLS modelling.

Table 5.15 – Factor analysis of FLEXCULT

	EFA				CFA		
n=331	Factor 1 loading	Factor 2 loading	Factor 3 loading	Commu-nalities	Factor 1 loading	Factor 2 loading	Commu-nalities
	Factor 1 loading	Factor 2 loading	Factor 3 loading	Commu-nalities			
team1	**0.75**	0.30	0.20	0.69	**0.77**	0.24	0.66
team3	**0.75**	0.17	0.22	0.64	**0.71**	0.23	0.56
team2	**0.67**	0.12	0.13	0.47	**0.62**	0.12	0.40
capdev1	**0.59**	0.43	0.24	0.60	**0.70**	0.34	0.60
capdev2	**0.63**	0.22	0.38	0.59	**0.61**	0.40	0.53
capdev3	**0.71**	0.11	0.33	0.63	**0.64**	0.31	0.50
empow1	**0.57**	0.54	0.02	0.61	**0.75**	0.16	0.59
empow2	**0.66**	0.42	0.08	0.62	**0.77**	0.17	0.62
empow3	**0.66**	0.39	0.12	0.60	**0.75**	0.20	0.60
change1	0.17	**0.87**	0.20	0.82	**0.54**	0.45	0.50
change2	0.23	**0.81**	0.26	0.77	**0.56**	0.49	0.55
change3	0.32	**0.72**	0.29	0.70	**0.59**	0.49	0.58
custom1	0.16	0.34	**0.82**	0.81	0.21	**0.88**	0.81
custom2	0.16	0.20	**0.88**	0.85	0.14	**0.89**	0.81
custom3	0.35	0.12	**0.73**	0.67	0.28	**0.71**	0.58
learn1	**0.52**	0.48	0.19	0.53	**0.66**	0.30	0.52
learn2	0.39	**0.56**	0.15	0.49	**0.59**	0.30	0.44
learn3					**0.73**	0.19	0.56

5.5.4 PLS analysis

Ideally, given the above factor analysis results, the measurement model for FLEXCULT would use six reflective latent variable indicators, because, compared to a formative latent variable indicator approach, this demands the least sample size and readily facilitates a product-indicator moderating model procedure (Chin, 1998; Chin et al., 2003). To test the empirical validity of a reflective latent variable indicator model, a hierarchical model with six latent dimensions was used to calculate the six latent variable component scores. In this way, the latent variable scores were calculated separately for each sub-group. This structure was chosen because it best fits with the factor analysis results. The latent variable scores were then used in a PLS model with six reflective indicators of FLEXCULT and the dependent variable FIRMPERF. Table 5.16 reports the results.

Table 5.16 – FLEXCULT: reflective indicators using latent variables

	All; n=331		Hyper; n=32		Mod. Comp; n=259		Stable; n=40	
	Loading	Weight	Loading	Weight	Loading	Weight	Loading	Weight
LVteam	0.82***	0.19	0.88***	0.19	0.82***	0.18	0.77***	0.27
LVcapdev	0.87***	0.26	0.93***	0.18	0.88***	0.27	0.84***	0.38
LVempow	0.85***	0.20	0.89***	0.18	0.84***	0.20	0.87***	0.22
LVchange	0.80***	0.20	0.88***	0.18	0.80***	0.22	0.70***	0.02
LVcustom	0.69***	0.17	0.90***	0.19	0.67***	0.18	0.59**	0.04
LVlearn	0.84***	0.20	0.89***	0.21	0.82***	0.20	0.90***	0.27

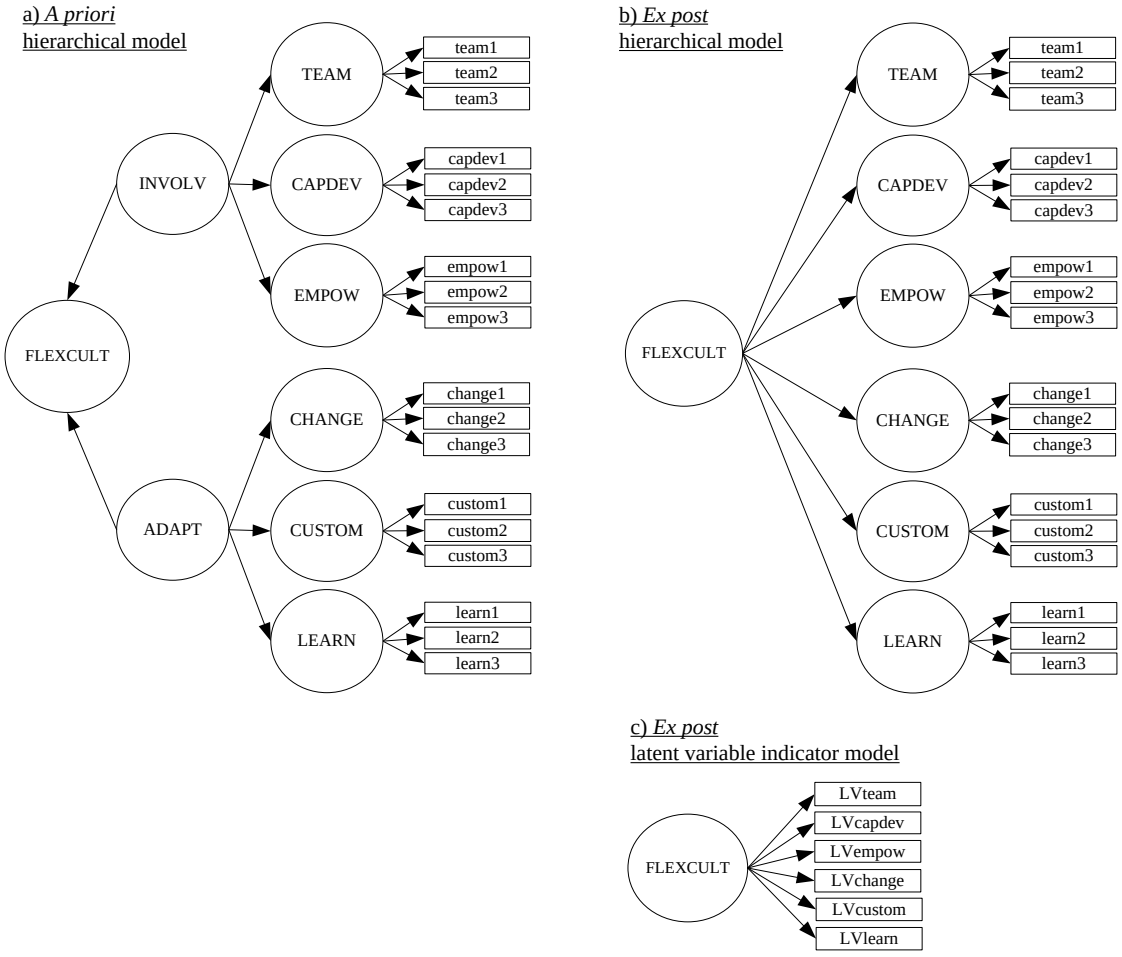
1-tailed significance levels: ***0.01 ; **0.05 ; *0.10.

Validity of a reflective measurement model is assessed by examining the loadings of the indicators.[27] Individual item reliability requires each indicator to share more variance with the component score that with error variance. This implies that standardised loadings should be greater than 0.70 (Chin, 1998). In Table 5.18, the loadings are reasonably consistent across the sub-groups. The indicators all load highly except for custom, which loads below 0.70 in all but the hypercompetitive sub-group. Rather than drop this indicator, Chin (1998) suggests that, as long as other more reliable indicators exist, keeping one unreliable item will likely increase predictiveness because it will still be weighted to the extent it helps minimise residual variance. Aside from the custom loadings, the high loadings strongly support a reflective latent value indicator score approach. Formative latent variable score indicators would suffer from the same multicollinearity problem discussed in the earlier BUDSTYLE section.

[27] For completeness, internal composite reliability, Cronbach alpha and average variance extracted should also be presented. To avoid partial repetition, they are instead presented in the context of the whole structural modelling stage.

Figure 5.4 shows the predicted versus ex post models. The predicted model was based on the empirical findings of Fey and Denison (2003) as well as the many prior studies of the Denison Organizational Culture Survey. The differences could be because the instrument was developed in contexts that differ from the sample used here. Or possibly, there was a method effect that might have stemmed from the exclusion of the strength dimensions from the survey. Nonetheless, given that the interest is in the total FLEXCULT dimension rather than any sub-dimensions, this is not an important issue for this research.

Figure 5.4 – FLEXCULT models: predicted versus empirically validated



5.6 FIRMPERF measurement: exploratory reliability and validity analysis

5.6.1 Descriptive statistics

Table 5.17 shows descriptive statistics (means, standard deviation, minimum and maximum) for the firm performance measures, by MARKCOMP sub-group and at the total sample level. The first block of three indicators is the relative-to-competitors scores. The second block of

three indicators is the percent importance of the preceding individual measure to the firm's performance. The last indicator, selfperf, is the weighted average composite measure, being the addition of the respective products of the three blocks. Within each MARKCOMP sub-group and for the total sample, there is strong consistency between the average scores across the items. Across all the sub-groups there is a moderately high level of average scores on all items (i.e., 6.0 to 6.5). This high level suggests a systematic perceptual bias, because the average should be closer to the middle score of 4.5. Nonetheless, the relative differences between firms are required for PLS modelling. The weight importance measures differ very little by sub-group, and for the total sample profit is 48%, followed by sales at 30% and market share at 22%. Finally, the standard deviations and minimum and maximum measures suggest that the variances in the scores are all satisfactory for PLS modelling purposes.

Table 5.17 – Descriptive statistics for FIRMPERF measures

	All firms n=331				Hypercompetitive n=32				Moderately competitive n=259				Stable n=40			
Indicator	Mean	Std. Dev.	Min.	Max.	Mean	Std. Dev.	Min.	Max.	Mean	Std. Dev.	Min.	Max.	Mean	Std. Dev.	Min.	Max.
sales	6.34	1.52	1	9	6.31	1.65	1	9	6.31	1.50	3	9	6.50	1.55	3	9
markshar	6.24	1.58	1	9	6.13	1.72	1	9	6.24	1.54	3	9	6.35	1.73	3	9
profit	6.34	1.66	1	9	6.41	1.72	1	9	6.39	1.62	2	9	6.00	1.88	1	9
salespercent	30%	15%	0%	80%	34%	15%	5%	70%	30%	14%	0%	80%	29%	17%	5%	80%
marksharpercent	22%	13%	0%	60%	19%	12%	0%	50%	22%	13%	0%	60%	22%	16%	0%	60%
profitpercent	48%	18%	5%	100%	46%	19%	5%	90%	48%	18%	10%	100%	49%	19%	10%	80%
selfperf	6.37	1.44	1	9	6.34	1.53	1	9	6.38	1.40	3	9	6.31	1.69	2.2	9

5.6.2 Correlation analysis

Table 5.18 shows a correlation matrix for the firm performance measures, by MARKCOMP sub-group and at the total sample level. Two observations are apparent. Firstly, for the relative measures, the inter-item correlations are very consistent within each sub-group, except for those between profit and sales which range from 0.48 to 0.70. Secondly, the correlations for the relative measures are mostly between 0.60 and 0.80 suggesting that they would be best modelled as reflective blocks.

Table 5.18 – Correlation matrix for FIRMPERF measures

		sales	markshar	profit	sales%	markshar%	profit%
All; n=331	markshar	***0.81***					
	profit	***0.58***	***0.60***				
	sales%	0.05	-0.04	-0.11			
	markshar%	0.09	0.07	0.00	***-0.16***		
	profit%	-0.10	-0.02	0.09	***-0.69***	***-0.60***	
	selfperf	***0.84***	***0.83***	***0.89***	-0.04	0.02	0.02
Hyper; n=32	markshar	***0.88***					
	profit	***0.70***	***0.64***				
	sales%	-0.19	-0.17	-0.27			
	markshar%	0.23	0.15	0.13	-0.04		
	profit%	0.02	0.04	0.14	***-0.78***	***-0.59***	
	selfperf	***0.87***	***0.84***	***0.93***	-0.29	0.12	0.16
Mod. Comp; n=259	markshar	***0.80***					
	profit	***0.59***	***0.60***				
	sales%	0.01	-0.08	-0.15			
	markshar%	0.08	0.06	-0.01	-0.13		
	profit%	-0.06	0.02	0.13	***-0.69***	***-0.62***	
	selfperf	***0.85***	***0.83***	***0.89***	-0.09	0.00	0.08
Stable; n=40	markshar	***0.83***					
	profit	***0.48***	***0.64***				
	sales%	***0.42***	0.28	0.16			
	markshar%	0.09	0.04	-0.03	-0.31		
	profit%	***-0.45***	-0.28	-0.12	***-0.63***	***-0.54***	
	selfperf	***0.79***	***0.86***	***0.87***	0.37	0.02	-0.34

2-tailed significance levels: ***0.01*** ; *0.05* ; *0.10* .

5.6.3 Factor analysis

Following from the strong inter-item correlations, exploratory factor analysis produced a single factor, as reported in Table 5.19.

Table 5.19 – Exploratory factor analysis for FIRMPERF measures

n=331	Factor 1 loading	Commu-nalities
sales	0.91	0.83
markshar	0.92	0.85
profit	0.81	0.66

5.6.4 PLS analysis

The discussion in Chapter Four outlined the need to empirically assess the optimal measurement model for FIRMPERF. Based on the six survey measures, there are three possible

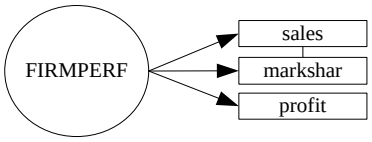
measurement model approaches (1) three reflective indicators using the relative measures; (2) three formative indicators using the relative measures; and (3) the weighted average composite measure selfperf. Table 5.20 reports the PLS modelling of the three options, in which BUDSTYLE is the independent variable and firm performance is the dependent variable.[28] Consistent with the correlation and factor analyses, the reflective mode strongly suits the high multicollinearity between the three relative measures. The selfperf models have the same R^2 as the other two models except for the lower value in the hypercompetition sub-group, suggesting that it is slightly inferior. Chin (1998) and Chin et al. (2003) recommend at least three indicators per construct, and to also optimise later supplementary testing, the three indicator reflective mode is adopted.

Table 5.20 – FIRMPERF: loadings and weights of reflective indicators

		Indicator loadings			R^2
		sales	markshar	profit	
All; n=331	reflective	0.90***	0.91***	0.84***	0.12
	formative	0.28	0.20	0.64***	0.12
	selfperf				0.12
Hyper; n=32	reflective	0.95***	0.92***	0.86***	0.43
	formative	0.24	0.34	0.53**	0.43
	selfperf				0.40
Mod. Comp; n=259	reflective	0.90***	0.90***	0.84***	0.11
	formative	0.35	0.14	0.64***	0.11
	selfperf				0.11
Stable; n=40	reflective	0.81***	0.93***	0.86***	0.02
	formative	-0.99*	1.34*	0.37	0.02
	selfperf				0.02

1-tailed significance levels: ***0.01 ; **0.05 ; *0.10.

Figure 5.5 – FIRMPERF model: empirically validated



[28] For completeness, internal composite reliability, Cronbach alpha and average variance extracted should also be presented. To avoid partial repetition, they are instead presented in the context of the whole structural modelling stage.

5.7 Structural models: PLS sub-group analyses of moderating effects

The prior sections explored the measurement models for the individual constructs. Using the measurement models and latent variables scores developed in the prior sections, this section tests the structural models. As discussed in Chapter Four, the moderating effect of MARKCOMP is investigated through sub-group comparison, which numerous other studies have used with PLS (Carte and Russell, 2003) in, for example the strategic management literature (e.g., Johannson and Yip, 1994), and the IT literature (e.g., Karahanna, Straub, and Chervany, 1999).

PLS models are typically analysed and interpreted in two stages: (1) the measurement model and (2) the structural model (Anderson and Gerbing, 1988; Hulland, 1999). Accordingly, this section has two sub-sections: (1) confirming the measurement models and (2) discussing the results of the structural models.

The PLS method uses very general soft distributional assumptions, and so model evaluation uses prediction-orientated measures that are also non-parametric (Wold, 1982; Chin, 1998: 316). Each procedure will be discussed in turn. One procedure, bootstrapping, is outlined here in advance, because it is also used for the measurement models. Bootstrapping is a parametric approach for estimating the precision of PLS estimates (Chin, 1998). In bootstrapping, "n sample sets are created in order to obtain n estimates for each parameter in the PLS models. Each sample is obtained by sampling with replacement from the original data set." (Chin, 1998: 320). The outcome of bootstrapping is a significance level for each measurement model relation and structural path. SmartPLS has a default setting of 200 resamples for bootstrapping, and this was retained in favour of a larger resample size (e.g., 600) because the much longer run-times produced very similar results to the default setting.[29]

Another setting required is the choice of weighting scheme. When a LV has more than one structural relationship, a weighting scheme is required in the PLS estimation process. There are three alternative weighting schemes: (1) path-weighting; (2) centroid; or (3) factor. The path-weighting scheme takes into account the directionality of the structural model (Chin, 1998), and is superior when causal relations are hypothesised; and so it was used throughout this research.

Table 5.21 and Figure 5.6 show the results for the four models, i.e., the total sample and the three MARKCOMP sub-group samples.

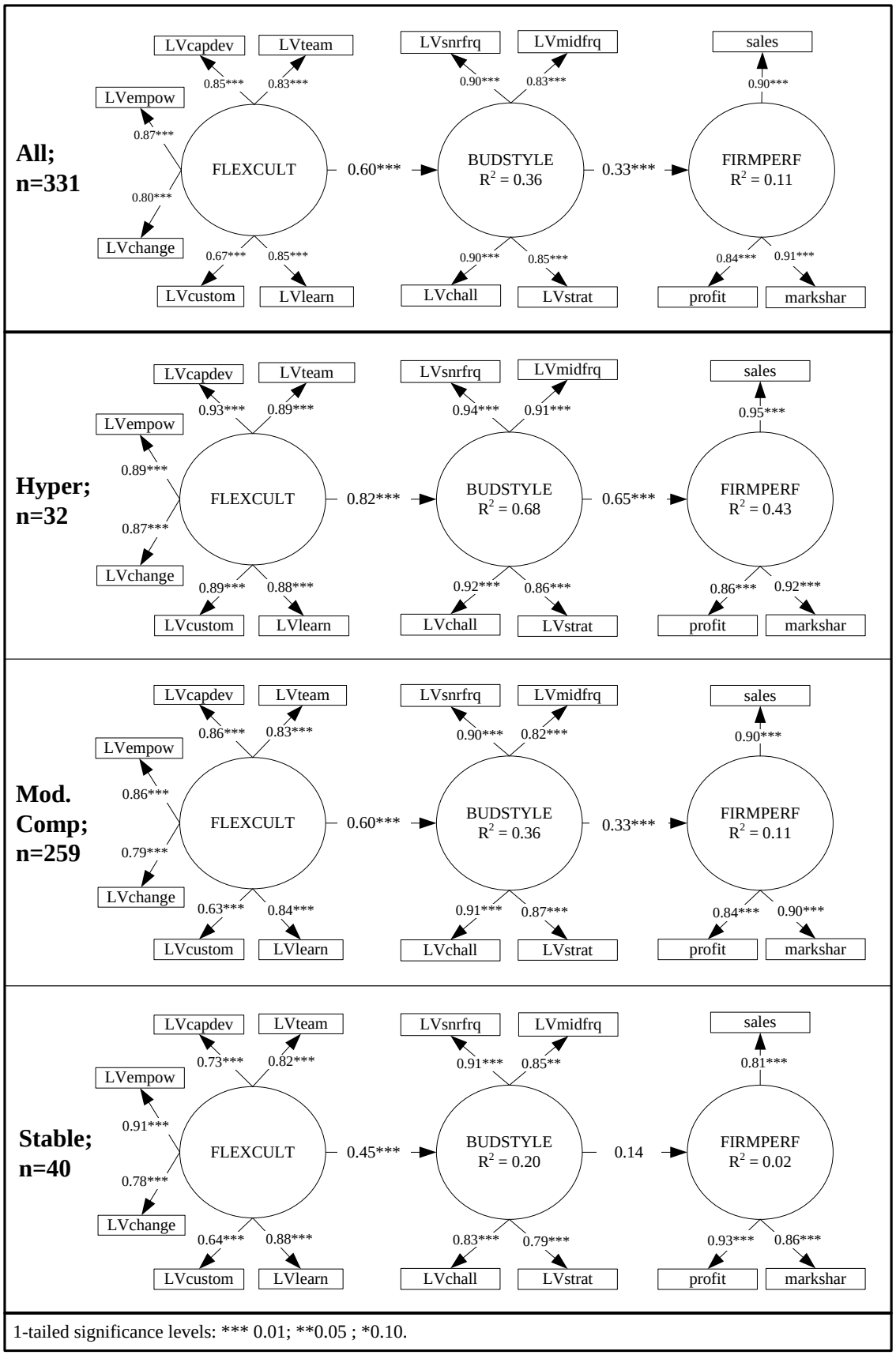
[29] Chin (1998) also outlines an alternative to bootstrapping. Jackknifing is an "inferential technique that assesses the variability of a statistic by examining the variability of the sample data rather that using parametric assumptions" (Chin, 1998: 318). Bootstrapping is more efficient but takes longer to compute than jackknifing. Because jackknifing is an approximation of bootstrapping (Chin, 1998), bootstrapping is the procedure used in this case.

Table 5.21 – Results of PLS structural and measurement models by sub-group

	All; n=331		Hyper; n=32		Mod. Comp; n=259		Stable; n=40	
Structural Model	Path	R^2	Path	R^2	Path	R^2	Path	R^2
FLEXCULT → BUDSTYLE	0.60***	0.360	0.82***	0.679	0.60***	0.364	0.45***	0.201
BUDSTYLE → FIRMPERF	0.33***	0.110	0.65***	0.427	0.33***	0.106	0.14	0.019
Measurement Model	Loading	Weight	Loading	Weight	Loading	Weight	Loading	Weight
FLEXCULT								
LVteam	0.83***	0.21	0.89***	0.21	0.82***	0.20	0.82***	0.31
LVcapdev	0.85***	0.20	0.93***	0.19	0.86***	0.21	0.73***	0.15
LVempow	0.87***	0.25	0.89***	0.20	0.87***	0.26	0.91***	0.23
LVchange	0.80***	0.19	0.87***	0.16	0.81***	0.20	0.78***	0.16
LVcustom	0.67***	0.14	0.89***	0.17	0.74***	0.13	0.64***	0.16
LVlearn	0.85***	0.22	0.88***	0.19	0.83***	0.23	0.88***	0.22
BUDSTYLE								
LVsnrfrq	0.90***	0.28	0.94***	0.28	0.90***	0.28	0.91***	0.31
LVmidfrq	0.83***	0.25	0.91***	0.27	0.83***	0.24	0.85***	0.30
LVchall	0.90***	0.29	0.92***	0.28	0.91***	0.29	0.83***	0.22
LVstrat	0.85***	0.33	0.86***	0.26	0.85***	0.33	0.79***	0.36
FIRMPERF								
sales	0.90***	0.36	0.95***	0.37	0.92***	0.37	0.81***	0.20
markshar	0.91***	0.36	0.92***	0.36	0.93***	0.35	0.93***	0.46
profit	0.84***	0.41	0.86***	0.37	0.85***	0.41	0.86***	0.47

1-tailed significance levels: ***0.01 ; **0.05 ; *0.10.

Figure 5.6 – Results of PLS structural and measurement models by sub-group



5.7.2 Measurement models: assessment of reliability and validity

A measurement item loading represents the correlation of the item with the LV score. Loadings are derived from simple regression between the item and the LV score. The indicator weights are calculated to obtain LV component scores that predict as much variance as possible in the indicator measures. Weights are derived from multiple regression (Chin, 1998). The PLS estimates are slightly different from the prior sections. This is because the measurement and structural models are calculated concurrently (Chin and Newsted, 1999), and in prior sections not all constructs were included. Bootstrap resampling was performed; all item loadings were significant at the 0.01 level.

The previous sections determined that all measurement models are reflective. The adequacy of reflective measurement models can be examined via: (1) individual item reliabilities, (2) the convergent validity of the measures of individual constructs, and (3) discriminant validity (Chin, 1998; Hulland, 1999). The following three sub-sections perform the respective examinations.

5.7.2.1 Individual item reliabilities

Individual item reliability is assessed by examining the loading against the respective construct. A rule of thumb of 0.70 is employed by many researchers, which implies that there is more shared variance between the construct (Chin, 1998; Hulland, 1999). All but two items load greater than 0.70. The custom measures for FLEXCULT load at 0.67 for the total sample, and 0.64 for the stable sub-sample. The two loadings only narrowly miss the rule of thumb level. As was discussed in section 5.5.4, keeping one slightly unreliable item will likely increase predictiveness, particularly given there are five more reliable indicators (Chin, 1998). Close to one-third of the loadings across all four sub-groups are above 0.90, making them ‘high’ (Chin, 1998), while the remainder largely reside in the 0.80 to 0.90 range. Thus, there is ample evidence of individual item reliability.

Further to the exploratory analysis of the dual construct BUDSTYLE model performed earlier, it can again be seen that each of the four items have strong equivalence. Across all three market contexts, there is a very narrow range between the lowest and highest loadings. Even though there is a very small rank-order, the pattern is reasonably consistent across the sub-groups. The same situation also applies for the weights. Thus, the predicted asymmetrical relations between the interaction frequency and interaction intensity constructs are further disproved.

The lack of context-specificity apparent in the BUDSTYLE measurement models is also largely evident for FLEXCULT and FIRMPERF. The loading and weighting patterns for each construct are very similar across the sub-groups. When performing PLS sub-group tests of moderation effects, the concurrent estimation of the structural and measurement models means the LV scores are based on different indicator combinations (Chin and Newsted, 1999). If the measurement models were materially context-specific, it would impair the ability to assess moderating effects by comparing sub-group path coefficients (Carte and Russell, 2003). The observed similarity in the loadings permits sub-group comparison to proceed freely, because the LVs are not context-specific (Carte and Russell, 2003).

5.7.2.2 Convergent validity

According to Chin (1998), there are three procedures for assessing the convergent validity of scales for reflectively measured LVs: (1) Cronbach alpha (Cronbach, 1951); (2) composite reliability ρ_c (Werts, Linn and Jöreskog, 1974); and (3) average variance extracted (AVE) (Fornell and Larcker, 1981). Table 5.22 reports the three measures for each sub-group.

Table 5.22 – AVE, composite reliability and Cronbach Alphas

		AVE	Composite Reliability	Cronbach Alpha
All; n=331	BUDSTYLE	0.76	0.93	0.90
	FIRMPERF	0.78	0.91	0.86
	FLEXCULT	0.66	0.92	0.90
Hyper; n=32	BUDSTYLE	0.83	0.95	0.93
	FIRMPERF	0.83	0.94	0.90
	FLEXCULT	0.80	0.96	0.95
Mod. Comp; n=259	BUDSTYLE	0.76	0.93	0.90
	FIRMPERF	0.78	0.91	0.86
	FLEXCULT	0.65	0.92	0.89
Stable; n=40	BUDSTYLE	0.72	0.91	0.87
	FIRMPERF	0.76	0.90	0.85
	FLEXCULT	0.64	0.91	0.89

Cronbach alpha of a measurement scale should be greater than 0.70 (Nunnally, 1978; Chin, 1998). Given that the results reported range from 0.85 to 0.95, there are no concerns with this measure of internal consistency.

Composite reliability, ρ_c, provides a closer approximation of internal composite reliability for PLS based models. Unlike the tau equivalency assumption of Cronbach alpha, composite reliability instead assumes accurate parameter estimates (Chin, 1998). The value of 0.70 or

higher is recommended for a composite reliability score (Fornell and Larcker, 1981; Chin, 1998). Given that the results reported range from 0.90 to 0.95, there are no concerns with this measure of internal consistency.

Average variance extracted (AVE) is the average of the squared loading of each item on a construct, and it is a more conservative measure than composite reliability (Fornell and Larcker, 1981). AVE assesses how well a LV explains the variance of its set of reflective indicators. It does this by assessing the amount of variance captured by the indicators of a construct versus the amount of variance caused by measurement error. Fornell and Larcker (1981) stated that AVE should be higher than 0.50, meaning that at least 50 percent of the measurement variance is captured by the construct (Chin, 1998). Given that the results reported range from 0.64 to 0.83, there are no concerns with this measure of reliability.

5.7.2.3 Discriminant validity

Chin (1998) outlined two procedures for assessing discriminant validity: (1) AVE-PHI matrix and (2) cross-loadings.

The diagonal elements (i.e., with double under-lining) in Table 5.23 show the square root of the AVE, whereas the off-diagonal elements show the PHI matrix of latent construct correlations. To satisfy the requirements of discriminant validity, the values of the square root of AVE should be higher than all correlations between each construct and all other constructs (Fornell and Larcker, 1981; Chin, 1998). The table shows that this requirement is fully met, and so there are no concerns with this test of discriminant validity.

Table 5.23 – Square root of AVE and correlation matrix

		BUDSTYLE	FIRMPERF	FLEXCULT
All; n=331	BUDSTYLE	0.87		
	FIRMPERF	***0.33***	0.88	
	FLEXCULT	***0.60***	***0.47***	0.81
Hyper; n=32	BUDSTYLE	0.91		
	FIRMPERF	**0.65**	0.91	
	FLEXCULT	**0.82**	***0.80***	0.89
Mod. Comp; n=259	BUDSTYLE	0.87		
	FIRMPERF	***0.33***	0.88	
	FLEXCULT	***0.6***	***0.47***	0.81
Stable; n=40	BUDSTYLE	0.85		
	FIRMPERF	0.14	0.87	
	FLEXCULT	***0.45***	0.22	0.80

2-tailed significance levels: ***0.01*** ; *0.05* ; *0.10* .

Items on the diagonal are the square root of AVE

For the cross-loading test of discriminant validity, reflective indicators should not have a higher correlation on a LV other than the one it is intended to measure. Furthermore, each block of indicators should load higher on its respective LV than indicators for other LVs (Chin, 1998). As reported in Table 5.24, these requirements are met in all cases.

Table 5.24 – Cross-loading of measurement items

All; n=331	BUDSTYLE	FIRMPERF	FLEXCULT	Hyper; n=32	BUDSTYLE	FIRMPERF	FLEXCULT
LVteam	0.50	0.36	**0.83**	LVteam	0.82	0.72	**0.89**
LVcapdev	0.47	0.48	**0.85**	LVcapdev	0.74	0.68	**0.93**
LVempow	0.59	0.37	**0.87**	LVempow	0.78	0.68	**0.89**
LVchange	0.46	0.38	**0.80**	LVchange	0.64	0.69	**0.87**
LVcustom	0.33	0.31	**0.67**	LVcustom	0.66	0.72	**0.89**
LVlearn	0.53	0.38	**0.85**	LVlearn	0.73	0.79	**0.88**
LVsnrfrq	**0.90**	0.26	0.52	LVsnrfrq	**0.94**	0.58	0.78
LVmidfrq	**0.83**	0.25	0.46	LVmidfrq	**0.91**	0.57	0.77
LVchall	**0.90**	0.25	0.53	LVchall	**0.92**	0.65	0.74
LVstrat	**0.85**	0.38	0.56	LVstrat	**0.86**	0.57	0.71
sales	0.28	**0.90**	0.42	sales	0.60	**0.95**	0.78
markshar	0.28	**0.91**	0.36	markshar	0.58	**0.92**	0.71
profit	0.31	**0.84**	0.45	profit	0.60	**0.86**	0.68
Mod. Comp; n=259	BUDSTYLE	FIRMPERF	FLEXCULT	Stable; n=40	BUDSTYLE	FIRMPERF	FLEXCULT
LVteam	0.46	0.33	**0.83**	LVteam	0.51	0.25	**0.82**
LVcapdev	0.48	0.48	**0.86**	LVcapdev	0.25	0.30	**0.73**
LVempow	0.60	0.37	**0.86**	LVempow	0.38	0.20	**0.91**
LVchange	0.47	0.41	**0.79**	LVchange	0.26	-0.02	**0.78**
LVcustom	0.30	0.32	**0.63**	LVcustom	0.26	0.02	**0.64**
LVlearn	0.53	0.36	**0.84**	LVlearn	0.37	0.22	**0.88**
LVsnrfrq	**0.90**	0.28	0.51	LVsnrfrq	**0.91**	-0.04	0.43
LVmidfrq	**0.82**	0.22	0.45	LVmidfrq	**0.85**	0.18	0.35
LVchall	**0.91**	0.24	0.56	LVchall	**0.83**	0.06	0.28
LVstrat	**0.87**	0.37	0.58	LVstrat	**0.79**	0.24	0.42
sales	0.28	**0.90**	0.41	sales	0.06	**0.81**	0.26
markshar	0.27	**0.90**	0.36	markshar	0.13	**0.93**	0.14
profit	0.31	**0.84**	0.46	profit	0.14	**0.86**	0.21

5.7.3 Structural models: assessment of construct relations

The prior section established the reliability and validity of the measurement models. This section can now proceed to assess the structural models. According to Chin (1998), PLS structural models are assessed with three sets of measures: (1) R^2 for dependent variables; (2) standardised path estimates with a resampling procedure such as bootstrapping; and (3) the Stone-Geisser (Stone, 1974; Geisser, 1975) test for predictive relevance.

The interpretation of R^2 measures in PLS models is identical to multiple regression (Chin, 1998). The squared multiple correlation (R^2) measures the percentage of a construct's variation that is explained by the model (Wixom and Watson, 2001). R^2 is assessed for each endogenous construct in the model, i.e., BUDSTYLE and FIRMPERF in this case. The interpretation of standardised path estimates can also be interpreted in the same way as multiple regression (Chin, 1998). Path coefficients indicate the strength of the relationship between two constructs (Wixom and Watson, 2001). Path coefficients are assessed for the FLEXCULT → BUDSTYLE

paths and the BUDSTYLE → FIRMPERF paths. Bootstrapping results show that all paths are significant at the 0.01 level, except for the path BUDSTYLE → FIRMPERF in the stable sub-group.

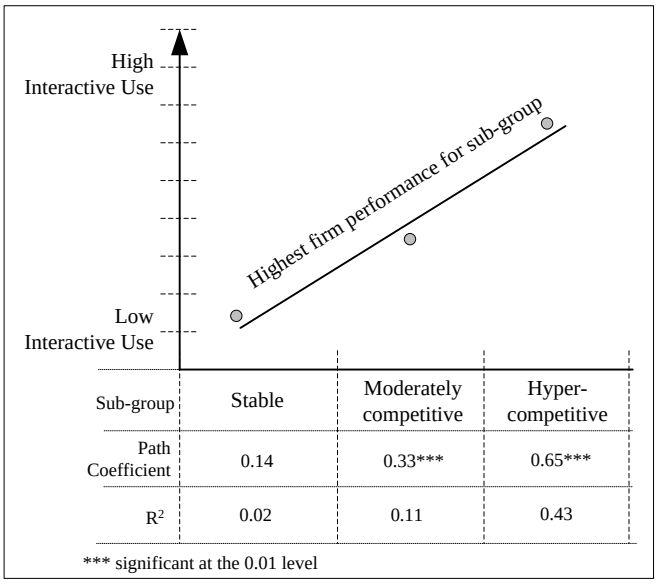
Starting with the hypercompetitive sub-group, BUDSTYLE has a moderately-strong R^2 of 0.68, whilst FIRMPERF has a more moderate R^2 of 0.43. Also, the path to BUDSTYLE of 0.82 is very strong, whilst the path to FIRMPERF of 0.65 is moderately-strong. Thus, highly interactive use of a budgeting system is an important predictor of firm performance in hypercompetitive settings, and flexibility culture is a very strong antecedent to interactive use.

For the other end of the market competition spectrum, in the stable sub-group, BUDSTYLE has a weak R^2 of 0.20, whilst FIRMPERF has a negligible R^2 of 0.02. Also, the path to BUDSTYLE of 0.45 is moderate, whilst the path to FIRMPERF of 0.14 is very weak and not significant ($p >$ 0.10). Thus, putting aside sample size considerations, the results show that budgeting systems style of use is not associated with firm performance in stable market settings, and budgeting system style of use is moderately dependent on flexibility culture.

In the middle of the market competition spectrum in the moderately competitive sub-group, BUDSTYLE has a moderate R^2 of 0.36 and FIRMPERF has a very weak R^2 of 0.11. The path to BUDSTYLE of 0.60 is moderately-strong, whilst the path to FIRMPERF of 0.33 is more moderate. Thus, whilst BUDSTYLE has a greater effect on FIRMPERF than for stable settings, the effect is less than for hypercompetitive settings.

Therefore, taking into account the results of all three MARKCOMP sub-groups, market competitiveness positively moderates the effect of BUDSTYLE on FIRMPERF. In addition, it is evident that MARKCOMP moderates the effect of FLEXCULT on BUDSTYLE, because the *R*-squares and paths to BUDSTYLE also increase in size across the stable, moderately competitive and hypercompetitive sub-groups respectively. Thus, in summary, the findings are twofold: (1) MARKCOMP positively moderates the effect of BUDSTYLE on FIRMPERF and (2) MARKCOMP positively moderates the effect of FLEXCULT on BUDSTYLE. Figures 5.7 and 5.8 show these relationships.

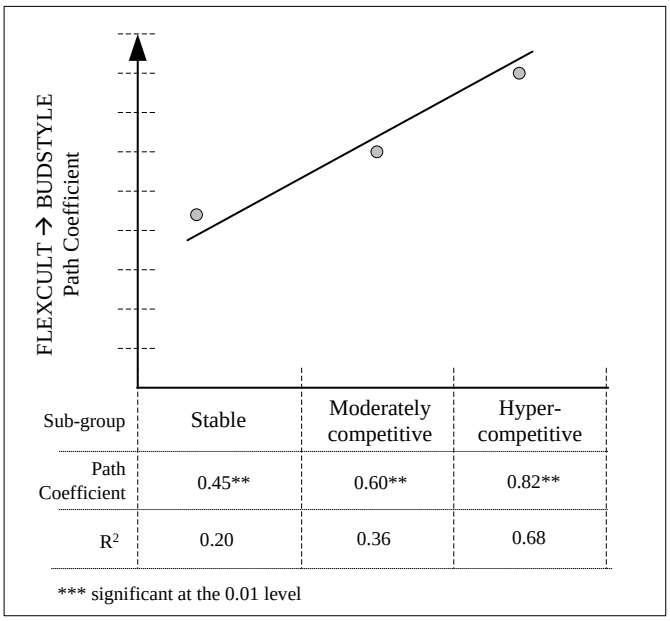
Figure 5.7 – MARKCOMP moderates the effect of BUDSTYLE on FIRMPERF



Sub-group	Stable	Moderately competitive	Hyper-competitive
Path Coefficient	0.14	0.33***	0.65***
R^2	0.02	0.11	0.43

*** significant at the 0.01 level

Figure 5.8 – MARKCOMP moderates the effect of FLEXCULT on BUDSTYLE



Sub-group	Stable	Moderately competitive	Hyper-competitive
Path Coefficient	0.45**	0.60**	0.82**
R^2	0.20	0.36	0.68

*** significant at the 0.01 level

In addition to examining the R^2 and path estimates, the Stone (1974) and Geisser (1975) predictive sample reuse procedure is used to test predictive relevance. Chin (1998) outlined the PLS adaptation of this procedure. A blindfolding procedure iteratively omits part of the data for a block of indicators and then attempts to estimate that omitted part, resulting in a generalised cross-validation measure. Q^2 represents the extent that values are reconstructed by the model and its parameter estimates. $Q^2 > 0$ implies the model has predictive relevance, while $Q^2 < 0$ represents a lack of predictive relevance. The omission distance should be a prime integer

between the number of indicators and cases (Wold, 1982; Chin, 1998). In this case, two distances were used: 7 and 15. Table 5.25 shows that all measures of the cross-validated redundancy Q^2 are greater than zero. Therefore, all the endogenous constructs in all the models have predictive relevance.

Table 5.25 – Cross-validated redundancy tests

	All; n=331		Hyper; n=32		Mod. Comp; n=259		Stable; n=40	
Omission distance	7	15	7	15	7	15	7	15
BUDSTYLE	0.27	0.27	0.56	0.56	0.26	0.27	0.13	0.13
FIRMPERF	0.08	0.08	0.34	0.35	0.08	0.08	0.01	0.00

There is, however, a major discrepancy between the total sample model (n = 331) and the moderately competitive sub-group model. Oddly enough, both models have almost identical estimates. Compared to the moderately competitive sub-group, the total sample BUDSTYLE R^2 of 0.36 is the same, and FIRMPERF has the same R^2 of 0.11. The path to BUDSTYLE of 0.60 is the same, and the path to FIRMPERF of 0.33 is also the same. Prima facie, the total sample model should be a main effects model, and the reasonable magnitude of the estimates suggests universal relationships between these variables. However, it looks as though the PLS procedure fails to account for the relatively small number of cases for the stable and hypercompetitive sub-groups. Further supplementary testing is performed in the following sections to explore this issue.

5.8 Supplementary testing: MARKCOMP sub-groups

To investigate the anomalous similarities between the total sample and moderately competitive sample, the moderately competitive sample (n = 259) was split into lower (n = 129) and upper (n = 130) groups. The distributions are reasonably symmetrical: for the lower split-group the MARKCOMP scores ranged from 3.2 to 4.5 with an average of 3.8, and for the upper split-group the MARKCOMP scores ranged from 4.5 to 5.8 with an average of 5.2.

Table 5.26 reports the PLS model results. The left block shows the total sample and the moderately competitive sample. The right block shows the results for the four groups; i.e., hypercompetitive, upper-moderately competitive, lower-moderately competitive, and stable.

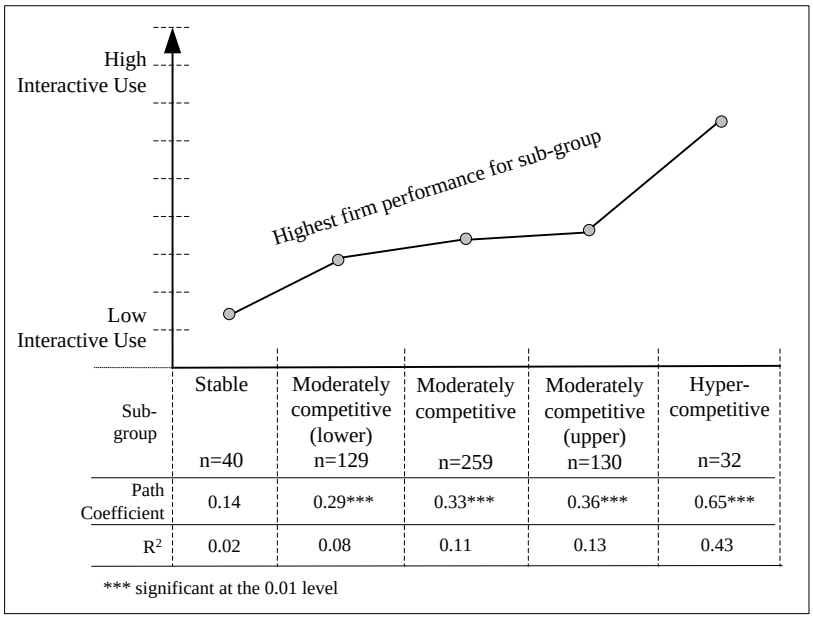
Table 5.26 – Assessment of low and high moderately competitive sub-groups

	All; n=331	Mod. Comp; n=259	Hyper; n=32	Mod. Comp (upper); n=130	Mod. Comp (lower); n=129	Stable; n=40
Structural Model	Path / R^2	Path / R^2	Path / R^2	Path / R^2	Path / R^2	Path / R^2
FLEXCULT → BUDSTYLE	0.60***	0.60***	0.82***	0.61***	0.60***	0.45***
R^2	0.36	0.36	0.68	0.37	0.35	0.20
BUDSTYLE → FIRMPERF	0.33***	0.33***	0.65***	0.36***	0.29***	0.14
R^2	0.11	0.11	0.43	0.13	0.08	0.02
Measurement Model	Loading	Loading	Loading	Loading	Loading	Loading
FLEXCULT						
LVteam	0.83***	0.82***	0.89***	0.82***	0.84***	0.82***
LVcapdev	0.85***	0.86***	0.93***	0.86***	0.86***	0.73***
LVempow	0.87***	0.87***	0.89***	0.87***	0.86***	0.91***
LVchange	0.80***	0.81***	0.87***	0.81***	0.77***	0.78***
LVcustom	0.67***	0.74***	0.89***	0.74***	0.51***	0.64***
LVlearn	0.85***	0.83***	0.88***	0.83***	0.84***	0.88***
BUDSTYLE						
LVsnrfrq	0.90***	0.90***	0.94***	0.90***	0.89***	0.91***
LVmidfrq	0.83***	0.83***	0.91***	0.83***	0.80***	0.85***
LVchall	0.90***	0.91***	0.92***	0.91***	0.90***	0.83***
LVstrat	0.85***	0.85***	0.86***	0.85***	0.87***	0.79***
FIRMPERF						
sales	0.90***	0.92***	0.95***	0.92***	0.87***	0.81***
markshar	0.91***	0.93***	0.92***	0.93***	0.85***	0.93***
profit	0.84***	0.85***	0.86***	0.85***	0.86***	0.86***

1-tailed significance levels: ***0.01 ; **0.05 ; *0.10.

The results for the lower and upper split-groups are quite similar. Compared to the n = 259 sub-group, the estimates for the upper split-group are fractionally greater, and the results for the lower split-group are fractionally lower. Figure 5.9 shows all the sub- and split-groups. Evidently, the moderately competitive (n = 259) path estimate and R^2 sit neatly between those of the lower and upper split-groups. Thus, the estimates from the moderately competitive sample are effectively an average of the two split samples.

Figure 5.9 – Moderately competitive sub-group split into lower and upper



Sub-group	Stable n=40	Moderately competitive (lower) n=129	Moderately competitive n=259	Moderately competitive (upper) n=130	Hyper-competitive n=32
Path Coefficient	0.14	0.29***	0.33***	0.36***	0.65***
R^2	0.02	0.08	0.11	0.13	0.43

*** significant at the 0.01 level

There are two important findings from the split sample analysis. Firstly, across the lower and upper split samples there is very little difference in the path magnitude. Thus, the effects within the moderately competitive sub-group are quite homogenous, implying very little moderation effect within this sub-group. Secondly, at both ends of the market competitiveness spectrum there are significant step-changes in gradients. This is particularly apparent for the step-up to the hypercompetitive sub-group, and notwithstanding the lack of significance, this is also somewhat apparent for the stable sub-group.

In light of the problem in which the total sample has extremely similar estimates as the moderately competitive sub-group, these two findings suggest that the PLS procedure incorrectly provides for the cases from the stable and hypercompetitive sub-groups. This issue is further explored in the product-indictor based tests of moderation in section 5.11.

5.9 Supplementary testing: sensitivity of the MARKCOMP approach

Section 5.2 raised a potential a concern with the reliability of two of the MARKCOMP indicators. In addition, as was discussed in section 4.4.2, given the originality of the operationalisation of MARKCOMP, additional PEU measures were included in the survey to test the sensitivity and robustness of the MARKCOMP measurement approach. This section demonstrates the robustness of the MARKCOMP approach that was used in the foregoing analyses. There are two sub-sections. The first re-runs the PLS sub-group models with sub-groups based on a four-item MARKCOMP method. The second sub-section compares the

MARKCOMP results with those derived from three sets of alternative measurement approaches using variations based on the six extra PEU measures from the survey.

5.9.1 Sensitivity analysis: reliability of the six MARKCOMP indicators

Tables 5.27 and 5.28 reproduce the correlation matrix and factor analysis results from section 5.2. They show that markint (i.e., intensity of market changes) and compint (i.e., intensity of competitor changes) load on a separate factor to the remaining four MARKCOMP measures.

Table 5.27 – Correlation matrix of MARKCOMP measures

n=331	markint	markpred	techint	techpred	compint	comppred
markpred	-0.04					
techint	-0.08	***0.20***				
techpred	0.04	***0.45***	***0.48***			
compint	***0.19***	-0.04	0.07	***0.14***		
comppred	-0.01	***0.36***	***0.16***	***0.40***	***0.17***	
MARKCOMP	***0.27***	***0.57***	***0.58***	***0.78***	***0.47***	***0.63***

2-tailed significance levels: ***0.01*** ; *0.05* ; *0.10* .

Table 5.28 – Exploratory factor analysis of MARKCOMP measures

n=331	Factor 1 loading	Factor 2 loading	Commu-nalities
markint	-0.10	**0.75**	0.57
markpred	**0.71**	-0.14	0.52
techint	**0.63**	-0.06	0.41
techpred	**0.84**	0.12	0.71
compint	0.13	**0.77**	0.61
comppred	**0.66**	0.18	0.46

There are two potential competing explanations for the two dimensional structure. On the one hand, markint and compint were the only two survey items that were reverse coded, and so this may be due to method error. On the other hand, respondents could well have correctly understood the questions and this may in fact be the "true" factor structure. Notably, the respondents were predominantly senior managers who were likely to be well-educated, and the questions were very clearly worded. There is also very little reason to expect that all four measures would be unidimensional. The theoretical reasoning provided by Volberda (1996) and Eisenhardt and Martin (2000) that was used to develop the six-measure MARKCOMP approach has not been empirically tested before. Additionally, many other notable studies have found

that the environment is multidimensional (e.g., Miles, Snow and Pfeffer, 1974; Miller and Friesen, 1983; Dess and Beard, 1984; Anand and Ward, 2004).

To test for sensitivity, the PLS sub-group results were compared for the six-item measure (MARKCOMP (6)), with those obtained for a four-item measure that excluded markint and techint (MARKCOMP (4)). The same sub-group sample sizes obtained for the MARKCOMP (6) measures were used for the MARKCOMP (4) measure because of the strong step-changes at the ends of the spectrum that were discussed in the previous section. Table 5.29 and Figure 5.10 present the comparison.

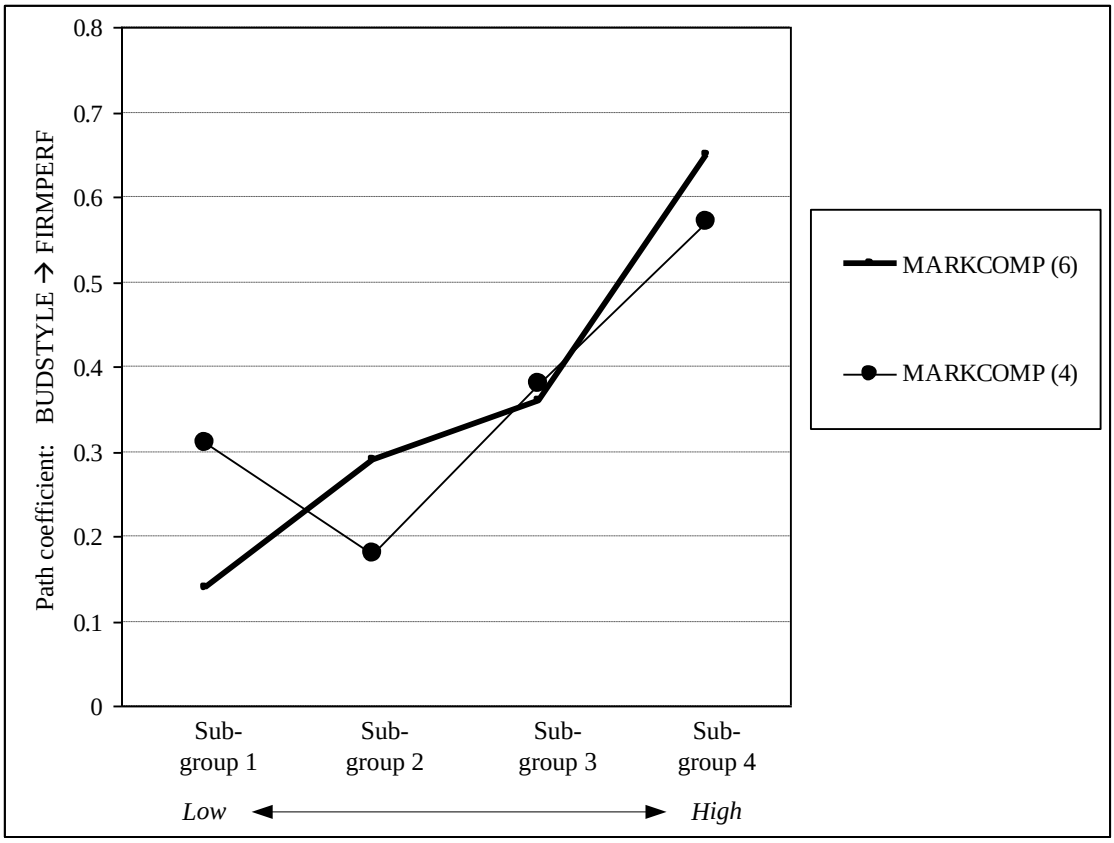
It is difficult to understand why the stable sub-group from the MARKCOMP (4) approach has a higher path estimate than for the MARKCOMP (6) approach. This could be because four measures are insufficient for this complex construct. The following section shows that this issue does not arise for alternative PEU based measures of the environment.

Table 5.29 – PLS sub-group results: MARKCOMP (6) versus MARKCOMP (4)

Basis	"Stable" n=40	"Lower moderate" n=129	"Upper moderate" n=130	"Hyper-competitive" n=32
MARKCOMP (6)	0.14	0.29***	0.36***	0.65***
MARKCOMP (4)	0.31*	0.18**	0.38***	0.57***

1-tailed significance levels: ***0.01 ; **0.05 ; *0.10.

Figure 5.10 – PLS sub-group results: MARKCOMP (6) versus MARKCOMP (4)



5.9.2 Sensitivity analysis: comparison of MARKCOMP to other measures

Tables 5.30 and 5.31 contain all 12 measures of the environment from the survey. The correlation matrix also contains three composite measures: MARKCOMP (6), environment (12) and PEU (aggregate). The last measure is a simple composite of the six measures other than those used for MARKCOMP.

Table 5.30 – Correlation matrix of measures of the environment

n=331	markrate	markint	markpred	markcompl	techrate	techint	techpred	techcompl	comprate	compint	comppred	compcompl	MARKCOMP	environment (12)
markint	*-0.11*													
markpred	***0.28***	-0.04												
markcompl	***0.34***	-0.03	***0.30***											
techrate	***0.40***	-0.02	***0.19***	***0.38***										
techint	***0.42***	-0.08	***0.20***	***0.34***	***0.74***									
techpred	***0.37***	0.04	***0.45***	***0.33***	***0.47***	***0.48***								
techcompl	***0.39***	0.02	***0.29***	***0.45***	***0.67***	***0.65***	***0.60***							
comprate	***0.36***	0.00	***0.25***	***0.35***	***0.41***	***0.35***	***0.45***	***0.50***						
compint	*0.11*	***0.19***	-0.04	0.02	*0.09*	0.07	*0.14*	*0.13*	***0.21***					
comppred	***0.19***	-0.01	***0.36***	***0.24***	***0.21***	***0.16***	***0.40***	***0.31***	***0.35***	***0.17***				
compcompl	***0.36***	0.03	***0.27***	***0.49***	***0.40***	***0.35***	***0.47***	***0.54***	***0.52***	***0.20***	***0.49***			
MARKCOMP	***0.40***	***0.27***	***0.57***	***0.37***	***0.53***	***0.58***	***0.78***	***0.62***	***0.49***	***0.47***	***0.63***	***0.55***		
environment (12)	***0.59***	*0.11*	***0.49***	***0.59***	***0.71***	***0.68***	***0.75***	***0.80***	***0.68***	***0.33***	***0.55***	***0.72***	***0.89***	
PEU (aggregate)	***0.65***	-0.03	***0.36***	***0.68***	***0.75***	***0.66***	***0.62***	***0.81***	***0.73***	***0.18***	***0.41***	***0.75***	***0.68***	***0.94***

2-tailed significance levels: ***0.01*** ; *0.05* ; *0.10* .

Table 5.31 – Factor analysis of measures of the environment

n=331	Factor 1 loading	Factor 2 loading	Factor 3 loading	Commu-nalities
markrate	**0.54**	0.31	-0.11	0.39
markint	-0.07	-0.05	**0.71**	0.51
markpred	0.10	**0.71**	-0.26	0.58
markcompl	**0.45**	0.44	-0.09	0.41
techrate	**0.88**	0.08	0.04	0.78
techint	**0.88**	0.04	-0.04	0.79
techpred	0.52	**0.55**	0.09	0.58
techcompl	**0.79**	0.32	0.11	0.74
comprate	0.47	**0.48**	0.22	0.50
compint	0.09	0.11	**0.76**	0.59
comppred	0.05	**0.78**	0.15	0.64
compcompl	0.42	**0.63**	0.22	0.62

The correlation matrix and factor analysis show that the environment is multi-dimensional. This is consistent with much prior work. For example, rate of change and complexity do not necessarily correlate (Duncan, 1972). Individual environment sectors are often discrete and impact firms to differing degrees (Daft, Sormunen and Parks, 1988). The rate and intensity dimensions of dynamism do not necessarily correlate – it is possible, for example, to have a high rate of change (i.e., frequent or rapid) with a fairly incremental overlay, or rapid change

with an accompanying discontinuous overlay (Eisenhardt, 1989; Volberda, 1996 and 1998). Dynamism (rate of change) and unpredictability of change are distinct characteristics of environments (Miles, Snow and Pfeffer, 1974; Miller and Friesen, 1983; Anand and Ward, 2004). It is possible to have highly dynamic and complex environments that are predictable (Volberda, 1996 and 1998). In a study of Aldrich's (1979) conceptualisation of the environment, Dess and Beard (1984) used factor analysis and found that unpredictability was not correlated with dynamism (volatility).

In addition to the three composite measures of the environment, a PEU profile based measure was developed. Duncan's (1972) framework is a two-dimensional grid based on dimensions of static-dynamic (i.e., the PEU dimensions of change rate) and simple-complex (i.e., the PEU dimension of complexity). Duncan's (1972) data showed that more dynamism leads to more uncertainty. More complexity only leads to more uncertainty when accompanied by dynamism. Therefore, complexity in stable environments is not necessarily associated with uncertainty. Law et al. (1998: 748) note that Duncan's model is a multidimensional construct of the profile type, requiring the simple-complex and static-dynamic dimensions to be dichotomised and fully crossed to form four profiles. This is shown in Table 5.32.

Table 5.32 – Duncan's (1972) PEU profile framework

	Simple	Complex
Static	Cell 1: Low PEU	Cell 2: Moderately low PEU
Dynamic	Cell 3: Moderately high PEU	Cell 4: High PEU

Based on Duncan's (1972) conclusions, the four profiles can then be grouped into low and high uncertainty. The low uncertainty group is the combination of cell 1 (low PEU) and cell 2 (moderately low PEU). The high uncertainty group is the combination of cell 3 (moderately high PEU) and cell 4 (high PEU).

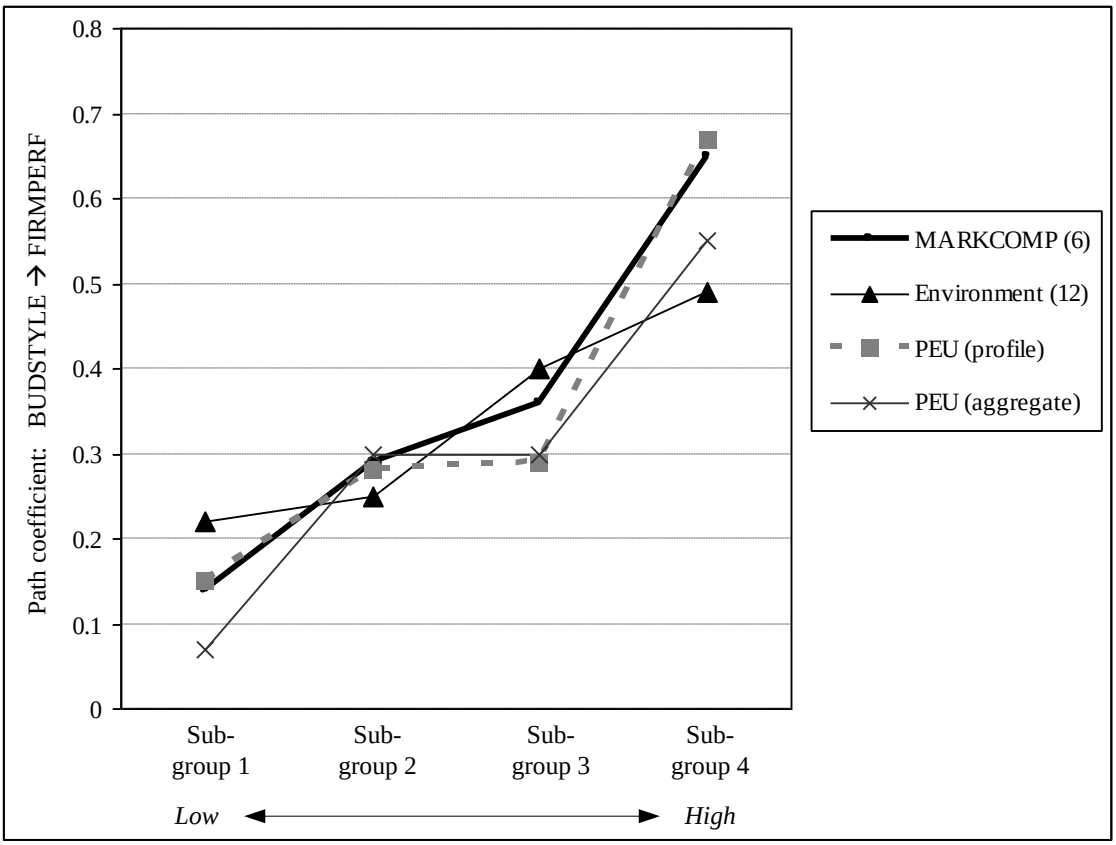
Table 5.33 and Figure 5.11 now present the PLS sub-group results using the four approaches. The same sample sizes as derived from the MARKCOMP (6) method were retained because of the observed sharp turns at the ends of the spectrum as discussed in the prior section.

Table 5.33 – PLS sub-group results: MARKCOMP (6) sensitivities

Basis	"Stable" n=40	"Lower moderate" n=129	"Upper moderate" n=130	"Hyper-competitive" n=32
MARKCOMP (6)	0.14	0.29***	0.36***	0.65***
Environment (12)	0.22	0.25***	0.40***	0.49***
PEU (profile)	0.15	0.28***	0.29***	0.67***
PEU (aggregate)	0.07	0.30***	0.30***	0.55***

1-tailed significance levels: ***0.01 ; **0.05 ; *0.10.

Figure 5.11 – PLS sub-group results: MARKCOMP (6) sensitivities



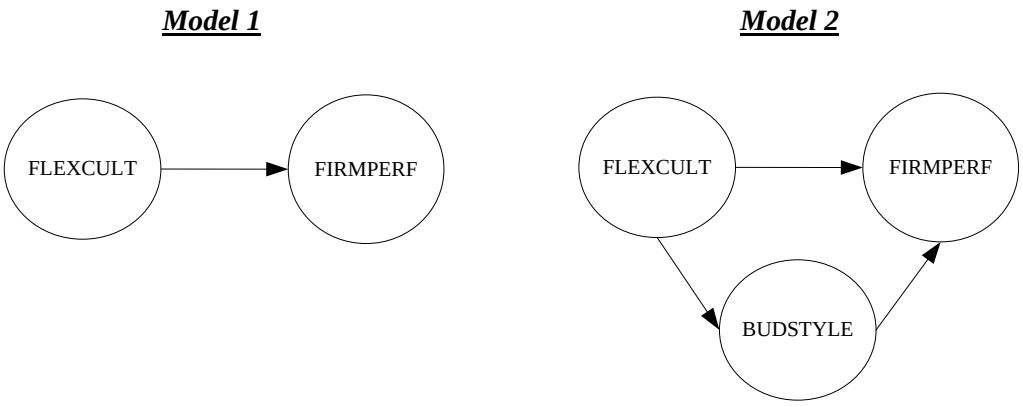
In summary, the sensitivity testing results clearly demonstrate the robustness of the MARKCOMP (6) approach, and justify its use for the sub-group basis used in the structural model testing.

5.10 Supplementary testing: indirect effects of FLEXCULT

The focus thus far has been upon an antecedent and consequence of BUDSTYLE. In an exploratory sense, this section shifts the focus to the FIRMPERF effects of FLEXCULT, examining the extent to which BUDSTYLE mediates the relationship between FLEXCULT and FIRMPERF. Mediation is a causal model that explains the process of "why" and "how" a cause-and-effect happens (Baron and Kenny, 1986; Wu and Zumbo, 2008). The prior sub-group modelling showed that FLEXCULT is antecedent to BUDSTYLE, which in turn positively affects the dependent variable FIRMPERF. This section explores how much of the FIRMPERF effects of FLEXCULT can be accounted for by its indirect transmission though BUDSTYLE rather than through other organisational mechanisms.

Baron and Kenny (1986) outlined the mediation test considered to be the default paradigm in organisational research (Collins, Graham and Flaherty, 1998; James, Mulaik, and Brett, 2006). The test has three regression equations that are examined for the presence of three conditions necessary to establish mediation. The three regression equations are: (1) mediator on the independent variable; (2) dependent variable on the independent variable; and (3) dependent variable on both the independent variable and on the mediator variable. With PLS, the three equations can be performed with just two models, as per Figure 5.12.

Figure 5.12 – Mediation models



The three conditions required to establish the extent of mediation are: (1) FLEXCULT must affect FIRMPERF in model 1; (2) FLEXCULT must affect BUDSTYLE and; (3) BUDSTYLE must affect FIRMPERF. The extent of mediation (i.e., the indirect effect of FLEXCULT transmitted through BUDSTYLE) is determined by the product of the two paths FLEXCULT → BUDSTYLE and BUDSTYLE → FIRMPERF. Alternatively, this product is normally equivalent to the difference between the path estimates from models 1 and 2 for the FLEXCULT → FIRMPERF relationship (MacKinnon, Warsi and Dwyer, 1995; James et al., 2006). If the three conditions

are met, either complete or partial mediation are present. If BUDSTYLE *completely mediates* the relationship, the FLEXCULT → FIRMPERF path in model 2 would be zero. If instead BUDSTYLE *partially mediates* the relationship, the FLEXCULT → FIRMPERF path in model 2 would be significant and depart from zero.

Table 5.34 – BUDSTYLE mediation effects

	All; n=331			Hyper; n=32			Mod. Comp; n=259			Stable; n=40		
	Model 1	Model 2	Diff.	Model 1	Model 2	Diff.	Model 1	Model 2	Diff.	Model 1	Model 2	Diff.
FLEXCULT → FIRMPERF	0.48***	0.43***	-0.05	0.80***	0.81***	0.01	0.48***	0.44***	-0.04	0.32	0.27	-0.05
FLEXCULT → BUDSTYLE		0.60***			0.82***			0.60***			0.45**	
BUDSTYLE → FIRMPERF		0.08*			-0.01			0.07			0.00	

1-tailed significance levels: ***0.01 ; **0.05 ; *0.10.

Table 5.34 reports the results by total sample and by MARKCOMP sub-group. Only for the total sample are the three conditions for mediation fully present. The two indirect paths show the required significant relations, i.e., FLEXCULT → BUDSTYLE (b = 0.60, p < 0.01) and BUDSTYLE → FIRMPERF (b = 0.08, p < 0.10). There is a very small partial mediation effect, evident by the 0.05 decrease in the FLEXCULT → FIRMPERF path coefficient from 0.48 (p < 0.01) to 0.43 (p < 0.01). Thus, at the total sample level, BUDSTYLE is only able to account for a very small proportion of the indirect effects of FLEXCULT on FIRMPERF.

However, for no MARKCOMP sub-group are the three conditions for mediation fully present. This can be explained by two confounding factors: small sample size and collinearity (Hoyle and Kenny, 1999). Multicollinearity can be a problem in mediation tests, because, as the independent variable is assumed to cause the mediator, they should be correlated (Baron and Kenny, 1986). Thus, larger correlations between FLEXCULT and BUDSTYLE result in multicollinearity when together they are regressed on FIRMPERF (Baron and Kenny, 1986). Small sample size also causes problems, and additionally, Hoyle and Kenny (1999) demonstrated how small sample size and collinearity interact to negatively affect the performance of mediation tests.

As reported in the correlation matrix in Table 5.35, for the hypercompetition sub-group, FLEXCULT and BUDSTYLE have a very high correlation (0.82) and a very small sample size (n = 32). The combination of these two factors confounds the mediation test, such that the small difference in the FLEXCULT → FIRMPERF coefficient of 0.01 has the incorrect sign. For the moderately competitive sub-group, the correlation between FLEXCULT and BUDSTYLE of 0.59 reported in Table 5.35 is at a level where multicollinearity problems can arise (Hoyle and Kenny, 1999; Grewal et al., 2004). Thus, even though the -0.04 difference in the FLEXCULT → FIRMPERF coefficient is of a similar magnitude to the total sample model, the BUDSTYLE →

FIRMPERF coefficient is not statistically significant (b = 0.07, p > 0.10). For the stable sub-group, there is no statistically significant effect of either a direct or indirect effect of FLEXCULT on FIRMPERF.

Table 5.35 – Correlation matrices from mediation models

		BUDSTYLE	FIRMPERF
All; n=331	FIRMPERF	***0.32***	
	FLEXCULT	***0.59***	***0.47***
Hyper; n=32	FIRMPERF	***0.65***	
	FLEXCULT	***0.82***	***0.8***
Mod. Comp; n=259	FIRMPERF	***0.32***	
	FLEXCULT	***0.59***	***0.46***
Stable; n=40	FIRMPERF	0.11	
	FLEXCULT	***0.41***	0.22

2-tailed significance levels: ***0.01*** ; *0.05* ; *0.10* .

There are two key points from the mediation analyses. Firstly, there is evidence of a small, partial mediation effect of BUDSTYLE on the relationship between FLEXCULT and FIRMPERF. This effect is only evident at the total sample level, with small sample size and collinearity issues likely affecting the tests at the sub-group level. Thus, the vast majority of the FIRMPERF affects of FLEXCULT remain unaccounted for by this research. Secondly, as will be discussed in later sections, and as reported in Table 5.37, the increase in the FLEXCULT → FIRMPERF paths across the sub-groups shows a positive moderating effect of market competitiveness: hypercompetitive b = 0.80 (p < 0.01); moderately competitive b = 0.48 (p < 0.01); and stable b = 0.32 (p > 0.10). This effect corroborates the theoretical arguments and findings of Fey and Denison (2003) upon which the hypotheses in Chapter Three were based.

In conclusion of this section, FLEXCULT has a relatively much greater importance to FIRMPERF than does BUDSTYLE. Because there is great deal of variance in BUDSTYLE accounted for by FLEXCULT (which is correlated with FIRMPERF), there is very little variance in BUDSTYLE to contribute to the prediction of FIRMPERF (Hoyle and Kenny, 1999).

5.11 Supplementary testing: moderation using product indicators

Section 4.3.4 discussed the product indicator approach as an alternative to the sub-group method for testing moderation effects in PLS. This section employs the product indicator method to test the robustness of the results from the sub-group method used in Section 5.7.

Section 5.8 discussed how the moderately competitive sub-group (n = 259) structural model produced almost identical estimates to the total sample sub-group (n = 331), and concluded that the moderately competitive sub-group is seriously over-weight and skews the total sample PLS analyses. To explore this issue further, product indicator testing conducted in this section employs three sample types: total (n = 331); 'medium' (n = 158); and 'small' (n = 115). Three medium sized samples are constructed which include all the stable and hypercompetitive cases, with an alternating one-third of the moderately competitive cases. Six small sized samples are constructed which include all the stable and hypercompetitive cases, with an alternating one-sixth of the moderately competitive cases. These medium and small samples are designed to counter the effects of over-weighting from the moderately competitive sample group.

This section follows the product indicator method demonstrated by Chin et al. (2003). A multiplicative interaction variable is produced by multiplying values of all items measuring the moderating variable with values of all items measuring the independent variable.[30] Then the multiplicative interaction variable is added to the structural model for assessment of the moderating relationship. As shown in Figure 5.13, four models are employed:

Model 1 is the main effects model, containing no interaction constructs.

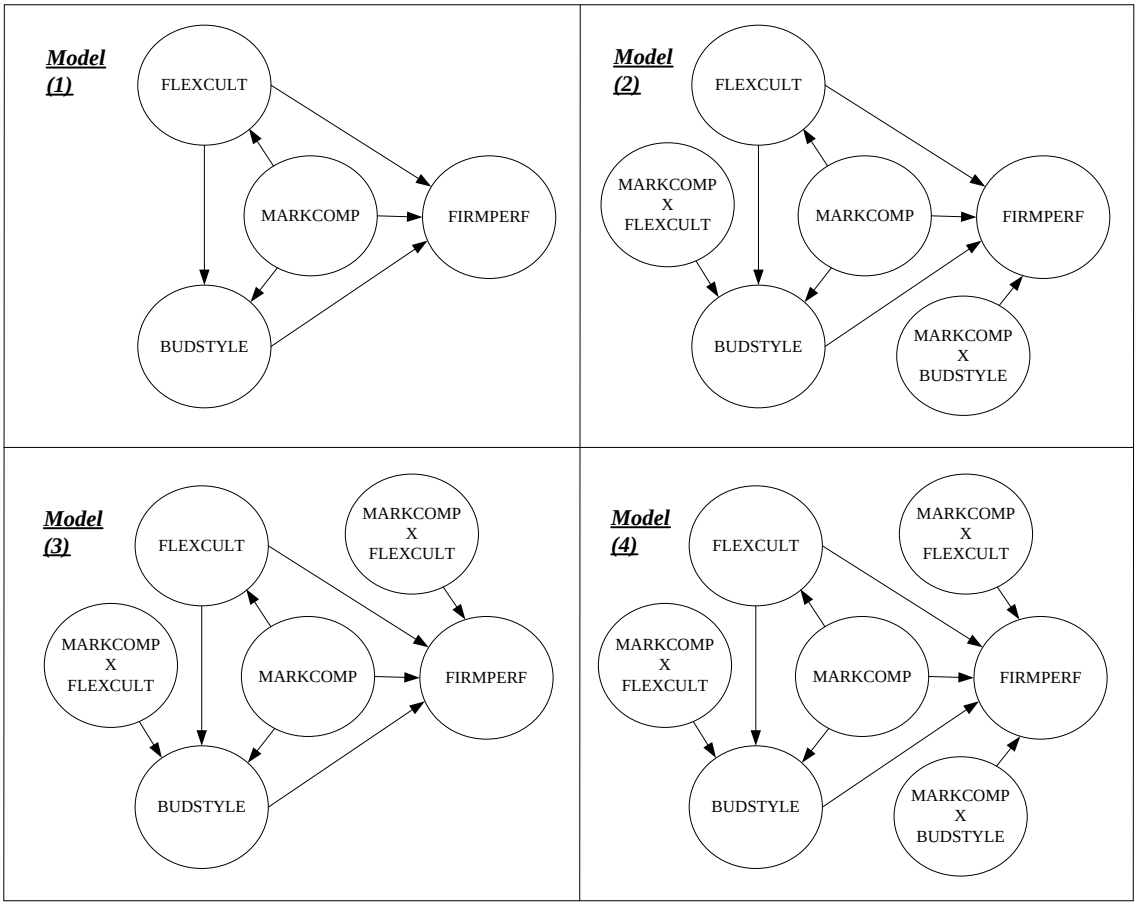
Model 2 has two interaction variables;
- (i) MARKCOMP moderation of the FLEXCULT → BUDSTYLE path.
- (ii) MARKCOMP moderation of the BUDSTYLE → FIRMPERF path.

Model 3 has two interaction variables;
- (i) MARKCOMP moderation of the FLEXCULT → BUDSTYLE path.
- (ii) MARKCOMP moderation of the FLEXCULT → FIRMPERF path.

Model 4 has three interaction variables:
- (i) MARKCOMP moderation of the FLEXCULT → BUDSTYLE path.
- (ii) MARKCOMP moderation of the BUDSTYLE → FIRMPERF path.
- (iii) MARKCOMP moderation of the FLEXCULT → FIRMPERF path.

[30] The multiplicative interaction variables were produced by the functionality in the SmartPLS software.

Figure 5.13 – Modeling for product indicator tests of moderating effects



Before proceeding to the interaction variable modelling, selection of a multiple indicator measurement model for the MARKCOMP construct is required, given that Chin et al. (2003) demonstrate that the product indicator approach works best with multiple construct indicators. Following the sensitivity analyses in Section 5.9, six alternative operationalisations were assessed using the main effects model (i.e., model 1 from Figure 5.13). Table 5.36 displays the six alternatives and shows that they provide reasonably consistent structural model results, thus enabling selection of a multiple product indicator model to proceed unhindered from theoretical concerns. The three MARKCOMP based alternatives (i.e., dimensions of intensity and predictability) have similar results to the three 'environment' based alternatives (i.e., dimensions of intensity, predictability, rate and complexity). Compared to the 'environment' models, the MARKCOMP models are most consistent with the sub-group modelling supplemented by this product indicator testing. For choosing between the reflective and formative alternatives for the MARKCOMP approach, formative product indicator models have not been demonstrated in the literature, and it is unclear if product indicators can combine formative and reflective measures (given that BUDSTYLE and FLEXCULT are both reflective).

Thus, the MARKCOMP six reflective items model is adopted for product indicator testing purposes.

Table 5.36 – Sensitivity of six measurement models for MARKCOMP

Model 1	MARKCOMP 1 item	MARKCOMP 6 refective items	MARKCOMP 6 formative items	Environment 1 item	Environment 12 reflective items	Environment 12 formative items
Structural Model						
FLEXCULT → BUDSTYLE	0.59***	0.59***	0.59***	0.58***	0.57***	0.56***
BUDSTYLE → FIRMPERF	0.08	0.08	0.08	0.08	0.08	0.07
FLEXCULT → FIRMPERF	0.43***	0.42***	0.41***	0.43***	0.43***	0.42***
MARKCOMP → BUDSTYLE	0.05	0.04	0.01	0.080	0.08	0.09
MARKCOMP → FLEXCULT	0.17***	0.27***	0.29***	0.28***	0.33***	0.36***
MARKCOMP → FIRMPERF	-0.02	0.02	0.06	-0.03	-0.01	0.03
Measurement Model						
markcomp	1.00***					
environment				1.00***		
compint		0.01	-0.13		0.13*	-0.11
comppred		0.52***	0.08		0.47***	0.00
comprate					0.64***	-0.10
compcompl					0.70***	0.08
markint		-0.24*	-0.22*		-0.11*	-0.15
markpred		0.65***	0.32*		0.49***	0.11
markrate					0.65***	0.42***
markcompl					0.67***	0.43***
techint		0.78***	0.80***		0.74***	0.27
techpred		0.78***	0.01		0.71***	0.17
techrate					0.75***	-0.08
techcompl					0.82***	0.30*

1-tailed significance levels: ***0.01 ; **0.05 ; *0.10.

For the medium sized samples, the moderately competitive sub-group was systematically split into three mutually exclusive split-groups. All 259 cases were rank-ordered by MARKCOMP score. Group one (n = 86) has cases 1, 4, 7 etc up to 257; group two (n = 86) has cases 2, 5, 8 etc up to 258; group three (n = 87) has cases 3, 6, 9 etc up to 259. These sub-sets of the moderately competitive sample were added to the stable sample (n = 40) and hypercompetitive sample (n = 32) to produce three medium sized samples: n = 159; n = 158a; n = 158b. Table 5.37 shows how these three medium sized samples compare with each other and with the total sample, using the main effects model, i.e., model 1 from Figure 5.13. There is a reasonable consistency across the four samples, and notably the medium sized samples satisfactorily represent the total sample results. Given this consistency, the analysis can comfortably proceed to assessing and comparing the product indicator models.

Table 5.37 – Structural models with medium sized samples

Model 1	n=331	n=159	n=158a	n=158b
FLEXCULT → BUDSTYLE	0.59***	0.66***	0.55***	0.51***
BUDSTYLE → FIRMPERF	0.08	0.07	0.10	0.10
FLEXCULT → FIRMPERF	0.42***	0.44***	0.45***	0.43***
MARKCOMP → BUDSTYLE	0.05	0.01	0.03	0.15*
MARKCOMP → FLEXCULT	0.27***	0.22**	0.34***	0.34*
MARKCOMP → FIRMPERF	0.02	-0.07	0.00	-0.06

1-tailed significance levels: ***0.01 ; **0.05 ; *0.10.

Table 5.38 – Moderating effects with medium sized samples

Sample	Model	Moderating effect	R^2 main effect (model 1)	R^2 interaction (models 2-4)	f^2	Path
n=331	2, 3 & 4	MARKCOMP × FLEXCULT → BUDSTYLE	0.38	0.39	0.02	0.19*
	2	MARKCOMP × BUDSTYLE → FIRMPERF	0.23	0.26	0.05	0.19*
	3	MARKCOMP × FLEXCULT → FIRMPERF	0.23	0.28	0.07	0.23**
	4	MARKCOMP × BUDSTYLE → FIRMPERF &	0.23	0.28	0.07	0.07
		MARKCOMP × FLEXCULT → FIRMPERF				0.18*
n=159	2, 3 & 4	MARKCOMP × FLEXCULT → BUDSTYLE	0.44	0.48	0.08	0.20*
	2	MARKCOMP × BUDSTYLE → FIRMPERF	0.22	0.27	0.06	0.22*
	3	MARKCOMP × FLEXCULT → FIRMPERF	0.22	0.29	0.09	0.27**
	4	MARKCOMP × BUDSTYLE → FIRMPERF &	0.22	0.29	0.10	0.06
		MARKCOMP × FLEXCULT → FIRMPERF				0.23*
n=158a	2, 3 & 4	MARKCOMP × FLEXCULT → BUDSTYLE	0.31	0.34	0.04	0.17
	2	MARKCOMP × BUDSTYLE → FIRMPERF	0.27	0.32	0.08	0.24**
	3	MARKCOMP × FLEXCULT → FIRMPERF	0.27	0.35	0.12	0.29**
		MARKCOMP × BUDSTYLE → FIRMPERF &	0.27	0.35	0.13	0.08
	4	MARKCOMP × FLEXCULT → FIRMPERF				0.24*
n=158b	2, 3 & 4	MARKCOMP × FLEXCULT → BUDSTYLE	0.34	0.39	0.10	0.25*
	2	MARKCOMP × BUDSTYLE → FIRMPERF	0.22	0.28	0.08	0.25*
	3	MARKCOMP × FLEXCULT → FIRMPERF	0.22	0.29	0.10	0.28**
	4	MARKCOMP × BUDSTYLE → FIRMPERF &	0.22	0.30	0.11	0.10
		MARKCOMP × FLEXCULT → FIRMPERF				0.22*

1-tailed significance levels: ***0.01 ; **0.05 ; *0.10.

The significance of a path for a multiplicative interaction variable shows the presence of a moderating effect, and the f^2 can be viewed as a gauge of the size of the effect: 0.02 = small; 0.15 = medium and 0.35 = large (Cohen, 1988; Chin, 1998).[31] Table 5.38 shows the results from the moderating effects models using the total sample and the three medium sized samples. Four observations are apparent. Firstly, reviewing the last column, the medium sample models

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$$f^2 = \frac{R^2_{included} - R^2_{excluded}}{1 - R^2_{included}}$$

have similar path estimate results to the total sample models. Secondly, reviewing the second last column, the medium sample models all have higher f^2 than the total sample models; the f^2 measures for the total sample models are small, whereas for the medium sample models they range from small to medium. Thirdly, there are only small differences between the results for each medium sized sample. These three points are additional evidence that the moderately competitive sub-group is seriously over-weight in its importance to total sample analyses. The lack of a moderation effect within the moderately competitive sub-group reduces the overall moderation effect as shown by the f^2 measures. Fourthly, when modelled by themselves (in models 2 and 3) the MARKCOMP X FLEXCULT multiplicative interaction variable has only a marginally greater impact than the MARKCOMP X BUDSTYLE multiplicative interaction variable. However, when both these multiplicative interaction variables are included (in model 4), the MARKCOMP X BUDSTYLE multiplicative interaction variable has no significant impact. Thus, consistent with the mediation analyses discussed in Section 5.10, compared to BUDSTYLE FLEXCULT has a relatively much greater importance to FIRMPERF.

Next, the results from the small samples are assessed. The small samples were produced with the same method used for the medium samples, albeit producing six rather than three split-groups of the moderately competitive cases. Table 5.39 shows the results from the main effects models using the total sample and the six small samples. There is a reasonable consistency across the seven samples, and notably the small sized samples satisfactorily represent the total sample results. Given this consistency, the analysis can comfortably proceed to assessing and comparing the product indicator models. Table 5.40 contains the results of the moderating effects models. The results are consistent with the four observations made above for the medium sized samples, particularly in terms of the f^2 which are larger than for the medium samples.

Table 5.39 – Structural models with small sized samples

Model 1	n=331	n=115a	n=115b	n=115c	n=115d	n=115e	n=116
FLEXCULT → BUDSTYLE	0.59***	0.59***	0.55***	0.56***	0.68***	0.57***	0.53***
BUDSTYLE → FIRMPERF	0.08	0.01	0.11	0.02	0.14	0.10	0.04
FLEXCULT → FIRMPERF	0.42***	0.43***	0.44***	0.39***	0.46***	0.48***	0.47***
MARKCOMP → BUDSTYLE	0.05	0.05	0.04	0.17*	0.01	0.07	0.07
MARKCOMP → FLEXCULT	0.27***	0.27**	0.32**	0.32**	0.24*	0.33***	0.33**
MARKCOMP → FIRMPERF	0.02	-0.12	-0.05	-0.13	-0.08	-0.09	-0.10

1-tailed significance levels: ***0.01 ; **0.05 ; *0.10.

Table 5.40 – Moderating effects with small sized samples

Sample	Model	Moderating effect	R^2 main effect (model 1)	R^2 interaction (models 2-4)	f^2	Path
n=331	2, 3 & 4	MARKCOMP × FLEXCULT → BUDSTYLE	0.38	0.39	0.02	0.19*
	2	MARKCOMP × BUDSTYLE → FIRMPERF	0.23	0.26	0.05	0.19*
	3	MARKCOMP × FLEXCULT → FIRMPERF	0.23	0.28	0.07	0.23**
	4	MARKCOMP × BUDSTYLE → FIRMPERF &	0.23	0.28	0.07	0.07
		MARKCOMP × FLEXCULT → FIRMPERF				0.18*
n=115a	2, 3 & 4	MARKCOMP × FLEXCULT → BUDSTYLE	0.37	0.41	0.07	0.20*
	2	MARKCOMP × BUDSTYLE → FIRMPERF	0.17	0.26	0.11	0.30**
	3	MARKCOMP × FLEXCULT → FIRMPERF	0.17	0.29	0.16	0.35**
	4	MARKCOMP × BUDSTYLE → FIRMPERF &	0.17	0.29	0.17	0.09
		MARKCOMP × FLEXCULT → FIRMPERF				0.29**
n=115b	2, 3 & 4	MARKCOMP × FLEXCULT → BUDSTYLE	0.32	0.35	0.05	0.18*
	2	MARKCOMP × BUDSTYLE → FIRMPERF	0.25	0.33	0.12	0.30**
	3	MARKCOMP × FLEXCULT → FIRMPERF	0.25	0.36	0.16	0.33**
	4	MARKCOMP × BUDSTYLE → FIRMPERF &	0.25	0.36	0.17	0.12
		MARKCOMP × FLEXCULT → FIRMPERF				0.25*
n=115c	2, 3 & 4	MARKCOMP × FLEXCULT → BUDSTYLE	0.40	0.45	0.08	0.22**
	2	MARKCOMP × BUDSTYLE → FIRMPERF	0.24	0.28	0.06	0.23**
	3	MARKCOMP × FLEXCULT → FIRMPERF	0.24	0.32	0.12	0.30**
	4	MARKCOMP × BUDSTYLE → FIRMPERF &	0.24	0.32	0.12	0.00
		MARKCOMP × FLEXCULT → FIRMPERF				0.30**
n=115d	2, 3 & 4	MARKCOMP × FLEXCULT → BUDSTYLE	0.47	0.52	0.09	0.22*
	2	MARKCOMP × BUDSTYLE → FIRMPERF	0.31	0.36	0.08	0.24**
	3	MARKCOMP × FLEXCULT → FIRMPERF	0.31	0.38	0.12	0.28**
	4	MARKCOMP × BUDSTYLE → FIRMPERF &	0.31	0.38	0.12	0.05
		MARKCOMP × FLEXCULT → FIRMPERF				0.25*
n=115e	2, 3 & 4	MARKCOMP × FLEXCULT → BUDSTYLE	0.36	0.41	0.08	0.22
	2	MARKCOMP × BUDSTYLE → FIRMPERF	0.27	0.32	0.07	0.23***
	3	MARKCOMP × FLEXCULT → FIRMPERF	0.27	0.37	0.15	0.33*
		MARKCOMP × BUDSTYLE → FIRMPERF &	0.27	0.37	0.15	0.01
	4	MARKCOMP × FLEXCULT → FIRMPERF				0.34*
n=116	2, 3 & 4	MARKCOMP × FLEXCULT → BUDSTYLE	0.31	0.38	0.11	0.27*
	2	MARKCOMP × BUDSTYLE → FIRMPERF	0.22	0.30	0.11	0.30*
	3	MARKCOMP × FLEXCULT → FIRMPERF	0.22	0.32	0.15	0.34**
	4	MARKCOMP × BUDSTYLE → FIRMPERF &	0.22	0.33	0.16	0.10
		MARKCOMP × FLEXCULT → FIRMPERF				0.26*

1-tailed significance levels: ***0.01 ; **0.05 ; *0.10.

In conclusion of this section, product indicator testing corroboratively supplements the sub-group testing. Specifically, market competitiveness moderates three relationships: (i) BUDSTYLE → FIRMPERF; (ii) FLEXCULT → BUDSTYLE and (iii) FLEXCULT → FIRMPERF. These findings are consistent with the sub-group modelling and mediation analyses. A number of additional findings are notable. Firstly, the moderating effect sizes were greater when the sample contained a lower number of cases from the moderately competitive sub-group. This is further evidence of a lack of a moderating effect within the moderately competitive sub-group, and highlights the bias in PLS from over-weighting full sample analyses with a

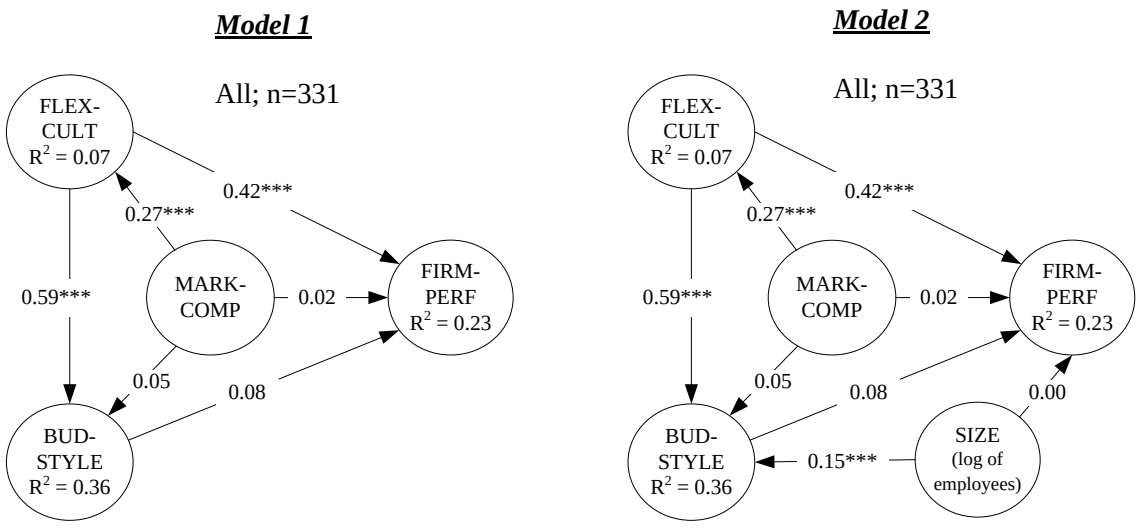
disproportionate number of cases from the moderately competitive sub-group. Secondly, with the smaller sized samples, the moderating effects enlarged to medium effect sizes. Compared to the strength of moderation in the sub-group analyses, the product indicator approach has less detection ability, highlighting the superiority of the sub-group approach for this dataset.

5.12 Supplementary testing: control variable SIZE

This section assesses for impacts of the control variable SIZE. As was discussed in Chapter Four, the logarithmic number of employees is used to test the effect of SIZE on BUDSTYLE and FIRMPERF. There are two sub-sections. Analysis is performed firstly at the total sample level and, secondly, by market competitiveness sub-groups.

For the total sample analysis (n = 331), *Model 2* in Figure 5.14 shows that SIZE has a small positive impact on BUDSTYLE (b = 0.15, $p < 0.01$), with no incremental impact on R^2 above that attributable to FLEXCULT and MARKCOMP. Thus, as expected, size of the firm can systematically influence organisational (budgeting) practices because it is a surrogate for organisational complexity (Baum and Wally, 2003). On the other hand, contrary to expectations (Garg, Walters and Priem, 2003), SIZE has zero impact on FIRMPERF, in terms of both path (b = 0.00, $p > 0.10$) and incremental R^2.

Figure 5.14 – PLS models for testing effects of SIZE on the total sample



1-tailed significance levels: *** 0.01; **0.05 ; *0.10.

The market competitiveness sub-group analysis is in two steps. Firstly, the market competitiveness sub-groups are compared to assess for differences in SIZE. Secondly, the SIZE impacts for each sub-group are assessed.

For the first step, Table 5.41 shows no significant differences between the means using independent samples t-tests. For both the log-employees and employees measures, the means and standard deviations show that the sub-groups are more or less equal in terms of firm size.[32] Hence, for the second step, sub-group comparative analysis can proceed freely.

Table 5.41 – SIZE: independent samples t-tests

		n	Mean	Std. Dev.	Mean diff.	T-value	Df	Sig. (2-tail)
Mod. Comp. vs. Hyper.	log-employess							
	Mod. Comp.	259	2.82	0.49	0.05	0.53	40.41	0.60
	Hyper.	32	2.78	0.45				
	employees							
	Mod. Comp.	256	1194	1753	80	0.26	40.44	0.80
	Hyper.	32	1114	1636				
Mod. Comp. vs. Stable.	log-employess							
	Mod. Comp.	259	2.82	0.49	-0.02	-0.20	54.49	0.84
	Stable	40	2.84	0.44				
	employees							
	Mod. Comp.	256	1194	1753	30	0.13	66.03	0.90
	Stable	40	1164	1243				
Hyper. Vs. Stable.	log-employess							
	Hyper.	32	2.78	0.45	-0.06	-0.57	66.07	0.57
	Stable.	40	2.84	0.44				
	employees							
	Hyper.	32	1114	1636	-51	-0.15	56.64	0.88
	Stable.	40	1164	1243				

Figure 5.15 shows the two models used to assess SIZE impacts for step two. The results are presented in Table 5.42. Consistent with the total sample analyses, SIZE does not impact FIRMPERF for any sub-group. For hypercompetitive markets, SIZE has a medium negative impact on BUDSTYLE (b = -0.33, p < 0.01) with an R^2 of 0.11. It seems that very high complexity in hypercompetitive conditions reduces interactive use of budgeting systems. Whereas, for moderately competitive markets, SIZE has a small positive impact on BUDSTYLE (b = 0.18, p < 0.01) with an R^2 of 0.03. The difference between the negative impact and positive impact in hypercompetitive and moderately competitive conditions could be due to information overload from a ceiling effect in the interaction between complexity and change (Duncan, 1972; Galbraith, 1973). For stable markets, SIZE has an insignificant impact on BUDSTYLE (b = -0.39, p < 0.10).

[32] Note, that for the same reasons in the response bias testing in Chapter 4, three extreme outliers were removed for employees. After removing the three outliers (35,000, 37,000, 40,000) the new maximum was 10,000. All three outliers were in the moderately competitive sub-group. Given that the log-employees approach smooths out the distorting effect of the extreme outliers, they were kept in the sample for the PLS sub-group analysis.

Figure 5.15 – Sub-group models for assessing SIZE impacts

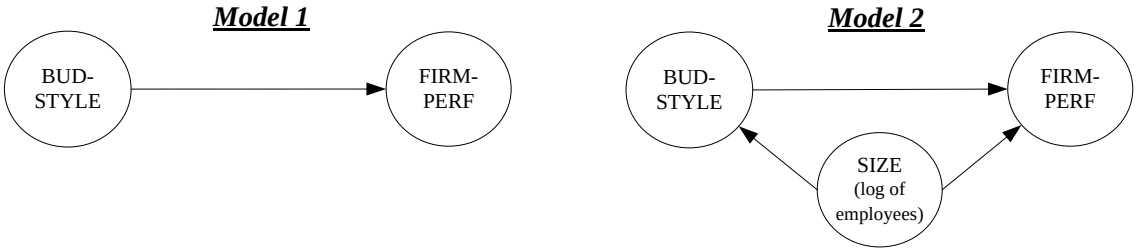


Table 5.42 – Results of sub-group modeling for SIZE impacts

	Model 1		Model 2	
	Path	R^2	Path	R^2
All; n=331				
BUDSTYLE → FIRMPERF	0.34***		0.34***	
SIZE → FIRMPERF			-0.06	
SIZE → BUDSTYLE			0.15***	
FIRMPERF		0.11		0.11
BUDSTYLE				0.01
Hyper; n=32				
BUDSTYLE → FIRMPERF	0.66***		0.64***	
SIZE → FIRMPERF			-0.04	
SIZE → BUDSTYLE			-0.33***	
FIRMPERF		0.43		0.43
BUDSTYLE				0.11
Mod. Comp; n=259				
BUDSTYLE → FIRMPERF	0.33***		0.33***	
SIZE → FIRMPERF			-0.04	
SIZE → BUDSTYLE			0.18***	
FIRMPERF		0.11		0.11
BUDSTYLE				0.03
Stable; n=40				
BUDSTYLE → FIRMPERF	0.26		0.08	
SIZE → FIRMPERF			-0.08	
SIZE → BUDSTYLE			-0.39	
FIRMPERF		0.43		0.43
BUDSTYLE				0.15

1-tailed significance levels: ***0.01 ; **0.05 ; *0.10.

In summary of this section, at the total sample level SIZE has a small positive impact on BUDSTYLE (b = 0.15, p < 0.01), with no incremental impact on R^2. SIZE has no impact on FIRMPERF. SIZE had differential impacts on BUDSTYLE in the sub-group PLS models. However, independent samples t-tests showed no significant difference in SIZE across the sub-

groups. Therefore, the conclusions drawn earlier for the structural models using sub-group analysis are not distorted by effects attributable to firm size.

5.13 Summary of results

This section has two sub-sections. Firstly, measurement model outcomes and modelling issues are summarised. Secondly, the key results are outlined, providing the basis for discussion in the final section of this chapter.

5.13.1 Summary of measurement model outcomes and modelling issues

To varying degrees, the four construct variables required measurement model assessment and calibration. For FLEXCULT, in contrast to the two-dimensional emergent structure predicted on the findings of Fey and Denison (2003), PLS modelling supported a six item reflective latent variable model. For FIRMPERF, PLS modelling supported a three item reflective model. For MARKCOMP, two of the six measures were reverse coded in the survey, and the data for these had the appearance of potential unreliability due to method error. However, this concern was alleviated with sensitivity tests against four other methods that drew on the six other measures of the external environment included in the survey. The comparisons clearly demonstrated the robustness of the MARKCOMP approach used to form the sub-groups.

Extensive analysis of the epistemology of the BUDSTYLE construct did not support the hypothesised asymmetrical dual construct model, instead suggesting a two dimensional structure consisting of interaction frequency and interaction intensity. Exploratory PLS modelling was performed to refine the analyses. Excessive multicollinearity between the interaction frequency and interaction intensity constructs was evident across all three MARKCOMP sub-groups, providing further disconfirmation of the hypothesised asymmetrical dual construct model. Four exhaustive configurations of single construct measurement models were examined for each MARKCOMP sub-group (i.e., hierarchical-emergent, hierarchical-latent, latent variable-formative, and latent variable-reflective). Comparative analysis revealed that the best operationalisation was the four dimensional latent-reflective structure, which also demonstrated very high inter-item equivalence across all three sub-groups.

The non-occurrence of context-specificity in the BUDSTYLE measurement models was also largely evident for FLEXCULT and FIRMPERF, with very similar loading and weighting patterns across the sub-groups. Thus, sub-group comparison for moderation effects was able to proceed freely without concerns of cross-group measurement differences (Carte and Russell, 2003). Sub-group modelling proceeded in two stages: measurement models and structural

models. In the first stage, individual item reliability, convergent validity and discriminant validity were successfully demonstrated for each construct in each sub-group. In the second stage, the structural models were assessed to examine the hypothesised relations. Predictive relevance was successfully demonstrated. As will be discussed in the next section, the sub-group models provide the basis for most of the findings.

In addition to the sub-group models, a series of exploratory supplementary tests were performed. In the sub-group modelling, the moderately competitive (n = 259) sub-group has almost identical estimates to the total sample model (n = 331). Splitting the moderately competitive sub-group into low and high sub-samples showed that there is very little moderation effect within sub-group. For the total sample model, it is evident that the PLS procedure fails to account for the relatively small number of cases for the stable and hypercompetitive sub-groups. This over-weighting issue was also demonstrated in a series of product indicator models that were used for testing interaction effects, corroborating the results from the sub-group models, albeit in a less parsimonious and more complicated manner. The small sample size for the stable sub-group (n = 40) has been assumed to not prevent valid inferences. Based on the R^2 of 0.02, a sample size of 400 would be required to produce a significant path estimate (Green 1991: 502-503; Chin, 1998). For the purposes at hand, it is assumed that the path estimate is correct, thus facilitating the generalisation of moderating effects across the whole spectrum of market competitiveness.

5.13.2 Summary of key results

This section summarises the key results. Three summary tables are discussed, and then the most salient results are displayed in a summary figure.

Table 5.43 shows the results of the models used to directly test the hypotheses. The bottom panel of the table shows the four latent variable scores that represent the four-dimensional latent measurement model for BUDSTYLE. Across all three market contexts, the four items have strong equivalence, and high loadings. Even though there is a very small rank-order, the pattern is reasonably consistent across the sub-groups. The same situation also applies for the weights. Thus, the predicted asymmetrical relations between the interaction frequency and interaction intensity constructs are not supported. Notably, with this configuration, the BUDSTYLE model is effectively operationalising the continuum between a diagnostic and interactive style of budgeting system use.

Also in Table 5.43, the top panel shows the results from the structural models used to test the hypothesised relationships. In the hypercompetitive sub-group, BUDSTYLE has a moderately-

strong R^2 of 0.68, FIRMPERF has a moderate R^2 of 0.43, the path to BUDSTYLE of 0.82 ($p < 0.01$) is very strong and the path to FIRMPERF of 0.65 ($p < 0.01$) is moderately-strong. In the moderately competitive sub-group, BUDSTYLE has a moderate R^2 of 0.36, FIRMPERF has a very weak R^2 of 0.11, the path to BUDSTYLE of 0.60 ($p < 0.01$) is moderately-strong and the path to FIRMPERF of 0.33 ($p < 0.01$) is more moderate. In the stable sub-group, BUDSTYLE has a weak R^2 of 0.20, FIRMPERF has a negligible R^2 of 0.02, the path to BUDSTYLE of 0.45 ($p < 0.01$) is moderate and path to FIRMPERF of 0.14 is very weak and not significant ($p > 0.10$). In summary, the findings are threefold: (1) market competition positively moderates the effect of BUDSTYLE on FIRMPERF; (2) market competition positively moderates the effect of FLEXCULT on BUDSTYLE; and (3) FLEXCULT is an important antecedent of BUDSTYLE.

Table 5.43 – Hypothesised relationships – summary of findings

	Hyper; n=32		Mod. Comp; n=259		Stable; n=40	
STRUCTURAL MODEL	Path	R^2	Path	R^2	Path	R^2
FLEXCULT → BUDSTYLE	0.82***	0.68	0.60***	0.36	0.45***	0.20
BUDSTYLE → FIRMPERF	0.65***	0.43	0.33***	0.11	0.14	0.02
BUDSTYLE - measurement model	Loading	Weight	Loading	Weight	Loading	Weight
LVsnrfrq	0.94***	0.28	0.90***	0.28	0.91***	0.31
LVmidfrq	0.91***	0.27	0.83***	0.24	0.85***	0.30
LVchall	0.92***	0.28	0.91***	0.29	0.83***	0.22
LVstrat	0.86***	0.26	0.85***	0.33	0.79***	0.36

1-tailed significance levels: ***0.01 ; **0.05 ; *0.10.

Table 5.44 presents supplementary PLS models using sub-groups. These models differ to those above for the hypothesised relationships by inclusion of a path from FLEXCULT to FIRMPERF. Although not explicitly hypothesised, the theoretical development in Chapter Three relied on the findings of Fey and Denison (2003) of a direct relationship between FLEXCULT and FIRMPERF moderated by MARKCOMP. The table shows strong support for such a relationship. The table also shows that there is no direct effect of BUDSTYLE on FIRMPERF when there is a path from FLEXCULT to FIRMPERF. Thus, FLEXCULT has a relatively much greater importance to FIRMPERF than does BUDSTYLE. Much of the variance in BUDSTYLE is attributable to FLEXCULT (which is correlated with FIRMPERF), and so there is limited variance in BUDSTYLE to contribute to the prediction of FIRMPERF. Evidently, whatever FIRMPERF variance BUDSTYLE explains is better explained by FLEXCULT.

Table 5.44 – Supplementary modeling – sub-groups

	Hyper; n=32		Mod. Comp; n=259		Stable; n=40	
STRUCTURAL MODEL	Path	R^2	Path	R^2	Path	R^2
FLEXCULT → FIRMPERF	0.81***		0.44***		0.27	
FLEXCULT → BUDSTYLE	0.82***		0.60***		0.45**	
BUDSTYLE → FIRMPERF	-0.01		0.07		0.00	
FIRMPERF		0.64		0.23		0.07
BUDSTYLE		0.67		0.36		0.20

1-tailed significance levels: ***0.01 ; **0.05 ; *0.10.

Table 5.45 shows the results from a supplementary PLS model using the total sample. This model is exhaustive; it contains all compatible structural relationships from the hypotheses and supplementary testing, thus including all potential relationships at the total sample level. The first three paths assess the direct effects of MARKCOMP, showing: (1) no effect on BUDSTYLE; (2) a small effect ($b = 0.17$, $p < 0.01$) on FLEXCULT; and (3) no effect on FIRMPERF. The next two paths assess the direct effects of FLEXCULT, showing: (4) a moderately-strong effect ($b = 0.59$, $p < 0.01$) on BUDSTYLE; and (5) a moderate effect ($b = 0.43$, $p < 0.01$) on FIRMPERF. The next path (6) shows that BUDSTYLE has no direct effect on FIRMPERF, although mediation analysis (Section 5.10) showed a small, partial mediation effect of BUDSTYLE on the relationship between FLEXCULT and FIRMPERF. Finally, the final two paths assess the effects of the control variable SIZE, showing: (7) no direct effect on FIRMPERF; and (8) a small effect ($b = 0.15$, $p < 0.01$) on BUDSTYLE.

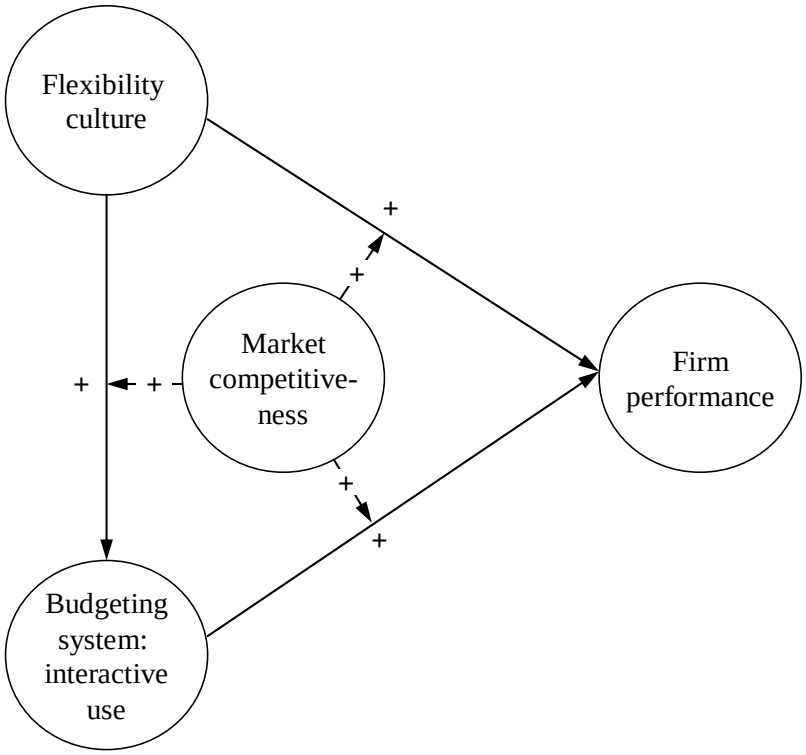
Table 5.45 – Supplementary modeling – total sample

	All; n=331	
	Path	R^2
MARKCOMP → BUDSTYLE	0.05	
MARKCOMP → FLEXCULT	0.17***	
MARKCOMP → FIRMPERF	-0.02	
FLEXCULT → BUDSTYLE	0.59***	
FLEXCULT → FIRMPERF	0.43***	
BUDSTYLE → FIRMPERF	0.08	
SIZE → FIRMPERF	0.00	
SIZE → BUDSTYLE	0.15***	
FIRMPERF		0.23
BUDSTYLE		0.38
FLEXCULT		0.03

1-tailed significance levels: ***0.01 ; **0.05 ; *0.10.

Based on the three preceding tables, the most salient findings can be summarised in Figure 5.16. MARKCOMP moderates the relationships between all three constructs. The small direct effect of MARKCOMP on FLEXCULT has been ignored, and SIZE is omitted given it was shown to be homogenous across the three sub-groups. Notably, BUDSTYLE is a four dimensional latent model that measures the continuum between diagnostic and interactive use.

Figure 5.16 – Figurative summary of key results



5.14 Discussion

This section discusses the results. There are three sub-sections. Firstly, the implications for the measurement and meaning of interactive control are discussed. Secondly, the results for the relationships between budgeting system style of use and firm performance are used to reinterpret the theory that was developed for the hypotheses in Chapter Three, and the implications and contributions to the MCS literature are outlined and discussed. The same approach to reinterpretation and discussion is applied in the final section to the relationships between flexibility culture and firm performance.

5.14.1 Interactive style of budgeting system use – measurement and meaning

The empirical analyses do not support the asymmetrical dual-construct model of budgeting systems style of use hypothesised in Chapter Three. Instead, the two dimensions are reflections

of a higher-order latent construct. The reflective relations hold at the sub-dimensional level across all three market competitiveness contexts, effectively resulting in a four-dimensional latent measurement model.

As it transpires, the model presents a new measurement approach for interactive control. This is because the four dimensions and associated scales are based on thematic analysis of Simons' work (Bisbe et al., 2007), and the latent structure identifies strongly with Simons' conceptualisation of interactive control. Had the predicted asymmetrical configuration been borne out by the empirical analyses, then the observed style of use would not have been 'interactive control' per se, but rather it would have presented an evolved and more refined version of the interactive control concept.

The measurement scales, in themselves, are a valuable contribution to the literature. They possess superior construct validity, assessed in terms of content validity and criterion validity (Bisbe et al. 2007).[33] Content validity is superior because the four dimensions and associated measures are firmly based on in-depth thematic analysis by Bisbe et al. (2007) of Simons' (1990, 1991, 1994, 1995 and 2000) work. In comparison, the extant scales reviewed in Chapter Four failed to cover all four critical dimensions – particularly for face-to-face challenge and debate and focus on strategic uncertainties. In terms of criterion-related validity, superior Cronbach alphas are evident. As was reported in table 5.24, the latent value component score indicators produced Cronbach alphas that ranged from 0.87 (stable sub-group) through to 0.93 (hypercompetitive sub-group). In contrast, the comparative continuum scales reviewed in Chapter Four had Cronbach alphas that ranged from just 0.59 to 0.77 (Abernethy and Brownell, 1999; Van der Stede, 2001; Bisbe and Otley, 2004).

The superior construct validity of the measurement scales, in conjunction with the empirical analyses performed, provides strong support for the extant meaning of interactive control. This contribution responds to the call by Bisbe et al. (2007) to more precisely specify the meaning of interactive control. By validating the extant conceptualisation of interactive control, its agreed-upon meaning is evolved and strengthened, making it less exploratory and less ambiguous (Bisbe et al., 2007). The latent four-dimensional conceptualisation was empirically demonstrated as uniform across the entire market competitiveness spectrum. Thus, this study found no context-specific epistemological issues for the most prominent contextual factor in MCS research: the external environment (Chenhall, 2003).

[33] Content validity is the degree of correspondence between the operationalisation and the conceptual definition (Bisbe et al. 2007). Criterion-related validity types empirically examine on the basis of measured scores whether the operationalisation performs and behaves according to theory (Bisbe et al. 2007).

The empirically demonstrated epistemology has strong significance for the core meaning of interactive control. The latent multi-dimensional model preserves Simons' (1991; 49-52) view that top manager involvement is the defining feature of interactive control. In a latent multi-dimensional model, the four dimensions are different forms manifested by the construct (Law et al., 1998: 743), and the causal relationships flow from the construct to the dimensions, and thus a change in the construct results in a change in the dimensions (Jarvis et al., 2003; Bisbe et al., 2007: 105). The interactive control 'construct' is the degree of involvement of top management in the control system. This is in strong contrast to the emergent multi-dimensional model proposed by Bisbe et al. (2007). In an emergent model, the dimensions do not share a common theme or single theoretical concept (e.g., top manager involvement). Instead of being driven by a higher-order construct, the separate dimensions define and form the construct, and the dimensions do not necessarily share the same antecedents.[34]

In conclusion, the present thesis makes two important contributions to the measurement and meaning of interactive control. The first contribution is the survey questions developed for operationalising the observable indicators for the measurement of interactive control. The measurement scales have superior construct validity. The four dimensions cover the salient properties of interactive control, based on in-depth thematic analysis of Simons' literature (Bisbe et al., 2007), and the empirical analyses showed very high reliability at both the dimensional and multi-dimensional levels. The second contribution concerns the support and refinement of the meaning of interactive control (Bisbe et al., 2007). The involvement of top management is confirmed as being central to the meaning of interactive control, and provides the basis of the latent multi-dimensional structure. Hence, because the four-dimensional model gives strength to the extant conceptualisation of interactive control, there does not seem to be a pressing requirement to further evolve the established meaning of the concept.

[34] It should be noted that the four dimensional latent model has two key differences to the tentative suggestions for future research offered by Bisbe et al. (2007). The two key differences could support the emergent structure proposed by Bisbe et al. (2007). Firstly, as argued by Bisbe et al. (2007), the dimension 'leadership style of top manager' is conceptually different to 'involvement of top manager' and so may not covary with the level of top management involvement. As was discussed in Chapter Four, this fifth dimension was not included in the present thesis because it was not explicitly discussed by Simons (1990, 1991, 1994, 1995 and 2000). Secondly, as described by Bisbe et al. (2007), the dimension 'intensive use by operating (i.e., middle) management' can be interpreted as having three distinct meanings, being either: (1) interactions between senior managers and middle managers; (2) interactions that only involve middle managers; or (3) interactions that involve middle managers and subordinates. As was discussed in Chapter Four, pre-testing procedures identified the distinctiveness of these three concepts, and the present thesis adopted the first meaning because it is most consistent with relevant explicit arguments made by Simons (1990, 1991 and 1995). Possibly, the other two potential types of interaction could result in an emergent model if the nature of such interactions did not covary with the level of top manager involvement.

5.14.2 Hypothesis 1: budgeting system style of use and firm performance

Hypothesis 1 (a) predicted that, in moderately competitive and hypercompetitive conditions, market competitiveness would negatively moderate the effect of budgeting systems interaction frequency on firm performance. The empirical evidence does not support the hypothesis. The findings are the reverse: market competitiveness positively moderates the effect of budgeting systems interaction frequency on firm performance (a relationship that also applies to stable market contexts).

Hypothesis 1 (b) predicted that, in moderately competitive and hypercompetitive conditions, market competitiveness would positively moderate the effect of budgeting systems interaction intensity on firm performance. The empirical evidence supports the hypothesis (a relationship that also applies to stable market contexts).

Even though the predictions made by hypothesis 1 (b) are supported, the applied theoretical reasoning was partially incorrect. In part, the rationale for hypothesis 1(b) was premised on that of hypothesis 1 (a), and vice versa. Thus, to some extent, the mutually supportive arguments between the two hypotheses provided a circular error in theoretical logic. As a result, whilst hypothesis 1 (a) had both an incorrect argument and prediction that partly flowed from hypotheses 1 (b), the correct prediction in hypothesis 1 (b) was partially based on incorrect theoretical reasoning that partly flowed from hypotheses 1 (a). There are two key reconciling factors that explain why the theoretical development behind the hypotheses was incorrect.

For the first reconciling explanation, the hypotheses were largely premised on the emphasised types of market change. In moderately competitive markets, the emphasis was the high rate (i.e., frequency) of change. Even though hypercompetitive markets were taken to have the same rate of change as moderately competitive markets, the emphasis was heavily placed on the greater relative intensity and unpredictability of change – in line with the discussion of the hypercompetition literature in section 4.4.2.2 (i.e., Volberda, 1996; Eisenhardt and Martin, 2000). As is evident from Table 5.46, in hypercompetitive conditions, not only is change more frequent, but it is also more intense and more unpredictable. Hence, a correct theoretical explication must take into account that hypercompetitive conditions have rapid discontinuous change as a key characteristic.

Table 5.46 – Mean differences by sub-group for all external environment measures

	Mean	Mean diff.	Mean	Mean diff.	Mean	Mean diff.	Mean	Mean diff.	Mean	Mean diff.	Mean	Mean diff.
	markrate		*markint*		*markpred*		*markcompl*		*techrate*		*techint*	
stable	3.68		2.15		2.65		4.70		4.15		3.63	
modcomp	5.26	1.58	2.84	0.69	4.63	1.98	6.08	1.38	5.90	1.75	5.73	2.10
hyper	6.09	0.84	3.88	1.03	6.09	1.46	6.81	0.73	7.31	1.41	7.47	1.74
	techpred		*techcompl*		*comprate*		*compint*		*comppred*		*compcompl*	
stable	2.30		3.30		2.90		2.33		2.50		3.40	
modcomp	4.95	2.65	5.17	1.87	4.35	1.45	4.19	1.86	4.63	2.13	5.19	1.79
hyper	7.66	2.71	7.44	2.27	6.63	2.27	5.97	1.78	6.88	2.25	7.16	1.97

All mean differences are signifcant at the 0.01 level.

The second reconciling explanation concerns the seniority of management required to orchestrate effective patterns of organisational learning for making strategic choices. In moderately competitive conditions, rather than incremental learning processes requiring the hypothesised frequent senior management involvement (i.e., leadership), they can largely be delegated to responsible middle managers. On the other hand, in hypercompetitive conditions, to ensure responsiveness to strategically significant rapid change, selection and experiential learning processes need to be led by frequent senior management involvement, with far less delegation to middle managers than was hypothesised.

In the following three sections, these two reconciling factors are taken into account, and dynamic capabilities theory is reinterpreted to provide a synthesis consistent with the empirical analyses. To address the two reconciling factors, compared to the hypothetical arguments in Chapter Three, a much greater emphasis is placed on considering strategic choice themes. Given the demonstrated latent nature of the style of use construct, the re-interpretation is structured by the type of market competitiveness. The discussion focuses mostly upon hypercompetitive and moderately competitive settings. The results from the stable market context are also interpreted with the logic of dynamic capabilities theory. A final section discusses the theoretical implications and summarises the resulting contributions.

5.14.2.1 Hypercompetitive conditions

In hypercompetitive conditions, the highly frequent, intense and unpredictable nature of market change requires ongoing reformulation of strategic choices. Success in these conditions requires effective selection of strategic choices informed by experiential learning (Eisenhardt and Martin, 2000). By conveying the achievement of operating capabilities against aspirations, budgeting system information motivates learning processes for top managers to select new

strategic choices, which then foster experiential learning by guiding and constraining decentralised operating capability development efforts by subordinates. To match the high-velocity market change, strategic choices need to be frequently reformulated and translated into budgeting system terms, requiring extensive discussion and challenging of experiences, coupled with debate and challenge of new potential alternatives. Therefore, consistent with the empirical modelling, a highly interactive style of use of budgeting systems is effective in hypercompetitive conditions.

In hypercompetitive conditions, effective top management involvement in a budgeting system needs to decipher and select which existing elements of operating capabilities should be discarded and which should be generalised and leveraged further (*cf.*, Eisenhardt and Martin, 2000). Such processes for deciphering and selection necessitate extensive challenge and debate of past progress and potential changes going forward. Given the high speed and discontinuous nature of change both inside and outside of the firm, frequent repetition and reiteration of this process is required. The fundamental changes to the integrative knowledge for reconfiguration and transformation requires top managers to input vision and provide guidance (Helfat and Raubitschek, 2000). The ongoing development of this integrative knowledge requires frequent interactions with subordinates to leverage their experiential learning.

In hypercompetitive conditions, effective experiential learning mechanisms provide general guidance, and define priorities that "keep managers focused on broadly important issues without locking them into specific behaviors" (Eisenhardt and Martin, 2000: 1111). Highly frequent discussions of budgeting system information provide a simple learning mechanism that structures the attention and sense making of managers for decentralised and specialised 'learning by doing' (*cf.*, Eisenhardt and Martin, 2000). As actual events unfold and unpredicted occurrences and obstacles rapidly arise, timely guidance and clarification to frame 'learning by doing' processes can be sought from top managers in budgeting system interactions. Hence, highly interactive use facilitates rapid dissemination of frontline experience of the changing environmental conditions, informing top managers of adaptation imperatives.

In summary, in hypercompetitive conditions, a highly interactive style of use of a budgeting system provides an effective second order dynamic capability that fosters experiential learning. Frequent, unpredicted strategic issues that arise from experiential learning can quickly come to the attention of senior management. Experiential learning is quickly fed back into selection learning processes for making strategic choices, with the crucial added ingredient of top management vision providing the essential entrepreneurial factor of integrative knowledge. Extensive discussion and debate are required to ensure that interpretations are sufficiently

informed to formulate and implement strategic choices. In this dynamic process, the budgeting cycle fosters a learning process that emphasises experiential learning. The conjunction of experiential and selection learning encourages the evolution of operating capabilities consistent with intense and unpredictable market change. By fostering this pattern of experiential and selection learning in these conditions, a budgeting system capability confers competitive advantage in the form of Schumpeterian rents (Teece et al., 1997; Eisenhardt and Martin, 2000).

5.14.2.2 Moderately competitive conditions

In moderately competitive conditions, market change is frequent, usually incremental and relatively predictable. Effective strategic choices are largely path dependent. To be successful in these conditions, variation learning produces linear change – meaning that current events resemble past events and the similarities along the path of experience permit learning to rely heavily on leveraging existing knowledge (Eisenhardt and Martin, 2000). By fostering variation learning for incremental development of operating capabilities, budgeting system information has the potential to motivate learning processes for formulating and implementing path dependent strategic choices. To match the moderate magnitude of market change, strategic choices need to be incrementally reformulated and translated into budgeting system terms, requiring occasional discussion and justification with top managers. Therefore, consistent with the empirical modelling, a more moderately interactive style of use is effective in moderately competitive conditions.

In these conditions, where existing knowledge can be leveraged to produce successful path dependent change (Eisenhardt and Martin, 2000), a highly interactive style of use would not promote variation learning. Instead, top management involvement in budgeting system processes can be limited to occasional incremental reformulation of existing strategic choices. Performance aspirations and associated anticipatory information have more sustainability, only requiring partial reformulation as dynamic market impacts accumulate over time. When involved in budgeting systems processes, top managers can sanction the modification of existing strategic choices, engaging in mild challenge and debate to ensure that a detailed and comprehensive understanding provides the basis for linear re-working of existing knowledge.

In moderately competitive conditions, anticipatory information more closely represents operating capability inputs and outputs. Where unfavourable variances between actual results and anticipations arise, the underperformance against aspirations motivates operating managers to search for realignment solutions. The relatively stable strategic choice framework provided by the anticipatory information promotes search processes in the “neighbourhood of existing

knowledge" that lead to outcomes that do not "fundamentally depart from the current knowledge" (Helfat and Raubitschek, 2000; 967). Being relatively stable, anticipatory information structures variation learning processes in which managers 'learn before doing' (Eisenhardt and Martin, 2000: 1110).

In summary, in moderately competitive conditions, a more moderately interactive style of use matches the frequent, incremental and relatively predictable market change, and thereby provides an effective second order dynamic capability. By fostering this pattern of variation learning in these conditions, a budgeting system capability confers competitive advantage in the form of market-matched Schumpeterian rents (Teece et al., 1997; Eisenhardt and Martin, 2000).

5.14.2.3 Stable market conditions

In stable market conditions, established operating capabilities largely suffice; there is limited need for dynamic capabilities (Zollo and Winter, 2002). The improvement achievement processes of organisational learning and reconfiguration are largely unnecessary, and thus, by default, dynamic capabilities are limited to the relatively static role of integration and coordination of production routines sustain current operations (Teece et al., 1997; Teece, 2003: 13). Instead of being concerned with change, dynamic capabilities will play a deployment function to "shape" and "configure" status-quo operating capabilities (Teece et al., 1997: 518; Teece, 2003).

In these conditions, the aspirations and anticipatory information in a budgeting system can redeploy the knowledge of current operating capabilities. Anticipatory information can have a high degree of specificity in terms of both inputs and outputs. The information contained in variances between anticipatory information and actual outcomes can guide relatively simple learning efforts that retain existing knowledge. Aspirational information can be extrapolated infrequently from historical system information. There is little need for top managers to involve themselves in using budgeting system processes to change strategic choices. At most, occasional variance information may require investigation of causes of unfavourable outcomes requiring remediation efforts by subordinates. Therefore, in stable conditions, the effective style of budgeting system use is diagnostic. Given that Schumpeterian rents are derived from innovation and risk-taking in uncertain environments (Schumpeter, 1950; Rumelt, 1987), diagnostic use in stable market conditions does not confer upon the firm any performance advantages.

5.14.2.4 Implications and contributions to the MCS literature

In addition to addressing the gap in the MCS literature pertaining to effective MCS for firms in hypercompetitive conditions (Chenhall, 2003), this synthesis provides three contributions to the broader MCS literature.

The first contribution is to the literature of empirical interactive controls. There has been little research concerning the antecedents, consequences and contingencies of interactive control systems. The present study found no universal effect of interactive budgeting system use on performance; the relationship is instead moderated by market competitiveness, with a very strong performance impact in hypercompetitive conditions. This finding further supports the contingent nature of successful interactive use of MCS in general (Simons, 1990, 1991 and 1994), and is very much in line with the related published survey-based literature (i.e., Abernethy and Brownell, 1999; Bisbe and Otley, 2004; Henri, 2006a and b; Widener, 2007).[35] More specifically, while budgeting systems are the 'central plank' of organisational control (Otley, 1999) and environmental uncertainty is the predominant contingency factor in MCS research (Chenhall, 2003), this study is the first to empirically validate Simons' (1991: 53 and 1995) field study observations that interactive use of budgeting systems is associated with high performance in high uncertainty conditions. Thus, the present study finds further support for the contingent nature of successful interactive use in general (Simons, 1990, 1991, 1994 and 1995), and empirically validates Simons' (1991 and 1995) specific observations of effective use of budgeting systems in higher uncertainty contexts.

The second contribution is to the literature of theoretical interactive controls. There has been very little development or enhancement of Simons' theoretical perspectives on interactive control systems use. Simons' synthesis of strategic choice themes with information processing and organisational learning theories resonates strongly with the knowledge-based view (KBV) of the firm. The KBV is a theory that draws from RBT, research into competitive dynamics, organisational capabilities and organisational learning (Grant 1996: 114; Spender, 1996; Nonaka and Teece, 2001). DCT has developed as a nexus between the RBT and KBV (Acedo,

[35] Abernethy and Brownell (1999) found only a moderated effect (strategic change) of interactive budgeting system use on firm performance. Bisbe and Otley (2004) found only a moderated effect (product innovation) of interactive MCS use (budgeting systems, balanced scorecards and project management systems) on firm performance. Henri (2006a) found no direct effects of strategy archetype or environmental uncertainty on types of PMS use. Henri (2006b) found that interactive (diagnostic) PMS use was positively (negatively) associated with organisational capabilities of market orientation, entrepreneurship, innovativeness and organisational learning. Widener (2007) found only a small effect of operational uncertainty (but not competitive uncertainty or technological uncertainty) on diagnostic PMS use, and only a small significant effect of competitive uncertainty (but not technological or operational uncertainty) on interactive PMS use (and did not test for moderating effects).

Barroso and Galan, 2006), providing a complementary perspective based on logic of action and change (Winter, 2000 and 2003; Zollo and Winter, 2002). Hence, by building upon recent developments in the strategic management literature, the synthesis with DCT contributes to the development of the theory of interactive control, facilitating a version embedded with stronger and more distinctive themes of organisational action and change.

The third contribution is to the treatment of organisational learning in the MCS literature. Whereas organisational learning is an important and sophisticated topic in the literature of strategic management and organisation studies (e.g., Prahalad and Hamel, 1990; Huber, 1991; March, 1991; Zollo and Winter, 2002), in the MCS literature it has predominantly been conceptualised in traditional terms of single loop (feedback) versus double loop (feedforward) learning (e.g., Argyris, 1977; Schendel and Hofer, 1979; Dery, 1982; Schreyogg and Steinman, 1987; Luckett and Eggleton, 1991). While some MCS studies have included newer concepts of organisational learning (e.g., Kloot, 1997; Chenhall, 2005; Henri, 2006b; Widener, 2007), Simons' (1990 and 1995) links between interactive MCS use and the orchestration of multilevel double loop learning processes remains the most sophisticated MCS organisational learning theory to date (see Section 2.2.5).

This thesis builds upon Simons' (1990) theory in two ways. Firstly, the market competitiveness matched styles of organisational learning greatly expand on the traditional binary concepts of double loop and single loop learning. The two learning styles of selection (hypercompetition) and variation (moderately competitive) expand on the concept of double loop learning, and the two learning styles of experiential (hypercompetition) and variation (moderately competitive) expand on the concept of single loop learning. These expanded concepts also facilitate refined specification of the frequency and intensity of interactive use, and thereby facilitate greater characterisation of how budgeting system interactions dynamically utilise organisational knowledge and aspirations. Secondly, building upon Simons' (1990 and 1995: 5) routine-based perspective of learning, the DCT synthesis adds two characteristics: path-dependence (i.e., being the emphasis in variation learning) and a target-orientation (i.e., where the aspirations in the anticipatory information motivate learning efforts). According to Levitt and March (1988), inclusion of these three characteristics provides a broad conceptualisation of organisational learning. Hence, in summary, this third contribution to the MCS literature is a broad conceptualisation of organisation learning attributable to interactive control systems use, related

to the role of aspirations and path-dependence in market competitiveness matched cycles and patterns of organisational learning.[36]

5.14.3 Hypothesis 2: flexibility culture and budgeting system style of use

Hypothesis 2 (a) predicted that, in moderately competitive and hypercompetitive conditions, flexibility traits of organisational culture would have a negative effect on budgeting system interaction frequency. The empirical evidence does not support this hypothesis. The findings instead show that flexibility culture has a positive effect on interactive use (including the implied interaction frequency dimension), and this effect is positively moderated by market competitiveness (and this moderating relationship also applies to stable market contexts).

Hypothesis 2 (b) predicted that, in moderately competitive and hypercompetitive conditions, flexibility traits of organisational culture would have a positive effect on budgeting system interaction intensity. The empirical evidence provides only partial support for this hypothesis. The findings instead show that, in addition to the positive effect of flexibility culture on interaction frequency (which is now conceptualised as a latent dimension of interactive use), this effect is positively moderated by market competitiveness (and this moderating relationship also applies to stable market contexts).

There are two explanations for reconciling the incorrect hypotheses with the empirical analyses. Firstly, the theoretical development was partly premised on the incorrect predictions in hypothesis 1, such that the flexibility culture linkages were firmly drawn to the style of use incorrectly hypothesised to be optimal in each market context. Consistent with the reconciling factors discussed for hypothesis 1, flexibility traits were related to the incorrect frequency of leadership involvement in strategic choices (i.e., interactive use). For hypercompetitive conditions, it was incorrectly hypothesised that high flexibility traits would enable middle managers to be responsible for extended periods of experiential learning without senior management involvement, thereby reducing the frequency of interactive use. For moderately competitive markets, lower flexibility traits were incorrectly hypothesised to require highly frequent senior management (through interactive use) in incremental learning processes.

The second explanation is that in the relationship between flexibility traits and budgeting system style of use, the moderating effect of market competitiveness was not hypothesised. The findings by Fey and Denison (2003) were a key premise in the hypotheses. However, they only

[36] As these styles are for both the development and deployment of the aspirational information, they also provide a response to the question of whether interactive use determines organisational learning or whether the relationship is recursive (Gray, 1990; Kloot, 1997).

examined the moderating effect of market competitiveness on the relationship between flexibility culture and firm performance. They did not examine any intervening variables. In the absence of other guidance from the extensive literature search undertaken, it was incorrectly assumed that the moderating effect would transplant to the transmitter of flexibility culture, i.e., to the relationship between style of use and firm performance.

In the following three sections, a re-synthesis is developed by type of market competitiveness, aligning theory with the empirical findings. Linking to the reinterpretation of the performance impacts of interactive use, a greater emphasis is placed on the information and communication processes for making strategic choices. Additionally, the moderating effect is explained by breaking down the organisational culture concept to include cultural sub-groups. A final section discusses the theoretical implications and summarises the consequent contributions.

5.14.3.1 Hypercompetitive conditions

With high flexibility values, organisational information and communication processes are embedded with a strong adaptability orientation and a strong sense of employee involvement (Trice and Beyer, 1984; Brown and Starkey, 1994; Fey and Denison, 2003). By affecting the breadth, elaborateness and thoroughness of information distribution and interpretation, high flexibility values can heighten organisational learning responses to changing circumstances (Daft and Weick, 1984; Huber, 1991; Makhija and Ganesh, 1997). The resulting information and communication processes tend to promote divergent, discontinuous strategic choices (Gagliardi, 1986; Dutton and Duncan, 1987; Pant and Lachman, 1998). Hence, flexibility values can condition the provision of information and communication processes for budgeting system use (Birnberg and Snodgrass, 1988; Henri, 2006a), thereby supporting the organisational learning processes fostered.

As shown by the empirical modelling, in hypercompetitive conditions, high levels of flexibility traits are strongly associated with highly interactive use. In these conditions, there is a universal relationship between flexibility traits and interactive use, which in turn provides optimal firm performance. Highly interactive uses require information provision and communication processes that support the framing, discussion and selection of dynamic strategic choices. This information must be provided by participants who accept the idea of risk-taking, and who are encouraged to communicate ideas for the socially complex processes of developing non-linear strategic choices. With only low or more moderate levels of flexibility traits, the information provision and communication capacity of the organisation inadequately responds to and solves problems and opportunities arising in the external market.

In hypercompetitive conditions, operating capability knowledge and market positions are less codifiable and less complete – making the acquisition and interpretation of needed information more tacit and more uncertain (Makhija and Ganesh, 1997; Turner and Makhija, 2006). For top management to be sufficiently informed, the interface between bottom-up and top-down strategic choices needs strong widespread employee involvement. With high flexibility values, the strong sense of ownership and responsibility supports the necessary questioning and challenging of assumptions and priorities. With the corresponding acceptance of trial and error learning, decentralised experiential learning quickly comes to the attention of top management. Value-laden in this way, the information enables top managers to use budgeting system interactions to decipher and select the optimal organisational experiences for recycling.

To conclude, in hypercompetitive conditions, firms need high levels of flexibility traits to support a highly interactive budgeting system. Otherwise, information and communication processes inadequately provide the "nervous system" needed for this effective second order dynamic capability (Zollo and Winter, 2002; Winter, 2000: 983). With high flexibility traits, budgeting system processes adapt to the rapid response time and change orientation needed to co-evolve effectively with the frequent, unpredictable and radical nature of market change. Thus, in these conditions, while the experiential and selection learning fostered by highly interactive use confer optimal Schumpeterian rents, in part the source of this competitive advantage comes from the VRNI resource-base of the high flexibility traits of organisational culture (Barney, 1986 and 1991).

5.14.3.2 Moderately competitive conditions

In moderately competitive conditions, the empirical analyses show that the relationship between interactive use and flexibility traits is less strong, with a positive moderating effect of market competitiveness. This is in contrast to hypercompetitive conditions, where the implied moderation effect is effectively neutralised by the high level of inherent market competition. Hence, in moderately competitive conditions, firms with high flexibility traits are able to temper the effects on the level of interactive use, such that more moderately interactive use can still be achieved. In these conditions, whilst overall firm performance is best served by a more moderate level of flexibility culture, too much of this resource does not necessarily lead to a sub-optimal, overly-interactive style of use. In other words, when it comes to budgeting system style of use, there is 'flexibility' in managing the negative effects of too much flexibility culture, such that the benefits of a more moderately interactive style of use are achievable.

This moderating effect of market competitiveness can be explained with two extra theoretical themes. Firstly, in this instance, it is useful to break-down the concept of organisational culture

into: (1) an organisational-wide cultural overlay and (2) cultural sub-groups (Gregory, 1983; Schein, 1985). Hierarchy influences the formation of cultural sub-groups, and top management teams are likely to have a sub-group culture that emphasises organisational design and control (Lorsch, 1986; Sackman, 1992). Hence, while the hypotheses correctly predicted that flexibility culture affects practically all aspects of organisational interactions including those at the top management level (Chatterjee et al., 1992), this only applies in the case of the organisational-wide cultural overlay. Given that top management is the defining feature of interactive use (Simons, 1990), the sub-culture at the top management level can profitably constrain the level of interactive use promoted by a high flexibility organisation-wide cultural overlay.

By limiting the frequency of their involvement, and by discouraging wide-scale participation and debate, top management can impose a more moderately interactive style of use, thereby tailoring to the less competitive market conditions. By acting in a manner consistent with their own cultural sub-group, top management can deemphasise the overly-expansive focus of the organisation-wide cultural overlay of high flexibility. By using a budgeting system as a frame of reference that constrains exploration efforts, top management can direct attention towards restricted aspects of the external environment (Weick, 1979), thereby successfully limiting exploitation of new possibilities and amplifying the exploitation of old certainties (March, 1991). Thus, the performance impinging values of high flexibility can be 'tuned down' by a top management focus on design and control for incremental path-dependent development, thereby successfully using a budgeting system to reduce the propensity of the wider organisation to interpret and distribute information that would otherwise promote over-learning (Huber, 1991).

At the minimum, firms in moderately competitive conditions need to possess a threshold level of flexibility culture to support the effective (i.e., more moderate) level of interactive use. The path-dependent and inertial properties of organisational culture (Barney, 1991) mean that top management has little immediate influence to amplify organisational and communication processes from a low flexibility culture baseline. As is also the case in hypercompetitive conditions, insufficiently low flexibility values will fail to provide the information flows and communication processes for effective patterns of organisational learning. In the case of optimal firm performance in moderately competitive conditions, variation learning requires leveraging existing knowledge (Eisenhardt and Martin, 2000). For more moderately interactive use, incremental reformulation of strategic choices by top management requires information from subordinates. To facilitate linear, path-dependent change, this information needs to facilitate interpretation of a detailed and complicated understanding of current operating capabilities and associated market positioning.

Without sufficient levels of flexibility culture, the involvement and commitment of frontline employees will be too weak to interpret and disseminate signals of customer and environmental change. Adversely, ideas and information for linear, analytical development of operating capabilities will not be disseminated upwards, such that the interface between top-down and bottom-up strategic choices will be under-informed. On the other hand, left unrestrained, flexibility culture that is too high will overwhelm interactions, and fail to discourage the generation of overly divergent ideas that divert from path-dependent development. Thus, more moderate flexibility is more likely to support a more moderately interactive style of use.

In summary, in moderately competitive conditions, acting in a manner consistent with their own sub-cultural group, top management can profitably limit their involvement in a budgeting system, such that, in comparison to hypercompetitive conditions, there is a weaker relationship between flexibility culture and interactive use. With threshold levels of flexibility traits, a moderately interactive style of use is supported, enabling budgeting system processes to provide the path dependent change orientation needed to co-evolve effectively with the frequent, incremental and relatively predictable market change. Without sufficient flexibility culture, information flows and communication processes fail to provide the "nervous system" needed for this effective second order dynamic capability (Winter, 2000: 983; Zollo and Winter, 2002). Thus, in these conditions, while the variation learning fostered by a moderately interactive use confers optimal Schumpeterian rents, in part, the source of this competitive advantage comes from a VRNI resource-base of moderate to high levels of flexibility traits of organisational culture (Barney, 1986 and 1991).

5.14.3.3 Stable market conditions

In stable market conditions, the empirical analyses show that flexibility culture is a moderate driver of interactive use. This relationship can be explained by extending the rationale provided for moderately competitive conditions. Hence, in stable market conditions, top management, acting in a manner consistent with their own sub-cultural group, can 'tone down' the effects of high flexibility traits, such that diagnostic use is achievable. While firm performance does not have a significant relationship with flexibility culture, too much of this resource does not necessarily lead to a sub-optimal interactive style of use. Schumpeterian rents are not conferred from diagnostic use in stable market conditions because there is no risk-taking or innovation. Therefore, low flexibility culture evidently does not provide a VRNI resource-base for budgeting systems style of use in stable market conditions.

5.14.3.4 Implications and contributions to the MCS literature

This section discusses three contributions to the MCS literature made by the empirically supported synthesis of the relationships between flexibility culture, interactive budgeting system use, market competitiveness and firm performance.

The first is a resource-based explanation of a critical source of the competitive advantage from an effective interactive budgeting system capability. To reiterate, flexibility culture can be a VRNI resource (Barney, 1986 and 1991) because: (1) it is 'valuable' (in fostering Schumpeterian rents) when it supports the market-matched style of organisational learning; (2) it is 'rare' because of path-dependencies based on unique personalities and history; (3) it is 'non-substitutable' and (4) it is largely 'inimitable' because systematic efforts to socially engineer a flexibility culture are most likely beyond the capabilities of most firms (Barney, 1986 and 1991: 107). As supported by the empirical modelling, not all firms are endowed with a flexibility culture supportive of an effective interactive budgeting system capability. The flexibility culture resource-base provides an isolating mechanism that is a barrier to imitation or adoption (Rumelt, 1984; Teece et al., 1997), conferring sustainability to the competitive advantage from effective interactive use.

In contrast, no prior study has sought to explain the very important issue of why some firms fail to adopt an optimal level of interactive use. If firms were unilaterally capable of adopting an optimal level of interactive use, there would be no relationships between interactive use and competitive advantage differences between firms. Simons' diagrams (1991: 50 and 1995: 93) imply that firms should have strong relationships between their strategic uncertainties and interactive control systems use. However, in the present study the path coefficient from market competitiveness to budgeting style of use was inconsequential ($b = 0.05$, $p > 0.10$). All other empirical survey-based studies also provide very little support of any direct relationships between interactive control and various 'strategic uncertainties' (Abernethy and Brownell, 1999; Bisbe and Otley, 2004; Henri, 2006a; Widener, 2007).[37] Thus, there is very little evidence that firms generally adopt a level of interactive use that associates with strategic

[37] Abernethy and Brownell (1999) found only a small correlation of 0.30 ($p < 0.05$) between budgeting system use and strategic change. Bisbe and Otley (2004) proposed that interactive use (of budgeting systems, balanced scorecards or project management systems) would foster innovation, but found no such relationship. Henri (2006a) found no direct effects of strategy or environmental uncertainty on styles of PMS use. Widener (2007) found only a small significant effect of operational uncertainty (but not competitive uncertainty or technological uncertainty) on diagnostic PMS use, and only a small significant effect of competitive uncertainty (but not technological or operational uncertainty) on interactive PMS use. Notably, this analysis assumes no material impacts from equifinality, i.e, multiple structural mechanisms or paths may produce the same organisational outcome (Galunic and Eisenhardt, 1994), or other interdependencies or complementarities or substitutability effects with other organisational control mechanisms.

uncertainties. Given the evidence of higher firm performance from the interaction effects of interactive use and some of these variables, this highlights an important need to explain this adoption heterogeneity. A VRNI flexibility culture provides one explanation, which in the case of budgeting systems is a very powerful one.

Whilst other MCS studies have drawn upon resource-based insights, the present study remains the first to apply RBT explanatory logic to explicate an MCS capability that conveys competitive advantage. A number of MCS studies have to varying degrees referenced RBT. Two case studies discussed concepts from RBT and DCT in interpreting field study observations of new MCS (i.e., Coad and Cullen, 2006; Wouters and Wilderon, 2008).[38] Unfortunately, two studies have incorrectly applied RBT logic, wrongly interpreting its fundamental tenets (i.e., Widener and Selto, 1999; Widener, 2006b).[39] Three studies have drawn upon RBT references to identify phenomena that ought to be linked to MCS (Widener, 2004 and 2006a; Henri, 2006b) without using the theory itself to provide explanation for the linkages.[40] Thus, in summary, the synthesis is the first to explicate a MCS capability that confers competitive advantage in terms of the basic tenets of RBT (and DCT) framework (Acedo, Barroso and Galan, 2006; Newbert, 2007).

The second contribution is to the quantitative MCS-organisational culture literature, which is at an early stage of development (Bhimani, 2003; Chenhall, 2003; Norris and O'Dwyer, 2004; Henri, 2006a). The quantitative analyses provide two insights. The first insight is via comparison to Henri's (2006a) study, which found only small effect sizes between flexibility culture and 'interactive styles' of use of PMS.[41] The much stronger effects between flexibility

[38] Coad and Cullen (2006) refer to detailed summaries of RBT and DCT for interpreting 'evolutionary' changes in costing systems in two case study firms. Wouters and Wilderom (2008) drew upon concepts of learning from the dynamic capabilities literature (i.e., Zollo and Winter, 2002) to study the development process of a PMS.

[39] As was footnoted in Chapter1, Widener and Selto (1999) draw upon RBT to discuss whether internal audit departments that are not a source of competitive advantage should be outsourced. This is inconsistent with RBT logic (e.g., Barney, 1991; Barney, 2001). Many critical aspects of firms are not a source of competitive advantage but are required to stay 'in the game' (e.g., Teece, 2008). Widener (2006b) incorrectly implies that PMS confer (i.e., mediate) some of the firm performance impact of strategic resources (human capital, structural capital and physical capital). However, RBT logic instead argues that resources can be deployed for value creation by capabilities. Unlike organisational culture, none of the resources in Widener's study can be used by a PM system or process.

[40] Widener (2004 and 2006a) selected human capital as a research variable because of its significance to RBT, but did not draw upon RBT logic to articulate the relationships with MCS. Henri (2006b) linked PMS interactive and diagnostic use (and dynamic tension between the two) to four general purpose dynamic capabilities (i.e., market orientation, entrepreneurship, innovativeness and organisational learning).

[41] As reported in Table 5.45, the present thesis found a moderately-strong effect ($b = 0.59$, $p < 0.01$) of flexibility culture on interactive budgeting system use for the total sample. As reported in Table 5.43, by sub-group the effects were: medium in stable market conditions ($b = 0.45$, $p < 0.01$); moderately-strong

culture and budgeting systems style of use in the present study suggest a much stronger impact on budgeting systems than PMS, presumably due to the broad and detailed range of information in budgeting systems and their 'central plank' status in organisational control (Simons, 1991: 53, 1995; Otley, 1999).[42] A second empirical insight is based on the unforeseen moderating effect of market competitiveness on the impact of flexibility culture on interactive use of budgeting systems. Notwithstanding that budgeting system style of use has only a very small mediation effect between flexibility culture and firm performance, this moderating effect suggests that top management can use a budgeting system to partially overcome the adverse effects of too much flexibility culture in moderately competitive and stable conditions. A stream of case studies has shown that MCS can be used over the long term to help manage organisational culture change (Dent, 1991; Chenhall and Euske, 2007), to which the present thesis adds the novel insight that top managers can use a budgeting system to manage and partially mitigate short term organisational problems resulting from too much flexibility culture.

The third contribution is to theory. Ahrens and Chapman (2004: 298) have called for research that helps "resolve the traditional dichotomy between mechanistic controls aimed at efficiency and organic controls aimed at flexibility". Most theoretical discussions have echoed Ouchi's (1979) uncertainty dependent dichotomy between (diagnostic) formal and informal controls. As noted by Chenhall (2003: 131), the interactive style of use has an embedded informal control theme of flexible communication, and, additionally, it has been shown that a budgeting system can be successful in highly uncertain conditions when accompanied by informal flexible communication processes (Chenhall and Morris, 1995; Chapman, 1998). However, given that Simons (1994: 170) explicitly excluded "culture" from his model, there has been a gap in the literature that this study has contributed to closing. By adding to Henri's (2006a) flexibility operationalisation of organisational culture, the present thesis contributes a systematic theoretical blending of a key formal control system (i.e., budgeting) and an important informal control mechanism (i.e., flexibility traits of organisational culture).

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in moderately competitive conditions (b = 0.60, p < 0.01) and; very strong in hypercompetitive conditions (b = 0.82, p < 0.01). In contrast, Henri (2006a) found only small effects, between control/flexibility culture and characteristics synonymous to 'interactive use' of PMS, namely: attention focussing (b = 0.13, p < 0.01); strategic decision-making (b = 0.18, p < 0.01) and legitimisation (b = 0.10, p < 0.05).

[42] It should be noted that comparison between the present study and Henri (2006a) is somewhat limited by two factors. Firstly, the studies used different estimation procedures: Henri used covariance-based SEM, which Chin (1998) shows produces smaller path estimates than PLS. Secondly, the studies use different construct operationalisations for flexibility culture, as discussed in Chapters 2 and 4.

5.15 Chapter conclusion

This chapter developed and assessed PLS models to test the theoretical model. An exhaustive series of procedures was undertaken. The main approach to test the hypothesised relationships used sub-group models, and this was corroborated and complemented by a series of exploratory supplementary tests. Only partial support for the hypotheses was found. The theoretical arguments developed in Chapter Three were reinterpreted in light of the findings. Implications and contributions to the MCS literature were discussed.

6.0 CHAPTER SIX – SUMMARY AND CONCLUSION

6.1 Introduction

This chapter summarises and concludes this research study. There are five sections. The first section summarises the research questions, hypotheses, research method and findings. The second section summarises the contributions the study makes to the literature. The third section discusses limitations of the study. The fourth section suggests some possibilities for future research prompted by the present study, and the fifth section outlines some implications for managerial practice. The sixth section contains concluding comments.

6.2 Summary of the research study and findings

6.2.1 Overview of the research questions, hypotheses and research method

Despite the increasing occurrence of hypercompetition (Wiggins and Ruefli, 2005), such conditions of intensive and unpredictable change had not been studied as a contingency factor for the effective design and use of MCS (Chenhall, 2003). To address this gap, a key formal control system and a key informal control system were researched. Budgeting systems are typically 'the central plank' of organisational control (Otley, 1999), and in hypercompetitive conditions successful firms need an organisational culture that emphasises flexibility (Volberda, 1996; Fey and Denison, 2003). Two research questions and associated hypotheses structured the research study to examine these two control mechanisms and firm performance.

The first research question asked 'what is the effective style of budgeting system use under hypercompetitive conditions?' The style of use construct was based on Simons' (1990) diagnostic-interactive continuum. In contrast to the conventional perspective in which diagnostic budgeting systems (i.e., management by exception) are inappropriate in high uncertainty conditions (Chapman, 1997), highly interactive budgeting systems have ongoing top management involvement for dynamic strategy reformulation (Simons, 1990 and 1995). Simons (1990 and 1995) observed that, in stable conditions, high performing firms used budgeting systems diagnostically, while in high uncertainty conditions, high performing firms used budgeting systems interactively. The greater intensity and unpredictability of change encountered in hypercompetitive settings make them significantly different to such high uncertainty conditions (D'Aveni, 1994; Volberda, 1996; Eisenhardt and Martin, 2000), and hence the effectiveness of a highly interactive budgeting system in hypercompetitive settings was deemed questionable. To explore this first research question, hypothesis 1 applied logic from the theory of dynamic capabilities to predict different budgeting system style of use

between hypercompetitive and moderately competitive (i.e., high uncertainty) settings. Budgeting system style of use was predicted to be an asymmetrical dual construct. The two dimensions were (1) interaction frequency, predicted to be negatively moderated by market competition and (2) interaction intensity, predicted to be positively moderated by market competition.

The second research question asked 'what is the role of flexibility values of organisational culture in the relationship between budgeting system style of use and firm performance in hypercompetitive conditions?' Conventional theoretical arguments in the MCS literature have adopted Ouchi's (1979) formal-informal dichotomy, whereby organisational culture is expected to replace reliance on formal control systems in high uncertainty conditions. This perspective has two serious shortcomings particularly pertinent for hypercompetitive conditions: it is premised solely on a diagnostic control system style of use and it does not operationalise flexibility values of organisational culture.

Moving on from this conventional perspective, while Simons (1994) explicitly excluded organisational culture from the diagnostic-interactive concepts, the interactive style of use has an embedded informal control theme of informal communications (Chenhall, 2003). More recently, Henri (2006a) theoretically and empirically linked flexibility culture as antecedent to interactive use of performance measurement systems. Building on this perspective, hypothesis two was premised on a positive moderating effect of market competition on the relationship between flexibility culture and firm performance (Volberda, 1996; Fey and Denision, 2003). This effect was linked to the budgeting systems style of use relationships predicted in hypothesis one. From the perspective of dynamic capabilities, a strategically appropriate flexibility culture provides a valuable, rare, non-substitutable and inimitable resource-base (Barney, 1986 and 1991), providing an effective budgeting system capability with an isolating mechanism that confers competitive advantage.

The research design used a cross-sectional survey administered in mail and web-based formats. Dillman's (2000) total design method was followed. Measurement scales for the budgeting system style of use construct were developed, and scales were adapted and justified for market competitiveness, flexibility culture and firm performance. A stratified sampling approach was employed using subject matter experts to help identify firms likely to self-report as being of the hypercompetitive type. Pre-testing and pilot testing procedures were used. The survey yielded a 31.1% response rate. After removing firms that did not meet the sampling controls criteria, a useable sample of 331 firms remained: 32 from hypercompetitive environments, 259 from moderately competitive environments and 40 from stable environments. Non-response bias

testing showed that the respondents do not materially differ from the non-respondent population.

PLS structural equation modelling was used to test the theoretical model. An exhaustive series of procedures was undertaken. The main approach used sub-group models, and this was corroborated and complemented by a series of exploratory supplementary tests. For quality purposes sampling controls were applied. Tests were performed to ensure that conclusions were not distorted by the effects of firm size on the style of use construct. Only partial support for the hypotheses was found. In particular, the asymmetrical dual construct conceptualisation of budgeting system style of use construct was not supported, instead affirming the latent conceptualisation of interactive control from the extant literature.

The remainder of this section discusses the three main sets of findings from this study: (1) the meaning of interactive control; (2) market competition, interactive budgeting systems and firm performance; and (3) flexibility culture, market competition and interactive budgeting systems.

6.2.2 Findings: the meaning of interactive control

Extensive analyses of the epistemology of the budgeting systems style of use construct did not support the hypothesised dual construct model. Instead of the predicted asymmetrical relations between the interaction frequency and interaction intensity constructs, a four dimensional latent-reflective structure was found to be uniform across the entire sphere of market competitiveness. Hence, this construct operationalises a continuum between a diagnostic and interactive style of budgeting system use. In terms of the meaning of interactive control, this latent multi-dimensional model preserves Simons' (1991) view that top manager involvement is the defining feature of interactive control. The interactive control 'construct' is the degree of involvement of top management in the control system. A change in the construct results in an equivalent change in each of the dimensions. This validation of the extant conceptualisation of interactive control was needed to strengthen its agreed-upon meaning, making it less exploratory (Bisbe et al., 2007).

6.2.3 Findings: market competition, budgeting systems and firm performance

For the hypercompetitive segment a moderately-strong relationship between interactive use and firm performance was found. For the moderately competitive segment, the relationship was more moderate. For the stable segment, the relationship was very weak and not significant. In summary, market competition was found to positively moderate the effect of interactive

budgeting system use on firm performance. In the remainder of this section this finding is interpreted for each segment of market competitiveness using dynamic capabilities theory.

In hypercompetitive conditions a highly interactive budgeting system provides an effective second order dynamic capability. In these conditions effective organisational learning mechanisms foster experiential learning, by providing general guidance and defining priorities that "keep managers focused on broadly important issues without locking them into specific behaviours" (Eisenhardt and Martin, 2000: 1111). With a highly interactive style of use, frequent, unpredicted strategic issues that arise from experiential learning can quickly come to the attention of senior management and rapidly feed into selection learning processes for strategic choices. Within interactions, intensive discussion ensures interpretations are sufficiently informed to evolve and deploy aspirations and strategic choices, as well as to ensure that top management vision provides the essential entrepreneurial factor of integrative knowledge. This highly dynamic recycling of experiential learning into selection learning fosters effective coevolution of operating capabilities with the unpredictable and discontinuous nature of market change. In hypercompetitive conditions, this pattern of learning fostered by a budgeting system capability confers competitive advantage in the form of Schumpeterian rents (Teece et al., 1997; Eisenhardt and Martin, 2000).

In moderately competitive conditions, a more moderately interactive style of use provides an effective second order dynamic capability to match the frequent, incremental and relatively predictable market change. In these conditions effective organisational learning mechanisms foster variation learning, by producing linear path dependent change that emphasises the re-use of existing knowledge (Eisenhardt and Martin, 2000). Top management involvement in budgeting system processes can be limited to occasional incremental reformulation of existing strategic choices, requiring mild challenge and debate to ensure that a detailed and complicated understanding provides the basis for linear re-working of existing knowledge. The relatively stable strategic choice framework provided by the anticipatory information promotes search processes in the "neighbourhood of existing knowledge" that lead to outcomes that do not "fundamentally depart from the current knowledge" (Helfat and Raubitschek, 2000; 967). In moderately competitive conditions, this pattern of learning fostered by a budgeting system capability confers competitive advantage in the form of Schumpeterian rents (Teece et al., 1997; Eisenhardt and Martin, 2000).

In stable market conditions, the effective style of budgeting system use is diagnostic. In these conditions, processes of organisational learning and reconfiguration are largely unnecessary, and (second order) dynamic capabilities play a deployment function to "shape" and "configure"

status-quo operating capabilities (Teece et al., 1997; Zollo and Winter, 2002; Teece, 2003). Anticipatory information can have a high degree of specificity in terms of both inputs and outputs to redeploy the knowledge of current operating capabilities. Variances between anticipatory information and actual outcomes can guide relatively simple learning efforts that retain existing knowledge and aspirational information can be extrapolated infrequently from historical system information. Given that Schumpeterian rents are derived from innovation and risk-taking in uncertain environments (Schumpeter, 1950; Rumelt, 1987), diagnostic use in stable market conditions does not confer competitive advantage.

6.2.4 Findings: flexibility culture, market competition and budgeting systems

For the hypercompetitive segment a very strong relationship between flexibility culture and interactive use was found. For the moderately competitive segment, the relationship was moderately-strong. In the stable segment, the relationship was moderate. To summarise, it was found that: (1) market competition positively moderates the effect of flexibility culture on interactive budgeting systems; and (2) flexibility culture is an important antecedent of interactive budgeting systems. These findings are explained in this section for each segment of market competitiveness. Additionally, a small partial mediation effect and the direct effect of flexibility culture on firm performance are discussed.

In hypercompetitive conditions, firms need high levels of flexibility traits to support a highly interactive budgeting system. High flexibility values embed organisational information and communication processes with a strong adaptability orientation and strong employee involvement (Trice and Beyer, 1984; Brown and Starkey, 1994; Fey and Denison, 2003). These qualities are important for the interface between bottom-up and top-down strategic choices. They support intensive debate of assumptions and priorities so that top management can frequently come to terms with decentralised learning experiences. High flexibility values thus promote a highly interactive style of use supportive of organisational learning processes that promote divergent, discontinuous strategic choices (Gagliardi, 1986; Dutton and Duncan, 1987; Pant and Lachman, 1998). Without high flexibility values, information systems and communication processes inadequately provide the “nervous system” needed for such an effective second order dynamic capability (Winter, 2000; Zollo and Winter, 2002). Thus, in these conditions, while the experiential and selection learning fostered by highly interactive use confer optimal Schumpeterian rents, in part the source of this competitive advantage comes from the VRNI resource-base of the high flexibility traits of organisational culture (Barney, 1986 and 1991).

In moderately competitive conditions the relationship between flexibility culture and interactive budgeting system use is less strong. Acting mostly from their cultural sub-group values of design and control (Lorsch, 1986; Sackman, 1992), top management can over-ride the effects of an organisational-wide cultural overlay of too much flexibility (Gregory, 1983; Schein, 1985), thereby limiting the frequency of their budgeting system involvement and discouraging wide-scale participation and debate. Top management can deemphasise an overly-expansive focus of high flexibility and instead impose a more moderately interactive style of use, thereby tailoring to the less competitive market conditions. On the other hand, without sufficient levels of flexibility culture, the involvement and commitment of frontline employees will be too weak to interpret and disseminate signals of customer and environmental change, such that the interface between top-down and bottom-up strategic choices will be under-informed. Given threshold levels of flexibility traits, a moderately interactive style of use is supported, enabling budgeting system processes to foster variation learning and confer optimal Schumpeterian rents. In part, the source of this competitive advantage comes from a VRNI resource-base of moderate to high levels of flexibility traits of organisational culture (Barney, 1986 and 1991). Thus, in these conditions, while overall firm performance is best served by a more moderate level of flexibility culture, too much of this resource does not necessarily lead to a sub-optimal, overly-interactive style of use.

In stable market conditions flexibility culture is a moderate driver of interactive use. In these conditions, acting in a manner consistent with a sub-cultural group that values design and control, top management can 'tone down' the effects of high flexibility traits to enforce a diagnostic style of use. Hence, while firm performance does not have a significant relationship with flexibility culture, too much of this resource does not necessarily lead to a sub-optimal interactive style of use. Schumpeterian rents are not conferred from diagnostic use in stable market conditions because there is no risk-taking or innovation. Therefore, low flexibility culture does not provide a VRNI resource-base for budgeting systems style of use in these conditions.

The supplementary analyses highlighted two other issues with flexibility culture. Firstly, there was a small partial mediation effect of interactive use on the relationship between flexibility culture and firm performance, meaning that the vast majority of the firm performance effects of flexibility culture remain unaccounted for by this research. Secondly, flexibility culture had a direct effect on firm performance, and this relationship was also moderated by market competitiveness. With this direct effect included in the PLS model, there was very little variance in the interactive budgeting system construct to contribute to the prediction of firm performance. Thus, consistent with the above explanations in this section, whatever firm

performance variance can be explained by interactive budgeting systems use is better explained by flexibility culture.

6.3 Summary of contributions

Primarily, this thesis responds to the gap in the literature to study effective MCS for hypercompetitive conditions (Chenhall, 2003). It makes this contribution by examining an important organisational control package comprising the central formal control system of budgeting with an important informal control mechanism of flexibility culture (Volberda, 1998; Otley, 1999). A number of additional supplementary contributions were made. Firstly, compared to prior survey studies of interactive control, the present thesis contributes comprehensive measurement scales with superior construct validity (Bisbe et al., 2007). Secondly, this study provides support for the contingent nature of successful interactive use in general (Simons, 1990, 1991, 1994 and 1995) and empirically validates Simons' (1991 and 1995) observations for effective interactive budgeting systems under uncertain conditions. Thirdly, this study provides a DCT infused version of interactive control processes, responding to appeals for a more action-oriented view of MCS (Dent, 1990; Chenhall, 2003; Bhimani and Langfield-Smith, 2007), and also contributing to the MCS literature a broad and expanded conceptualisation of organisation learning. The perspective provided is also the first to explicate a MCS capability that confers competitive advantage in resource-based terms. Fourthly, to the under-researched MCS and organisational culture contingency literature (Chenhall, 2003), this thesis contributes a flexibility culture operationalisation that reveals the great importance of flexibility culture to the interactive use of budgeting, and also contributes a perspective that helps "resolve the traditional dichotomy between mechanistic controls aimed at efficiency and organic controls aimed at flexibility" (Ahrens and Chapman, 2004: 298). Lastly, this thesis also contributes to the DCT literature by providing a specific example of a second order dynamic capability, and by shedding light on how a VRNI resource-base of flexibility culture can underlay effective second order dynamic capabilities.

6.4 Limitations of the study

This section identifies and discusses six pertinent limitations of this study.

Firstly, the data are self-reported assessments by managers. Although significant steps were taken in the design and testing phases to limit concerns regarding single-informant data, issues of common method bias and key informant bias cannot be completely ruled out. However, strong measurement model reliability and validity, combined with the confidentially that was assured to respondents, reduce concerns that responses may have been artificially inflated or

disguised. Additionally, Harman's one factor analysis provided evidence against the presence of one common factor. Common method bias would have produced consistent effects between the variables, but instead it was demonstrated that all effects were moderated by market competitiveness.

Secondly, the survey research was conducted solely in Australia and spanned many industries. Even though a minimum firm size (i.e., $20 million AUD and 150 employees) was enforced, a wide range of firm sizes was included. This broad focus was necessitated by the scarcity of firms operating in hypercompetitive conditions, but also helped generalise the findings. Empirical studies in a limited number of industries would help identify more specific corporate and industry differences. Even if this were difficult for hypercompetitive conditions, further confirmation in moderately competitive and market conditions would be particularly useful in validating the findings. Additionally, sourcing data from outside of Australia would help further validate the generality of the findings.

Thirdly, although the measurement scales were largely sourced or adapted from prior literature, the study results are to some degree exploratory. In particular, the operationalisation of market competitiveness was newly adapted to enable the identification and isolation of firms in hypercompetitive conditions. To the knowledge of the author, no prior study has measured hypercompetition via a survey. The measures used in this study were carefully developed and relied on existing literature to the greatest extent possible. The two change dimensions (i.e., intensity and unpredictability) and the three sectors (i.e., market, competitor and technology) were all supported by an extensive review of the PEU and hypercompetition literatures. The scoring system and cut-off points were adapted from Eisenhardt and Martin (2000) and Volberda (1996). The operationalisation stood up to numerous sensitivity tests that included other change dimensions (i.e., complexity and frequency). Nonetheless, the measures have not been empirically verified by a prior study and the possibility remains that they do not truly gauge the salient characteristics of hypercompetition, e.g., "ambiguous industry structure, blurred boundaries, fluid business models, ambiguous and shifting players, nonlinear and unpredictable change" (Eisenhardt and Martin, 2000: 1115).

A fourth limitation is the small sample sizes of the stable segment (i.e., n = 40) and the hypercompetitive segment (i.e., n = 32). This issue is twofold. Firstly, even though a strength of the PLS method is the small sample size required (Chin, 1997), the stable segment had a very low R^2 (0.02) which suggests that a sample size of 400 would be required to produce a significant path estimate (Chin, 1998; Green 1991). As was noted in Chapter Five, for the purposes at hand, it was assumed that the path estimate provided with the small sample is

correct, thus facilitating the generalisation of moderating effects across the whole spectrum of market competitiveness. The strong segment results meant that this was not an issue in the hypercompetition segment. A second issue concerns the ability to draw valid inferences from the small sample size of these two segments. This issue is less pertinent for the hypercompetition segment, given that the target sample selection strategy heavily emphasised a very broad range of firms likely to self report as operating under hypercompetitive conditions.

A fifth limitation is the cross-sectional data employed in the study. Although unlikely, while the empirical analyses support the theoretical development, it is possible that firm performance is an antecedent variable rather than the converse. Although the results are substantiated with theory and by many supporting studies in the extant literature, further longitudinal research could empirically establish causality. A difficulty with a longitudinal study is the problem of causal lag, whereby the firm performance benefits of exploration through flexibility culture and interactive budgeting systems might not happen for several years.

A sixth limitation is the operationalisation of organisational culture. There are three issues. The first issue concerns the breadth of operationalisation. This study only included flexibility traits of organisational culture. There are numerous other dimensions of organisational culture that exist simultaneously in organisations, e.g., strength (Fey and Denison, 2003). Given that survey studies must balance the trade-off between enhancement of response rates and collection of desirable supplementary data, in this study the survey was kept to a single A3 page in an attempt to maximise responses from the time-poor respondents in the small target population of hypercompetitive firms, which restricted the ability to collect additional supplementary data. Even though flexibility is but one measurable dimension of organisational culture, in this case it was chosen due to its demonstrated importance in hypercompetitive conditions (Volberda, 1996; Fey and Denison, 2003). Further to this issue, while flexibility culture is but one organisational cultural overlay, organisations also comprise multiple sub-cultural groups.

A second issue with organisational culture in this study concerns the basis of measurement. Flexibility culture was measured using the scales from the Denison Organizational Culture Survey, which has been progressively developed by Denison and colleagues (Denison, 1984, 1990 and 1996; Denison and Mishra, 1995; Denison and Neale, 1996), widely published in management journals and validated in numerous instances and settings. However, the measurement is based on traits, which are merely summary characteristics of an organisation's culture and the processes by which culture may impact on competitive advantage (Denison and Mishra, 1995). The measures do not cover other components of organisational culture, such as symbols and beliefs (Barney, 1986). The third issue with organisational culture concerns its

measurability. Even though this study used conventional test procedures to display satisfactory reliability and validity, organisational culture is a complex concept that may not be greatly ameliorable to survey-based operationalisation.

6.5 Possibilities for future research

This section suggests some areas for future research that can extend or complement the current study. Five main possibilities are discussed.

Firstly, future studies could examine other control mechanisms for hypercompetitive conditions. In most complex organisations, an overall control package comprises multiple interdependent control systems (Otley, 1980 and 1999). As with the current study, cross-sectional survey studies can effectively utilise the small sample size functionality of PLS. Care must be taken to separate out the hypercompetitive segment from the total sample in order to avoid under-weighting effects such as those experienced in the current study. Ideally, a large sample of hypercompetitive firms could be procured, possibly from multiple countries, such that a large number of constructs could be modelled simultaneously. Alternatively, a small number of constructs that are complementary to budgeting systems style of use and flexibility culture could be examined.

Future research needs to carefully consider the relationship between PLS sample size requirements and the strength of relationships – the small sample size of the hypercompetitive segment (i.e., n = 32) in the current study was successfully estimated because the relationships between the constructs were all reasonably strong. One suggestion is to study the style of use of program management systems, which have been identified as useful for the transformation of operating capabilities (Simons, 1991 and 1995). Such a study could use dynamic capabilities theory, and respond in part to the gap in the literature to investigate effective MCS for various types of change, including incremental versus discontinuous change, and evolutionary versus revolutionary change (Chenhall, 2003 and 2008). As an alternative to cross-sectional survey studies, similar to the methods used by Simons (1990) and Chapman (1998), case studies could usefully study multiple firms in hypercompetitive conditions and compare MCS elements in the context of firm performance differentials.

Secondly, future research could apply the flexibility and small sample size requirements of PLS to examine the interdependencies among a broad range of formal and informal control systems. While this may not be practical for studying hypercompetitive conditions due to sample size issues, for stable and moderately competitive conditions this technique has great promise. The MCS literature has lagged behind other disciplines (e.g., psychology, marketing and strategic

management) in the adoption of advanced statistical procedures. The SEM approach used by Widener (2007) to examine Simons' (1995) 'levers of control' model could be extended to include multiple MCS and prominent contingency factors such as PEU and business strategy. The 'levers of control' model presents the strongest attempt thus far of a comprehensive theory of MCS (Ahrens and Chapman, 2004; Bruining et al., 2004) and there remains significant scope for empirical exploration. For example, the concepts of beliefs and boundary systems remain very general (Ahrens and Chapman, 2004), and the interplay between numerous styles of use of MCS remain largely unknown. Beliefs and boundary systems might have great potential to systematically manage organisational culture change. The inertia qualities of organisational culture are worthy of significant research attention (Sorensen, 2002).

Thirdly, future research could seek a multi-faceted view of organisational culture and MCS. For example, it would be interesting to explore multiple organisational cultural issues, such as sub-culture effects on MCS (Ahrens and Mollona, 2007), or the differential effects between core and peripheral values (Pant and Lachman, 1998), or other dimensions of organisational culture such as strength, i.e., values of consistency, coordination and integration (Fey and Denison, 2003). Future research might usefully investigate top manager leadership style and top management sub-culture as a useful way to gain further insights into interactive control.

Fourthly, another area of opportunity is the use of finite mixture (FIMIX) PLS (Hahn et al., 2002; SmartPLS 2.0[43]). This technique is gaining popularity in the marketing discipline as a means to segment data ex post. Future studies could collect data for a broad range of control mechanisms, antecedents, consequences, contextual factors, and descriptive variables and use FIMIX PLS to explore relationships and segmentation for unobserved heterogeneity. This approach, using a battery of variables (e.g., Desarbo et al., 2005) could usefully assist in developing management control archetypes.[44]

Fifthly, qualitative methodologies would be particularly useful in understanding how different sub-cultures within a firm impact the styles of use of MCS. This could take an approach similar to Bhimani (2003) albeit with a multi-cultural perspective. It would be very interesting to get a systemic understanding within a large complex organisation by involving representative employees from all sub-cultures. Many studies have examined how MCS can affect culture

[43] Authors: Ringle, Christian Marc/Wende, Sven/Will, Alexander. Title: SmartPLS. Release: 2.0 (beta). Internet: http://www.smartpls.de Organisation: University of Hamburg. City: Hamburg, Germany. Year: 2005.

[44] Notably, although not reported, as part of the current study some FIMIX PLS analyses were performed. The procedure segmented the dataset in a manner that was not meaningful to the current study and could not be interpreted because there was little supplementary data for interpreting the basis of the segments.

change over long periods of time (for a review see Chenhall and Euske, 2007) and it would be interesting to observe a firm as it goes through a variety of levels of market competition, with systematic efforts to change organisational culture, and adjustments to interactive MCS use.

6.6 Implications for managerial practice

This study has important implications for practice. Senior managers need to be knowledgeable about the level and changeability of market competitiveness faced by their firm. Most organisational environments have long periods of moderate competitiveness, punctuated with periods of hypercompetition (Sorensen, 2002). At the same time, hypercompetition is becoming more prominent in more industries (Wiggins and Ruefli, 2005). The 2008 global financial crisis will trigger changes in many industries. For example many parts of the finance sector experienced discontinuous and unpredicted changes at the onset of the crisis. Ongoing globalisation forces are likely to continue to drive hypercompetitive shifts through many industries (D'Aveni, 1994). Given the associated difficulties and anxieties, managerial practice can benefit greatly from the insights and findings from the present study.

The implications for the interactive use of budgeting system are reasonably straightforward. Senior managers need to match their level of involvement in budgeting system processes with the level of market competitiveness they face. Greater levels of market competitiveness need greater top management involvement, in terms of: (1) the frequency of senior management interactions with other senior managers; (2) the frequency of interactions between senior and middle management; (3) the degree of challenge and debate in the interactions; and (4) the degree of strategic content in the interactions.

There are a number of surrounding issues worth considering. Firstly, in addition to a sub-culture at the senior management level with appropriate design and control values, senior management need knowledge of 'best practice' budgeting system style of use. The existence of 'best practice' processes can be a source of competitive advantage because diffusion of an innovation can take many years (Teece, 2007). The deployment of 'best practice' may require cognitive skills and organising abilities that are to some extent innate (Castanias and Helfat, 1991 and 2001). Secondly, some firms may have a top manager who might be under-involved in budgeting processes, in which case another senior manager (e.g., chief financial officer) may help balance the interactive controls process by exercising an ongoing leadership function. On the other hand, over-involvement may not carry overly-detrimental performance effects, as evidenced by the low R^2 in the moderately competitive segment (0.11) and in the stable segment (0.02).

In comparison, the implications for managers of optimising an organisation's cultural values of flexibility are less straightforward. Practitioners can understand concepts of flexibility culture (Barley, Meyer and Gash, 1988) and have most likely encountered basic prescriptions to be more flexible and innovative (e.g., Lorsch, 1986). This study notes that those calls ignore the contingency effects of market competitiveness, i.e., too much flexibility culture in conditions of less market competitiveness is detrimental to firm performance. Bearing in mind the need for flexibility values to support the organisational level processing of information needed for interactive use, a firm will fit into one of the following three scenarios. Firstly, the level of flexibility culture is too low for the level of market competitiveness, in which case firm performance in general will be sub-optimal and sufficiently high interactive use unattainable. Secondly, the level of flexibility culture is effective for the level of market competitiveness, in which case firm performance in general will be optimal and as will the level of interactive use. Thirdly, the level of flexibility culture is too high for the level of market competitiveness, in which case firm performance in general will be sub-optimal even if senior management effectively adopt an effective level of interactive use.

Managerial prescriptions are complicated by two factors, the first of which is the problem of changing conditions of market competitiveness over the longer term. The second complicating factor is the extent to which organisational cultures have inertia properties that beget managerial culture change efforts. For firms in scenarios one and three these factors apply in both the short and long term, while for firms in scenario two, the complications are for the longer term only. Before engaging in culture change activities, senior managers need to carefully consider the likely market competitiveness conditions in the longer term. To the extent that culture change might be a slow and hazardous process, by the time the culture has been changed it may no longer match with the changed market competitiveness conditions at that future time. Firms might be better off with alternate means of managing short term hypercompetitive shifts, e.g., by temporarily restructuring or acquiring a smaller more nimble entity to handle the bulk of the temporary innovation burden.

From the dynamic capabilities perspective adopted by the current study, while some firms may obtain superior performance from their flexibility culture, firms without such cultures cannot expect to engage in managerial activities to develop cultures that will generate such performance (Barney, 1986). This perspective assumes that systematic efforts to socially engineer a valuable culture may be, for the time being at least, beyond the capabilities of most firms (Barney, 1986). This static view is in contrast to those where organisational culture is a variable that can be moulded, shaped and changed to suit managerial purposes (Smircich, 1983). In practice, there are of course ways to change a culture. Some suggested examples

include: changing senior managers; recognising, rewarding and promoting innovation; changing limits of delegated authority to tighten or loosen decision rights; changing reporting structures to facilitate or control communication and information flows; and using beliefs and value systems (Simons, 1994 and 1995). A cultural audit could be undertaken, possibly using the Denison Organizational Culture Survey.

6.7 Concluding comments

As Eisenhardt and Martin (2000: 1112) note, in hypercompetitive situations people need guidance to "focus their attention amid a cacophony of information and possibilities, help provide sense making about the situation, and be confident enough to act in these highly uncertain situations where it is easy to become paralysed by anxiety". Highly interactive budgeting systems provide a competitive advantage conferring 'semi-structure' in these situations by organising and motivating experiential patterns of organisational learning and change. Based on a resource-base of a high flexibility culture, such a second-order dynamic capability effectively matches the unpredictable and discontinuous nature of change in hypercompetitive conditions. In conditions of moderate market competitiveness, moderately interactive use of budgeting systems instead delivers competitive advantage, in which case a threshold level of moderate flexibility culture is required to underlie this capability. In stable conditions, a diagnostic budgeting system is associated with greatest firm performance, and by not requiring a flexibility culture resource-base does not confer competitive advantage in this case. This study responds to practitioner debates as to whether or not to abandon or improve budgeting practices (Hansen et al., 2003). As Simons (1990) noted, the simple presence or absence of an MCS does not determine effectiveness as much as does the way in which it is used by the organisation.

APPENDICES

Appendix A – Extant definitions of interactive control

Simons (1994: 170) – defined diagnostic control systems as "formal feedback systems used to monitor organizational outcomes and correct deviations from preset standards of performance. Diagnostic control systems – exemplified by business plans and budgets – are the prototypical feedback systems used to track variances from preset goals and manage by exception." Managers invest attention in diagnostic control systems in three instances: 1) to set and negotiate goals, (2) receive updates and exception reports, and (3) to follow up on significant exceptions. Diagnostic control measurements compare outputs (either quantity or quality) to a predetermined measurement scale.

Simons (1994: 170-171) – defined interactive control systems as "formal systems used by top managers to regularly and personally involve themselves in the decision activities of subordinates. Any diagnostic control system can be made interactive by continuing and frequent top management attention and interest. The purpose of making a control system interactive is to focus attention and force dialogue and learning throughout the organization." Accordingly, interactive controls "demand regular attention from operating subordinates at all levels of the company" **(Simons, 1990: 136)** so that the system "collects(s) and generate(s) information that relates to the effects of strategic uncertainties on the strategy of the business" **(Simons, 1995: 108-109)**. Top management involvement "provides an opportunity for top management to debate and challenge underlying data, assumptions and action plans" (Simons, 1990: 136). Interactive use "trigger(s) revised action plans" with resulting "re-forecasting of future states based on revised current information" (Simons, 1995: 108-109).

Abernethy and Brownell (1999: 191) – "A defining feature of interactive use of budgets is the continual exchange between top management and lower levels of management, as well as interactions within various levels of management but across functions. This interaction involves not only participation between subordinates and superiors in the budget setting process, but also an ongoing dialogue between organizational members as to why budget variances occur, how the system or behaviours can be adapted and even whether any action should be taken in response to these variances. In this setting, the budgeting system becomes a "database" which facilitates organizational learning. Interactive use occurs when top management "uses the planning and control procedures to actively monitor and intervene in ongoing decision activities of subordinates. Since this intervention provides an opportunity for top management to debate and challenge underlying data, assumptions and action plans, interactive management controls demand regular attention from operating subordinates at all levels of the company (Simons, 1990: 136)."

Davila (2000: 396) – "…the information was used to monitor the project, but it was not discussed with my team except when it reported events that fell below plans or expectations" (diagnostic system) and "the information was used constantly in the interactions with my team. Frequently it was the main topic of our conversation" (interactive system)."

Van der Stede (2001: 123-124) – "According to Simons' broad description, control is interactive when top managers actively use planning and control systems to monitor and intervene in ongoing decision activities of their business unit managers. Diagnostic controls, on the other hand, are subject to top management attention only when important targets are missed (Simons, 1995: 161-162). This discussion seems to indicate that, with respect to budgeting, interactive/diagnostic control types differ in terms of the frequency of top management attention to budgeting performance. That is, budget control is interactive when managers routinely discuss performance and diagnostic when managers only focus on unfavourable budget variances."

Marginson (2002: 1022) – "According to Simons (1995), there are several particularities with regard to diagnostic control systems. One specific characteristic of interactive control is that top management is heavily involved in using this control system. But interactive control systems are not exclusively used by higher level managers. A second important feature of interactive control is that these systems are used throughout the organization. Third, interactive control systems are used to promote and provoke discussion and the emphasis is on learning. Fourth, interactive systems deal with strategic uncertainties that may initiate the need for strategic change."

Bisbe and Otley (2004: 711) – "…Interactive control systems are measurement systems that are used to focus attention on the constantly changing information that top-level managers consider to be of strategic importance. In contrast to diagnostic controls, what characterizes interactive controls is senior managers' strong level of involvement. Top managers pay frequent and regular attention to interactive control systems, and get personally involved in them. Furthermore, this pattern of attention signals the need for all organizational members to pay frequent and regular attention to the issues addressed by the interactive control systems. Through interactive control systems, top managers send messages to the whole organization in order to focus attention on strategic uncertainties. Consequently, interactive control systems place pressure on operating managers at all levels of the organization, and motivate information gathering, face-to-face dialogue and debate. As participants throughout the orga1nization respond to the perceived opportunities and threats, organizational learning is stimulated, new ideas flow and strategies emerge. In this way, interactive control systems guide and provide input to innovation and to the formation of emergent strategies. In expanding and orientating opportunity-seeking and learning, interactive control systems contribute to fostering the development of innovation initiatives that are successfully transformed into enhanced performance."

Widener (2006: 4) – "While the diagnostic system allows managers to manage results on an exception basis, an interactive system is forward-looking and characterized by active and frequent dialogue among top managers. The interactive system is intended to help the firm search for new ways to strategically position itself in a dynamic marketplace."

Bisbe et al. (2007) – interactive use of a control system requires: (1) an intensive use by top management; (2) an intensive use by operating management; (3) a pervasiveness of face-to-face challenges and debates; (4) a focus on strategic uncertainties; and (5) a non-invasive, facilitating and inspirational involvement of the top manager.

Appendix B – Adaptation of Desarbo (2005) PEU scales

Dimension	Original (Desarbo, 2005)	Adaptation (used in thesis)
Market		
Rate	In our kind of business, customers' product preferences change quite a bit over time	In our kind of business, customers' product preferences change quite a bit over time
Intensity	We cater to many of the same customers that we used to in the past	We cater to many of the same customers that we used to in the past
Predictability	It is very difficult to predict any changes in this market place	It is very difficult to predict any changes in this market place
Complexity	Not provided.	There are many, diverse market events that impact our business' operations. Note: this is based on the definition of "the number and diversity of events occurring in environmental sectors outside the operations of your company"
Other 1	Our customers tend to look for new products all the time	Excluded. Note: relates to changes in customer preferences. This is another RATE question.
Other 2	Sometimes our customers are very price-sensitive, but on other occasions, price is relatively unimportant	Excluded. Note: relates to changes in customer preferences.
Other 3	New customers tend to have product-related needs that are different from those of our existing customers	Excluded. Note: relates to changes in customers. This is another RATE question.
Technology		
Rate	The technology in our industry is changing rapidly	The technology in our industry is changing rapidly
Intensity	A large number of new product ideas have been made possible through technological breakthroughs in our industry	A large number of new product ideas have been made possible through technological breakthroughs in our industry
Predictability	It is very difficult to forecast where the technology in our industry will be in two to three years	It is very difficult to forecast where the technology in our industry will be in two to three years
Complexity	Not provided.	There are many, diverse technological events that impact our business' operations. Note: this is based on the definition of "the number and diversity of events occurring in environmental sectors outside the operations of your company"
Other 4	Technological changes provide big opportunities provide big opportunities in our industry	Excluded. Note: relates to technical opportunity.
Other 5	Technological developments in our industry are rather minor	Excluded. Note: this blends RATE and INTENSITY
Other 6	The technological changes in this industry are frequent	Excluded. Note: this is another RATE question
Competitors		
Rate	One hears of new competitive move almost every day	One hears of new competitive move almost every day
Intensity	Not provided.	Our competitors are the same as those from the past
Predictability	Not provided.	It is very difficult to predict any changes in who might be our future competitors
Complexity	Not provided.	There are many, diverse competitor events that impact our business' operations.
Other 7	Competition in our industry is cutthroat	Excluded. Note: relates to general competition
Other 8	There are many 'promotion wars' in our industry	Excluded. Note: relates to promotion wars
Other 9	Anything that one competitor can offer, others can match readily	Excluded. Note: relates to general competition
Other 10	Price competition is a hallmark of our industry	Excluded. Note: relates to price wars
Other 11	Our competitors are relatively weak	Excluded. Note: relates to general competition

Appendix C – Adaptation of Slater and Olson (2000) firm performance scales

Dimension	Original (Slater and Olson, 2000)	Adaptation (used in thesis)
Sales growth	Sales growth compared to your major competitor	Sales growth compared to your major competitors Note: 'competitor' is changed to 'competitors', because this is more consistent with the conceptualisation of firm performance in industry-relative terms
	Sales volume compared to sales unit objectives	Excluded. Note: this is excluded because it is inconsistent with the conceptualisation of firm performance in industry-relative terms.
Market share	Market share compared to your major competitor	Market share compared to your major competitors Note: 'competitor' is changed to 'competitors', because this is more consistent with the conceptualisation of firm performance in industry-relative terms
	Market share compared to sales unit objectives	Excluded. Note: this is excluded because it is inconsistent with the conceptualisation of firm performance in industry-relative terms.
Profit	Profitability compared to your major competitor	Profitability compared to your major competitors Note: 'competitor' is changed to 'competitors', because this is more consistent with the conceptualisation of firm performance in industry-relative terms
	Profitability compared to sales unit objectives.	Excluded. Note: this is excluded because it is inconsistent with the conceptualisation of firm performance in industry-relative terms.

Appendix D – Note to equities analysts for selection of target industries

Dear <Equities Research Analyst>,

Thank you for assisting with this PhD research. Please consider the following.

Based on the intensity and unpredictability of change encountered, the research design classifies industries into three types:
1. radical change
2. moderate change
3. low change

The research focuses on firms that operate in industries with *radical change*. These are industries that are experiencing highly intense and highly unpredictable change, in terms of: 1) *technology*, 2) *competitors*, and/or 3) *customer expectations*.

Some examples of highly intense and highly unpredictable changes in *technology that have underlain radically changing industries* are: steam to diesel-electric locomotives; fountain to ballpoint pens; fossil fuel to nuclear power plants; safety to electric razors; propeller to jet aircraft; and leather to polymeric plastics. Further examples included the developments in the underlying technology in the industries of: photolithography; xerography; personal tape-machines; and jet-engines; biopharmaceuticals; biotechnology; and digital communications.

Some examples of radically changing industries (from the academic literature), in which the change was driven by *competitor* moves and *customer expectations* include:

- The U.S. commercial banking sector in the mid 1990s - had new and continually shifting product and geographic markets, frequent entry of unexpected competitors, radical redefinition of market boundaries, and short product life cycles.

- The digital communications industry - has sequentially and over an extended period of time experienced the entry of new competitors with different customer offerings.

- The Japanese beer industry in the mid 1990s - had a tenfold increase in new product development.

Guided by these examples of intense and unpredictable change, please can you nominate which of the Australian industries (in the spreadsheet) you believe are currently undergoing radical change?

Your selection will help determine the range of industries for which a mailing list will be purchased from Dun and Bradstreet. Respondents to the mail-out questionnaire will self-report the rate of change for their industry. Your nominations will be used to guide the sample selection for the mail-out. For the final analysis, firms will self-report the degree of change in their industry.

Thank you very much,
Matt Peters.

Appendix E – Profiles of pre-test participants

Pre-test phase	Participant		Employees	Revenue ($M)
Phase 1	1	Divisional Finance Manager	6,700	4,000
	2	Finance Manager	800	35
	3	Finance and Strategy Manager	4,500	1,000
	4	General Manager - Business Performance	210,000	40,000
	5	Senior Financial Analyst	7,500	1,500
Phase 2	1	Market Research Consultant	N/A	N/A
	2	Thesis Principal Supervisor	N/A	N/A
	3	Thesis Secondary Supervisor	N/A	N/A
	4	Chief Financial Officer	400	100
	5	CFO	450	140
	6	CFO Australian Equities Division	121	250
	7	Planning Manager	50	2.5
	8	Planning & Strategy Manager	1200	580
Phase 3	1	Senior Marketing Manager	100	N/A
	2	Client Relationship Marketing Manager	40	N/A
	3	Head of Deposits	170	70
	4	Vice President	150	3,000
	5	Head of Marketing	100	500
	6	General Manager Finance BIG W	20,000	3,465
	7	Head of Cards	475	75
	8	Budgeting and Forecasting Manager	165,000	30,000

Appendix F – Development of BUDSTYLE survey questions

Senior management interaction frequency (SNR-FRQ)				
Pre-test phase 2				
Participant	Senior managers very frequently meet and discuss profit planning information.	Senior managers are very frequently involved in profit planning activities.	Senior managers very frequently interact with peers and subordinates in profit planning meetings.	Senior managers very frequently attend presentations of profit planning information.
4	8	8	7	8
5	9	9	9	9
6	9	7	6	6
7	5	6	3	6
8	8	8	7	8
Pre-test phase 3				
Participant	Senior managers very frequently meet and discuss profit planning information.	Senior managers are continually involved in profit planning activities.	Senior managers very often interact with peers and subordinates in profit planning activities.	Senior managers very regularly attend presentations of profit planning information.
1	9	4	4	7
2	6	6	6	5
3	9	9	5	8
4	9	8	8	3
5	9	9	9	9
6	8	6	7	8
7	9	7	9	9
8	9	8	5	8
Final questions				
	Senior managers meet and discuss profit planning information very frequently (e.g., weekly)	Senior managers are continually involved in profit planning activities	Senior managers constantly interact with other senior managers in profit planning activities	Senior managers very often attend presentations of profit planning information

Senior and middle management interaction frequency (MID-FRQ)

Pre-test phase 2

Participant	Middle managers very frequently meet and discuss profit planning information	Middle managers are very frequently involved in profit planning activities	Middle managers very frequently interact with peers and subordinates in profit planning meetings	Middle managers very frequently attend presentations of profit planning information
4	5	7	8	5
5	6	7	5	7
6	6	5	6	7
7	7	8	7	5
8	6	3	3	4

Pre-test phase 3

Participant	Middle managers very frequently meet and discuss profit planning information.	Middle managers are continually involved in profit planning activities.	Middle managers very often interact with peers and subordinates in profit planning activities.	Middle managers very regularly attend presentations of profit planning information.
1	3	2	6	5
2	5	4	5	3
3	5	6	8	6
4	6	6	7	8
5	9	6	9	9
6	6	7	8	5
7	9	9	9	9
8	6	5	5	5

Final questions

Middle and senior managers meet and discuss profit planning information very frequently (e.g., weekly)	Middle managers are continually involved in profit planning activities with senior managers	Middle managers constantly interact with senior managers in profit planning activities	Middle managers very often present profit planning information to senior managers

Degree of challenge and debate (CHALL)

Pre-test phase 2

Participant	Senior and middle managers challenge and debate the assumptions underlying profit plans.	Senior and middle managers heavily review and revise profit planning information.	Senior and middle managers consider multiple alternatives and scenarios in profit planning meetings.	Senior and middle managers openly share their understanding of why results differ from expectations.	Senior and middle managers freely and frankly question the progress made towards delivering on profit plan expectations.	Senior and middle managers reorganize based on decisions made in profit planning meetings.	Senior and middle managers freely discuss differing views on ways to achieve profit plan expectations.
4	8	8	7	8	8	5	7
5	8	9	9	8	9	9	8
6	7	8	7	8	6	7	6
7	7	5	6	3	8	6	4
8	8	8	8	8	8	6	7

Pre-test phase 3

Participant	Senior and middle managers challenge and debate the assumptions underlying profit plans.	Senior and middle managers intensively review and revise profit planning information.	Senior and middle managers consider multiple alternatives and scenarios in profit planning meetings.	Senior and middle managers openly share their understanding of why results differ from expectations.	Senior and middle managers openly question the progress made for delivering profit plan expectations.
1	4	3	3	4	4
2	5	4	4	5	6
3	7	7	7	6	7
4	7	6	7	3	7
5	5	7	5	8	8
6	6	8	6	7	6
7	6	8	3	9	9
8	6	8	7	7	6

Final questions

Profit planning meetings always have extensive challenge and debate of underlying assumptions	Every profit planning meeting involves intensive review and revision of action plans	Profit planning meetings always include consideration of multiple alternatives and scenarios	Every profit planning meeting has in-depth discussion of why results differ from expectations	Profit planning meetings always investigate progress made for delivering on expectations

Degree of focus on strategic uncertainties (STRAT)

Pre-test phase 2

Participant	In profit planning discussions, attention is focused on the sustainability of business strategies.	In profit planning discussions, significant new business development opportunities are clarified and defined.	In profit planning discussions, business critical threats are analyzed and interpreted.	In profit planning discussions, strategic business changes are reviewed and evaluated.	In profit planning discussions, strategic business imperatives are redefined and reprioritized.	In profit planning discussions, business strategies are replanned and redirected.	In profit planning discussions, significant new initiatives are communicated and planned.
4	6	7	7	6	5	6	6
5	9	9	9	9	9	9	9
6	7	8	9	7	4	6	4
7	5	6	4	4	6	5	6
8	7	7	9	9	8	9	7

Pre-test phase 3

Participant	In profit planning discussions, attention is focused on the sustainability of business strategies.	In profit planning discussions, significant new business development opportunities are clarified and defined.	In profit planning discussions, business critical threats are analyzed and interpreted.	In profit planning discussions, strategic business changes are reviewed and evaluated.	In profit planning discussions, strategic business imperatives are redefined and reprioritized.
1	3	6	3	3	5
2	5	6	5	6	5
3	5	6	6	6	6
4	7	5	5	7	5
5	3	5	5	3	2
6	7	6	8	8	7
7	6	6	6	6	5
8	8	8	8	7	8

Final questions

The sustainability of our business strategies is a key theme in profit planning meetings	Significant business development opportunities are a key focus in every profit planning meeting	Business critical threats are always an important discussion point in profit planning meetings	Strategic business changes are always assessed in profit planning meetings	Strategic business imperatives are redefined and reprioritized in every profit planning meeting

Appendix G – The mail questionnaire

UNIVERSITY OF TECHNOLOGY SYDNEY

Senior Management Involvement in Profit Planning

Best Practice Survey

November 2007

Purpose of this survey:

- We are researching best practices of senior management involvement in the strategic leadership of profit budgeting and forecasting.
- We examine how the role of senior management in this leadership task may be sensitive to key internal and external factors.
- Findings from the research will provide insights into how senior managers can adapt their frequency and style of involvement in profit planning activities to differing strategically important circumstances.

To receive your executive report on the best practice findings from this research:

- Return the attached postcard and tick the relevant box.

The survey is being conducted by the Profit Planning Research Team:

- The team is made up of: Professor Peter Booth, Associate Professor Siggi Gudergan, and Matt Peters.
- To enquire about the survey, please call Matt Peters on **0414 460 058** or contact **profit-planning.research@uts.edu.au**

The survey is anonymous and confidential:

- In line with the University's Research Ethics Requirements, the survey is completely anonymous. There is no identification number on the questionnaire. Your participation will be kept confidential and results will only be reported in aggregate form.

Returning the questionnaire:

- Simply return the questionnaire in the attached reply paid envelope.
- Also, please return the enclosed postcard separately in the mail – so that we know to not send you a reminder.

Option to respond on the internet:

- You can instead logon to an internet based version: **http://www.questionpro.com/akira/TakeSurvey?id=777283**

→ START HERE (please)

Please note: this survey repeatedly uses the term *business unit*. However, in some organisations, the more familiar term may be *business division* or *division*.
If your position spans across multiple business units, please answer all questions with respect to only the largest single business unit that you can report on.

1. For how long have you worked in your business unit? *(Please tick one item only)*
   - O Less than 1 year.
   - O More than 1 year.

2. Within your business unit, which management group are you in? *(Please tick one item only)*
   - O *Senior management* (the business unit top manager and his/her direct reports).
   - O *Middle management* (below the senior management team).
   - O Neither senior nor middle management (please note this survey does not apply to you – please stop now).

3. For how long has the *top manager* of your business unit held their role? *(Please tick one item only)*
   - O Less than 1 year.
   - O 1 - 2 years
   - O 2 - 3 years.
   - O 3 + years.

PROFIT PLANNING

- A profit plan outlines the planned sales revenues, expenses and net income – usually by month.
- Profit plans are typically set annually (e.g., as part of the annual budget), and may be updated with forecasts.
- *Profit planning* is an activity that undertakes and compares budgeted, forecasted and actual revenues and expenses by revenue and cost category.

Please indicate the degree to which you agree or disagree with the following statements regarding profit planning in your business unit ('Strongly Disagree' =1, through to 'Strongly Agree' = 9).
Please circle your response around the corresponding number.

		Strongly Disagree								Strongly Agree
4.	Senior managers meet and discuss profit planning information very frequently (e.g., weekly)	1	2	3	4	5	6	7	8	9
5.	Middle managers constantly interact with senior managers in profit planning activities	1	2	3	4	5	6	7	8	9
6.	Profit planning meetings always have extensive challenge and debate of underlying assumptions	1	2	3	4	5	6	7	8	9
7.	Senior managers are continually involved in profit planning activities	1	2	3	4	5	6	7	8	9
8.	Significant business development opportunities are a key focus in every profit planning meeting	1	2	3	4	5	6	7	8	9
9.	Profit planning meetings always investigate progress made for delivering on expectations	1	2	3	4	5	6	7	8	9
10.	Middle managers very often present profit planning information to senior managers	1	2	3	4	5	6	7	8	9
11.	Strategic business changes are always assessed in profit planning meetings	1	2	3	4	5	6	7	8	9
12.	Every profit planning meeting involves intensive review and revision of action plans	1	2	3	4	5	6	7	8	9
13.	Middle and senior managers meet and discuss profit planning information very frequently (e.g., weekly)	1	2	3	4	5	6	7	8	9
14.	Business critical threats are always an important discussion point in profit planning meetings	1	2	3	4	5	6	7	8	9
15.	Senior managers constantly interact with peers in profit planning activities	1	2	3	4	5	6	7	8	9
16.	Profit planning meetings always include consideration of multiple alternatives and scenarios	1	2	3	4	5	6	7	8	9
17.	Senior managers very often attend presentations of profit planning information	1	2	3	4	5	6	7	8	9
18.	Strategic business imperatives are redefined and reprioritized in every profit planning meeting	1	2	3	4	5	6	7	8	9
19.	Middle managers are continually involved in profit planning activities with senior managers	1	2	3	4	5	6	7	8	9
20.	Every profit planning meeting has in-depth discussion of why results differ from expectations	1	2	3	4	5	6	7	8	9
21.	The sustainability of our business strategies is a key theme in profit planning meetings	1	2	3	4	5	6	7	8	9

22. On average, how often do senior managers meet and discuss profit planning information with other senior managers?

(Please tick one item only)

O Weekly or more O Once a month O Quarterly O Twice a year O Once a year

INTERNAL FACTORS – INTRINSIC TO YOUR BUSINESS UNIT

Please indicate the degree to which you agree or disagree with the following statements regarding your business unit ('Strongly disagree' = 1, 'Strongly agree' = 9).

		Strongly Disagree								Strongly Agree
23.	Working in this organisation is like being part of a team	1	2	3	4	5	6	7	8	9
24.	Teams are the primary building blocks of this organisation	1	2	3	4	5	6	7	8	9
25.	This organisation relies on horizontal control and coordination to get work done, rather than hierarchy	1	2	3	4	5	6	7	8	9
26.	This organisation is constantly improving compared with its competitors in many dimensions	1	2	3	4	5	6	7	8	9
27.	This organisation continuously invests in the skills of employees	1	2	3	4	5	6	7	8	9
28.	The capability of people is viewed as an important source of competitive advantage	1	2	3	4	5	6	7	8	9
29.	Information is widely shared so that everyone can get information he or she needs when it is needed	1	2	3	4	5	6	7	8	9
30.	Decisions are usually made at the level where the best information is available	1	2	3	4	5	6	7	8	9
31.	Everyone believes that he or she can have a positive impact	1	2	3	4	5	6	7	8	9
32.	This organisation is very responsive and changes easily	1	2	3	4	5	6	7	8	9
33.	This organisation responds well to competitors and other changes in the external environment	1	2	3	4	5	6	7	8	9
34.	This organisation continually adopts new and improved ways to work	1	2	3	4	5	6	7	8	9
35.	Customer comments and recommendations often lead to changes in this organisation	1	2	3	4	5	6	7	8	9
36.	Customer input directly influences our decisions	1	2	3	4	5	6	7	8	9
37.	The interests of the final customer rarely get ignored in our decisions	1	2	3	4	5	6	7	8	9
38.	This organisation encourages and rewards those who take risk	1	2	3	4	5	6	7	8	9
39.	We view failure as an opportunity for learning and improvement	1	2	3	4	5	6	7	8	9
40.	We make certain we coordinate our actions and efforts between different areas in this organisation	1	2	3	4	5	6	7	8	9

EXTERNAL FACTORS - IMPACTING YOUR BUSINESS UNIT

These questions concern the impacts of external factors in the primary markets your business unit currently serves.

Please indicate the degree to which you agree or disagree with the following statements regarding your business unit ('Strongly disagree' = 1, 'Strongly agree' = 9).

		Strongly Disagree								Strongly Agree
41.	In our kind of business, customers' product preferences change quite a bit over time	1	2	3	4	5	6	7	8	9
42.	We cater to many of the same customers that we used to in the past	1	2	3	4	5	6	7	8	9
43.	It is very difficult to predict any customer changes in this market place	1	2	3	4	5	6	7	8	9
44.	There are many, diverse market events that impact our business' operations	1	2	3	4	5	6	7	8	9
45.	The technology in our industry is changing rapidly	1	2	3	4	5	6	7	8	9
46.	Many new product ideas have been made possible through technological breakthroughs in our industry	1	2	3	4	5	6	7	8	9
47.	It is very difficult to forecast where the technology in our industry will be in two to three years	1	2	3	4	5	6	7	8	9
48.	There are many, diverse technological events that impact our business' operations	1	2	3	4	5	6	7	8	9
49.	One hears of new competitive moves almost every day	1	2	3	4	5	6	7	8	9
50.	Our competitors are the same as those from the past	1	2	3	4	5	6	7	8	9
51.	It is very difficult to predict any changes in who might be our future competitors	1	2	3	4	5	6	7	8	9
52.	There are many, diverse competitor events that impact our business' operations	1	2	3	4	5	6	7	8	9

OTHER BUSINESS UNIT INFORMATION

Please relate the situation in your business unit over the last two years. Relative to your competitors, how has your business unit performed for the following three areas of performance ('Much Worse' = 1, 'Much Better' = 9):

			Much Worse							Much Better
53.	Sales growth	- relative to your major competitors	1	2	3	4	5	6	7	8 9
54.	Market share	- relative to your major competitors	1	2	3	4	5	6	7	8 9
55.	Profitability	- relative to your major competitors	1	2	3	4	5	6	7	8 9

In order to better account for the relevance of each of the above areas of performance to your business unit, please divide 100% among the three performance areas in terms of their relative importance to achieving the strategy pursued by your business unit.

56.	Sales growth	%	- importance to your business strategy
57.	Market share	%	- importance to your business strategy
58.	Profitability	%	- importance to your business strategy
		100 %	**Note**: Please make sure your answers add to 100%

59. What was the profit plan performance of your business unit last financial year? *(Please tick one item only)*
    - O Below budget.
    - O On budget.
    - O Better than budget.

60. What is the *title of your role*?

    _____

61. How many *employees* work for your business unit?

    _____

62. What was the *annual sales* in dollars for your business unit, as stated in last years financial accounts?

    _____

63. How long has your business unit been in operation? *(Please tick one item only)*
    - O Less than 2 years.
    - O 2 – 3 years.
    - O Greater than 3 years.

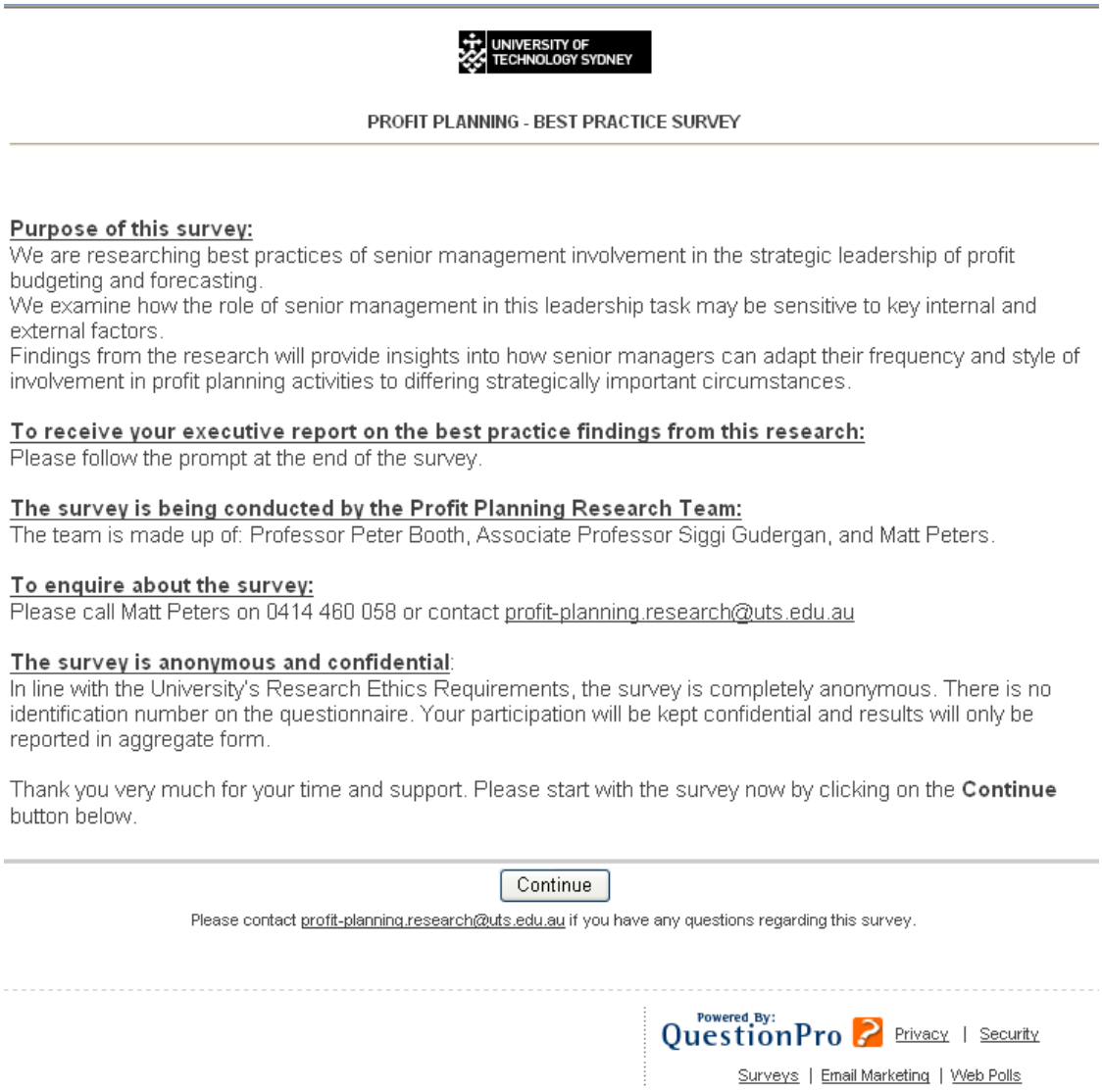
64. What is the main industry of your business unit? *(Please tick one item only)*
    - O Agriculture, Forestry and Fishing.
    - O Mining.
    - O Construction.
    - O Manufacturing.
    - O Public Administration.
    - O Wholesale Trade.
    - O Retail Trade.
    - O Finance, Insurance and Real Estate.
    - O Services.
    - O Transportation, Communications, Electric, Gas & Sanitary Services.

65. Which category of ownership best fits your business? *(Please tick one item only)*
    - O Listed on the Australian Stock Exchange.
    - O Privately held in Australia.
    - O Foreign owned.

FINISH HERE (thank you) ←

Please return the survey in the attached envelope. Please also return the separate postcard.
If you have a question, please contact: profit-planning.research@uts.edu.au or call 0414 460 058.

Appendix H – The internet questionnaire



UNIVERSITY OF TECHNOLOGY SYDNEY

PROFIT PLANNING - BEST PRACTICE SURVEY

Purpose of this survey:
We are researching best practices of senior management involvement in the strategic leadership of profit budgeting and forecasting.
We examine how the role of senior management in this leadership task may be sensitive to key internal and external factors.
Findings from the research will provide insights into how senior managers can adapt their frequency and style of involvement in profit planning activities to differing strategically important circumstances.

To receive your executive report on the best practice findings from this research:
Please follow the prompt at the end of the survey.

The survey is being conducted by the Profit Planning Research Team:
The team is made up of: Professor Peter Booth, Associate Professor Siggi Gudergan, and Matt Peters.

To enquire about the survey:
Please call Matt Peters on 0414 460 058 or contact profit-planning.research@uts.edu.au

The survey is anonymous and confidential:
In line with the University's Research Ethics Requirements, the survey is completely anonymous. There is no identification number on the questionnaire. Your participation will be kept confidential and results will only be reported in aggregate form.

Thank you very much for your time and support. Please start with the survey now by clicking on the **Continue** button below.

Continue

Please contact profit-planning.research@uts.edu.au if you have any questions regarding this survey.

Powered By: QuestionPro Privacy | Security
Surveys | Email Marketing | Web Polls

UNIVERSITY OF TECHNOLOGY SYDNEY

Questions marked with a * are required

PROFIT PLANNING - BEST PRACTICE SURVEY

Please note: this survey repeatedly uses the term business unit. However, in some organisations, the more familiar term may be business division or division.

If your position spans across multiple business units, please answer all questions with respect to only the largest single business unit that you can report on. *

1. For how long have you worked in your business unit? *

-- Select --

Within your business unit, please consider these two defined categories of management:
- *senior management* are the top manager and his/her direct reports.
- *middle management* are managers below the senior management team.

2. To which management group do you belong? *

-- Select --

3. For how long has the top manager of your business unit held their role? *

-- Select --

PROFIT PLANNING

- A profit plan outlines the planned sales revenues, expenses and net income – usually by month.
- Profit plans are typically set annually (e.g., as part of the annual budget), and may be updated with forecasts.
- Profit planning is an activity that undertakes and compares budgeted, forecasted and actual revenues and expenses by revenue and cost category.

Please indicate the degree to which you agree or disagree with the following statements regarding profit planning in your business unit ('Strongly Disagree' =1, through to 'Strongly Agree' = 9).

	Strongly Disagree								Strongly Agree
4. Senior managers meet and discuss profit planning information very frequently (e.g., weekly) *	○	○	○	○	○	○	○	○	○
5. Middle managers constantly interact with senior managers in profit planning activities *	○	○	○	○	○	○	○	○	○
6. Profit planning meetings always have extensive challenge and debate of underlying assumptions *	○	○	○	○	○	○	○	○	○
7. Senior managers are continually involved in profit planning activities *	○	○	○	○	○	○	○	○	○
8. Significant business development opportunities are a key focus in every profit planning meeting *	○	○	○	○	○	○	○	○	○
9. Profit planning meetings always investigate progress made for delivering on expectations *	○	○	○	○	○	○	○	○	○
10. Middle managers very often present profit planning information to senior managers *	○	○	○	○	○	○	○	○	○
11. Strategic business changes are always assessed in profit planning meetings *	○	○	○	○	○	○	○	○	○
12. Every profit planning meeting involves intensive review and revision of action plans *	○	○	○	○	○	○	○	○	○
13. Middle and senior managers meet and discuss profit planning information very frequently (e.g., weekly) *	○	○	○	○	○	○	○	○	○
14. Business critical threats are always an important discussion point in profit planning meetings *	○	○	○	○	○	○	○	○	○
15. Senior managers constantly interact with peers in profit planning activities *	○	○	○	○	○	○	○	○	○

PROFIT PLANNING (continued)

	Strongly Disagree								Strongly Agree
16. Profit planning meetings always include consideration of multiple alternatives and scenarios *	○	○	○	○	○	○	○	○	○
17. Senior managers very often attend presentations of profit planning information *	○	○	○	○	○	○	○	○	○
18. Strategic business imperatives are redefined and reprioritized in every profit planning meeting *	○	○	○	○	○	○	○	○	○

19. Middle managers are continually involved in profit planning activities with senior managers *
20. Every profit planning meeting has in-depth discussion of why results differ from expectations *
21. The sustainability of our business strategies is a key theme in profit planning meetings *

	Weekly or more	Once a month	Quarterly	Twice a year	Once a year
22. On average, how often do senior managers meet and discuss profit planning information with other senior managers? *					

Continue

Please contact profit-planning.research@uts.edu.au if you have any questions regarding this survey.

UNIVERSITY OF TECHNOLOGY SYDNEY

Questions marked with a * are required

PROFIT PLANNING - BEST PRACTICE SURVEY

INTERNAL FACTORS - INTRINSIC TO YOUR BUSINESS UNIT

Please indicate the degree to which you agree or disagree with the following statements regarding your business unit ('Strongly Disagree' = 1, 'Strongly Agree' = 9).

	Strongly Disagree								Strongly Agree
23. Working in this organisation is like being part of a team *									
24. Teams are the primary building blocks of this organisation *									
25. This organisation relies on horizontal control and coordination to get work done, rather than hierarchy *									
26. This organisation is constantly improving compared with its competitors in many dimensions *									
27. This organisation continuously invests in the skills of employees *									
28. The capability of people is viewed as an important source of competitive advantage *									
29. Information is widely shared so that everyone can get information he or she needs when it is needed *									
30. Decisions are usually made at the level where the best information is available *									
31. Everyone believes that he or she can have a positive impact *									

INTERNAL FACTORS (continued)

	Strongly Disagree								Strongly Agree
32. This organisation is very responsive and changes easily *									
33. This organisation responds well to competitors and other changes in the external environment *									
34. This organisation continually adopts new and improved ways to work *									
35. Customer comments and recommendations often lead to changes in this organisation *									
36. Customer input directly influences our decisions *									
37. The interests of the final customer rarely get									

UNIVERSITY OF TECHNOLOGY SYDNEY

Questions marked with a * are required

PROFIT PLANNING - BEST PRACTICE SURVEY

EXTERNAL FACTORS - IMPACTING YOUR BUSINESS UNIT

These questions concern impacts of external factors in the primary markets your business unit currently serves. Please indicate the degree to which you agree or disagree with the following statement regarding your business unit ('Strongly disagree' = 1, 'Strongly agree' = 9).

	Strongly Disagree								Strongly Agree
41. In our kind of business, customers' product preferences change quite a bit over time *	○	○	○	○	○	○	○	○	○
42. We cater to many of the same customers that we used to in the past *	○	○	○	○	○	○	○	○	○
43. It is very difficult to predict any customer changes in this market place *	○	○	○	○	○	○	○	○	○
44. There are many, diverse market events that impact our business' operations *	○	○	○	○	○	○	○	○	○
45. The technology in our industry is changing rapidly *	○	○	○	○	○	○	○	○	○
46. Many new product ideas have been made possible through technological breakthroughs in our industry *	○	○	○	○	○	○	○	○	○
47. It is very difficult to forecast where the technology in our industry will be in two to three years *	○	○	○	○	○	○	○	○	○
48. There are many, diverse technological events that impact our business' operations *	○	○	○	○	○	○	○	○	○
49. One hears of new competitive moves almost every day *	○	○	○	○	○	○	○	○	○
50. Our competitors are the same as those from the past *	○	○	○	○	○	○	○	○	○
51. It is very difficult to predict any changes in who might be our future competitors *	○	○	○	○	○	○	○	○	○
52. There are many, diverse competitor events that impact our business' operations *	○	○	○	○	○	○	○	○	○

Continue

Please contact profit-planning.research@uts.edu.au if you have any questions regarding this survey.

UNIVERSITY OF TECHNOLOGY SYDNEY

Questions marked with a * are required

PROFIT PLANNING - BEST PRACTICE SURVEY

OTHER BUSINESS UNIT INFORMATION

Please relate the situation in your business unit over the last two years. Relative to your competitors, how has your business unit performed with respect to the following three performance measures ('Much Worse' = 1, 'Much Better' = 9):

	Much Worse								Much Better
53. Sales growth - relative to your major competitors *	○	○	○	○	○	○	○	○	○
54. Market share - relative to your major competitors *	○	○	○	○	○	○	○	○	○
55. Profitability - relative to your major competitors *	○	○	○	○	○	○	○	○	○

In order to better account for the relevance of each of the above areas of performance to your business unit, please divide 100% among the three performance areas in terms of their relative importance to achieving the strategy pursued by your business unit. *

56. Sales growth: % importance to your business strategy

57. Market share: % importance to your business strategy

58. Profitability: % importance to your businss strategy

0

Values must add up to 100

	Below budget	On budget	Better than budget
59. What was the profit plan performance of your business unit last financial year? *	○	○	○

60. What is the title of your role? *

61. How many employees work for your business unit? *

	Below budget	On budget	Better than budget
59. What was the profit plan performance of your business unit last financial year? *	○	○	○

60. What is the title of your role? *

61. How many employees work for your business unit? *

62. What was the annual sales in dollars for your business unit, as stated in last years financial accounts? *

63. How long has your business unit been in operation? *

-- Select --

64. What main industry does your business unit operate in? *

-- Select --

65. Which category of ownership best fits your business? *

-- Select --

Continue

Please contact profit-planning.research@uts.edu.au if you have any questions regarding this survey.

Thank you for completing this survey.

As the final step, **please send an email** to profit-planning.research@uts.edu.au
Because your response is anonymous, we need your email for two reasons:
(1) so that you can request your copy of the Executive Summary Report, and
(2) so that we know to not inconvenience you by sending you a reminder note.

Thanks again. Please close this browser to finish.

Thank You for completing this survey

Appendix I – Mail survey cover letters

Round 1 – mail survey cover letter

12th November 2007

NAME
TITLE
COMPANY NAME
ADDRESS

Survey on senior management involvement in budgeting and forecasting for profit

To <name>,

We are conducting a nationwide survey on senior management involvement in profit planning. Profit budgeting, forecasting and tracking is a key activity in realising an organization's strategy. Senior management need to adapt the style and frequency of their involvement in profit planning depending on key external and internal factors. This survey will provide key insights into these relationships.

An executive report of the best practice findings will be made available. It will suggest opportunities for senior management to adapt their frequency and style of involvement in profit planning activities to changing circumstances.

We realise you have limited time, and would like to emphasise the value of your response. If you can, it takes about 10 minutes to complete the survey. Without your help this important research is impossible.

If you are unable to respond yourself, can you please refer this survey to a fellow senior manager?

Responses are anonymous, and completely confidential.

This research is for Matt Peters' doctorate in management accounting, which I am supervising.

Please return the questionnaire at your earliest convenience. Every response counts!

Thank you for your time and co-operation.

Production Note:
Signature removed prior to publication.

Professor Peter Booth
Senior Deputy Vice Chancellor

P.S. If you would like to complete the survey online please go to the website at
http://www.questionpro.com/akira/TakeSurvey?id=777283

Please address any comments about this study to Matt Peters on [redacted] or profit-planning.research@uts.edu.au

Round 2 – mail survey cover letter

21st November 2007

NAME
AND
ADDRESS
GOES HERE

Survey on senior management involvement in budgeting and forecasting for profit

To <name>,

I am writing to please remind you about an invitation mailed to you last week to participate in our nationwide survey. If you have already completed and returned the questionnaire to us, please accept our sincere thanks.

We believe the study is important to you because profit planning (i.e., profit budgeting, forecasting and tracking) is a key activity in realising your business strategies. The survey will provide key insights into how senior management need to adapt the style and frequency of their involvement in profit planning depending on key external and internal factors.

An executive report of the best practice findings will be made available to survey participants. It will suggest opportunities for senior management to adapt their frequency and style of involvement in profit planning activities to changing circumstances.

We realise you have limited time, and would like to emphasise the value of your response. If you can, it takes about 10 minutes to complete the survey. If you are unable to respond yourself, can you please refer this survey to a fellow senior manager? Every response counts!

Responses are anonymous, and completely confidential.

Please, at your earliest convenience, return the questionnaire included in this mail package, or alternatively you could complete the survey on the website at: http://www.questionpro.com/akira/TakeSurvey?id=777283

Thank you for your valuable time and co-operation.

Production Note:
Signature removed prior to publication.

Professor Peter Booth
Senior Deputy Vice Chancellor

Please note: this research is for Matt Peters' doctorate in management accounting, which I am supervising. Please address any comments to Matt Peters on [redacted] or profit-planning.research@uts.edu.au

Round 3 – mail survey cover letter

3rd December 2007

NAME
POSITION TITLE
COMPANY NAME
ADDRESS
GOES HERE

Survey on senior management involvement in budgeting and forecasting for profit

To <first name> < last name>,

I am writing to please remind you about our nationwide survey. Over the past three weeks, we have mailed you two invitations. To the best of our knowledge, we have not yet received a response from you.

We believe the study is important to you because profit planning (i.e., profit budgeting, forecasting and tracking) is a key activity in realising your business strategies. The survey will provide key insights into how senior management need to adapt the style and frequency of their involvement in profit planning depending on key external and internal factors.

An executive report of the best practice findings will be made available to survey participants. It will suggest opportunities for senior management to adapt their frequency and style of involvement in profit planning activities to changing circumstances.

We realise you have limited time, and would like to emphasise the value of your response. If you can, it takes about 10 minutes to complete the survey. If you are unable to respond yourself, can you please refer this survey to a fellow senior manager? Every response counts!

Responses are anonymous, and completely confidential.

Please, at your earliest convenience, return the questionnaire included in this mail package, or alternatively you could complete the survey on the website at http://www.questionpro.com/akira/TakeSurvey?id=777283

Thank you for your valuable time and co-operation.

Production Note:
Signature removed prior to publication.

Professor Peter Booth
Senior Deputy Vice Chancellor

Please note: this research is for Matt Peters' doctorate in management accounting, which I am supervising. Please address any comments to Matt Peters on [redacted] or profit-planning.research@uts.edu.au

Round 4 (final) – mail survey cover letter

13th December 2007

NAME
POSITION TITLE
COMPANY NAME
ADDRESS
GOES HERE

Survey on senior management involvement in budgeting and forecasting for profit

To <first name> < last name>,

I am writing to please remind you about our nationwide survey. Over the past month, we have sent you several invitations to participate. To the best of our knowledge, we are yet to receive a response. The study is drawing to a close, and this is the last invitation that we will be sending to you. We are still concerned that firms that have not yet responded may have different situations than those that have. We are hoping for your response to enhance the accuracy of the results.

We firmly believe the study is important to you because profit planning (i.e., profit budgeting, forecasting and tracking) is a key activity in realising your business strategies. The survey will provide key insights into how senior management need to adapt the style and frequency of their involvement in profit planning depending on key external and internal factors.

An executive report of the best practice findings will be made available to survey participants. It will suggest opportunities for senior management to adapt their frequency and style of involvement in profit planning activities to changing circumstances.

We realise you have limited time, and would like to emphasise the value of your response. If you can, it takes about 10 minutes to complete the survey. If you are unable to respond yourself, can you please refer this survey to a fellow senior manager? Every response counts!

Responses are anonymous, and completely confidential.

Please, **before Christmas**, return the questionnaire included in this mail package, or alternatively you could complete the survey on the website at http://www.questionpro.com/akira/TakeSurvey?id=777283

Thank you for your valuable time and co-operation.

Production Note:
Signature removed prior to publication.

Professor Peter Booth
Senior Deputy Vice Chancellor

Please note: this research is for Matt Peters' doctorate in management accounting, which I am supervising. Please address any comments to Matt Peters on [redacted] or profit-planning.research@uts.edu.au

Appendix J – Email notes

Round 2 – email survey cover letter

19th November 2007

SUBJECT: Senior management involvement in profit planning – best practice survey

To <first name> <last name>,

I am writing to please remind you about an invitation mailed to you last week to participate in our nationwide survey. If you have already completed and returned the questionnaire, please accept our sincere thanks.

We believe the study is important to you because profit planning (i.e., profit budgeting, forecasting and tracking) is a key activity in realising your business strategies. The survey will provide key insights into how senior management need to adapt the style and frequency of their involvement in profit planning depending on key external and internal factors.

An executive report of the best practice findings will be made available to survey participants. It will suggest opportunities for senior management to adapt their frequency and style of involvement in profit planning activities to changing circumstances.

Responses are anonymous, and completely confidential.

If you are yet to respond, could you please complete and return the questionnaire that was mailed to you at your earliest convenience. Alternatively, you could take the survey at the website by clicking on this link:

Thank you for your valuable time and co-operation.

Professor Peter Booth
Senior Deputy Vice Chancellor
University of Technology, Sydney

Please note: this research is for Matt Peters' doctorate in management accounting, which I am supervising. Please address any comments to Matt Peters on [redacted] or via this email address. If you are unable to connect to the website with the link above, please copy and paste this address into your web browser: http://www.questionpro.com/akira/TakeSurvey?id=777283.

Round 3 – email survey cover letter

3rd December 2007

SUBJECT: Senior management involvement in profit planning – best practice survey

To <first name> <last name>,

I am writing to please remind you about our nationwide survey. We have invited you to participate by mail and email over the last three weeks. To the best of our knowledge, we have not yet received a response from you.

We strongly believe the study is important to you because profit planning (i.e., profit budgeting, forecasting and tracking) is a key activity in realising your business strategies. The survey will provide key insights into how senior management need to adapt the style and frequency of their involvement in profit planning depending on key external and internal factors.

An executive report of the best practice findings will be made available to survey participants. It will suggest opportunities for senior management to adapt their frequency and style of involvement in profit planning activities to changing circumstances.

We realise you have limited time, and would like to emphasise the value of your response. If you can, it takes about 10 minutes to complete the survey. If you are unable to respond yourself, can you please refer this survey to a fellow senior manager? Every response counts!

Please respond to the survey at the website by clicking on this link: "CLICK HERE"

Responses are anonymous, and completely confidential.

Thank you for your valuable time and co-operation.

Professor Peter Booth
Senior Deputy Vice Chancellor
University of Technology, Sydney

Please note: this research is for Matt Peters' doctorate in management accounting, which I am supervising. Please address any comments to Matt Peters on [redacted] or via this email address. If you are unable to connect to the website with the link above, please copy and paste this address into your web browser: http://www.questionpro.com/akira/TakeSurvey?id=777283.

Round 4 – email survey cover letter

11th December 2007

SUBJECT: Senior management involvement in profit planning – best practice survey

To <first name> <last name>,

I am writing to please remind you about our nationwide survey. We have invited you to participate by mail and email over the month. To the best of our knowledge, we have not yet received a response from you.

We strongly believe the study is important to you because profit planning (i.e., profit budgeting, forecasting and tracking) is a key activity in realising your business strategies. The survey will provide key insights into how senior management need to adapt the style and frequency of their involvement in profit planning depending on key external and internal factors.

An executive report of the best practice findings will be made available to survey participants. It will suggest opportunities for senior management to adapt their frequency and style of involvement in profit planning activities to changing circumstances.

We realise you have limited time, and would like to emphasise the value of your response. If you can, it takes about 10 minutes to complete the survey. If you are unable to respond yourself, can you please refer this survey to a fellow senior manager? Every response counts!

Please respond to the survey at the website by clicking on this link: "CLICK HERE"

Responses are anonymous, and completely confidential.

Thank you for your valuable time and co-operation.

Professor Peter Booth
Senior Deputy Vice Chancellor
University of Technology, Sydney

Please note: this research is for Matt Peters' doctorate in management accounting, which I am supervising. Please address any comments to Matt Peters on [redacted] or via this email address. If you are unable to connect to the website with the link above, please copy and paste this address into your web browser: http://www.questionpro.com/akira/TakeSurvey?id=777283.

Round 5 (final) – email survey cover letter

18th December 2007

SUBJECT: Senior management involvement in profit planning – best practice survey

To <name>,

I am writing to please remind you about our nationwide survey. Over the past month, we have sent you three separate invitations to participate. To the best of our knowledge, we are yet to receive a response. The study is drawing to a close at the year-end, and this is the last invitation that we will be sending to you. Whilst many firms have responded, we are concerned that non-respondent firms such as yours may have different situations. We are hoping for your response to enhance the accuracy of the results.

We strongly believe this study is important to you because profit planning (i.e., profit budgeting, forecasting and tracking) is a key activity in realising your business strategies. The survey will provide key insights into how senior management need to adapt the style and frequency of their involvement in profit planning depending on key external and internal factors.

An executive report of the best practice findings will be made available to survey participants. It will suggest opportunities for senior management to adapt their frequency and style of involvement in profit planning activities to changing circumstances.

We realise you have limited time, and would like to emphasise the value of your response. If you can, it takes about 10 minutes to complete the survey. If you are unable to respond yourself, can you please refer this survey to a fellow senior manager? Every response counts!

Please respond to the survey at the website by clicking on this link: "CLICK HERE"

Responses are anonymous, and completely confidential.

Thank you for your valuable time and co-operation.

Professor Peter Booth
Senior Deputy Vice Chancellor
University of Technology, Sydney

Please note: this research is for Matt Peters' doctorate in management accounting, which I am supervising. Please address any comments to Matt Peters on [redacted] or via this email address. If you are unable to connect to the website with the link above, please copy and paste this address into your web browser: http://www.questionpro.com/akira/TakeSurvey?id=777283.

Appendix K – Postcard included in questionnaire mail-outs

ADDRESS ON THE FRONT OF THE POSTCARD (REPLY PAID)

Matt Peters
C/o School of Accounting
University of Technology, Sydney
PO Box 123
Broadway NSW 2007

ON THE BACK OF THE POSTCARD

Please return this postcard to let us know you have completed the survey.

Your name_____

Your company name_____

If you would like copy of the executive report, please provide the following:

Your email address_____
Or
Your mailing address_____

Appendix L – Executive report on survey findings

UNIVERSITY OF TECHNOLOGY SYDNEY

Senior Management Involvement in Profit-Planning

- Best Practice Survey

- Executive Report on Survey Findings

- January 2008

- Matt Peters and Professor Peter Booth

profit-planning.research@uts.edu.au

EXECUTIVE SUMMARY

As part of a PhD study, in November and December 2007 we administered a mail and internet survey to senior managers of Australian-based business units from a broad range of industries. The survey asked questions concerning:

1. senior management involvement in profit-planning (frequency and intensity).
2. the extent to which the organization's culture valued flexibility.
3. unpredictable and intense change in key competitive forces (competitors, customers and technology).
4. business unit performance.

We received appropriate usable responses from 331 medium-to-large business units (at least $20 million in annual revenue, and at least 150 people employed).

We found:

1. The highest performing business units of the group that faced *stable* competitive forces had *low* involvement of senior management in profit-planning (i.e. quarterly interactions with low levels of challenge and debate and little strategy reformulation).

   On the other hand, the highest performing business units of the group that faced *radically changing* competitive forces had *high* involvement of senior management in profit-planning (i.e. fortnightly-to-monthly interactions with very high levels of challenge and debate and dynamic strategy reformulation).

2. The highest performing business units in the group that faced *stable* competitive forces had organizational cultures that placed a *low* emphasis on flexibility. On the other hand, the highest performing business units in the group that faced *radically changing* competitive forces had organizational cultures that *highly* valued flexibility.
3. Greater flexibility was strongly associated with greater levels of senior management involvement in profit-planning.

INTRODUCTION

This executive report proceeds in four parts.

Section one outlines the four organizational characteristics studied, namely:

1. involvement of senior management in profit-planning
2. flexibility type organizational culture
3. changing competitive forces
4. business unit performance.

Section two discusses the research model findings, which are the relationships between the four organizational characteristics.

Section three outlines the implications for managers in practice.

Section four summarizes respondent characteristics, such as size and industry.

An appendix provides further information.

1.0 FOUR ORGANIZATIONAL CHARACTERISTICS

1.1 Involvement of senior management in profit-planning – interactive use

A *profit plan* outlines the planned sales revenues, expenses and net income – usually by month. Profit plans are typically set annually (e.g., as part of the annual budget), and may be updated with forecasts. *Profit planning* is an activity that undertakes and compares budgeted, forecasted and actual revenues and expenses by revenue and cost category.

We investigated four dimensions of senior management involvement in profit-planning:

1. frequency of senior management interactions involving profit-planning
2. frequency of profit planning interactions between senior and middle management
3. degree of challenge and debate in profit planning interactions
4. degree of strategic content in profit planning interactions.

We then aggregated the four measures to provide a composite measure called *interactive use of profit-planning*.

1) Frequency of senior management interactions involving profit-planning is how often senior managers meet and discuss profit-planning information. A low frequency means that they only discuss system information infrequently (e.g., annually), whilst a high frequency could mean fortnightly. The table below shows how the 331 responses were spread over the 9-point continuum measurement scales, where 1 = 'low frequency' and 9 = 'high frequency'. The mean response was 6.5, which represents a moderately high frequency level.

Frequency of senior management involvement in profit-planning											
Low frequency ◄								► High frequency			
1	2	3	4	5	6	7	8	9	**Sum**		
3	3	15	16	47	66	79	71	31	**331**	Mean	6.5
1%	1%	5%	5%	14%	20%	24%	21%	9%	**100%**	Std. Deviation	1.7

2) Frequency of profit planning interactions between senior and middle management is how often senior managers meet with middle managers and discuss profit-planning information. A low frequency means that they only discuss system information infrequently (e.g., annually), whilst a high frequency could mean fortnightly. The table below shows how the 331 responses were spread over the 9-point continuum measurement scales, where 1 = 'low frequency' and 9 = 'high frequency'. The mean response was 5.7, suggesting that these meeting occur slightly less often than the abovementioned senior management only meetings.

Frequency of profit-planning interactions between senior and middle management											
Low frequency ◄								► High frequency			
1	2	3	4	5	6	7	8	9	**Sum**		
5	11	31	41	58	59	73	38	15	**331**	Mean	5.7
2%	3%	9%	12%	18%	18%	22%	11%	5%	**100%**	Std. Deviation	1.8

3) Degree of challenge and debate in profit-planning interactions refers to the intensity of profit-planning interactions. A low degree means very limited face-to-face discussion of profit-planning information, whilst at the other end of the continuum, a high degree requires senior (and middle) managers to extensively and collectively debate and challenge action plans. The table below shows how the 331 responses were spread over the 9-point continuum measurement scales, where 1 = 'low degree' and 9 = 'high degree'. The mean response was 6.3, which represents a moderately high level of challenge and debate in each profit-planning interaction.

Degree of challenge and debate in profit-planning interactions											
Low degree ◄								► High degree			
1	2	3	4	5	6	7	8	9	**Sum**		
2	5	6	19	58	85	97	40	19	**331**	Mean	6.3
1%	2%	2%	6%	18%	26%	29%	12%	6%	**100%**	Std. Deviation	1.5

4) Degree of strategic content in profit planning interactions refers to extent to which discussions concerning profit-planning information include consideration of strategically important action plans. A low degree occurs when senior management do not use profit-planning information to discuss strategic changes, whilst, a high degree occurs when senior managers use profit-planning interactions to actively promote and support strategic change. The table below shows how the 331 responses were spread over the 9-point continuum measurement scales, where 1 = 'low degree' and 9 = 'high degree'. The mean response was 6.3, which represents a moderately high level of strategic content in each profit-planning interaction.

Degree of strategic content in profit-planning interactions											
Low degree ◄——————————► High degree											
1	2	3	4	5	6	7	8	9	**Sum**		
3	5	9	16	52	95	86	48	17	**331**	Mean	6.3
1%	2%	3%	5%	16%	29%	26%	15%	5%	**100%**	Std. Deviation	1.5

Interactive use of profit-planning systems is the composite of the four above dimensions - it is the average of the four. It is the over-arching nature of senior management involvement in profit-planning. This concept was first researched by Simons (1995)[i] and generally refers to the extent to which senior management attention to profit-plans demands attention from subordinates throughout the company so that profit-planning interactions collect and generate information relating to strategic uncertainties. Interactive use of profit-plans provides an opportunity for senior management to debate and challenge underlying data, assumptions and action plans. The level of interactive use can range from low to high:

- *High interactive use* triggers revised action plans with resulting re-forecasting of future states based on revised current information. The top manager leads frequently recurring meetings that require the regular attention of all levels of management for continual challenge and debate of strategically important action plans.
- *Low interactive use* typically means that budgets are prepared and presented by staff specialists to meet the financial goals set by top management, who subsequently use them to manage by exception the implementation of the intended strategies by tracking variances from the preset goals.

The table below shows how the 331 responses were spread over the 9-point continuum measurement scales, where 1 = 'low interactive use' and 9 = 'high interactive use'. The mean response was 6.1, which represents a moderately high level of interactive use.

Overall interactive use of profit-planning systems											
Low ◄——————————► High											
1	2	3	4	5	6	7	8	9	**Sum**		
3	5	6	23	71	89	86	37	11	**331**	Mean	6.1
1%	2%	2%	7%	21%	27%	26%	11%	3%	**100%**	Std. Deviation	1.5

1.2 Flexibility type organizational cultures

Organizational culture is defined as "a system of shared values (that defines what is important) and norms that define appropriate attitudes and behaviours for organizational members (how to feel and behave)". Whilst cultural artefacts such as myths and rituals are organization specific, organizational values and norms vary by organization and can be measured by surveys. We used the Denison Organizational Culture Survey, which has been widely published and validated in numerous instances and settings[ii].

Flexibility type cultures value spontaneity, change, openness, adaptability and responsiveness. There are two dimensions to flexibility type cultures:

1. *Adaptability* refers to external orientation, and is reflected by: creating change, customer focus, and organizational learning.
2. *Involvement* refers to internal integration, and is reflected by: employee empowerment, team orientation, and capability development.

These elements of flexibility are covered further in Appendix A. The table below shows how the 331 responses were spread over the 9-point continuum measurement scales, where 1 = 'low degree' and 9 = 'high degree'. The mean response was 6.6, which represents a moderately high degree of flexibility.

Flexibility culture											
Low degree	◄							►	High degree		
1	2	3	4	5	6	7	8	9	**Sum**		
0	4	1	10	40	90	115	63	8	**331**	Mean	6.6
0%	1%	0%	3%	12%	27%	35%	19%	2%	**100%**	Std. Deviation	1.2

1.3 Changing competitive forces

The survey asked questions about three external competitive forces that business units face:

1. *Technology* refers to the development of new production techniques and methods, innovation in materials and products, and general trends in research and science.
2. *Customers* refer to those companies or individuals that purchase the products made by the business unit, and include companies that acquire the products for resale, as well as final customers.
3. *Competitors* include the companies, products, and competitive tactics: companies that make substitute products, products that compete with the business unit and other companies in the same industry.

For each of these three competitive forces, measures were taken concerning two types of change encountered:

1. *Intensity of change* refers to the size of change, or the level of stability among changes. The intensity of change increases when the proximity of the change to current circumstances decreases, which can range from stable, through incremental to discontinuous change.
2. *Unpredictability* reflects the extent to which cause-effect relationships concerning competitive forces are incomplete. The unpredictability dimension can range from predictable to unpredictable. When predictable, past experiences can be readily extrapolated into the future (e.g., seasonal factors). When unpredictable, data may simply not be available, the future may be seen as having trend breaks or discontinuities, or product life cycles may be ambiguous and feedback loops may be long in duration.

In total we used six measures to gauge the level of change in a business unit's competitive forces[iii]. The two change dimensions of intensity and unpredictability were measures for each of the three forces (please see Appendix B for further information). The table below shows how the 331 responses were spread over the 9-point

continuum measurement scales, where 1 = ‘most stable’ and 9 = ‘most radical’. The mean response was 4.5, which represents a medium level of change in competitive forces.

Changing competitive forces											
Most stable	◄							►	Most radical		
1	2	3	4	5	6	7	8	9	**Sum**		
2	11	58	99	85	61	15	0	0	**331**	Mean	4.5
1%	3%	17%	30%	26%	18%	5%	0%	0%	**100%**	Std. Deviation	1.2

Based on a composite measure we divided the 331 business units into four categories of external organizational environments:

1. *Stable* environments are static, simple and very predictable.
2. *Low change* environments are slowly changing in a relatively predictable manner.
3. *Moderate change* environments have stable and identifiable competitors and players, linear and moderately predictable change.
4. *Radical change* environments have, ambiguous and shifting players, nonlinear and unpredictable change.

The above four categories are used in the later section concerning the findings of the research model.

1.4 Business unit performance

The research design used self-reported subjective measures of business unit performance (which have been found in the past to correlate highly with objective measures). Profitability and market performance (market share and sales growth) are widely recognised as the two most important indicators of financial performance.

Competitive advantage is often operationalised in terms of superior performance, which is measured as relative to the industry average. Relative measures also fulfil the requirement to control for differences in performance that are due to industry, environment, and strategy effects.

Thus the survey asked respondents to rate the performance of their business unit relative to competitors for profitability, market share and sales growth. In addition, measurement of business unit performance must recognise that different business units have different organizational imperatives and associated performance measures. Accordingly, we also asked respondents to weight the importance of the three measures for the unique situation of their own business unit.

The table below shows the weighted, industry relative based measures of business unit performance. The table shows how the 331 responses were spread over the 9-point continuum measurement scales, where 1 = ‘low performance’ and 9 = ‘high performance’. The mean response was 6.4.

Business unit performance											
Low performance ◄								► High performance			
1	2	3	4	5	6	7	8	9	**Sum**		
2	2	11	16	54	80	90	52	24	**331**	Mean	6.4
1%	1%	3%	5%	16%	24%	27%	16%	7%	**100%**	Std. Deviation	1.5

2.0 FINDINGS: RESEARCH MODEL

Based on the four organizational characteristics discussed above, there are three sets of meaningful relationships in the research model

1. how different levels of interactive use of profit-plans are associated with business unit performance
2. the effects of flexibility type cultural traits on business unit performance
3. the effects of flexibility cultural traits on interactive use of profit-plans.

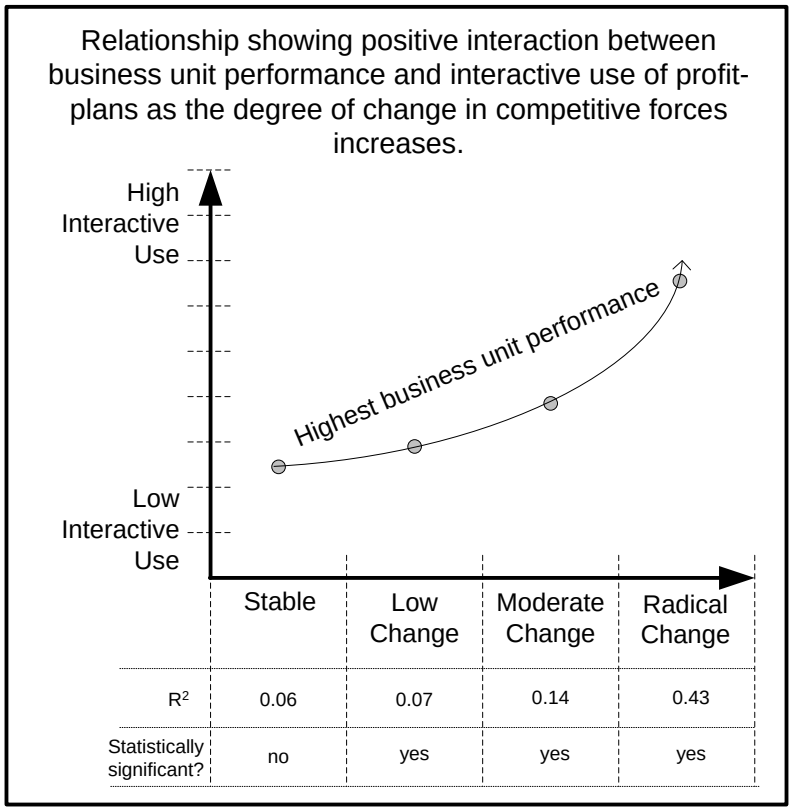
2.1 How different levels of interactive use of profit-plans are associated with business unit performance

We found no evidence of a universal relationship between the level of interactive use of profit-plans and business unit - i.e., less or more interactive use of profit-plans does not *generally* lead to greater business unit performance.

Instead, we found that the best performing business units had a match between the level of interactive use of profit-plans and their type of change in competitive forces. These performance-maximizing matches differed across the four categories of change in competitive forces. As the figure below shows, stable environments require the lowest interactive use, and radically changing environments require the greatest interactive use.

The R^2 and statistical significance tests highlight the fact that the strength of the relationships in statistical terms increases as the level of change in competitive forces increases:

- In *stable conditions*, low interactive use is only loosely associated with high business unit performance. There may be only very minor adverse performance impacts from having a suboptimal level of interactive use in stable conditions.
- In *low change conditions*, there is a small increase in statistical significance, such that low interactive use is detectably related to highest business unit performance.
- In *moderate change conditions*, moderate interactive use is significantly associated with high business unit performance.
- In *radically changing conditions* there is a very significant relationship between high interactive use of profit-plans and high firm performance; and conversely, low levels of interactive use of profit-plans are associated with low business unit performance.



We provide two reasons that serve to summarize these relationships:

1. Greater change in competitive forces requires the organization to undertake more learning for the purposes of adaptation. The greater the level of interactive use of a profit-plan, the greater the amount of organizational learning orchestrated by senior management.
2. Greater change in competitive forces requires the organization to make dynamic alterations to the formulation and implementation of business strategies. Using profit-planning information to debate and challenge strategic uncertainties more frequently provide opportunities for senior managers to have greater and timelier strategic choices.

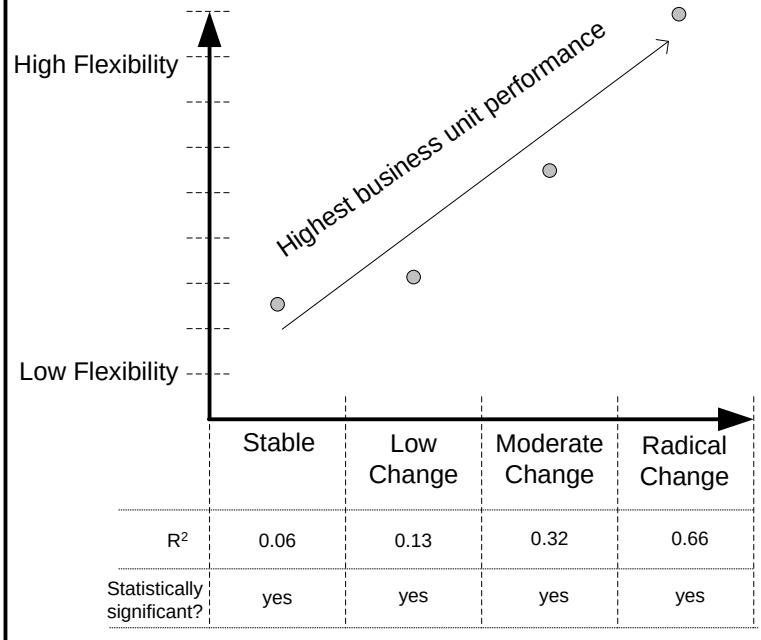
2.2 The effects of flexibility type cultural traits on business unit performance.

We found a universal relationship between the level of flexibility and business unit performance - i.e., less flexibility is associated with lower business unit performance, and higher flexibility is associated with higher business unit performance. This relationship has a correlation coefficient of 0.41, suggesting that this is a noteworthy relationship. However, in addition, we found that the best performing business units had a match between the level of flexibility and the change type of their competitive forces. These performance-maximizing matches differed across the four categories of change in competitive forces. As the figure below shows, stable settings require the lowest levels of flexibility, and radically changing settings require the greatest.

The R^2 and statistical significance tests highlight the fact that the strength of the relationships in statistical terms increases as the level of change in competitive forces increases:

- In *stable* environments, lower flexibility is weakly associated with high business unit performance.
- In *low change environments*, low flexibility is also weakly associated with high business unit performance.
- In *moderate change environments*, moderate flexibility is significantly associated with high business unit performance.
- In *radically changing environments* there is a very significant relationship between very high flexibility and high firm performance; and conversely, low levels of flexibility are strongly associated with low business unit performance.

Relationship showing positive interaction between business unit performance and flexibility type cultures as the degree of change in competitive forces increases.



	Stable	Low Change	Moderate Change	Radical Change
R^2	0.06	0.13	0.32	0.66
Statistically significant?	yes	yes	yes	yes

The two dimensions that make up flexibility can explain these relationships: adaptability and involvement. Adaptability refers to external orientation, and is reflected by: creating change, customer focus, and organizational learning. Involvement refers to internal integration, and is reflected by: employee empowerment, team orientation, and capability development. These traits associate positively with requirements to change the organization in response to changes in competitive forces. The greater the changes in competitive forces, the more valuable will be a culture that fosters complementary adaptation and has employees involved in the consequent internal re-integration.

2.3 The effects of flexibility type cultural traits on profit-planning use.

Given that higher interactive use of profit-plans and higher flexibility both drive greatest firm performance as the level of change in competitive forces increases, it follows that there should be a relationship between interactive use and flexibility cultures. Indeed, greater flexibility was associated with greater interactive use, with a correlation coefficient of 0.59.

Flexibility type cultures value spontaneity, change, openness, adaptability and responsiveness. These traits associate positively with the information processing related characteristics of interactive use of profit-planning information, which include: exchanges of information…lateral communication…open channels of information…free flow of information…information exchange…and strategic decision-making.

3.0 MANAGERIAL IMPLICATIONS

There are two implications that could benefit managers:

1. Managers should match the level of interactive use of profit-plans to the level of change in competitive forces. By matching the level of interactive use of profit-plans managers can maximize the performance of the business unit. The table below illustrates this matching pattern:

	Change in competitive forces			
	Stable	Low change	Moderate change	Radical change
Senior management interactions	quarterly to monthly	every one to two months	every one to two months	fortnightly to monthly
Senior and middle management interactions	quarterly to monthly	every one to two months	every one to two months	fortnightly to monthly
Degree of challenge and debate	low	moderate	moderate	very high
Degree of strategic content	low	moderate	moderate	very high

2. It is well known that organizational cultures can be difficult to change – which is why it often considered a key source of sustainable competitive advantage. There is, however, a strong pay-off from matching the level to which the organization values flexibility with the level of change in competitive forces. This managerial implication can be further complicated for business units that are expecting to face a decrease or increase to the level of change in competitive forces.

4.0 RESPONDENT CHARACTERISTICS

4.1 Size of business units

We only analysed medium-to-large sized business units. Two criteria were used to determine the minimum size of a business unit for analysis: (1) annual sales of at least $20 million, and (2) at least 150 people employed. As the two tables show, annual revenue ranged from $21m to $20bn, and number of employees ranged from 150 to 40,000.

Annual revenue: $m												
21 - 60	61 - 80	81 - 100	101 - 130	131 - 180	181 - 280	281 - 480	481 - 708	709 - 1500	1500 - 20000	**Sum**		
33	33	33	33	33	33	33	33	33	34	**331**	Mean	804
10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	**100%**	Std. Deviation	2105

Employees												
150 - 200	201 - 250	251 - 300	301 - 400	401 - 500	501 - 700	701 - 1000	1001 - 1500	1501 - 3000	3001 - 40000	**Sum**		
33	33	33	33	33	33	33	33	33	34	**331**	Mean	1510
10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	**100%**	Std. Deviation	3823

4.2 Industries

Of the ten industry types, manufacturing made up the majority (33%) of responses. As the table shows there is a broad spread across industries. It is important to note that the competitive forces (in terms of unpredictability and intensity of change) can differ greatly between firms within an industry.

Industry classification		
	Frequency	Percent
Manufacturing.	112	33.8%
Services.	59	17.8%
Wholesale Trade.	29	8.8%
Finance, Insurance and Real Estate.	25	7.6%
Public Administration.	24	7.3%
Mining.	23	6.9%
Construction.	20	6.0%
Retail Trade.	16	4.8%
Agriculture, Forestry and Fishing.	12	3.6%
Transportation, Communications, Electric, Gas & Sanitary Services.	11	3.3%
Total	331	100.0%

4.3 Business unit ownership

As shown in the table below, the majority of business units were foreign owned (42%). Privately held firms made up 32% and the remaining 25% were listed on the ASX. All business units were at least three years old, because start-up businesses have been found to use profit-planning systems differently compared to mature business units.

Business unit ownership		
	Frequency	Percent
Foreign owned.	140	42.3%
Privately held in Australia.	107	32.3%
Listed on the Australian Stock Exchange.	84	25.4%
Total	331	100.0%

4.4 Role of respondents

Of the 333 respondents, 299 were in senior management (90%) and 32 (10%) were in middle management. Only those middle management roles deemed to have the necessary visibility to provide valid responses to the survey were included. A breakdown by role is provided in the table below.

All respondents had been with the business unit for at least one year. All business units had top manager tenure of at least one year, because it has been shown that new top managers temporarily use profit-planning systems in an abnormal style as they use them to develop their understanding of the business unit.

Role of respondents		
	Frequency	Percent
CFO / Finance Director	91	27.5%
CEO / Managing Director	86	26.0%
General Manager	35	10.6%
Financial Controller	30	9.1%
Senior Finance Manager	26	7.9%
Finance Manager	20	6.0%
Senior Manager - Other	13	3.9%
Planning Manager	12	3.6%
Other	10	3.0%
Director	5	1.5%
Head Of Department	3	0.9%
Total	331	100.0%

4.5 Profit-planning performance

As the table below shows; 50% of the business units achieved better than budget last financial year; 31% finished below budget; and 19% were on budget.

Profit planning performance last financial year		
	Frequency	Percent
Better than budget.	165	49.8%
Below budget.	102	30.8%
On budget.	64	19.3%
Total	331	100.0%

APPENDITURE A – FLEXIBILITY TYPE ORGANIZATIONAL CULTURE ANALYSIS

The eighteen statements below were used to gauge the level of flexibility type organizational culture. Survey respondents were asked the extent to which they agreed with each statement, with 1 being “strongly disagree” and 9 being “strongly agree”.

Dimension / sub-dimension	Statement
Involvement	
Empowerment	Decisions are usually made at the level where the best information is available.
	Information is widely shared so that everyone can get the information he or she needs when it is needed.
	Everyone believes that he or she can have a positive impact.
Team orientation	Working in this organization is like being part of a team.
	This organization relies on horizontal control and coordination to get work done, rather than hierarchy.
	Teams are the primary building blocks of this organization.
Capability development	This organization is constantly improving compared with its competitors in many dimensions.
	This organization continuously invests in the skills of employees.
	The capability of people in this organization is viewed as an important source of competitive advantage.
Adaptability	
Creating change	This organization is very responsive and changes easily.
	This organization responds well to competitors and other changes in the business environment.
	This organization continually adopts new and improved ways to work.
Customer focus	Customer comments and recommendations often lead to changes in this organization.
	Customer input directly influences our decisions.
	The interests of the final customer rarely get ignores in our decisions.
Organizational learning	We view failure as an opportunity for learning and improvement.
	This organization encourages and rewards those who take risk.
	We make certain that we coordinate our actions and efforts between different units in this organization.

APPENDITURE B – CHANGING COMPETITIVE FORCES ANALYSIS

The six statements below were used to gauge the level of change in the three competitive forces. Survey respondents were asked the extent to which they agreed with each statement, with 1 being “strongly disagree” and 9 being “strongly agree”.

1. CUSTOMERS

a) *Intensity:* We cater to many of the same customers that we used to in the past.

b) *Unpredictability:* It is very difficult to predict any changes in this market place.

2. TECHNOLOGY

a) *Intensity:* A large number of new product ideas have been made possible through technological breakthroughs in our industry.

b) *Unpredictability:* It is very difficult to forecast where the technology in our industry will be in two to three years.

3. COMPETITORS

a) *Intensity:* Our competitors are the same as those from the past.

b) *Unpredictability:* It is very difficult to predict any changes in who might be our future competitors.

References

[i] Simons, R. (1995). Levers of control. Harvard University Press, Boston.

[ii] Denison, D. R. & Neale, W. S. (1996). Denison organizational culture survey. Aviat, Ann Harbor, MI.

[iii] Volberda, H. W. (1998). Building the flexible firm. Oxford University Press, New York.

Appendix M – Correlation matrix of all key measures

n=331	snrfrq1	snrfrq2	snrfrq3	snrfrq4	midfrq1	midfrq2	midfrq3	midfrq4	chall1	chall2	chall3	chall4	chall5	strat1	strat2	strat3	strat4	strat5	team1	team2	team3	capdev1
snrfrq2	***0.61***																					
snrfrq3	***0.47***	***0.58***																				
snrfrq4	***0.45***	***0.54***	***0.58***																			
midfrq1	***0.67***	***0.61***	***0.56***	***0.48***																		
midfrq2	***0.42***	***0.41***	***0.47***	***0.46***	***0.63***																	
midfrq3	***0.70***	***0.47***	***0.54***	***0.42***	***0.65***	***0.55***																
midfrq4	***0.44***	***0.54***	***0.63***	***0.55***	***0.66***	***0.68***	***0.61***															
chall1	***0.38***	***0.52***	***0.41***	***0.40***	***0.42***	***0.40***	***0.35***	***0.44***														
chall2	***0.46***	***0.61***	***0.59***	***0.54***	***0.54***	***0.54***	***0.45***	***0.54***	***0.46***													
chall3	***0.44***	***0.51***	***0.51***	***0.40***	***0.42***	***0.44***	***0.48***	***0.49***	***0.47***	***0.53***												
chall4	***0.42***	***0.47***	***0.52***	***0.54***	***0.37***	***0.33***	***0.42***	***0.42***	***0.48***	***0.45***	***0.48***											
chall5	***0.44***	***0.61***	***0.54***	***0.50***	***0.47***	***0.45***	***0.43***	***0.50***	***0.52***	***0.65***	***0.62***	***0.49***										
strat1	***0.29***	***0.49***	***0.46***	***0.37***	***0.38***	***0.35***	***0.35***	***0.40***	***0.48***	***0.47***	***0.46***	***0.42***	***0.35***									
strat2	***0.31***	***0.44***	***0.49***	***0.38***	***0.35***	***0.37***	***0.31***	***0.41***	***0.41***	***0.49***	***0.54***	***0.43***	***0.44***	***0.51***								
strat3	***0.36***	***0.48***	***0.59***	***0.43***	***0.40***	***0.35***	***0.37***	***0.41***	***0.43***	***0.52***	***0.45***	***0.54***	***0.45***	***0.51***	***0.58***							
strat4	***0.35***	***0.39***	***0.41***	***0.43***	***0.34***	***0.33***	***0.43***	***0.49***	***0.45***	***0.39***	***0.57***	***0.51***	***0.51***	***0.42***	***0.37***	***0.42***						
strat5	***0.34***	***0.40***	***0.47***	***0.39***	***0.31***	***0.28***	***0.36***	***0.34***	***0.40***	***0.48***	***0.53***	***0.51***	***0.53***	***0.41***	***0.53***	***0.53***	***0.56***					
team1	***0.32***	***0.40***	***0.46***	***0.41***	***0.34***	***0.26***	***0.31***	***0.35***	***0.36***	***0.42***	***0.24***	***0.38***	***0.36***	***0.34***	***0.31***	***0.37***	***0.21***	***0.31***				
team2	***0.19***	***0.27***	***0.26***	***0.21***	***0.20***	***0.19***	***0.24***	***0.24***	***0.25***	***0.30***	***0.25***	***0.21***	***0.29***	***0.24***	***0.23***	***0.32***	***0.22***	***0.32***	***0.52***			
team3	***0.23***	***0.33***	***0.41***	***0.34***	***0.32***	***0.23***	***0.27***	***0.34***	***0.34***	***0.37***	***0.21***	***0.31***	***0.35***	***0.31***	***0.32***	***0.30***	***0.22***	***0.32***	***0.82***	***0.47***		
capdev1	***0.21***	***0.30***	***0.38***	***0.33***	***0.32***	***0.22***	***0.27***	***0.32***	***0.29***	***0.35***	***0.26***	***0.37***	***0.29***	***0.36***	***0.32***	***0.41***	***0.32***	***0.38***	***0.56***	***0.49***	***0.52***	
capdev2	***0.20***	***0.28***	***0.33***	***0.27***	***0.26***	***0.17***	***0.21***	***0.27***	***0.25***	***0.32***	***0.20***	***0.32***	***0.22***	***0.28***	***0.32***	***0.35***	***0.23***	***0.31***	***0.50***	***0.38***	***0.48***	***0.60***
capdev3	***0.18***	***0.31***	***0.39***	***0.25***	***0.25***	***0.19***	***0.20***	***0.28***	***0.28***	***0.36***	***0.23***	***0.32***	***0.29***	***0.28***	***0.29***	***0.35***	***0.22***	***0.31***	***0.51***	***0.42***	***0.52***	***0.57***
empow1	***0.34***	***0.38***	***0.40***	***0.31***	***0.36***	***0.24***	***0.39***	***0.37***	***0.34***	***0.37***	***0.37***	***0.36***	***0.40***	***0.40***	***0.37***	***0.41***	***0.31***	***0.37***	***0.53***	***0.47***	***0.42***	***0.53***
empow2	***0.31***	***0.35***	***0.42***	***0.32***	***0.35***	***0.27***	***0.37***	***0.41***	***0.39***	***0.48***	***0.37***	***0.36***	***0.42***	***0.34***	***0.36***	***0.39***	***0.34***	***0.43***	***0.58***	***0.42***	***0.54***	***0.53***
empow3	***0.27***	***0.38***	***0.46***	***0.32***	***0.31***	***0.22***	***0.31***	***0.34***	***0.32***	***0.39***	***0.30***	***0.39***	***0.36***	***0.34***	***0.37***	***0.43***	***0.26***	***0.30***	***0.62***	***0.43***	***0.53***	***0.53***
change1	***0.22***	***0.26***	***0.31***	***0.27***	***0.22***	***0.20***	***0.29***	***0.30***	***0.23***	***0.29***	***0.33***	***0.34***	***0.34***	***0.29***	***0.32***	***0.32***	***0.37***	***0.33***	***0.45***	***0.31***	***0.37***	***0.51***
change2	***0.22***	***0.28***	***0.40***	***0.32***	***0.25***	***0.20***	***0.26***	***0.28***	***0.26***	***0.33***	***0.26***	***0.35***	***0.34***	***0.31***	***0.31***	***0.32***	***0.30***	***0.29***	***0.52***	***0.28***	***0.42***	***0.57***
change3	***0.24***	***0.28***	***0.32***	***0.29***	***0.29***	***0.23***	***0.26***	***0.32***	***0.26***	***0.35***	***0.30***	***0.28***	***0.34***	***0.33***	***0.34***	***0.35***	***0.30***	***0.28***	***0.53***	***0.35***	***0.47***	***0.54***
custom1	***0.16***	***0.21***	***0.24***	***0.19***	***0.22***	***0.25***	***0.22***	***0.29***	***0.19***	***0.25***	***0.25***	***0.24***	***0.24***	***0.23***	***0.21***	***0.22***	***0.24***	***0.23***	***0.40***	***0.28***	***0.35***	***0.40***
custom2	***0.14***	***0.14***	***0.20***	***0.14***	***0.20***	***0.23***	***0.21***	***0.27***	***0.14***	***0.18***	***0.23***	***0.23***	***0.19***	***0.23***	***0.20***	***0.18***	***0.23***	***0.22***	***0.37***	***0.28***	***0.37***	***0.40***
custom3	***0.17***	***0.22***	***0.21***	***0.18***	***0.20***	***0.15***	***0.14***	***0.21***	***0.12***	***0.23***	***0.18***	***0.26***	***0.22***	***0.26***	***0.23***	***0.22***	***0.12***	***0.25***	***0.43***	***0.32***	***0.41***	***0.39***
learn1	***0.25***	***0.33***	***0.35***	***0.25***	***0.33***	***0.19***	***0.33***	***0.35***	***0.30***	***0.34***	***0.28***	***0.37***	***0.30***	***0.32***	***0.31***	***0.38***	***0.28***	***0.33***	***0.49***	***0.37***	***0.45***	***0.53***
learn2	***0.22***	***0.34***	***0.38***	***0.31***	***0.31***	***0.23***	***0.34***	***0.40***	***0.29***	***0.33***	***0.33***	***0.41***	***0.39***	***0.34***	***0.28***	***0.33***	***0.33***	***0.27***	***0.45***	***0.33***	***0.40***	***0.48***
learn3	***0.28***	***0.37***	***0.36***	***0.27***	***0.31***	***0.21***	***0.29***	***0.32***	***0.30***	***0.33***	***0.30***	***0.35***	***0.32***	***0.29***	***0.27***	***0.37***	***0.27***	***0.31***	***0.60***	***0.44***	***0.54***	***0.51***
markint	-0.05	*-0.12*	-0.06	-0.06	-0.04	-0.02	0.01	0.02	***-0.15***	*-0.12*	-0.07	*-0.10*	***-0.19***	-0.04	-0.01	-0.01	0.02	0.03	***-0.17***	-0.07	***-0.19***	-0.02
markpred	0.04	*0.12*	0.09	0.07	0.01	0.04	0.07	*0.11*	0.07	0.08	***0.22***	***0.19***	***0.15***	0.04	***0.17***	*0.13*	***0.21***	***0.18***	0.06	*0.12*	0.01	0.06
techint	0.08	*0.09*	*0.10*	0.06	0.09	0.08	0.06	***0.15***	0.02	0.08	***0.14***	*0.09*	0.04	***0.16***	***0.19***	0.06	*0.13*	***0.15***	***0.14***	***0.15***	***0.17***	***0.20***
techpred	0.06	0.06	0.05	0.02	*0.12*	0.06	*0.12*	*0.10*	-0.02	0.04	***0.19***	*0.12*	*0.10*	0.09	*0.11*	*0.12*	***0.23***	***0.20***	0.03	0.09	0.05	*0.09*
compint	0.08	0.02	0.03	0.05	0.08	0.02	0.07	0.05	-0.01	0.02	0.01	-0.01	0.01	-0.03	-0.07	0.03	*0.11*	0.03	-0.02	-0.05	-0.02	-0.05
comppred	*0.09*	*0.09*	0.07	0.03	0.07	0.05	*0.09*	*0.10*	0.09	*0.11*	***0.18***	*0.11*	***0.14***	0.06	0.01	0.04	***0.17***	*0.13*	0.04	0.07	0.07	0.05
sales	***0.14***	***0.17***	***0.23***	***0.19***	***0.21***	***0.15***	***0.17***	***0.19***	***0.20***	***0.15***	***0.20***	***0.20***	***0.16***	***0.26***	***0.25***	***0.25***	***0.23***	***0.22***	***0.25***	***0.32***	***0.27***	***0.48***
markshar	***0.12***	***0.17***	***0.20***	***0.18***	***0.20***	***0.16***	***0.15***	***0.16***	***0.20***	***0.18***	***0.21***	***0.25***	***0.15***	***0.31***	***0.25***	***0.22***	***0.23***	***0.24***	***0.23***	***0.26***	***0.25***	***0.41***
profit	***0.19***	***0.20***	***0.24***	***0.20***	***0.28***	***0.12***	***0.21***	***0.18***	***0.15***	***0.23***	***0.19***	***0.29***	***0.15***	***0.29***	***0.28***	***0.29***	***0.20***	***0.29***	***0.31***	***0.30***	***0.27***	***0.50***

2-tailed significance levels: ***0.01*** ; *0.05* ; *0.10* .

Appendix M – Correlation matrix of all key measures (continued)

	capdev2	capdev3	empow1	empow2	empow3	change1	change2	change3	custom1	custom2	custom3	learn1	learn2	learn3	markint	markpred	techint	techpred	compint	comppred	sales	markshar
snrfrq2																						
snrfrq3																						
snrfrq4																						
midfrq1																						
midfrq2																						
midfrq3																						
midfrq4																						
chall1																						
chall2																						
chall3																						
chall4																						
chall5																						
strat1																						
strat2																						
strat3																						
strat4																						
strat5																						
team1																						
team2																						
team3																						
capdev1																						
capdev2																						
capdev3	***0.67***																					
empow1	***0.45***	***0.43***																				
empow2	***0.56***	***0.53***	***0.63***																			
empow3	***0.52***	***0.52***	***0.60***	***0.63***																		
change1	***0.40***	***0.31***	***0.51***	***0.46***	***0.48***																	
change2	***0.41***	***0.41***	***0.52***	***0.47***	***0.49***	***0.78***																
change3	***0.49***	***0.38***	***0.54***	***0.56***	***0.48***	***0.69***	***0.67***															
custom1	***0.45***	***0.38***	***0.33***	***0.37***	***0.37***	***0.45***	***0.49***	***0.51***														
custom2	***0.42***	***0.39***	***0.26***	***0.31***	***0.30***	***0.36***	***0.40***	***0.44***	***0.80***													
custom3	***0.46***	***0.45***	***0.35***	***0.30***	***0.37***	***0.34***	***0.38***	***0.40***	***0.57***	***0.62***												
learn1	***0.52***	***0.49***	***0.52***	***0.46***	***0.48***	***0.51***	***0.46***	***0.47***	***0.38***	***0.33***	***0.40***											
learn2	***0.41***	***0.42***	***0.44***	***0.44***	***0.43***	***0.51***	***0.49***	***0.47***	***0.34***	***0.33***	***0.32***	***0.62***										
learn3	***0.48***	***0.51***	***0.54***	***0.54***	***0.49***	***0.40***	***0.44***	***0.51***	***0.33***	***0.29***	***0.40***	***0.56***	***0.46***									
markint	-0.03	-0.09	-0.01	0.00	-0.05	0.01	-0.06	-0.06	*-0.13*	***-0.16***	***-0.17***	-0.01	-0.03	***-0.13***								
markpred	0.08	-0.02	***0.14***	0.08	0.07	***0.24***	***0.15***	***0.16***	***0.14***	0.05	0.02	***0.16***	***0.20***	0.08	-0.04							
techint	***0.23***	***0.14***	***0.21***	***0.18***	*0.11*	***0.18***	***0.20***	***0.25***	***0.27***	***0.23***	***0.21***	*0.12*	***0.21***	***0.18***	-0.08	***0.20***						
techpred	0.08	0.05	***0.18***	0.08	0.07	***0.14***	***0.14***	***0.16***	***0.19***	0.09	0.09	0.08	***0.22***	***0.15***	0.04	***0.45***	***0.48***					
compint	-0.04	-0.03	0.00	0.04	-0.02	0.05	0.01	0.00	-0.01	-0.03	-0.05	-0.04	0.02	-0.06	***0.19***	-0.04	0.07	***0.14***				
comppred	0.08	0.05	0.08	0.05	0.04	*0.11*	0.07	*0.10*	***0.15***	0.07	0.02	0.09	*0.11*	0.07	-0.01	***0.36***	***0.16***	***0.40***	***0.17***			
sales	***0.32***	***0.43***	***0.31***	***0.23***	***0.31***	***0.27***	***0.35***	***0.27***	***0.24***	***0.26***	***0.25***	***0.31***	***0.33***	***0.22***	-0.03	0.03	***0.13***	0.05	*-0.11*	-0.02		
markshar	***0.20***	***0.34***	***0.28***	***0.20***	***0.26***	***0.24***	***0.29***	***0.21***	***0.19***	***0.23***	***0.20***	***0.26***	***0.30***	***0.17***	-0.03	0.06	***0.14***	0.03	-0.09	-0.04	***0.81***	
profit	***0.28***	***0.31***	***0.39***	***0.22***	***0.33***	***0.33***	***0.37***	***0.33***	***0.24***	***0.26***	***0.30***	***0.34***	***0.36***	***0.26***	-0.01	*0.11*	***0.21***	***0.13***	-0.03	0.00	***0.58***	***0.60***

2-tailed significance levels: ***0.01*** ; *0.05* ; *0.10* .

REFERENCES

Abernathy, W. J., and Utterback, J. M. (1978). Patterns of industrial innovation. *Technology Review, 80(7):* 40-47.

Abernathy, W. J. and Clark, K. B. (1985). Mapping the winds of creative destruction. *Research Policy, 14:* 3-22.

Abernethy, M. A. and Brownell, P. (1997). Management control systems in research and development organizations: the role of accounting, behavior and personnel controls. *Accounting, Organizations and Society, 22(3-4):* 223-248.

Abernethy, M. A. and Brownell, P. (1999). The role of budgets in organizations facing strategic change: an exploratory study. *Accounting, Organizations and Society, 24:* 189-204.

Abernethy, M. A. and Guthrie, C. H. (1994). An empirical assessment of the fit between strategy and management information systems design. *Accounting and Finance, 34:* 49–66.

Acedo, F. J., Barroso, C. and Galan, J. L. (2006). The resource-based theory: dissemination and main trends. *Strategic Management Journal, 27:* 621-636.

Ahrens, T. and Chapman, C. S. (2004). Accounting for flexibility and efficiency: a field study of management control systems in a restaurant chain. *Contemporary Accounting Research, 21(2):* 271-301.

Ahrens, T. and Mollona, M. (2007). Organizational control as cultural practice - a shop floor ethnography of a Sheffield steel mill. *Accounting, Organizations and Society, 32:* 305-331.

Aldrich, H. E. (1979). *Organizations and environments.* Englewood Cliffs, NJ: Prentice-Hall.

Amit, R. and Schoemaker, P. J. (1993). Strategic assets and organizational rent. *Strategic Management Journal, 14:* 33–46.

Anand, G. and Ward, P. T. (2004). Fit, flexibility and performance in manufacturing: coping with dynamic environments. *Production and Operations Management, 13(4):* 369-385.

Anderson, J. C. and Gerbing, D. W. (1988). Structural equation modeling in practice: a review and recommended two step approach. *Psychological Bulletin, 103: 411-423.*

Ang, S. and Cummins, L. (1997). Strategic response to institutional influences on information systems outsourcing. *Organization Science, 8*: 235-255.

Anthony, R. N. (1965). *Planning and control systems: framework for analysis.* Boston: Graduate School of Business Administration, Harvard University.

Arend, L. (1999). *Patterns of democracy.* New Haven: Yale University Press.

Arend, R. J. (2003). Revisiting the logical and research considerations of competitive advantage. *Strategic Management Journal, 24):* 279-284.

Argyris, C. (1977). Organization learning and management information systems. *Accounting, Organizations and Society, 2:* 113-129.

Argyris, C. and Schon, D. (1978). *Organizational learning.* Reading, MA: Addison-Wesley.

Armstrong, P., Marginson, P., Edwards, P. and Purcell, J. (1996). Budgetary control and the labour force: findings from a survey of large British companies. *Management Accounting Research, 7:* 1-23.

Atkinson, A. A., Balakrishnan, R., Booth, P., Cote, J. M., Groot, T., Malmi, T., Roberts, H., Uliana, E. and Wu, A. (1997). New directions in management accounting research. *Journal of Management Accounting Research, 9:* 79–108.

Auster, E. and Choo, C. W. (1993). Environmental scanning by CEOs in two Canadian industries. *Journal of the American Society for Information Science, 44(4):* 194-203.

Awasthi, V. N., Chow, C. W. and Wu, A. (1998). Performance measures and resource expenditure choices in a teamwork environment: the effects of national culture. *Management Accounting Research, 9:* 119-138.

Babakus, E., Cravens, D., Grant, K., Ingram, T. and LaForge, R. (1996). Investigating the relationships among sales, management control, sales territory design, salesperson performance, and sales organization effectiveness. *International Journal of Research in Marketing, 13:* 345-363.

Babbie, E. (1994). *The practice of social research.* Seventh Edition, Belmont, CA: Wadsworth Publishing Company.

Bagozzi, R. P. (1980). *Causal models in marketing.* New York: John Wiley and Sons.

Baines, A. and Langfield-Smith, K. (2003). Antecedents to management accounting change: a structural equation approach. *Accounting, Organizations and Society, 28(7-8):* 675-698.

Barley, S. R.. (1983). Semiotics and the study of occupational and organizational cultures. *Administrative Science Quarterly, 28:* 393-413.

Barley, S. R., Meyer, G. W. and Gash, D. C. (1988). Cultures of culture: academics, practitioners and the pragmatics of normative control. *Administrative Science Quarterly, 33:* 24-60.

Barney, J. B. (2001). Is the resource-based "view" a useful perspective for strategic management research? Yes. *Academy of Management Review, 26:* 41–56.

Barney, J. (1986). Organizational culture: can it be a source of sustained competitive advantage? *Academy of Management Review, 11(3)*: 656-665.

Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of Management, 17:* 99-120.

Baron, R. M. and Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: conceptual, strategic, and statistical considerations. *Journal of Personality and Social Science,* 51(6): 1173-1182.

Baum, J. R. and Wally, S. (2003). Strategic decision speed and firm performance. *Strategic Management Journal, 24:* 1107-1129.

Beard, D. W. (1978). The structure of organizational environments: a factor analytical approach. *Organization and Administrative Sciences, 3:* 85-105.

Bhimani, A. (2003). A study of the emergence of management accounting system ethos and its influence on perceived system success. *Accounting, Organizations and Society, 28*: 523-548.

Bhimani, A. and Langfield-Smith, K. (2007). Structure, formality and the importance of financial and non-financial information in strategy development and implementation. *Management Accounting Research, 18:* 3-31.

Birnberg, J. G., Turopolec, L. and Young, S. M. (1983). The organizational context of accounting. *Accounting, Organizations and Society, 8(2/3):* 111-129.

Birnberg, J. G. and Snodgrass, C. (1988). Culture and control: a field study. *Accounting, Organizations and Society, 13(5):* 447-464.

Bisbe, J, and Otley, D. (2004). The effects of interactive use of management control systems on product innovation. *Accounting, Organizations and Society, 29(8):* 709-737.

Bisbe, J., Batista-Foguet, J. M. and Chenhall, R. (2007). Defining management accounting constructs: a methodological note on the risks of conceptual misspecification. *Accounting, Organizations and Society, 32(7-8):* 789-820.

Bloor, G. and Dawson, P. (1994). Understanding professional culture in organizational context. *Organization Studies, 15(2):* 275-295.

Bogner, W. C. and Barr, P. S. (2000). Making sense in hypercompetitive environments: a cognitive explanation for the persistence of high velocity competition. *Organization Science, 11(2):* 212-226.

Boland, R. J. and Pondy, L. R. (1983). Accounting in organizations: a union of natural and rational perspectives. *Accounting, Organizations and Society, 8(2/3):* 223-234.

Bollen, K. A. (1995). Structural equation models that are nonlinear in latent variables: a least squares estimator. In P. M. Marsden (ed). *Sociological methodology*, Cambridge, MA: Blackwell.

Bollen, K. and Lennox, R. (1991). Conventional wisdom on measurement: a structural equation perspective. *Psychological Bulletin, 110(2):* 305-314.

Bourgeois, L. J. (1985). Strategic goals, perceived uncertainty, and economic performance in volatile environments. *Academy of Management Journal, 28:* 548-573.

Bourn, M. and Ezzamel, M. (1986). Organizational culture in hospitals in the national health service. *Financial Accountability and Management, 2(3):* 203- 225.

Bouwens, J. and Abernethy, M. (2000). The consequences of customization on management accounting system design. *Accounting, Organizations and Society, 25(3):* 221–259.

Boyd, B. K., Dess, G. G. and Rasheed, A. M. (1993). Divergence between archival and perceptual measures of the environment: causes and consequences. *Academy of Management Review, 18(2):* 204-226.

Briers, M. and Hirst, M. (1990). The role of budgetary information in performance evaluation. *Accounting, Organizations and Society, 15(4):* 373–398.

Brown, A. D. and Starkey, K. (1994). The effect of organizational culture on communication and information. *Journal of Management Studies, 31(6):* 807-829.

Brown, D. A., Booth P. and Giacobbe, F. (2004). Technological and organizational influences on the adoption of activity-based costing in Australia. *Accounting and Finance, 44: 329-356.*

Brown, S. L. and Eisenhardt, K. M. (1997). The art of continuous change: linking complexity theory and time-paced evolution in relentlessly shifting organizations. *Administrative Science Quarterly, 42:* 1–34.

Brown, S. L. and Eisenhardt, K. M. (1998). *Competing on the edge: strategy as structured chaos*. Boston: Harvard Business School Press.

Bruining, H., Bonnet, M. and Wright, M. (2004). Management control systems and strategy change in buyouts, *Management Accounting Research, 15:* 155-177.

Buchko, A. A. (1994). Conceptualization and measurement of environmental uncertainty: an assessment of the Miles and Snow perceived environmental uncertainty scale. *Academy of Management Journal, 37:* 410–425.

Burns, T. and Stalker, G. (1961). The Management of Innovation. London: Tavistock.

Capon, N., Farley, J. and Hoenig, S. (1990). Determinants of financial performance: a meta-analysis. *Management Science, 36(10):* 1143-1159.

Carpenter, M. A. and Fredrickson, J. W. (2001). Top management teams, global strategic posture, and the moderating role of uncertainty. *Academy of Management Journal, 44(3):* 533-545.

Carte, T. A. and Russell, C. J. (2003). In pursuit of moderation: nine common errors and their solutions, *MIS Quarterly, 27(3):* 479-501.

Castanias, R. P. and Helfat, C. E. (1991). Managerial resources and rents. *Journal of Management, 17(1):* 155–171.

Castanias, R. P. and Helfat, C. E. (2001). The managerial rents model: theory and empirical analysis. *Journal of Management, 27:* 661-678.

Chapman, C. S. (1997). Reflections on a contingent view of accounting. *Accounting, Organizations and Society, 22(2):* 189-205.

Chapman, C. S. (1998). Accountants in organizational networks. *Accounting, Organizations and Society, 23(8):* 737–766.

Chatterjee, S., Lubatkin, M.H., Schweiger, D.M. and Weber, Y. (1992). Cultural differences and shareholder related value in related mergers: linking equity and human capital. *Strategic Management Journal, 44(3):* 533-545.

Chenhall, R. H. (2003). Management control systems design within its organizational context: findings from contingency-based research and directions for the future. *Accounting, Organizations and Society, 28:* 127-168.

Chenhall, R. H. (2005). Integrative strategic performance measurement systems, strategic alignment of manufacturing, learning and strategic outcomes: an exploratory study. *Accounting, Organizations and Society, 30:* 395-422

Chenhall, R. H. and Euske, K. J. (2007). The role of management control systems in planned organizational change: an analysis of two organizations. *Accounting, Organizations and Society, 32(7-8):* 601-637.

Chenhall, R. H. and Langfield-Smith, K. (1998). The relationship between strategic priorities, management techniques and management accounting: an empirical investigation using a systems approach. *Accounting, Organizations and Society, 23(3):* 243-264.

Chenhall, R. H. and Morris, D. (1986). The impact of structure, environment and interdependencies on the perceived usefulness of management accounting systems. *Accounting Review, 61:* 16-35.

Chenhall, R. H. and Morris, D. (1995). Organic decision and communication processes and management accounting systems in entrepreneurial and conservative business organizations. *Omega, International Journal of Management Science, 23(5):* 485–497.

Child, D. (1990). *The essentials of factor analysis.* Second edition, London: Cassel Educational Limited.

Child, J. (1972). Organization structure, environment and performance: the role of strategic choice. *Sociology, 6:* 1-22.

Child, J. (1974). What determines organizational performance? The universal vs. the it-all depends. *Organization Dynamics, 1:* 2-18.

Child, J. (1975). Managerial and organizational factors associated with company performance – part II. A contingency analysis. *Journal of Management Studies, 12:* 12-28.

Chin, W. W. (1997). Overview of the PLS Method. http://disc-nt.cba.uh.edu/chin/PLSINTRO.HTM

Chin, W. W. (1998). The partial least squares approach to structural equation modelling. In G. A. Marcoulides (ed.), *Modern methods for business research (pp. 195-336).* Mahwah, NJ: Lawrence Erlbaum Associates.

Chin, W. W. and Gopal, A. (1995). Adoption intention in GSS: relative importance of beliefs, *Data Base Advances, 26(2-3):* 42-64.

Chin, W. W. and Newsted, P. R. (1999). Structural equation modelling analysis with small samples using partial least squares. In R. H. Hoyle (ed.), *Statistical strategies for small sample research (pp. 307-341).* Thousand Oaks, Sage.

Chin, W. W., Marcolin, B. L. and Newsted, P. R. (2003). A partial least squares latent variable modeling approach for measuring interaction effects: results from a Monte Carlo simulation study and an electronic-mail emotion/adoption study. *Information Systems Research, 14(2):* 189-217.

Chong, V. (1996). Management accounting systems, task uncertainty and managerial performance: a research note. *Accounting, Organizations and Society, 21(5):* 415-421.

Chong, V. and Chong, K. (1997). Strategic choices, environmental uncertainty and SBU performance: a note on the intervening role of management accounting systems. *Accounting and Business Research, 27(4):* 268–276.

Coad, A. F. and Cullen, J. (2006). Inter-organisational cost management: towards an evolutionary perspective. *Management Accounting Research, 17:* 342-369.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd Ed.), Hillsdale, NJ, Lawrence Earlbaum.

Collins, L. M., Graham, J. W. and Flaherty, B. P. (1998). An alternative framework for defining mediation. *Multivariate Behavioral Research, 33:* 295-313.

Collis, D. J. (1994). Research note: how valuable are organizational capabilities? *Strategic Management Journal, 15(Winter):* 143-153.

Covaleski, M.A., Evans III, J.I., Luft. J.L. and Shields, M.D. (2003). Budgeting research: three theoretical perspectives and criteria for selective integration. *Journal of Management Accounting Research, 15:* 3-49.

Craig, T. (1996). The Japanese beer wars: initiating and responding to hypercompetition in new product development. *Organization Science, 7(3): 302-321*.

Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika, 16:* 297-334.

Cyert, R. M. and March, J. G. (1963). *A behavioral theory of the firm.* Englewood Cliffs, NJ: Prentice-Hall.

Daft, R. L. and Weick, K. E. (1984). Toward a model of organizations as interpretation systems. *Academy of Management Review, 9:* 284–295.

Daft, R., Sormunen, J. and Parks, D. (1988). Chief executive scanning, environmental characteristics, and company performance: an empirical study. *Strategic Management Journal, 9:* 123-139.

Daneels, E. (2008). Organizational antecedents of second-order competences. *Strategic Management Journal, 29:* 519-543.

D'Aveni, R. A. (1994). *Hyper-competition.* New York, Free Press.

Davila, T. (2000). An empirical study on the drivers of management control systems' design in new product development. *Accounting, Organizations and Society, 25:* 383–409.

Denison, D. R. (1984). Bringing corporate culture to the bottom line. *Organizational Dynamics, 13(2):* 4-22.

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

Denison, D. R. (1996). What IS the difference between organizational culture and organizational climate? A native's point of view on a decade of paradigm wars. *Academy of Management Review, 21(3):* 619-654.

Denison, D. R. and Mishra, A. K. (1995). Toward a theory of organizational culture and effectiveness. *Organization Science, 6(2):* 204-223.

Denison, D. R. and Neale, W. S. (1996). *Denison organizational culture survey.* Ann Harbor, MI, Aviat.

Dent, J. F. (1990). Strategy, organization and control: some possibilities for accounting research. *Accounting, Organizations and Society, 15:* 3–25.

Dent, J. F. (1991). Accounting and organizational cultures: A field study of the emergence of a new organizational reality. *Accounting, Organizations and Society, 16(8):* 705-732.

Dery, D. (1982). Erring and learning: an organizational analysis. *Accounting, Organizations and Society, 7(3):* 217-223.

Desarbo, W. S., Di Bendetto, C. A., Song, M. and Sinha, I. (2005). Revisiting the Miles and Snow strategic framework: uncovering interrelationships between strategy types, capabilities, environmental uncertainty, and firm performance. *Strategic Management Journal, 26:* 47-74.

Dess, G. G. and Beard, D. W. (1984). Dimensions of organizational task environments. *Administrative Science Quarterly, 29:* 52-73.

Dess, G. G., Lumpkin, G. T. and Covin, J. G. (1997). Entrepreneurial strategy making and firm performance: tests of contingency and configuration models. *Strategic Management Journal, 18(9):* 677-695.

Diamond, S. S. (2000). *Reference guide on survey research.* Washington DC: The Federal Judicial Centre.

Dill, W. R. (1958). Environments as an influence on managerial autonomy. *Administrative Science Quarterly, 2(4):* 409-443.

Dillman, D. A. (2000). *Mail and internet surveys.* New York: John Wiley and Sons, Inc.

Donaldson, L. (2001). *The contingency theory of organizations.* California, Sage.

Duncan, R. (1972). Characteristics of organizational environments and perceived environmental uncertainty. *Administrative Science Quarterly, 17(3):* 313–327.

Dutton, J. E. and Duncan, R. B. (1987). The creation of momentum for change through the process of strategic issue diagnosis. *Strategic Management Journal, 8:* 279-295.

Dwyer, F. R. and Welsh, M. A. (1985). Environmental relationships of the internal political economy of marketing channels. *Journal of Marketing Research, 22:* 397-414.

Edwards, J. R. and Bagozzi, R. P. (2000). On the nature and direction of relationships between constructs and measures. *Psychological Methods, 5(2):* 155-174.

Eisenhardt, K. M. (1989). Making fast decisions in high velocity environments. *Academy of Management Journal, 32:* 543-576.

Eisenhardt, K. M. and Bourgeois, L. J. (1988). Politics of strategic decision making in high velocity environments: towards a mid-range theory. *Academy of Management Journal, 31:* 737-770.

Eisenhardt, K. M. and Martin, J. A. (2000). Dynamic capabilities: what are they? *Strategic Management Journal, 21:* 1105-1121.

Ekholm, B. and Wallin, J. (2000). Is the annual budget really dead? *European Accounting Review, 9:* 519-539.

Elenkov, D. S. (1997). Strategic uncertainty and environmental scanning: the case for institutional influences on scanning behavior. *Strategic Management Journal, 18(4):* 287-302.

Fey, C. F. and Denison, D. R. (2003). Organizational culture and effectiveness: can American theory be applied in Russia? *Organization Science, 14(6):* 686-706.

Fiol, C. M. and Lyles, M. A. (1985). Organizational learning. *Academy of Management Review, 10(4):* 803-813.

Flamholtz, E.G. (1983). Accounting, budgeting and control systems in their organizational context: theoretical and empirical perspectives. *Accounting, Organizations and Society, 8(2/3):* 153-169.

Flamholtz, E. G., Das, T. K. and Tsui, A. S. (1985). Toward an integrative framework of organizational control. *Accounting, Organizations and Society, 10(1):* 35-50.

Fornell, C. (1982). *A second generation of multivariate analysis.* New York: Praeger.

Fornell, C. and Bookstein, F. L. (1982). Two structural equation models: LISREL and PLS applied to consumer exit-voice theory. *Journal of Marketing Research, 19:* 440-452.

Fornell, C. and Larcker, D. F. (1981). Two structural equation models with unobservable variables and measurement error. *Journal of Marketing Research, (18):* 39-50.

Frow, N., Marginson, D. and Ogden, S. (2005). Encouraging strategic behavior while maintaining management control: multi-functional project teams, budgets, and the negotiation of shared accountabilities in contemporary enterprises. *Management Accounting Research, 16:* 269-292.

Gagliardi, P. (1986). The creation and change of organizational cultures. *Organizational Studies, 7:* 117-134.

Galbraith, J. (1973). *Designing Complex Organizations.* Reading, MA: Addison-Wesley.

Galbraith, J. R. (1977). *Organization Design.* Reading, MA: Addison-Wesley.

Galunic, D. C. and Eisenhardt, K. M. (1994). Renewing the strategy-structure-performance paradigm. *Research in Organizational Behavior, 16:* 215-255.

Garg, V. K., Walters, B. A. and Priem, R. L. (2003). Chief executive scanning emphases, environmental dynamism, and manufacturing performance. *Strategic Management Journal, 24:* 725-744.

Gavetti, G. and Levinthal, D. (2000). Looking forward and looking backward: cognitive and experiential search. *Administrative Science Quarterly, 45:* 113–137.

Geisser, S. (1975). The predictive sample reuse method with applications. *Journal of the American Statistical Association, 70: 320-328.*

Gerloff, E. A., Muir, N. K. and Bodensteiner, W. D. (1991). Three components of perceived environmental uncertainty: an exploratory analysis of the effects of aggregation. *Journal of Management, 17(4):* 749-768.

Gimeno, J. and Woo, C. Y. (1996). Hypercompetition in a multimarket environment: the role of strategic similarity and multimarket contact in competitive de-escalation. *Organization Science, 7(3):* 322-341.

Goddard, A. (1997a). Organizational culture and budgetary control in a UK local government organization. *Accounting and Business Research, 27(2):* 111-123.

Goddard, A. (1997b). Organizational culture and budget related behavior: a comparative contingency study of three local government organizations. *The International Journal of Accounting, 32(1):* 79-97.

Goold, M. and Quinn, J. J. (1990). The paradox of strategic controls. *Strategic Management Journal, 11:* 43-57.

Gordon, G.G. (1985). The relationship of corporate culture to industry sector and corporate performance. In Kilmann, R.H., Saxton, M.J., Serpa, R. and associates (eds.), *Gaining control of the corporate culture (pp. 103-125).* San Francisco: Jossey-Bass.

Gordon, G.G. and DiTomaso, T.T. (1992). Predicting corporate performance from organizational culture. *Journal of Management Studies, 29:* 783-799.

Gordon, L. A. and Miller, D. (1976). A contingency framework for the design of accounting information systems. *Accounting, Organizations and Society, 1(1):* 59-69.

Gordon, L. A. and Narayanan, V. K. (1984). Management accounting systems, perceived environmental uncertainty and organization structure: an empirical investigation. *Accounting, Organizations and Society, 1:* 33–47.

Gosselin, M. (1997). The effects of strategy and organizational structure on the adoption and implementation of activity-based costing. *Accounting, Organizations and Society 22(2):* 105–122.

Govindarajan, V. (1984). Appropriateness of accounting data in performance evaluation: an empirical examination of environmental uncertainty as an intervening variable. *Accounting, Organizations and Society, 9:* 33–48.

Govindarajan, V. (1988). A contingency approach to strategy implementation at the business-unit level: integrating administrative mechanisms with strategy. *Academy of Management Journal, 31(4):* 828–853.

Govindarajan, V. and Gupta, A. K. (1985). Linking control systems to business unit strategy: impact on performance. *Accounting, Organizations and Society, 10:* 125–135.

Govindarajan, V. J. and Fisher, J. (1990). Strategy, control systems and resource sharing: effects on business-unit performance. *Academy of Management Journal, 33:* 259–285.

Grant, R. M. (1996). Toward a knowledge-based theory of the firm. *Strategic Management Journal, 17(Summer Special Issue):* 109-122.

Grant, R.M. (2003). Strategic planning in a turbulent environment: evidence from the oil majors. *Strategic Management Journal, 24:* 491-517.

Gray, B. (1990). The enactment of management control systems: a critique of Simons. *Accounting, Organizations and Society, 15:* 145-148.

Green, S. B. (1991). How many subjects does it take to do a regression analysis? *Multivariate Behavioral Research, 26(3):* 499-510.

Green, S. G. and Welsh, A. M. (1988). Cybernetics and dependence: reframing the control concept. *Academy of Management Review, 13(2):* 287-304.

Gregory, K. L. (1983). Native-view paradigms: multiple cultures and culture conflicts in organizations. *Administrative Science Quarterly, 9:* 359-376.

Grewal, R., Cote, J. A. and Baumgartner, H. (2004). Multicollinearity and measurement error in structural equation models: implications for theory testing. *Marketing Science, 23(4): 519-529.*

Guilding, C. (1999). Competitor-focused accounting: an exploratory note. *Accounting, Organizations and Society, 24(7):* 583–595.

Gul, F. and Chia, Y. (1994). The effects of management accounting systems, perceived environmental uncertainty and decentralization on managerial performance: a test of a three-way interaction. *Accounting, Organizations and Society, 19(4/5):* 413–426.

Gupta, A. K. and Govindarajan, V. (1984). Business unit strategy, managerial characteristics and business unit effectiveness at strategy implementation. *Academy of Management Journal, 27:* 24–41.

Hage, J. (1965). An axiomatic theory of organizations. *Administrative Science Quarterly, 10:* 289-320.

Hahn, C., Johnson, M. D., Hermann, A. and Huber, F. (2002). Capturing customer heterogeneity using a finite mixture PLS approach. *Schmalenbach Business Review, 54:* 243-269.

Hair, J. F., Anderson, R. E., Tatham, R. L. and Black, W. C. (1998). *Multivariate Data Analysis, Fifth Edition*. NJ, Prentice Hall.

Hambrick, D. (1987). Top management teams: key to strategic success. *California Management Review, 30:* 88-108.

Hambrick, D. and Mason, P. (1984). Upper echelons: the organization as a reflection of its top managers. *Academy of Management Review, 9:* 193-206.

Hambrick, D. C. and Snow, C. C. (1977). A contextual model of strategic decision making in organizations. *Academy of Management Proceedings,* 108-112.

Hannan, M. T. and Freeman, J. (1984). Structural inertia and organizational change. *American Sociological Review, 49:* 149–164.

Hansen, G. and Wernerfelt, B. (1989). Determinants of firm performance: the relative performance of economic and organizational factors. *Strategic Management Journal, 10(5):* 399-411.

Hansen, S. C. and Otley. D. T. and Van der Stede, W. A. (2003). Practice developments in budgeting: an overview and research perspective. *Journal of Management Accounting Research, 15:* 95-116.

Hansen, S.C. and Van der Stede, W.A. (2004). Multiple facets of budgeting: and exploratory study. *Management Accounting Research, 15:* 415-439.

Hanssen-Bauer, J. and Snow, C.C. (1996). Responding to hypercompetition: the structure and processes of a regional learning network organization. *Organization Science, 7(4):* 413-427.

Harrison, G. L. and McKinnon, J.L. (1998). Editorial: culture and management accounting. *Management Accounting Research, 9:* 113-118.

Harrison, G. L. (1993). Reliance on accounting performance measures in superior evaluative style, the influences of national culture and personality. *Accounting, Organizations and Society, 18:* 319-339.

Harrison, G.L. and McKinnon, J.L. (1999). Cross-cultural research in management control systems design: a review of the current state. *Accounting, Organizations and Society, 24:* 483-506.

Hartmann, F. G. H. (2000). The appropriateness of RAPM: toward the development of theory. *Accounting, Organizations and Society, 25:* 451-482.

Hedberg, B. (1981). How organizations learn and unlearn. In P. C. Nystrom and W. H. Starbuck (Eds.), *Handbook of Organizational Design, 1 (pp. 3-27).* New York: Oxford University Press.

Helfat, C. E. and Raubitschek, R.S. (2000). Product sequencing: co-evolution of knowledge, capabilities and products. *Strategic Management Journal, 21:* 961-979.

Henderson, R. M., and Clark, K. B. (1990). Architectural innovation: the reconfiguration of existing product technologies and the failure of established firms. *Administrative Science Quarterly, 35:* 9-30.

Henri, J. F. (2006a). Organizational culture and performance measurement systems. *Accounting, Organizations and Society, 31:* 77-103.

Henri, J. F. (2006b). Management control systems and strategy: a resource-based perspective. *Accounting, Organizations and Society, 31:* 529-558.

Hill, C. W. and Rothaermel, F. T. (2003). The performance of incumbent firms in the face of radical technological innovation. *Academy of Management Review, 28(2):* 129-141.

Hirst, M. K. (1983). Reliance on accounting performance measures, task uncertainty and dysfunctional behaviour. *Journal of Accounting Research 21(2):* 596-605.

Hopwood, A. G. (1980). The organizational and behavioural aspects of budgeting and control. In Arnold, J., Carlsberg, B. and Scapens, R. (Eds), *Topics in management accounting (*pp.221-240). Oxford: Phillip Allen.

Hopwood, A. G. (1987). The archaeology of accounting systems. *Accounting, Organizations and Society, 12(3):* 207-234.

Hoyle, R. H. and Kenny, D. A. (1999). Sample size, reliability, and tests of statistical mediation. In R. H. Hoyle (Ed.), *Statistical strategies for small sample research* (pp. 195-221). Thousand Oaks, Sage.

Huber, G. P. (1991). Organizational learning: the contributing processes and the literatures. *Organization Science, 2(1):* 88-115.

Hulland, J. (1999). The use of partial least squares (PLS) in strategic management research: a review of four recent studies. *Strategic Management Journal, 20(2):* 195-204.

Hult, G. T., Ketchen, D. J. and Arrfelt, M. (2007). Strategic supply chain management: improving performance through a culture of competitiveness and knowledge development. *Strategic Management Journal, 28:* 1035-1052.

Illinitch, A. Y., D'Aveni, R. A. and Lewin, A. Y. (1996). New organizational forms and strategies for managing in hypercompetitive environments. *Organization Science, 7(3):* 211-222.

Ittner, C. D., Larcker, D. F. and Randall, T. (2003). Performance implications of strategic performance measurement in financial services firms. *Accounting, Organizations and Society, 28(3-4):* 715-741.

Jagpal, H. S. (1982). Multicollinearity in structural equation models with unobserved variables, *Journal of Marketing Research, 19:* 431-439.

James, L. R. and Brett, J. M. (1984). Mediators, moderators, and tests for mediation. *Journal of Applied Psychology, 69(2):* 307-321.

James, L. R., Mulaik, S. A. and Brett, J. M. (2006). A tale of two methods. *Organizational Research Methods, 9(2):* 233-244.

Jarvis, C. B., MacKenzie, S. B. and Podsakoff, P. M. (2003). A critical review of construct indicators and measurement model misspecification in marketing and consumer research. *Journal of Consumer Research, 30 (2):* 199-218.

Johansson, J. K. and Yip, G. S. (1994). Exploiting globalization potential: U.S. and Japanese strategies. *Strategic Management Journal, 15:* 579-601.

Jones, C. S. (1985). An empirical study of the evidence for contingency theories of management accounting systems in conditions of rapid change. *Accounting, Organizations and Society, 10(3):* 303-328.

Jones, N. (2003). Competing after radical technological change: the significance of product line management strategy. *Strategic Management Journal, 24:* 1265-1287.

Jöreskog, K. G. (1998). Interaction and nonlinear modeling: issues and approaches. In R. E. Schumacker and G. A. Marcoulides (Eds.), *Interaction and nonlinear effects in structural equation modeling* (pp. 239-250). London: Lawrence Erlbaum Associations.

Jurkovich, R. (1974). A core typology of organizational environments. *Administrative Science Quarterly, 19:* 380-394.

Kaplan, D. (1994). Estimator conditioning diagnostics for covariance structure models. *Sociological Methods Research, 23:* 200-229.

Kaplan, R. S. and Norton, D. P. (1992). The balanced scorecard – measures that drive performance. *Harvard Business Review, Jan-Feb:* 71-79.

Kaplan, R. S., and Norton, D. P. (1996). *The balanced scorecard.* Boston, MA, Harvard Business School Press.

Karahanna, E., Straub, D. W. and Chervany, N. L. (1999). Information technology adoption across time: a cross-sectional comparison of pre-adoption and post-adoption beliefs. *MIS Quarterly, 23(2)9:* 183-213.

Khandwalla, P. N. (1977). *The design of organizations.* New York: Harcourt Brace.

Kline, R. B. (1998). *Principles and practice of structural equation modeling.* Guildford Press, New York.

Kloot, L. (1997), Organizational learning and management control systems: responding to environmental change. *Management Accounting Research, 8:* 47-73.

Kotter, J. P. and Heskett, J. L. (1992). *Corporate culture and performance.* New York: Free Press.

Langfield-Smith, K. (1997). Management control systems and strategy: a critical review. *Accounting, Organizations and Society, 22(2):* 207–232.

Larcker, D. F. (1981). The importance of selected information characteristics and strategic capital budgeting decisions. *The Accounting Review, July:* 519–538.

Lau, C.M. and Tan, J.J. (1998). The impact of budget emphasis, participation and task difficulty on managerial performance: a cross-cultural study of the financial services sector. *Management Accounting Research, 9:* 163-183.

Law, K. S., Wong, C. and Mobley, W. H. (1998). Towards a taxonomy of multidimensional constructs. *Academy of Management Review, 23:* 741-755.

Lawrence, P. and Lorsch, J. (1967). *Organizations and environments.* Boston: Harvard Business School Press.

Lebas, M and Weigenstein, J. (1986). Management control: the roles of rules, markets and culture. *Journal of Management Studies, 23(3):* 259-72.

Lee, C., Lee, K. and Pennings, J. M. (2001). Internal capabilities, external networks, and performance: a study in technology-based ventures. *Strategic Management Journal, 22:* 615-640.

Levinthal, D. and March, J. (1993). The myopia of learning. *Strategic Management Journal, 14:* 95-112.

Levitt, B. and March, J. (1988). Organizational learning. *Annual Review of Sociology, 14:* 319-40.

Liebeskind, J. P., Oliver, A. L., Zucker, L. and Brewer, M. (1996). Social networks, learning and flexibility: sourcing scientific knowledge in new biotechnology firms. *Organization Science,* 7(4): 428-443.

Lindsay, W. M. and Rue, L. W. (1980). Impact of the organization environment on the long-range planning process: a contingency view. *Academy of Management Journal, (23):* 385-404.

Lohmöller, J.B. (1989). *Latent variable path modeling with partial least squares.* New York, Springer-Verlag.

Lorsch, J. W. (1986). Managing culture: the invisible barrier to strategic change. *California Management Review, 28(2):* 95-109.

Luckett, P. F. and Eggleton, I. R. C. (1991). Feedback and management accounting: a review of research into behavioral consequences. *Accounting, Organizations and Society, 16(4):* 371-394.

Luft, J.L. and Shields, M.D. (2003). Mapping management accounting: graphics and guidelines for theory-consistent empirical research. *Accounting, Organizations and Society, 28(2-3):* 169-249.

MacKinnon, D. P., Warsi, G. and Dwyer, J. H. (1995). A simulation study of mediated effect measures. *Multivariate Behavioral Research, 30:* 41-62.

Madhok, A. and Tallman, S. B. (1998). Resources, transactions and rents. *Organization Science, 9(3):* 326-339.

Mahoney, J. and Pandian, J. R. (1992). The resource-based view within the conversation of strategic management. *Strategic Management Journal, 13:* 363–380.

Makadok, R. and Walker, G. (2000). Identifying a distinctive competence: forecasting ability in the money fund industry. *Strategic Management Journal, 21:* 853-864.

Makhija, M. V. and Ganesh, U. (1997). Control and partner learning in learning-related joint ventures. *Organization Science, 8(5):* 508-527.

March, J. G. (1991). Exploration and exploitation in organizational learning. *Organization Science, 2(1)*: 71-87.

March, J. G. and Simon, H. A. (1958). *Organizations.* New York: Wiley.

Marginson, D. E. (2002). Management control systems and their effects on strategy formation at middle-management levels: evidence from a U.K. organization. *Strategic Management Journal, 23:* 1019-1031.

Markus, M.L. and Pfeffer, J. (1983). Power and the design and implementation of accounting and control systems. *Accounting, Organizations and Society, 8(2/3):* 205-218.

Marsh, H. W. and Hau, K. T. (1999). Confirmatory factor analysis: strategies for small sample sizes. In R. H. Hoyle (Ed.), *Statistical strategies for small sample research* (pp. 251-284). Thousand Oaks, Sage.

Mason, C. H. and Perrault, W. D. (1991). Collinearity, power, and interpretation of multiple regression analysis, *Journal of Marketing Research, 28:* 268-280.

May, R. C., Stewart, W. H. and Sweo, R. (2000). Environmental scanning behavior in a transitional economy: evidence from Russia. *Academy of Management Journal, 3:* 403-427.

McNamara, G., Vaaler, P. M. and Devers, C. (2003). Same as it ever was: the search for evidence of increasing hypercompetition. *Strategic Management Journal, 24:* 261-278.

Merchant, K. (1981). The design of the corporate budgeting system: influences on managerial behavior and performance. *The Accounting Review, 4:* 813–829.

Merchant, K. (1985). *Control in business organizations.* Boston, Pitman.

Miles, R. E. and Snow, C. C. (1978). *Organizational strategy, structure, and process.* New York, McGraw Hill

Miles, R. E., Snow, C. C. and Pfeffer, J. (1974). Organization-environment: concepts and issues. *Industrial Relations, 13:* 224-264.

Miller, D. (1981). Toward a new contingency approach: the search for organizational gestalts. *Journal of Management Studies, 18(1):* 1-26.

Miller, D. (1988). Relating Porter's business strategies to environment and structure: analysis and performance implications. *Academy of Management Journal, 31(2):* 280-308.

Miller, D. and Droge, C. (1986). Psychological and traditional determinants of structure. *Administrative Science Quarterly, 31:* 539-560.

Miller, D. and Friesen, P. H. (1982). Innovation in conservative and entrepreneurial firms: two models of strategic momentum. *Strategic Management Journal,* 1–25.

Miller, D. and Friesen, P. H. (1983). Strategy-making and environment: the third link. *Strategic Management Journal, 4:* 221–235.

Milliken, F. (1987). Three types of perceived uncertainty about the environment: state, effect and response uncertainty. *Academy of Management Review, 12:* 133-143.

Mintzberg, H. (1979). *The Structuring of Organizations.* Englewood Cliffs. NJ: Prentice-Hall.

Moore, D. L. and Tarnai, J. (2002). Evaluating nonresponse error in mail surveys. In R. M. Groves, D. A. Dillman, J. L. Eltinge, and R. J. A. Little (Eds.), *Survey nonresponse* (pp. 197-211). New York: Wiley.

Netemeyer, R. G., Bearden, W. O. and Sharma, S. (2003). *Scaling procedures: issues and applications.* Thousand Oaks, Sage.

Newbert, S. L. (2007). Empirical research in the resource-based view of the firm: an assessment and suggestions for future research. *Strategic Management Journal, 28:* 121-146.

Nonaka, I. and Teece, D. J. (2001). Introduction. In Nonaka, I. and Teece, D. J. (Eds.), *Managing industrial knowledge: creation, transfer and utilization (pp. 1-12).* London, Sage.

Norris, G. and O'Dwyer, B. (2004). Motivating socially responsive decision making: the operation of management controls in a socially responsive organization. *The British Accounting Review, 36:* 173-196.

Nunnally, J. C. (1978). *Psychometric theory.* Second edition. New York: McGraw-Hill.

O'Connor, N.G. (1995). The influence of organizational culture in the usefulness of budget participation by Singapore-Chinese managers. *Accounting, Organizations and Society, 20(5):* 383-403.

O'Reilly, C. A. and Chatman, J. A. (1996). Culture as social control: corporations, cults and commitment. *Research in Organizational Behavior, 18:* 157-200

Otley, D. (1999). Performance management: a framework for management control systems research. *Management Accounting Research, 10:* 363-382.

Otley, D. T. (1980). The contingency theory of management accounting: achievement and prognosis. *Accounting, Organizations and Society, 4:* 413–428.

Ouchi, W. G. (1977). The relationship between organizational structure and organizational control. *Administrative Science Quarterly, 22:* 95–113.

Ouchi, W. G. (1979). A conceptual framework for the design of organizational control mechanisms. *Management Science, Sep:* 833–848.

Pant, N. and Lachman, R. (1998). Values incongruity and strategic choices. *Journal of Management Studies, 35(2):* 195-212.

Pennings, J. M. (1992). Structural contingency theory: a reappraisal. *Research in Organizational Behavior, 14:* 267-292.

Perrow, C. (1970). *Organizational analysis: a sociological view. California,* Wadsworth Publishing Company.

Peteraf, M. A. (1993). The cornerstones of competitive advantage: A resource-based view. *Strategic Management Journal 14:* 179–192.

Podsakoff, P. M. and Organ, D. W. (1986). Self-reports in organizational research: problems and prospects. *Journal of Management, 12:* 531-544.

Porter, M. E. (1980). *Competitive strategy.* New York: Free Press.

Porter, M. E. (1985) *Competitive advantage: creating and sustaining superior performance.* New York, Free Press.

Prahalad, C. K. and Hamel, G. (1990). The core competence of the corporation. *Harvard Business Review, May/June:* 79–91.

Priem, R. L., Rasheed, A. M. A. and Kotulic, A. G. (1995). Rationality in strategic decision processes, environmental dynamism and firm performance. *Journal of Management, 21(5):* 913-929.

Priem, R. L., and Butler, J. E. (2001). Is the resource-based "view" a useful perspective for strategic management research? *Academy of Management Review, 26:* 22–40.

Priem, R. L., Love, L. G. and Shaffer, M. A. (2002). Executive's perceptions of uncertainty sources: a numerical taxonomy and underlying dimensions. *Journal of Management, 28(6):* 725-746.

Quinn, R.E. and Kimberley, J.R. (1984). Paradox planning and perseverance: guidelines for managerial practice. In Kimberley, J.R. and Quinn, R.E. (Eds.), *Managing Organizational Transitions* (pp. 295-313). Homewood, IL: Dow-Jones-Irwin.

Ramos-Rodriguez, A. R. and Ruiz-Navarro, J. (2004). The intellectual structure of strategic management research. *Strategic Management Journal, 25:* 981-1004.

Ravichandran, T. and Lertwongsatien, C. (2005). Effect of information systems resources and capabilities on firm performance: a resource-based perspective. *Journal of Management Information Systems, 21(4):* 237-276.

Reed, R. and DeFillippi, R. J. (1990). Causal ambiguity, barriers to imitation, and sustainable competitive advantage. *Academy of Management Review 15:* 88-102.

Reinartz, W., Krafft, M. and Hoyer, W. D. (2004). The customer relationship management process: its measurement and impact on performance. *Journal of Marketing Research, XLI:* 293-305.

Ricardo, D. (1817). *Principles of political economy and taxation.* London, J. Murray.

Rosenbloom, R. S. (2000). Leadership, capabilities, and technological change: the transformation of NCR in the electronic era. *Strategic Management Journal, 21*: 1083-1103.

Rothaermel, F. T. (2001). Incumbent's advantage through exploiting complementary assets via interfirm cooperation. *Strategic Management Journal, 22:* 687-699.

Rumelt, R. P. (1984). Towards a strategic theory of the firm. In: B. Lamb, (Ed.), *Competitive strategic management* (pp. 556-570). Englewood Cliffs, Prentice-Hall.

Rumelt, R. P. (1987). Theory, strategy, and entrepreneurship. In D. Teece (Ed.), *The competitive challenge* (pp. 137–158). Cambridge: Ballinger.

Rungtusanatham, M. J. (1998). Let us not overlook content validity. *Decision Line, 29(4):* 10-13

Sackman, S. A. (1992). Culture and subcultures: an analysis of organizational knowledge. *Administrative Science Quarterly, 37:* 140-161.

Sarkar, M., Echambadi, R. and Harrison, J. S. (2001). Alliance entrepreneurship and firm market performance. *Strategic Management Journal, 22:* 701-711.

Sawyerr, O. O. (1993). Environmental uncertainty and environmental scanning activities of Nigerian manufacturing executives: a comparative analysis. *Strategic Management Journal, 14:* 287-299.

Schein, E. H. (1985). *Organizational culture and leadership. A dynamic view.* San Francisco: Jossey-Bass.

Schendel, D. E. and Hofer, C. W. (1979). Introduction In D. E. Schendel and C. W. Hofer (Eds), *Strategic Management* (pp. 1-22). Boston-Toronto: Little, Brown.

Schreyogg, G. (1980). Contingency and choice in organization theory. *Organization Studies, 1(4):* 305-326.

Schreyogg, G. and Steinmann, H. (1987). Strategic control: a new perspective. *Academy of Management Review, 12(1):* 91-103.

Schumacker, R. E. (2002) Latent variable interaction modeling. *Structural Equation Modeling, 9(1):* 40-54.

Schumpeter, J. A. (1934). *The theory of economic development.* Cambridge, MA, Harvard University Press.

Schumpeter, J. A. (1942). *Capitalism, socialism and democracy.* New York: Harper and Row.

Schumpeter, J. A. (1950). *Capitalism, socialism and democracy (3rd edition).* New York, Harper and Row.

Shields, M. D., Den, F. J. and Kato, Y. (2000). The design and effects of control systems: tests of direct- and indirect-effects models. *Accounting, Organizations and Society, 25:* 185-202.

Siggelkow, N. and Rivkin, J. W. (2005). Speed and search: designing organizations for turbulence and complexity. *Organization Science, 16(2):* 101-122.

Simmonds, K. (1981). Strategic management accounting. *Management Accounting, 59(4): 26-29.*

Simons, R. (1987a). Planning, control and uncertainty: a process view. In W. J. Bruns and R. S. Kaplan (Eds.) *Accounting and management: field study perspectives* (pp. 339-362). Boston MA: Harvard Business School Press.

Simons, R. (1987b). Accounting control systems and business strategy: an empirical analysis. *Accounting, Organizations and Society, 12:* 357–374.

Simons, R. (1990). The role of management control systems in creating competitive advantage: new perspectives. *Accounting, Organizations and Society, 15(1/2):* 127-143.

Simons, R. (1991). Strategic orientation and top management attention to control systems. *Strategic Management Journal 12:* 49–62.

Simons, R. (1994). How new top managers use control systems as levers of strategic renewal. *Strategic Management Journal, 15:* 169–189.

Simons, R. (1995). *Levers of control*. Boston, Harvard University Press.

Simons, R. (2000). *Performance measurement and control systems for implementing strategy.* Upper Saddle River, NJ: Prentice-Hall.

Slagmulder, R. (1997). Using management control systems to achieve alignment between strategic investment decisions and strategy. *Management Accounting Research, 8:* 103-139.

Slater, S. F. and Olson, E. M. (2000). Strategy type and performance: the influence of sales force management. *Strategic Management Journal, 21:* 813-829.

Smart, C., and Vertinsky, I. (1984). Strategy and the environment: A study of corporate responses to crises. *Strategic Management Journal, 5:* 199–213.

Smircich, L. (1983). Concepts of organizational culture and organizational analysis. *Administrative Science Quarterly, 28:* 339-358.

Smith, A. D. and Zeithaml, C. (1996). Garbage cans and advancing hypercompetition: the creation and exploitation of new capabilities and strategic flexibility in two Regional Bell Operating Companies. *Organization Science, 7(4):* 388-399.

Soeters, J. and Schreuder, H. (1988). The interaction between national and organizational cultures in accounting firms. *Accounting, Organizations and Society, 13(1):* 75-85.

Sorensen, J. B. (2002). The strength of corporate culture and the reliability of firm performance. *Administration Science Quarterly, 47:* 70-91.

Spanos, Y. E. and Lioukas, S. (2001). An examination into the causal logic of rent generation: contrasting Porter's competitive strategy framework and the resource-based perspective. *Strategic Management Journal, 22:* 907-934.

Spender, J. C. (1996). Making knowledge the basis of a dynamic theory of the firm. *Strategic Management Journal, 17(Winter Special Issue):* 45-62.

Stone, M. (1974). Cross-validatory choice and assessment of statistical predictions. *Journal of the Royal Statistical Society, 36(2): 111-133.*

Straub, D. W. (1989). Validating instruments in MIS research. *MIS Quarterly, 13(2):* 147-169.

Sunder, S. (2002). Management control, expectations, common knowledge, and culture. *Journal of Management Accounting Research, 2002:* 173-187

Tani, T. (1995). Interactive control in target cost management. *Management Accounting Research, 6:* 399-414.

Teece, D. J. (2003). Explicating dynamic capabilities: asset selection, coordination, and entrepreneurship in strategic management theory. Haas School of Business, University of California, Berkeley Business and Public Policy Working Paper BPP-98.

Teece, D. J. (2007). Explicating dynamic capabilities: the nature and microfoundations of (sustainable) enterprise performance. *Strategic Management Journal, 28:* 1319-1350.

Teece, D. J., Pisano, G. and Schuen, A. (1997). Dynamic capabilities and strategic management. *Strategic Management Journal, 18(7):* 509-533.

Thomas, L. G. (1996). The two faces of competition: dynamic resourcefulness and the hypercompetitive shift. *Organization Science, 7(3):* 221-242).

Thompson, J. D. (1967) *Organizations in action*. New York, McGraw Hill.

Tippins, M. J. and Sohi, R. (2003). IT competency and firm performance: is organizational learning a missing link? *Strategic Management Journal, 24:* 745-761.

Tosi, H. L. and Slocum, J. W. (1984). Contingency theory: some suggested directions. *Journal of Management, 10(1):* 9-26.

Tosi, H., Aldag, R. and Storey, R. G. (1973). On the measurement of the environment: an assessment of the Lawrence and Lorsch environmental uncertainty scale. *Administrative Science Quarterly, 18:* 27-36.

Trice, H. M. and Beyer, J. M. (1984). Studying organizational cultures through rites and ceremonials. *Academy of Management Review, 9(4):* 653-669.

Tsang, E. W. (2002). Acquiring knowledge by foreign partners from international joint ventures in a transition economy: learning-by-doing and learning myopia. *Strategic Management Journal, 23(9):* 835-854.

Tuomela, T. (2005). The interplay of different levers of control: a case study of introducing a new performance measurement system. *Management Accounting Research, 16:* 293-320.

Turner, K. I. And Makhija, M. V. (2006). The role of organizational controls in managing knowledge. *Academy of Management Review, 31(1):* 197-217.

Tushman, M. L. and O'Reilly, C. (1997). *Winning through innovation.* Boston: Harvard Business School Press.

Tushman, M. L., and Anderson, P. (1986). Technological discontinuities and organizational environments. *Administrative Science Quarterly, 31:* 439-465.

Vaivio, J. (1999). Exploring a 'non-financial' management accounting change. *Management Accounting Research, 10:* 409-437.

Van de Ven, A. H. and Drazin, R. (1985). The concept of fit in contingency theory. In B. M. Staw and L. L. Cummings (Eds.), *Research in Organizational Behavior, 7* (pp. 333-365). Greenwich, CT: JAI Press.

Van der Stede, W. A. (2000). The relationship between two consequences of budgetary controls: budgetary slack creation and managerial short-term orientation. *Accounting, Organizations and Society, 25(6):* 609–622.

Van der Stede, W. A. (2001). Measuring 'tight budgetary control'. *Management Accounting Research, 12:* 119-137.

Van der Stede, W. A., Young, S. M. and Chen, C. X. (2005). Assessing the quality of evidence in management accounting research: the case of survey studies. *Accounting, Organizations and Society, 30(7-8):* 655-684.

Varaiya, N., Kerin, R. and Weeks, D. (1987). The relationship between growth, profitability, and firm value. *Strategic Management Journal, 8(5):* 487-497.

Venkatraman, N. and Ramanujam, V. (1987). Measurement of business economic performance: an examination of method convergence. *Journal of Management, 13:* 109-122.

Volberda, H. W. (1996). Toward the flexible form: how to remain vital in hypercompetitive environments. *Organization Science, 7(4):* 359-374.

Volberda, H. W. (1998). *Building the flexible firm.* New York, Oxford University Press.

Waterhouse, J. and Tiessen, P. (1978). A contingency framework for management accounting systems research. *Accounting, Organizations and Society, 3(1):* 65–76.

Weick, K.E. (1979). *The social psychology of organizing (2nd ed.)*. Reading, WA, Addison-Wesley.

Wernerfelt, B. (1984). A resource-based view of the firm. *Strategic Management Journal*, 5: 171–180.

Werts, C. E., Linn, R. L. and Joreskog, K. G. (1974). Interclass reliability estimates: testing structural assumptions. *Educational and Psychological Measurement, 34:* 25-33.

Widener, S. K. (2004). An empirical investigation of the relation between the use of strategic human capital and the design of the management control system. *Accounting, Organizations and Society, 29:* 377-399.

Widener, S. K. (2006a). Human capital, pay structure, and the use of performance measures in bonus compensation. *Management Accounting Research, 17:* 198-221.

Widener, S. K. (2006b). Associations between strategic resource importance and performance measures use: the impact on firm performance. *Management Accounting Research, 17:* 433-457.

Widener, S. K. (2007). An empirical analysis of the levers of control framework. *Accounting, Organizations and Society, 32*: 757-788.

Widener, S. K. and Selto, F. H. (1999). Management control systems and boundaries of the firm: why do firms outsource internal auditing activities? *Journal of Management Accounting Research, 11:* 45-73.

Wiggins, R. R. and Ruefli, T. W. (2005). Schumpeter's ghost: is hypercompetition making the best of short times? *Strategic Management Journal, 26:* 887-911.

Wilkins, A. (1989). *Developing corporate character.* San Francisco: Jossey-Bass.

Williamson, O. E. (1999). Strategy research: governance and competence perspectives. *Strategic Management Journal, 20:* 1087-1108.

Winter, S. G. (2000). The satisficing principle in capability learning. *Strategic Management Journal, 21*: 981-996.

Winter, S. G. (2003). Understanding dynamic capabilities. *Strategic Management Journal, 24*: 991-995.

Wixom, B. H. and Watson, H. J. (2001). An empirical investigation of the factors affecting data warehousing success. *MIS Quarterly, 15(1):* 17-41.

Wold, H. (1982). Soft modeling: the basic design and some extensions. In K. G. Joreskog and H. Wold. (Eds.), *Systems under indirect observations: causality, structure, prediction* (Part 2: pp. 1-54). Amsterdam: North-Holland.

Wood, S. W. (1979). A reappraisal of the contingency approach to organization. *Journal of Management Studies, 16:* 334- 354.

Wouters, M. and Wilderom, C. (2008). Developing performance-measurement systems as enabling formalization: a longitudinal field study of a logistics department. *Accounting, Organizations and Society, 33:* 488-516.

Wu, A. D. and Zumbo, B. D. (2008). Understanding and using mediators and moderators. *Social Indicators Research, 87:* 367-392.

Yilmaz, C., Alpkan, L. and Ergun, E. (2005). Cultural determinants of customer- and learning-oriented value systems and their joint effects on firm performance. *Journal of Business Research, 58:* 1340-1352.

Young, G., Smith, K. G. and Grimm, C. M. (1996). "Austrian" and industrial organization perspectives on firm-level competitive activity and performance. *Organization Science, 7(3):* 243-254.

Zollo, M. and Winter, S. G. (2002). Deliberate learning and the evolution of dynamic capabilities. *Organization Science, 13(3):* 339-351.