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Theorizing Contingencies in Management Control Systems Research

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Abstract: Contingency-based research has a long tradition in the study of management control systems (MCS). Researchers have attempted to explain the effectiveness of MCS by examining designs that best suit the nature of the environment, technology, size, structure, strategy and national culture. In recent years, contingency-based research has maintained its popularity with studies including these variables but redefining them in contemporary terms. This chapter provides a critical review of findings from contingency-based studies over the past 25 yr, deriving a series of propositions relating MCS to organizational context. The chapter examines issues related to the purpose of MCS, the elements of MCS, the meaning and measurement of contextual variables and issues concerning theory development. The final section considers the possibility that contingency-based ideas can encompass insights from a variety of theories to help understand MCS within its organizational context.

1. Introduction

The three purposes of this chapter are to provide a review of empirical, contingency-based research as it has developed since the early 1980s; to critically evaluate this work; and consider a variety of theoretical foundations that may assist in developing future research. The review is based, in the main, on research employing survey-based methods that has been published in a broad selection of accounting and management journals.[1] The review is selective and illustrative of issues pertinent to the development of a contingency-based framework for the design of management controls systems (MCS), and does not attempt a comprehensive coverage of relevant research.

The chapter is structured as follows. The next section introduces the area of contingency-based MCS research and provides an overview of findings over the past 25 yr. The following nine sections review articles in terms of their contribution to understanding topics considered within contingency-based research. These are: the meaning of MCS, outcomes of MCS, and the contextual variables of external environment, technology (traditional and contemporary), organizational structure, size, strategy and national culture. Each section comprises two parts: first, findings from the extant literature are presented, and a series of propositions summarizing these findings are offered;

[1]The journals include: Accounting, Organizations and Society; Accounting and Business Research; Accounting and Finance; Accountability and Performance, Behavioral Research in Accounting; Contemporary Accounting Research, European Accounting Review, International Journal of Accounting, Journal of Accounting and Economics, Journal of Accounting Literature, Journal of Accounting Research; Journal of Accounting and Public Policy; Journal of Business Finance and Accounting, Journal of Cost Management; Journal of Financial Economics; Journal of Management Accounting Research; Management Accounting Research, The Accounting Review and The American Economic Review. In addition, articles are drawn from management journals: Administrative Science Quarterly, Academy of Management Journal, Academy of Management Review, Advances in Strategic Management, American Psychologist, Decision Sciences, California Management Review, Journal of Applied Psychology, Journal of Management, Journal of Marketing Research, Journal of Occupational and Organizational Psychology, Harvard Business Review, Human Relations, Human Resource Management, Management International Review, Management Science, Marketing Science, Organizational Dynamics, Organizational Studies, OMEGA, Personnel Psychology and Strategic Management Journal and Sociology.

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and second, critical issues concerning each variable are examined with a view to identifying area that provide challenges for improvement and opportunities for future research. Following these sections, issues concerning theory development are examined. Finally, the potential role of a variety of theories in progressing understanding of contingency-based research in MCS is considered.

2. An Organizational Framework for Contingency-Based MCS Research

The identification of contextual variables potentially implicated in the design of effective MCS can be traced to the original structural contingency frameworks developed within organizational theory. Theorists such as Burns & Stalker (1961), Perrow (1970), Thompson (1967), Lawrence & Lorsch (1967) and Galbraith (1973) focused on the impact of environment and technology on organizational structure. Early accounting researchers drew on this work to investigate the importance of environment, technology, structure and size to the design of MCS. Reviews conducted 25 yr ago by Waterhouse & Tiessen (1978) and Otley (1980) were able to structure their commentaries by categorizing the early research into these key variables.

In considering MCS research since 1980, it is apparent that these key variables have been confirmed as descriptors of fundamental, generic elements of context. Many recent studies, included in this review, focus on contemporary aspects of the environment, technologies and structural arrangements. They draw on the original organizational theorists to develop arguments that help explain how the effectiveness of MCS depends on the nature of contemporary settings. Also, recent research has considered the relevance of additional contextual variables to the design of MCS. Perhaps the most important new stream of literature has been that which is related to the role of strategy. This has been assimilated within the traditional organizational model in ways that suggest important links among strategy, environment, technology, organizational structure and MCS (see Langfield-Smith, 2006, for a review). The importance of technology to MCS design has been enriched by research drawing on the manufacturing literature (Hayes et al., 1988; Skinner, 1975), and the work of economists such as Milgrom & Roberts (1990). Issues concerning the role of MCS within advanced manufacturing settings such as Total Quality Management (TQM), Just-in-Time (JIT) and Flexible Manufacturing (FM) have been explored (see Young & Selto, 1991, for a review). Researchers have gained new insights into the role of MCS within new structural arrangements, such as teams, by drawing on the human resource management literature that investigates the dynamics of teams including issues concerning performance evaluation (Cohen, 1993; Katzenbach & Smith, 1993). National culture has been identified as an element of context following the development of multinational operations in many organizations (see Harrison & McKinnon, 1999, for a review).

In reviewing the past 25 yr of contingency-based research, it is important to consider the extent to which progress has been made in developing an empirical body of literature relating MCS to elements of context. The conventional, functionalist contingency-based approach to research assumes that MCS are adopted to assist managers achieve some desired organizational outcomes or organizational goals. The appropriate design(s) of MCS will be influenced by the context within which they operate. The following nine sections consider: *the meaning of MCS*, the *outcomes of MCS* and the key contextual variables as they have evolved, historically, in the literature. First, the relationship between MCS and the *external environment* is considered. This is followed by *technology* (both *traditional* and *contemporary*), *structure* and *size*. Next, *strategy* is examined. Finally, the role of *national culture* in MCS design is reviewed. On the basis of the empirical findings, propositions that relate contextual variables to the MCS are offered. Assessing these propositions requires considering the shortcomings in contingency-based research, identifying the extent to which progress has been made in addressing these issues and noting opportunities for improvements and future directions.[2]

3. The Meaning of MCS

The terms management accounting (MA), management accounting systems (MAS), management control systems (MCS) and organizational controls (OC) are sometimes used interchangeably. MA refers to a collection of practices such as budgeting or product costing, while MAS refers to the systematic use of MA to achieve some goal. MCS is a broader term that encompasses MAS and also includes other controls

[2]Since 1980, several commentators have provided critiques of contingency research in management accounting based on their beliefs of shortcoming in prior studies (Otley, 1980; Otley & Wilkinson, 1988; Moores & Chenhall, 1994; Covaleski et al., 1996; Chapman, 1997; Fisher, 1995, 1998; and Ittner & Larcker, 2001 for a more general review of empirical research in MCS). In this chapter, the main criticisms concerning variable definition and measurement are considered within the critical evaluation of the contingency variables. Several authors note that contingency research has not considered interpretive and critical views of the world. These issues are examined in the final section of the chapter.

such as personal or clan controls. OC is sometimes used to refer to controls built into activities and processes such as statistical quality control or just-in-time management. The term MCS is used, in the main, throughout this chapter.

The definition of MCS has evolved over the year from one focusing on the provision of more formal, financially quantifiable information to assist managerial decision making to another that embraces a much broader scope of information. This includes external information related to markets, customers, competitors, non-financial information related to production processes, predictive information and a broad array of decision support mechanisms and informal personal and social controls. Conventionally, MCS are perceived as passive tools, providing information to assist managers. However, approaches following a sociological orientation see MCS as more active, furnishing individuals with power to achieve their own ends. Contingency-based research follows the more conventional view that perceives MCS as a passive tool designed to assist a manager's decision making.

Contingency-based research has focused on a variety of aspects of MCS. These include practices such as ABC/ABM (Anderson & Young, 1999; Gosselin, 1997), non-financial performance measures (see Ittner & Larcker, 1998b for a review), balanced scorecards (Davis & Albright, 2004; Hoque & James, 2000; Malina & Selto, 2001; Malmi, 2001), post-completion audits (Chenhall & Morris, 1993; Smith, 1993), variance analysis (Emsley, 2000) and economic value analysis (Biddle et al., 1998). Several studies examine how budgetary practices are used such as budget participation (see Shields & Shields, 1988, for a review), budget slack (Davila & Wouters 2005; Dunk, 1993; see Dunk and Nouri, 1998, for a review; Merchant, 1985b; Van der Stede, 2000; Webb, 2002), tight budgetary control (Van der Stede, 2001) and the role of budgetary targets in managing role ambiguity (Marginson & Ogden, 2005). Other areas of interest in MCS research are the information dimensions that underlie MCS. The most important dimensions include the following: a composite dimension covering the importance of meeting budgets, formality of communications and systems sophistication, links to rewards systems (Bruns & Waterhouse, 1975; Merchant, 1981), sophistication of controls (Khandwalla, 1972), reliance on accounting performance measures (Brownell, 1982a, 1987; see Hartmann, 2000 for a review; Hopwood, 1972, 1974; Hirst, 1981; Imoisoli, 1989; Otley, 1978), dimensions of information such as scope, timeliness and aggregations (Chenhall & Morris, 1986; Gordon and Narayanan, 1984; Larcker, 1981), sophistication of capital budgeting (Haka, 1987; Larcker, 1983), cost consciousness (Shields & Young, 1994), competitor-focused accounting (Guilding, 1999; Guilding & McManus, 2002), strategic interactive controls and diagnostic controls (Simons, 1995), sensitivity and precision of performance measures (Abernethy, et al., 2004; Banker & Datar, 1989), activity knowledge structure (Dearman & Shields, 2001), common compared to unique performance measures (Lipe & Salterio, 2000).

3.1. Critical Evaluation

Overall, assessing findings from contingency-based research involves judging how the results accumulate to provide generalizable findings concerning MCS. As is common in many social sciences, MCS researchers are faced with decisions on whether to build on an existing area of study, such as the role of formal budgets, or identify emerging aspects of MCS, such as balanced scorecards or target costing, and investigate the settings within which they may be most beneficial.

Within the body of literature reviewed in this chapter, there is a mixture of studies focused on traditional themes and studies exploring recently emerging elements of MCS and context. Both types of studies are required. Studying the role of novel MCS practices within contemporary settings is necessary to ensure that MCS research is relevant. Given that many dimensions of MCS and their contexts change, novel studies will always be required to address emerging issues (Atkinson et al., 1997). There is a pressing need for studies of situations in which contemporary MCS may be best suited. A solid body of research has emerged that has examined the design and implementation of ABC/ABM with important contingencies associated with successful implementation emerging from the research (Anderson, 1995; Anderson & Young, 1999; Anderson, et al., 2001; Chenhall, 2004; Foster & Swenson, 1997; Kennedy & Affleck-Graves, 2001; Krumwiede, 1998; McGowan & Klammer, 1997; Shields, 1995). Recent work has begun to examine situations within which balanced scorecards may best suit (Davis & Albright, 2004; Hoque & James, 2000; Ittner & Larcker, 1998b, 2001, 2003; Malmi, 2001) and if non-financial performance indicators are universally effective (Abernethy & Lillis, 1995; Chenhall, 1997; Ittner & Larcker, 1998a; Perera, et al., 1997). However, there is very little published contingency work on the practices of target costing, life cycle costing and product life cycles.

Some recent studies have examined how MCS link to aspects of the production processes such as links to value chain analysis (Dekker, 2003), measures of the benefits of supplier partnerships (Seal et al., 1999) and using total cost of ownership for sourcing decisions (Wouters et al., 2005). The implications for MCS of

coordinating inter-organizational relationships, such as alliances between suppliers and customers, are being examined (Cooper & Slagmulder, 2004; Dekker, 2004; Håkan & Lind, 2004). Work has begun to shed light on how enterprise resource planning relates to MCS (Chapman, 2005; Dechow & Mouritsen, 2005). Davila (2000) identified information that is related to issues concerning customers, product design, time, cost, resources and profitability, which is distinguished on the level of detail, updating frequency and interactive use with operational personnel.

Contemporary MCS research has drawn on ideas from disciplines such as economics with insights provided from agency theory (Baiman, 1982, 1990; Lambert, 2006 Handbook). Also, operations management has highlighted the need for MCS to be grounded in an understanding of the value chain and how this provides the potential to effect desired strategies. For example, for some time, considerable interest has been devoted to relating costing (Berliner & Brimson, 1988) and performance measurement (AAA, 1990) to an analysis of operations by way of value chain analysis. However, links with other disciplines such as marketing and human resource management have not been widely explored. There has been some MCS research that has specifically addressed marketing issues, particularly, customer performance measures or customer focus. These identify customer-based accounting performance measures (Guilding & McManus, 2002) and the way that including these measures within MCS broadens the role of management accounting (Vaivio, 1999). Customer satisfaction has been included in a variety of studies (Banker et al., 2000; Ittner & Larcker, 1998a). However, the marketing literature identifies a rich context that has great relevance to MCS. For example, marketing research has focused on determinates of customer satisfaction such as loyalty (Heskett et al., 1994; Reicheld, 1996), and links with desired outcomes (Anderson et al., 1994, 1997; Fornell et al., 1996). MCS research has started examining these issues. For example, Smith & Wright (2004) show the importance of customer loyalty to financial performance and how loyalty is enhanced by post-sale service quality but not by product quality. The *lifetime value of a customer* (CLV) is based on assumptions of customer loyalty and their annual consumption of goods and services (Reichheld, 1996). Other useful ideas include the *service profit chain* that maintains that there are strong direct links between profit, growth, customer loyalty, customer satisfaction, the value of goods and services delivered to customers and employee capability, satisfaction, loyalty and productivity (Heskett et al., 1994). *The service profit chain* has been likened to a form of balanced scorecard with its focus on drivers and means–end relationships. Measuring *brand equity* has sought to identify the effectiveness of brand-building activities of managers and isolates factors such as loyalty, perceived quality, associations and awareness (Aaker, 1991). Very little research in MCS has attempted to identify how the marketing context affects the way in which MCS are employed and how marketing and MCS may combine to effect desired outcomes.

Human resource management provides a rich area for research. For example, what are the contingencies affecting the assessment of human resource management initiatives? Examples of the latter include measurement to guide and evaluate the learning capabilities of the organization, measures such as team maturity indexes and organizational climate surveys that attempt to assess the effectiveness of administrative innovations. Recent developments of relevance to MCS researchers include corporate social reporting (including triple bottom line and environmental reporting) (Al-Tuwaijri et al., 2004; Gray, 1996, 2002; Patten, 2002), 360-degree performance evaluation (Hazucha et al., 1993), forensic accounting (Manning, 2000), intangible assets (Grojer, 2001; Power, 2001), knowledge-based organizations (Ditillo, 2004) and intellectual capital (Andeiessen, 2004; Brooking, 1996; Edvinsson, 2002; Stewart, 2001; Sveiby, 1997). Studies have examined the role of intellectual capital and the design of MCS (Widener, 2004), using intellectual capital for managing knowledge (Mouritsen et al., 2001) and for mobilizing change (Johanson et al., 2001). Linking intangibles and intellectual capital to financial performance has been attempted by way of the human capital index (HCI) developed by Watson-Wyatt (Watson & Wyatt, 2005). Contingency research can assist understanding by examining how MCS are implicated in these areas, and if the effectiveness of these approaches is context specific.

Finally, there is a need for more research into service and not-for-profit organizations as these entities become increasingly important within most economies. Examples of this research are the use of MCS in hospitals (Abernethy & Brownell, 1999; MacArthur and Stanahan, 1998; Noreen & Soderstrom, 1994), in the public sector (Gieger & Ittner, 1996; Williams et al., 1990) and the military (Chenhall & Euske, 2005).

Notwithstanding the importance of studying controls that are relevant to contemporary settings, it is important to develop knowledge in ways that ensure coherence in the study of elements of MAS and contextual variables, and in the findings of these studies. Such confidence can be derived from replication studies that enhance the validity and reliability of findings and thereby provide a strong base to move

forward by way of model development (Lindsay, 1995). Commentators have been critical that in most areas of MCS research, studies have not developed sufficient 'critical mass' to confirm findings.

In some areas of MCS that have attracted a substantial research effort, such as RAPM, variation in dimensions of variables across studies and different measures of the variables have inhibited the coherent accumulation of findings (Hartmann, 2000; Kren & Liao, 1988). This is particularly the case where the MCS constructs are defined from practice, as opposed to more exact definitions derived from theory.[3] The way in which studies evolved within the area of RAPM helps illustrate several difficulties in isolating the meaning and measurement of MCS variables (Hartmann, 2000; Otley & Fakiolas, 2000). First, the precise meaning of the concept of RAPM has been confused by lack of definition of what is accounting and non-accounting and what is reliance (Hartmann, 2000). Given the ambiguity with the concept, it is not surprising that researchers sought to gain clarification by modifying their studies as understanding of RAPM and its measurement developed. Such refining of concepts and measurement is common in other social sciences, such as psychology. It is unfortunate that it is not part of the MCS research tradition to spend more time on developing robust measures of the elements of MCS, particularly when there is ambiguity in the meaning of constructs. For example, it is not clear how balanced scorecards should be measured. It seems likely that the content and implementation of balanced scorecards vary widely among organizations. It would seem useful to develop a valid measure of balanced scorecards that could then be used by researchers to explore the role of balanced scorecards within the context within which the scorecards are applied. While such a valid measure would enhance consistency between studies, a difficulty exists in the dynamic nature of MCS practices. MCS that are valid today may lose validity as they evolve through time. Certainly, because of advances in information technology (IT) software, some types of balanced scorecards being employed today are more comprehensive and strategic in nature than those being used 5 yr ago. Similarly, the concept of RAPM and how it relates to broader controls has changed since the early work in the 1970s and 1980s. Without accommodating changes in contemporary control systems, concepts and measures of MCS are unlikely to address pertinent, contemporary issues. A research climate that encouraged the development of valid concepts and measures of MCS would have to recognize the need for modification to incorporate the evolution of MCS.

Participative budgeting has also been studied widely. Unlike RAPM, participation in budgets has almost universally been conceptualized and measured following Milani (1975). In some studies, additional measures are employed to provide some validation on the primary measure (Brownell & McInnes, 1986). Other studies of budget-related behaviour have drawn on attitudes and satisfaction with budgets, as developed by Swieringa & Moncur (1975). There have been a considerable number of studies that have confirmed the measurement of the generic MCS characteristics of broad scope, timeliness, aggregation and integration. These studies have employed concepts and measures developed by Chenhall & Morris (1986), sometimes with minor adjustments to suit the particular setting, and appear to be robust across a variety of settings. However, there has been little replication or coherence in measurement development in studies examining MCS practices of contemporary interest such as static–flexible budgets, non-financial performance measures, activity-based accounting, competitor-focused accounting and product development information. Similarly, while studies have explored important areas of MCS such as social controls, personnel control, sophisticated integrative mechanisms, administrative controls, interpersonal controls and sophisticated controls, there has been very little replication.

A further criticism related to the nature of accounting controls within contingency-based research is that these form only part of broader control systems (Chapman, 1998; Merchant, 1985a; Otley, 1980, 1994). Contingency-based research has focused on specific elements of accounting controls, generic information dimensions of MCS, with a limited number of studies examining broader elements of control, such as clan and informal controls, or integrative mechanisms. A difficulty in studying specific elements of MCS in isolation from other organizational controls is the potential for serious model under specification. Thus, if specific accounting controls are systematically linked with other organizational controls, studies that exclude or do not control these elements within the research method may report spurious findings. For example, a study focused only on formal budget systems may argue that they are unsuitable in uncertain operating conditions as they include incomplete information and lack flexibility. However, evidence may indicate that successful organizations rely extensively on formal budgets. This unexpected finding occurs as a consequence of limiting the study to budgets without

[3]See Bisbe et al. (2005) for a discussion of the importance of defining the meaning of MCS constructs and the difference between practice-based and theory-based constructs.

considering broader control and information networks. It may be that successful organizations operating in uncertain conditions have formal budgets but they are systematically combined with open and flexible informal communications between managers. The formal budgets are useful in assisting planning and curbing excessive innovation, while the informal communications provide broader information in flexible ways. Simons (1987, 1991, 1995) showed that formal budgets can provide interactive controls in uncertain conditions whereby the budgets generate intelligence data to build internal pressure to break out of narrow search routines and encourage the emergence of new strategic initiatives. Chapman (1998) also argues that in uncertain conditions effective organizations can employ formal accounting but they should take place within a situation that involves intense verbal communication between organizational groups. Frow et al. (2005) found that managers were able to manage high levels of interdependencies by cooperating informally (informal channel of social interaction) but did so within the framework of formal systems (formally directed procedures). This approach helped specify what was required and how it could be achieved by managing interdependencies. Also, formal controls were used when informal arrangements were not physically possible or when they broke down.

A way of addressing these concerns is to identify a variety of control taxonomies and consider how they relate to various aspects of MCS. One such taxonomy involves classifying controls as ranging from mechanistic to organic. Mechanistic controls rely on formal rules, standardized operating procedures and routines. Organic systems are more flexible, responsive, involve fewer rules and standardized procedures and tend to be richer in data.[4] Table 1 provides a grouping of elements of MCS and control types commonly found in research, in terms of the organic or mechanistic nature of control.

These taxonomies are useful for addressing concerns of how MCS relates to broader control systems and can guide research into how particular aspects of MCS are consistent with the control 'culture' of organizations.

Finally, it should be noted that there is a distinction between the adoption of MCS and the implementation of the systems. Much can be learned about the success or otherwise of MCS by examining how the control culture, organic or mechanistic, influences the processes of implementation. This becomes particularly important while studying the adoption of innovative MCS such as activity-based accounting (Anderson & Young, 1999; Gosselin, 1997; Krumwiede, 1998; Shields, 1995) and balanced scorecards (Hoque & James, 2000; Ittner & Larcker, 2003) both of which often become closely linked to the organization's control culture; and the extent of change in MCS, in general (Baines & Langfield-Smith, 2003; Libby & Waterhouse, 1996; Williams & Seaman, 2001).

It seems clear that broader issues of control are likely to have implications for research into understanding MCS design. There have been advances over the past 20 yr in demonstrating the importance of considering management accounting practices as aspects of MCS. Understanding how specific aspects of management accounting relates to broader control concepts, as outlined in Table 1, assists in researching the complementary or substitution effects of non-accounting controls. An important part of the research agenda is to understand how different controls can be combined, to suit the particular circumstances of the organization (Fisher, 1995). In studying broad controls, it is necessary to be aware of the boundaries that some organizations and accountants place around MAS and MCS. Without such awareness, there can be confusion as to what is a formal accounting control, what is a structural control, what are personnel and informal controls.

4. Outcomes of MCS

Outcomes may be separated into issues related to the *use* or *usefulness* of the MCS, *behavioural* and *organizational* outcomes. There is an implied connection between these outcomes. If the MCS are found to be useful then they are likely to be used and provide satisfaction to individuals, who then presumably can approach their tasks with enhanced information. As a consequence, these individuals take improved decisions and better achieve organizational goals. Clearly, there are broad leaps in logic from useful MCS, to improved job satisfaction and enhanced organizational performance. Moreover, there is no

[4]Several authors provide for an elaboration of mechanistic and organic control. Perrow (1970) distinguishes mechanistic from organic controls on the basis of manager's discretion, power and coordination within groups and interdependence between groups. Organic controls involve higher discretion and power, coordination by mutual adjustment and high interdependence between work groups. Ouchi (1977, 1979) identifies market controls (prices), mechanistic formal bureaucratic controls (rules to control output of work and the behaviour of workers), and organic, informal clan controls (recruitment, traditions and ceremonial control). Galbraith (1973) refers to mechanistic controls as rules, programs and procedures, hierarchy and goal setting; and organic controls as creating slack resources, self-contained tasks, vertical information systems and lateral relations.

Table 1. Organic and mechanistic forms of MCS.

More organic
Clan controls (Ouchi, 1980; Govindarajan and Fisher, 1990) (control cultures and norms)
Social controls (Merchant, 1985a) (self and group controls), (Rockness and Shields, 1984) (input controls—social controls and budgets).
Personnel controls (Merchant, 1985a) (selection, training, culture, group rewards, resources); Abernethy and Brownell, 1997) (socialization and training)
Sophisticated integrative mechanisms (Abernethy and Lillis, 1995) (task forces, meetings, etc.)
Prospect controls (Macintosh, 1994) (focus on plans and the future, infrequent and general reporting)
MCS that provide broad scope information, flexible aggregations and integrative information, and information provided in a timely way (Chenhall and Morris, 1986)
Static/flexible budgets (Brownell and Merchant, 1990) (flexibility of budgets to volume changes)
Participative budgets (Shields and Shields (1988) (involvement of subordinates in setting budgets)
Low reliance on accounting controls (Hirst, 1981; Brownell, 1982; 1987) (use of more profit oriented controls or non-accounting)
Budget slack (Merchant, 1985b; Dunk, 1993) (excess resources over that needed to complete tasks efficiently)
Competitor-focused accounting (Guilding, 1999) (competitor cost assessment, position monitoring and appraisal, strategic costing and pricing)
Strategic interactive controls (Simons, 1995) (use of performance evaluation for strategic planning)
Product development information (Davila, 2000) (levels of detail, frequency of updating and pattern of usage for information related to product cost and design, time related, customer related, resource inputs, profitability)
Enabling controls (Ahrens & Chapman, 2004)
More mechanistic
Budget constrained performance evaluation style (Hopwood, 1972) (high emphasis on cost budgets)
Budget control (Rockness and Shields, 1984)
High reliance on accounting controls (Hirst, 1981; Brownell, 1982, 1987) (accounting for performance evaluation)
High budget use (Bruns and Waterhouse, 1975; Merchant, 1981, (importance, involvement, time spent on budgets)
Narrow scope (Chenhall and Morris, 1986) (financial, internal, historic)
Sophisticated capital budgeting (Larcker, 1981; Haka, 1987) (DCF, etc.)
Sophisticated controls (Khandwalla, 1972) (standard costing, incremental costing, statistical quality control, inventory control)
Operating procedures, budgets and statistical reports (Macintosh and Daft, 1987).
Administrative use of budgets (Hopwood, 1972; Merchant, 1981) (importance of meeting budget, formality of communications, systems sophistication and participation)
Inter personnel controls (Bruns and Waterhouse, 1975) (Lack of formal controls but centralization, lack of autonomy, pressure inducing actions by superiors)
Output and results controls (Merchant, 1985a; Macintosh, 1994) (outcomes or effectiveness)
Behavior controls (Ouchi, 1979, Merchant, 1985a, Rockness and Shields, 1984) (standardization, rules, formalization)
Patriarchal control (Whitley, 1999) (personal & informal, centralized control from the top)
Action controls (Merchant, 1985a); process controls, manufacturing performance measures (Chenhall, 1997) (direct measures of production processes)
Diagnostic controls (Simons, 1995) (use of control to provide feedback on operations)
Coercive controls (Ahrens & Chapman, 2004)

compelling evidence to suggest that such links exist. Even within contingency-based research, the link between enhanced organizational performance and usefulness of some aspect of MCS may well depend on the appropriateness of the useful MCS to the context of the organization.

Considerations of interest to designers and researchers of MCS have been the extent to which the systems provide information (Mia & Chenhall, 1994), the degree of use (Abernethy & Guthrie, 1994; Anderson & Young, 1999; Foster & Swenson, 1997; Guilding, 1999), the usefulness of the information (Chenhall & Morris, 1986; Shields, 1995) or the beneficial nature of the MCS (Chenhall & Langfield-Smith, 1998a), importance in making operational decisions (Bouwens & Abernethy, 2000), importance to product development (Davila, 2000), whether they are helpful to the organization (Guilding, 1999) and satisfaction with the systems (Bruns & Waterhouse, 1975; Ittner & Larcker, 1998b).

Behavioural outcomes such as job satisfaction have been important in human resource management. The

provision of a work-place environment to enhance employee welfare or job satisfaction is seen by some as a worthwhile goal in its own right. Moreover, other things being same, it may be presumed that individuals who are satisfied with their jobs will identify with organizational goals and work more effectively. Interestingly, there have not been many MCS studies that have examined the effects of MCS on job satisfaction (Banker et al., 1993; Brownell, 1982b; Chenhall, 1986). A variety of studies has examined the effect of MCS on job-related tension or stress (Brownell & Hirst, 1986; Hopwood, 1972; Hirst, 1983; Shields et al., 2000). Unlike job satisfaction, stress appears to be more closely related to the nature of the MCS and is implicated in associations with performance (Shields et al., 2000).

Organizational outcomes in contingency-based research have been dominated by self-assessment processes where individuals provide an indication of their performance, or their organizational unit, across a range of potentially important managerial processes (see e.g. Mahoney et al., 1963) or goals of the organization (Govindarajan, 1984). The issue of the validity of self-assessment is often raised as a concern. Evidence suggests that a subordinate's self-assessment correlates with objective assessments (Bommer et al., 1995; Venkatraman & Ramanujam, 1987) and with a superior's subjective assessment (Furnham & Stringfield, 1994; Heneman, 1974; Riggo & Cole, 1992). Notwithstanding this evidence, it is always reassuring when a superior's performance rating of the respondent is included in the study.

There has been a growing body of research relating MCS change to share prices, although this is not widespread. Larcker (1983) found that firms adopting incentive performance plans experienced an increase in capital investment and a positive security market reaction on disclosure of the plan to the market. Gordon & Smith (1992) reported that returns to investors were higher for firms employing post-completion reviews when matched with asymmetric information, capital intensity, capital expenditure and insider ownership. Smith (1993) identified that positive returns were associated with post-completion reviews in abandonment decisions. McConnell & Muscarella (1985) report positive associations between announcements of increases in capital investment plans, MCS and share price movement. However, Gordon & Silvester (1999) found no significant association between the installation of ABC and significant stock market reaction. Ittner & Larcker (1998a) and Ittner et al. (2002, 2003) have included share price movement as a measure of performance in studies of the effectiveness of performance measures. Kennedy & Affleck-Graves (2001) examined the effect of ABC on stock returns. This poses the question as to whether improved understanding would follow from studying these main effects within a variety of organizational contexts or not. These studies do not employ contingency-based approaches as they explore only the main effects between share price movement and the adoption of elements of MCS (Studies often examine industry effects and the importance of capital expenditure). Progress in this area may be limited due to the difficulties in extracting the effects of adopting different MCS on share prices from other events that may be associated with share price movements. With numerous possible events effecting share prices, control problems can become acute. Also, data collection is complicated because of the need to collect data on the adoption and implementation of MCS by survey methods and then to match these with share price changes. Also, perhaps the lack of research in the area says something about the different types of training between researchers in finance and management accounting.

4.1. Critical Evaluation

Contingency-based studies have examined MCS as both dependent and independent variables. To examine fit between MCS and context, some commentators have claimed that the outcome variables should be some dimension of desired organizational or managerial performance (Otley, 1980; Otley & Wilkinson, 1988). Good fit means enhanced performance, while poor fit implies diminished performance. While it is often claimed that the ultimate goal of MCS research is to provide findings that assist managers achieve their goals or those of their organization, MCS research has continued to include dimensions of MCS, their use and usefulness, as the outcome variable. Also, it is noteworthy that performance has been included as an independent variable explaining some characteristics of MCS (see Langfield-Smith, 2006, for a discussion).

While not explicit in most studies with MCS as the outcome variable, it is implied that associations between context and MCS reflect equilibrium conditions, or indicate optimal solutions because of survival-of-the-fittest conditions. If equilibrium is assumed, then studying performance is inappropriate as every firm has optimal performance given its situation. There is a view that studying MCS as the outcome variable is justified as rational managers are unlikely to adopt or use MCS that do not assist in enhancing performance (An alternate view is that managers may adopt MCS for institutional or political reasons that may be inconsistent with rational economic reasons.) Alternatively, some argue that links between MCS, context and performance can be

tenuous as they involve many factors concerning the quality of managing the production processes (Birnberg et al., 1983; Kren & Liao, 1988). In general, if disequilibrium conditions are assumed, then it may be useful for contingency-based studies to first establish adoption and use of MCS, then to examine how they are used to enhance decision quality and finally investigate links with organizational performance.

Care is required when interpreting studies that have outcome variables related to the characteristics of MCS, such as 'use' and 'usefulness' of the systems. Individuals may be forced to use MCS, such as budgets or DCF analysis in decision making, even though they find them of little use. Also, linking 'use', 'usefulness', 'benefits' or 'satisfaction' to organizational effectiveness is potentially problematic. A particular MCS may be perceived as not useful and rate low in satisfaction or benefits but organizational performance may be high due to the supply of required information from other sources, either formal or informal. These issues can be resolved by careful attention to the research question. It is quite legitimate to study the adoption of systems and their use. However, it may not be appropriate to claim that these outcomes are of value in improving organizational performance. Similarly, the extent to which MCS are perceived as useful may not imply improved organizational performance. If studying one aspect of the MCS in isolation from other sources of information, researchers should ensure that the studied attribute is the sole source of the information being studied. If an aspect of the MCS is being considered within situations that include broader information and controls, the potential influence of these other controls should be included or controlled within the research design.

In summary, despite the critique that contingency-based studies should include organizational performance as the dependent variable, studies still follow approaches with MCS as the dependent variable. Care in theory construction, including clarification of assumptions related to equilibrium conditions, is required in following either approach. Studies can provide important insights into the extent of adoption, use and usefulness of MCS; however, it should not be assumed that the models necessarily lead to enhanced organizational performance. Similarly, if performance is the dependent variable then compelling theory is required to show how the combination of MCS and context enable managers to take more effective decisions that enhance organizational performance.

Given the assumption that organizations should identify organizational performance as the criterion variable, a critical issue is, what constitutes performance? Distinguishing official and operative goals would seem an essential aspect of MCS research that includes consideration of goals, mainly as it flags that the issue of organizational goals is far from being unproblematic (Perrow, 1970). Investigating these goals requires a dynamic approach that examines the goal formulation process. There are several issues that become important. First, goal formulation or change often involves the influence of new powerful players, either within or outside the organization, who can dramatically change official goals. MCS can act either as a tool to effect such changes or hinder their acceptance within the organization. For example, a new Chief Executive Officer may stipulate that improved shareholder value is a priority. Consequently, performance measurement based on Economic Value Analysis may be introduced in an attempt to align the actions of all employees with the single objective of improving economic value. Second, changes in the areas of organizational effectiveness can redirect goals to those areas of effectiveness. The unplanned discovery of a new technology that potentially increases throughput can result in the adoption of 'timely' delivery as a goal of the organization.

Third, it is apparent that the measurement of goals can have explicit effects on goal formulation, both intended and unintended. Goals may be selected or evolve as they can be measured readily by the MCS. A preoccupation with formal, 'hard' measures may direct attention to those measures at the expense of the subtleties of the situation. For example, measuring aspects of customer or employee satisfaction, the organizational culture or intellectual capital often require more subjective assessments of progress and, as such, may receive less attention than activities subjected to hard measures such as production rejects or throughput.

Fourth, in addition to influencing types of goals, MCS may affect goal achievement by establishing standards or benchmarks for performance. Goals that are too hard may cause frustration and withdrawal, while standards that are too easy may not provide sufficient challenge. Standards that are achievable but with sufficient stretch to provide a challenge are often recommended as ideal. However, in today's environment of intense competition and global operations, requirements for substantial continuous improvement may mean that difficult standards based on continuous improvements are required to survive. Performance measures can readily establish targets that require continuous improvement.

Fifth, recently many organizations have recognized the need to satisfy multiple and potentially competing goals. Mission statements identify the requirements to attract and maintain shareholders, employees and customers; and to do so in ways that are socially acceptable. Accountants have responded by

refining triple bottom line reporting, environmental accounting, social corporate reporting and corporate sustainability (Epstein & Birchard, 2000).

Sixth, aligning operative goals with official goals is an important aspect of strategic management. This is the essence of performance hierarchies and balanced scorecards that attempt to capture the interactive effects of official goals associated with the interests of shareholders, customers, the internal processes and the potential for the organization to sustain itself by learning and innovation. Moreover, these types of performance management methods attempt to align strategy with operations by translating official goals into operative goals and cascading the latter down through the organization. Of course, connections between official and operative goals can be quite different in similar organizations. Achieving shareholder welfare might require organizations to follow different operative goals concerning decisions on quality, cost, delivery and the like.

Linkages between MCS and organizational goals are quite explicit, as a primary function of MCS is to measure progress towards achieving desired organizational ends. It is a useful exercise when evaluating characteristics of MCS used for reporting on goals to judge the extent to which they accommodate the following: consider multiple stakeholders; measure efficiency, effectiveness and equity; capture financial and non-financial outcomes; provide vertical links between strategy and operations and horizontal links across the value chain; provide information on how the organization relates to its external environment and its ability to adapt. Presumably, balanced scorecards or performance hierarchies provide a methodology to tackle many of these issues. The complexity of achieving these expectations may help to explain why many firms that attempt to adopt balanced scorecards have difficulty in implementing them.

5. Contextual Variables and MCS

Before examining the contextual variables, a distinction is noted between generic and specific definitions. When considering environment, specific definitions refer to particular attributes such as intense price competition from existing or potential competitors, or the likelihood of a change in the availability of materials. Generic definitions attempt to capture the effects of specific attributes in a more generalized way. Generic definitions enable designers and researchers of MCS to discuss the influence of contextual variables without having to identify the particular details of individual organizations. Constructing taxonomies of context and theories relating these to the use of MCS and organizational outcomes becomes more tractable. Clearly, to make prescriptive recommendations to a particular organization, it is necessary that the specific attributes of the environment be identified. Moving between the generic and specific should not be problematic provided the generic definitions are robust. Chapman (1997) provides a discussion of the trade-offs between simplicity, accuracy and generalizability in variable definition.

5.1. The External Environment

The external environment is a powerful contextual variable that is at the foundation of contingency-based research. Perhaps the most widely researched aspect of the environment is uncertainty. Early contingency research in organizational design focused on the effects of uncertainty on organizational structure. Examples include Burns & Stalker (1961), Lawrence & Lorsch (1967), Perrow (1970) and Galbraith (1973). It is important to distinguish uncertainty from risk. Risk is concerned with situations in which probabilities can be attached to particular events, whereas uncertainty defines situations in which probabilities cannot be attached and even the elements of the environment may not be predictable. The importance of uncertainty as a fundamental variable in MCS contingency-based research has been stressed recently by Chapman (1997) and Hartmann (2000). Both reinterpret aspects of MCS research by examining the impact of environmental uncertainty.

Uncertainty and risk do not provide a comprehensive description of the environment. Khandwalla (1977) provides a useful taxonomy of environmental variables. These include turbulence (risky, unpredictable, fluctuating and ambiguous), hostility (stressful, dominating and restrictive), diversity (variety in products, inputs and customers) and complexity (rapidly developing technologies). Other elements of the environment that may generate pressure or provide opportunities include complexity and dynamism (Duncan, 1972), (simple–complex and static–dynamic (Waterhouse & Tiessen, 1978]), controllable and uncontrollable (Ewusi-Mensah, 1981), ambiguity (Ouchi, 1979) or equivocality (Daft & Macintosh, 1981).

In MCS research, uncertainty has been related to the usefulness of broad scope information (Chenhall & Morris, 1986; Chong & Chong, 1997; Gordon & Narayanan, 1984; Gul & Chia, 1994) and timely information (Chenhall & Morris, 1986); performance evaluation characterized by a more subjective evaluation style (Govindarajan, 1984; Moores & Sharma, 1998); less reliance on incentive-based pay (Bloom, 1998), non-accounting style of performance evaluation rather than a budget-constrained or profit-oriented style (Ross, 1995) and participative budgeting (Govindarajan,

1986).[5] Functional area, particularly research and development (R&D) (seen as facing higher environmental uncertainty compared to marketing) combined with budgetary participation was shown to enhance performance (Brownell, 1985). Changes in the competitive environment were associated with strategy, organizational design and technology, all of which were associated with changes in non-financial indicators (Baines & Langfield-Smith, 2003).

Some evidence suggests the benefits of combinations of traditional budgetary controls and more interpersonal and flexible controls in conditions of environmental uncertainty. Ezzamel (1990) reported that high environmental uncertainty was associated with an emphasis on budgets for evaluation and required not only explanation of variances but also high participation and interpersonal interactions between superiors and subordinates. Merchant (1990) found that environmental uncertainty was linked to pressure to meet financial targets but there was some flexibility by way of higher manipulation of information. In a study of four cases, Chapman (1998) proposed that accounting has a planning role to play in conditions of uncertainty; but there must be substantial interactions between accountants and other managers to cope with changing conditions as they unfold in unpredictable ways.

Environmental hostility (difficulty) has been associated with a strong emphasis on meeting budgets (Otley, 1978). Hostility from intense competition has been related to a reliance on formal control (Imoisili, 1985) and sophisticated accounting, production and statistical control (Khandwalla, 1972). However, certain specific elements of competitive position, such as strength of market position and stages in product life cycles were not associated with the importance of budgets or participation (Merchant, 1984). Also, environmental complexity (but only when derived from suppliers and government), independent of function, was associated with a reduced emphasis on budgets (Brownell, 1985).

From these illustrations, it can be seen that a consistent stream of research over the past 20 yr has confirmed that uncertainty has been associated with a need for more open, externally focused, non-financial styles of MCS. However, hostile and turbulent conditions appear, in the main, to be best served by a reliance on formal controls and an emphasis on budgets. The question may be posed, what is the appropriate MCS for organizations operating in conditions of uncertainty, turbulence and hostility? The organizational design literature proposes that organizations facing extreme pressure will initially tighten control as such pressure is likely to threaten short-term survival and then adopt more organic controls (Khandwalla, 1977). Little is known about the appropriate design of MCS to assist in managing complex and competing forces from the external environment. It would be useful to examine how contemporary, interactive information systems can provide a blend of tight controls with the opportunity to source more open, informal and subjective information. Certainly, there is evidence that effective organizations combine tight controls with more open, informal and flexible information and communication systems (Ahrens & Chapman, 2004; Chapman, 1998; Chenhall & Morris, 1995; Simons, 1987).

The following propositions summarize the research findings relating MCS to the external environment.

5.1.1. Propositions Concerning the External Environment and MCS

The more uncertain the external environment, the more open and externally focused the MCS.

The more hostile and turbulent the external environment, the greater the reliance on formal controls and emphasis on traditional budgets.

Where MCS focused on tight financial controls are used, in uncertain external environments, they will be used together with an emphasis on flexible, interpersonal interactions.

5.1.2. Critical Evaluation

The distinction between dimensions within the external environment, such as uncertainty, hostility and complexity are important to MCS design. More mechanistic, formal MCS tend to provide incomplete information in uncertain conditions and require rapid reformulation to cope with the unfolding unpredictability. However, in complex situations there is a need for more information within the MCS, but once designed the systems should be sufficient to assist in taking and implementing decisions. Clear specification of the environmental dimensions of interest is required, as different theories are required to consider the effects of different dimensions. There are rich research opportunities to investigate appropriate MCS design for settings that are uncertain and also hostile and complex.

Interpreting studies that have examined the influence of the external environment is complicated by the use of different measures of the same environmental construct. For example, Gordon & Narayanan's (1984) studied of the association between

[5]The theory used by Ross (1995) examines task uncertainty but the study measures environmental uncertainty.

perceived environmental uncertainty and more broadly scoped MCS. They used a measure of uncertainty that captured the intensity of competition, the dynamic and unpredictable nature of the external environment and elements of change. In studying the same type of MCS variables, Chenhall & Morris (1986) used a measure of uncertainty that considered lack of information on environmental factors, inability to assign probabilities on how the environment will affect success or failure and not knowing the outcome of decisions on how the organization would lose if the decision were incorrect. The measure used by Gordon & Narayanan (1984) is more specifically focused on the external situation than Chenhall & Morris (1986), which has a composite of external components and implications for internal decisions. Even within the measure used by Gordon & Narayanan (1984) elements of unpredictability are combined with difficulty. Tymond et al. (1998) provide a comprehensive review of MCS research investigating the role of environmental uncertainty, providing recommendations that the measures should involve top managers' perceptions of the external environment. The application of a single valid and reliable measure of environmental uncertainty would assist in comparing the results of studies examining uncertainty and help build a coherent body of knowledge on the effects of this variable on MCS design.

The environment will continue to be a central element of context in contingency-based research. The specific attributes of the environment are changing and should be included in future studies. The external environment that most organizations face includes increased social pressure on issues such as environmental ecology and the economic and social well being of employees and society. The implications for management and MCS of global competition and operations are increasingly important. As organizations become involved in networks involving other entities such as joint ventures and supplier and customer alliances, the boundaries between what is internal and external become blurred and consequently the role of MCS will likely change. Additionally, the way in which the environment exerts pressure should be explored. Granlund & Lukka (1998) note that pressure may come from economic causes, coercion from institutions, normative pressure derived from appropriate social conduct and the tendency to mimic apparently successful practices.

5.2. Generic Concepts of Technology

Technology has many meanings in organizational behavior. At a general level, technology refers to how the organization's work processes operate (the way tasks transform inputs into outputs) and includes hardware (such as machines and tools), materials, people, software and knowledge. Three generic types of technology of importance to MCS design maybe identified from the organizational literature: complexity, task uncertainty and interdependence.[6]

Using these notions of technology, several key attributes that may influence MCS design can be derived. First, organizations producing highly specialized, non-standard, differentiated products are likely to employ complex unit or batch technologies. These will tend to involve processes that have low analyzability of processes and many exceptions. Also, managers are likely to have imperfect knowledge of processes and low ability to measure outputs. A need for flexible responses to specific customers increases interdependencies across the value chain involving reciprocal interactions with customers, suppliers and functional units such as marketing, production, purchasing and R&D. It might be expected that these types of technologies would require controls to encourage flexible responses, high levels of open communication within the work force and systems to manage the interdependencies. Traditional, mechanistic MCS based on financial controls would not seem to suit these circumstances.

Second, organizations that produce standard, undifferentiated products employing capital intensive, automated processes are likely to employ mass production and process technologies. These will involve highly analyzable processes and few exceptions. Knowledge of processes and measures of output will be more readily available. Interdependencies are moderate being sequential. This technology requires standardized, administrative controls such as traditional, formal financial MCS. A variant of this technology is where there are non-standard products but the processes are well understood. Interdependencies with customers are likely to be reciprocal. This technology is typical of an

[6]Complexity derives from standardization of work, with large-batch and mass production (e.g. highly automated factories), process and small-batch unit technologies representing increasing levels of complexity (Woodward, 1965). Task uncertainty refers to variability in tasks and the analyzability of methods of performing the tasks with high variability and unanalyzable tasks inducing control difficulties and a need for more organic controls (Perrow, 1970). Task uncertainty also concerns the knowledge of transformation processes and predictability in measuring outputs (Ouchi, 1979). Interdependence increases the level of coordination difficulties, and has implications for control systems, as the interdependencies move from pooled (no direct relationship between adjacent processes), to sequential (one-way interdependencies), to reciprocal (two-way interdependencies).

organization producing customized products but employing reasonably automated processes. Controls are required that are flexible and that are consistent with managing interdependencies. A reliance on traditional administrative controls, including financial MCS, is unlikely to provide required flexibility and more open, informal controls will be more suitable to manage interdependencies. At the same time, traditional, formal controls may assist in controlling processes that are well understood.

5.2.1. Findings: Standardized-Automated Processes and MCS

Technologies characterized by more (less) standardized and automated processes are served by more (less) traditional formal MCS with highly (less) developed process controls (Khandwalla, 1977); high (low) budget use (Merchant, 1984) and high (low) budgetary controls (Dunk, 1992). High budgetary slack provides a buffer against low predictability within the processes and is found less in more predictable, automated processes with high workflow integration (Merchant, 1985b). Alternatively, slack will be positively related to less automated, less predictable job- or batch-type technologies.

5.2.2. Task Uncertainty and MCS

Technologies with high (low) task analyzability are related to a high (low) reliance on standard operating procedures, programs and plans (Daft & Macintosh, 1981); tasks high in difficulty and variability are associated with a low reliance on accounting performance measures (Hirst, 1983); knowledge of task transformations is associated with behaviour control (but only limited support was found for relationships between measurability of output and control systems) (Rockness & Shields, 1984); technologies with few (many) exceptions that are high (low) in analyzability are associated with accounting (personnel) controls (Abernethy & Brownell, 1997). Mia & Chenhall (1994) demonstrated that marketing departments faced more task uncertainty than production departments and consequently used broad scope information to enhance performance. Brownell & Dunk (1991) showed that there was a fit between conditions of low task difficulty, participative budgeting and a high budget emphasis; while high task difficulty suited participation with or without a strong budget emphasis. Lau et al. (1995) provided similar results, although they found that high participation and high task difficulty provided a fit irrespective of budget emphasis, while high participation and high budget emphasis enhanced performance in low task difficulty situations. Brownell & Merchant (1990) found that higher (lower) standardization of products (high knowledge of input/output relations) combined with flexible (static) budgets and low (high) participation to enhance performance. Brownell & Merchant's (1990) finding that low task uncertainty combined with more flexible budgets is somewhat inconsistent with other findings linking high task uncertainty with more informal, open MCS.

5.2.3. Interdependence and MCS

Low levels of interdependence have been linked to budgets, operating procedures and statistical reports; with statistical reports used for planning and informal coordination used in highly interdependent situations (Macintosh & Daft, 1987). In low interdependent public sector organizations there was an emphasis on budget analysis and managers' influence on budgets but infrequent interactions with superiors and little required explanation from budgets (Williams et al., 1990). In more complex situations (reciprocal interdependencies), there was less emphasis on budgets and more frequent interaction between subordinates and superiors. High (low) interdependence was found to be associated with broad (narrow) scope MCS that focuses (lack of focus) on appropriate aggregations and integrative information (Chenhall & Morris, 1986). Strategies of customization were associated with high levels of interdependence with the latter correlating with the importance for operational decisions of the information characteristics of integration, aggregation and timeliness (Bouwens & Abernethy, 2000).[7] Gerdin (2005a) found that high interdependence was associated with both the amount of MAS information for decision making and the frequency of its use. Moreover, the amount of MAS information was associated with high performance. This study shows how greater use of MCS was a response to interdependence and how this information assisted in maintaining high performance. Abernethy et al. (2004) found that aggregated divisional summary performance measures were positively associated with interdependencies when the division is affected by other divisions, but there was a

[7]Differences in findings between Chenhall & Morris (1986) and Bouwens & Abernethy (2000) relate to the usefulness of broad scope and timely MCS. Concerning broad scope MCS, perhaps the interdependence considered in operating decisions, as studied by Bouwens & Abernethy (2000), relates to internal considerations and therefore broad scope information that tends to be focused on external information would not be useful. There does not appear to be any obvious explanation for differing results related to timely information.

negative association when the division's activities affect others. This finding indicates that in situations of sequential interdependencies the importance of aggregate divisional summary measures depends on the direction of the sequence.

5.2.4. Propositions Concerning Generic Concepts of Technology and MCS

The more technologies are characterized by standardized and automated processes, the more formal the controls including a reliance on process control and traditional budgets with less budgetary slack.

The more technologies are characterized by high levels of task uncertainty, the more informal the controls including less reliance on standard operating procedures, programs and plans, accounting performance measures, behaviour controls; higher participation in budgeting; more personal controls, clan controls and use of broad scope MCS.

The more technologies are characterized by high levels of interdependence, the more informal the controls including fewer statistical operating procedures; more statistical planning reports and informal coordination; less emphasis on budgets and more frequent interactions between subordinates and superiors; greater usefulness of aggregated and integrated MCS, greater use of MCS and more important aggregated divisional summary performance reports.

5.3. Contemporary Technologies

Over the past 20 yr, MCS research has developed to consider the role of advanced technologies such as JIT, TQM and FM as dimensions of context. To establish the importance of these elements of technology, accounting researchers have drawn on theories from manufacturing developed by theorists such Hayes et al. (1988), Skinner (1975) and from economics such as notions of complementarities as modelled by Milgrom & Roberts (1990). Young & Selto (1991) provide a review of new manufacturing practices and some implications for performance measures and incentive schemes, arguing a need to consider technology changes within their organizational context.

Notwithstanding the importance of manufacturing theories, understanding the appropriate fit between MCS and advanced technologies is assisted by reflecting on the basic, generic notions of technology addressed above. Kalagnanam & Lindsay (1999) argue that JIT is best suited to open, informal and organic forms of controls. They claim that organic systems can best manage the close linkages or coupling within JIT that can cause variability (task uncertainty due to many exceptions) between elements of production processes (interdependence). Organic systems are also required to manage the need for flexible responses to customers, which involves coordinating reciprocal interdependencies across the value chain. Finally, JIT implies continuous improvement that is best served by commitment to change from the shop floor, which is encouraged by organic systems.

Similar arguments may be made for implementing innovative MCS in TQM and FM situations. These technologies have high variability and low analyzability. The low analyzability derives from the need to continually exploit potential complementarities between the various elements of TQM practices (Chenhall, 1997). (In TQM situations, management may strive to develop processes with high analyzability, but the need to continually balance the way the technology delivers on competing priorities makes this task difficult to analyze). Also, TQM and FM involve the effective management of interdependencies within production processes including relationships with customers, suppliers and other external parties. Controls are required to encourage managers and shop-floor employees to focus on the critical elements of variability within the TQM programs and to provide effective links across the value chain. This information is generated at both the process (cybernetic type controls such as statistical process controls) and strategic levels (i.e. linking processes to strategic outcomes). Continuous improvement requires access to knowledge on world's best practice and systems to encourage innovation. Appropriate control systems should be open and informal, include broad scope information, benchmarking and performance measures that indicate links between strategy and operations such as balanced scorecards and strategic integrative controls.

5.3.1. Findings: Advanced Technologies and MCS

Ittner & Larcker (1995) demonstrated that product-focused TQM was linked to timely problem solving information and flexible revisions to reward systems. They found for advanced (holistic) TQM, external benchmarking and the integration of quality and strategic information are important. Ittner & Larcker (1997) examined the association between quality programs and a variety of strategic controls related to implementation, internal and external monitoring. Links between quality and strategic controls were found, with differences between countries. Also, sample-wide performance effects were restricted to controls concerning managers' participation in approving quality programs and team formulation, with other associations contingent on industry effects. Sim & Killough (1998) found

that customer and quality performance was higher in TQM and JIT situations where there were customer- and quality-related performance goals and incentives compared to where fixed pay was used. Ittner et al. (1999) reported that performance gains from supplier partnership practices were associated with extensive use of non-price selection criteria, frequent meetings and interactions with suppliers and supplier certification. These controls were not effective for arms-length supplier relations. Kalagnanam & Lindsay (1999) showed that organic MCS were associated with effective JIT systems. Some studies have examined the role of non-financial performance measures in advanced technologies. Banker et al. (1993) found that JIT, TQM, teamwork and worker morale were associated with the provision of non-financial, quality and productivity measures to shop-floor employees. Fullerton & McWatters (2002) identified that non-traditional performance measures (bottom-up measures, product and vendor quality), compensation rewards based on non-traditional measures and empowerment were related to more advanced JIT.

There is some evidence suggesting that relying on non-financial measures to evaluate managers in TQM situations provides interactive strategic control (Chenhall, 1997). Mia (2000) discovered that the provision of broadly based MCS enhanced organizational performance in JIT settings. The broad MCS included performance targets related to non-financial manufacturing indicators, actual performance on those targets, organizational financial indicators and industry and organizational trends on overall performance. Maiga & Jacops (2005) found that quality goals, quality feedback and quality incentives were antecedents to quality performance, which in turn was associated with customer satisfaction but not with financial performance. Customer-focused manufacturing, together with advanced manufacturing technology (AMT), have been associated with non-financial measures (Perera et al., 1997). It is noteworthy that there is ambiguity in findings related to the extent to which associations between usefulness of non-financial performance measures and advanced technologies are related to enhanced performance. For example, Chenhall (1997) found positive performance effects between combinations of non-financial measures and TQM, while Perera et al. (1997) did not. One explanation for these different findings is in the use of the performance measures. Chenhall (1997) related the measures to reward-and-compensation systems, whereas Perera et al. (1997) did not make this linkage. Perhaps the extent to which non-financial measures are used to evaluate and reward managers may be important in understanding the links among performance measures, advanced technologies and performance (Chenhall, 1997, cf. Perera et al., 1997). This suggestion is consistent with Sim and Killough's (1998) findings that incentive pay enhanced the positive effects of TQM and JIT on customer and quality performance. Also, Larcker's (1983) market-based study found that the combination of incentive schemes and capital investment was associated with improved investor return. Sprinkle (2000) reporting a laboratory study, demonstrated the importance of incentive schemes to enhance both absolute performance and rates of improvement by encouraging individuals to spend more time on tasks and to use and analyze information.

Foster & Horngren (1988) found that flexible manufacturing systems (FMS) were associated with performance measures focused on time, quality, operating efficiency and flexibility. There was also a change in the costing methods (allocations, treatment of costs as period and changes in the components of direct costs). However, FM has been linked to a de-emphasis of efficiency-based measures with control derived from integrative liaison devices (Abernethy & Lillis, 1995). It is to be noted that there is a difference between FMS that are *technical systems* such as computer-aided design and computer-assisted manufacturing (CAD/CAM) and FM that is a generic notion of technology emphasizing a *strategy* of flexible response and customization. Lillis (2002) found that the extent to which operating units followed strategies of responsiveness or quality affected the extent to which managers found multiple measures assisted them. While multiple measures assisted in managing quality strategies, managers found them more problematic for responsiveness strategies, possibly because of the difficulties of designing complete measures for responsiveness.

More research is needed to explore whether both focused formal controls at the operational level and more complex integrative devices can co-exist to assist control within TQM and FM situations. Also, links between different types of controls for operational, managerial and strategic decisions should be explored. For example, Chenhall & Langfield-Smith (1998a) link performance with combinations of various traditional and contemporary controls with a range of strategies and manufacturing practices.

5.3.2. Propositions Concerning Advanced Technologies and MCS

TQM is associated with broadly based MCS including timely, flexible and externally focused information;

close interactions between advanced technologies and strategy; and non-financial performance measurement.

The extent to which combinations of advanced technologies and non-financial performance measures are associated with enhanced performance depends on the degree to which the measures are used as part of reward and compensation schemes.

The advanced technologies of JIT and FMS are associated with broadly based MCS such as informal controls and greater use of non-financial performance measures.

FM is associated with the use of informal, integrative mechanisms.

Supplier partnership practices are associated with non-financial measures, informal meetings and interactions across the value chain.

5.3.3. Critical Evaluation

The three generic concepts of technology that have been used in MCS research (complexity, task uncertainty and interdependence) are separate constructs but there are some common themes concerning uncertainty. It seems likely that conversion of inputs into outputs within less complex, mass production technologies is more programmable and predictable than in job- or batch-styled technologies servicing customized products. High levels of predictability are associated with the throughput of process technologies but not for the management of breakdowns and other exceptions. The construct of task uncertainty concerns lack of information and is a combination of variability or lack of knowledge about alternatives and uncertainty about how to analyze the variations, or measure outputs, that occur during the conversion of materials into output. Higher levels of interdependence, where the work of one sub-unit is complicated by having to rely on another, raises the possibility of more uncertainty derived from lack of control over the supplying sub-unit.

The importance of uncertainty as an aspect of both environment and technology has led to some ambiguity between environmental and technological uncertainty in MCS research. For example, Hirst (1983) argued that accounting performance measures would be inappropriate in conditions of environmental uncertainty but measured uncertainty with a composite measure comprising both elements of task and environmental uncertainty arguing that the concepts are measuring the same thing. Ross (1995) theorizes effects between task uncertainty and performance measures but uses measures of environmental uncertainty. Clarification of links between environmental and technological uncertainty is required to isolate potentially different effects of these variables on MCS design. For example, external uncertainty implies a lack of information that makes it difficult to plan types of products and services, levels of output and create contingency plans. Also, it makes evaluation difficult as demand may change in ways beyond the control of managers. This suggests that more flexible, interactive MCS are required to encourage learning and adaptation and evaluate managers on the basis of more subjective measures or against adjustable criteria dependent on changing circumstances. The uncertainty associated with technology is, in part, derived from the environment with the technology being responsive to the uncertainty associated with markets and product requirements. Thus, technology may respond to environmental uncertainty by becoming more flexible or by employing JIT techniques. The appropriate MCS design is likely to be more flexible and organic. However, uncertainty, also, is caused directly within the technical processes, independently from environmental conditions. This may be derived from a search for improvements in product design and cost efficiencies and is likely to increase concern with managing uncertainty and complexity associated with the production processes. These conditions may prompt the adoption of planning and evaluation systems such as activity-based accounting, non-financial manufacturing performance measures and supplier networks.

Despite the links between environmental and task uncertainty, where possible researchers should draw on work that has tried to resolve issues related to the validity and reliability of measures concerning these contextual variables. An example of this is Brownell & Dunk (1991) who sought to reconcile findings related to the role of task uncertainty to the study of budgetary-related behaviours. Studies by Hirst (1983) and Brownell & Hirst (1986), used a measure of task uncertainty that aggregated the separate dimensions of task difficulty (analyzability) and variability (number of exceptions). Brownell & Dunk (1991), argued that such a composite measure is inappropriate as it mixes up the potential effects of difficulty and analyzability. They found that task difficulty, and not task variability, moderated the effects of budget behaviours on performance.

The area of contemporary manufacturing practices, such as JIT, TQM, FM and AMT, has provided many opportunities for contingency-based research (Young & Selto, 1991). Ideas from economics concerning complementarities are likely to prove useful in modelling the way multiple aspects of manufacturing can be combined optimally (Milgrom & Roberts,

1990).[8] Developing an understanding of best manufacturing practices and the way in which manufacturing aligns with or provides the impetus for strategy would seem to be a necessary step in ensuring that MCS design maintains relevance to the technical core of organizations. Closer cooperation between MCS researchers and manufacturing technology experts and industrial engineers would be fruitful. The importance of advances in information technology (IT) cannot be underestimated (Arunachalam, 2004; Chapman & Chua, 2003). The adoption of interactive IT systems, such as SAP R/3, often triggers the adoption of particular performance and costing systems.

As the average life span of products decrease, consideration of the life cycle of products has become a concern in manufacturing. Short product life cycles place demands for new product initiatives and alter cost structures. Also, decreasing life cycles increase operating risk and require increased capital investment. Understanding how MCS innovations, such as target costing, can assist management within these settings will likely become increasingly important.

There has been little work that has investigated how MCS are best suited to different stages in the growth of firms. Important topics are the role of more formal systems at the stages of new firm formation, early growth, maturity and decline. Questions arise concerning the requirements of MCS at these different stages. Particularly, are there differences in the role of MCS in growth compared to more mature stages, and how are MCS implicated in the transition across stages? Moores & Yuen (2001) provide an examination of issues concerning different aspects of MCS that are important for different stages of the growth cycle of firms. Davila (2005) examined how MCS formalize human resource management in small growing firms. Davila & Foster (2005) consider how firms adopt and implement budgets as they grow from the initiation stage to more mature entities.

Finally, it is noteworthy, that most contingency-based MCS research has involved large, manufacturing organizations. There have been some studies in the hospital and hospitality sectors but, on the whole, there has been little research investigating the service and government sectors. Some examples include studies within government agencies (Gieger & Ittner, 1996; Williams et al., 1990), in hospitals (Abernethy & Brownell, 1999; MacArthur and Stanahan, 1998; Noreen & Soderstrom, 1994), R&D (Shields & Young, 1994) and marketing departments (Foster & Gupta, 1994; Guilding & McManus, 2002; Smith & Wright, 2004). The growth in importance of service industries such as hospitality and tourism and the introduction of managerial approaches to public sector management provide many opportunities for future research.

5.4. Organizational Structure

Organizational structure is about the formal specification of different roles for organizational members, or tasks for groups, to ensure that the activities of the organization are carried out.

Structural arrangements influence the efficiency of work, the motivation of individuals, information flows and control systems and can help shape the future of the organization.

There have been various definitions of organizational structure. An important distinction is the difference between the outcomes of structure and the structural mechanisms. Lawrence & Lorsch (1967) refer to structure, generically, as the way in which the organization is differentiated and integrated. Differentiation is concerned with the extent to which sub-unit managers act as quasi-entrepreneurs, while integration is defined as the extent to which the sub-units act in ways that are consistent with organizational goals. The mechanisms to achieve differentiation involve decentralizing authority, while integration involves rules, operating procedures, committees and the like. Pugh et al. (1968, 1969) empirically identified examples of structural mechanisms that have been used commonly in contingency-based research, including centralization, standardization, formalization and configuration.

Burns & Stalker (1961) discuss structure, generically, in terms of mechanistic and organic approaches. The means to achieve these forms of structure involve mechanisms such as rules, procedures and openness of communications and decision processes. Perrow (1970) identified structure in terms of bureaucratic and non-bureaucratic approaches. Designers of MCS have been concerned with formulating MCS to be consistent with the intent of organizational structure. Consequently, it is useful to consider the extent to which MCS are mechanistic or organic, or to which they differentiate or integrate.[9]

The choice of structure in organizational contingency research has focused on the appropriate structure to fit the levels of uncertainty in the environment

[8]It is important to note differences between theories based on contingent compared to complementary relationships. Contingent relationships consider the design of controllable variables, for example budgets, in response to exogenous variables, for example the environment. Complementary relationships involve the co-design of multi-controllable variables, for example aspects of manufacturing.

[9]Table 1 considers the way in which elements of MCS can be grouped as mechanistic or organic.

(Burns & Stalker, 1961; Drazin & Van de Ven, 1985; Galbraith, 1973; Lawrence & Lorsch, 1967), strategy (Chandler, 1962) and the organization's technology (Galbraith, 1973; Perrow, 1970; Thompson, 1967; Woodward, 1965). Generally, it is believed that more organic structures are suited to uncertain environments. However, it should be noted that Lawrence & Lorsch (1967) identified a need for higher levels of differentiation to cope with diverse and uncertain environments and that this causes potential integration problems that require sophisticated liaison mechanisms (integrative personnel, meetings), rather than rules and procedures. This type of response is something of a hybrid between mechanistic (for differentiation) and organic types of structure (for integration) to manage uncertainty.

A large body of literature suggests that strategies characterized by diversification require differentiated, divisional structures (Chandler, 1962; Chenhall, 1979; Dyas & Thanheiser, 1976; Shannon, 1973). Also, it may be argued that once particular structures are in place then decisions will be influenced by the opportunities afforded by managers from authority granted to them and, perhaps, by the political interests of those individuals. Thus, strategy might follow structure (Donaldson, 1987). Often the structural arrangements have important implications for information flows that may shape or bias the future directions of the organization (Bower, 1970).

In the prior section, extensive links between technology and types of controls were drawn. It is, also, noteworthy that early studies of organizational design identified important links between technology and structure. Particularly, early research found that changing to more efficient technologies did not necessarily lead to enhanced effectiveness. Implementing the new efficient technologies involved reformulating the existing roles and structures that were accepted by individuals. These reformulated structures were not well received by employees. As a consequence, there were dramatic negative effects in the way individuals related to the new technologies and consequently there was a deterioration in performance. It was apparent that *socio-technical* approaches were required to ensure improved organizational performance (Trist & Bamforth, 1951). These early observations are important to many recent structural innovations such as work-based teams that attempt to harness developments in technology with the efficient blending of appropriate skills and the motivating force of teamwork.

When evaluating contingency relationships between MCS and structure, elements of environment, technology and strategy are likely to be implicated in the relationships and, as such, much can be gained by considering them at the same time.

5.4.1. Findings: Organizational Structure and MCS

Evidence from MCS research suggests linkages between large and diversified organizations that employ differentiated structures and the use of MCS to assist in integration. Large firms with sophisticated technologies that are decentralized have been associated with a strong emphasis on formal MCS (Bruns & Waterhouse, 1975); and large, diverse, decentralized firms used more administrative controls (importance placed on budgets, sophisticated budgets, formal patterns of communications and participation in budgets) (Merchant, 1981). Managers of decentralized organizations were identified as perceiving aggregated and integrated information as useful (Chenhall & Morris, 1986). From a corporate managers viewpoint, Abernethy et al. (2004) found that decentralization was associated with the importance given to highly aggregated divisional summary measures (financial and efficiency output measures) to assess divisional performance. This supports the idea that in highly differentiated situations, performance evaluation should respect the decision rights of managers. More specific non-aggregated measures are inconsistent with high autonomy.

There is some evidence relating MCS to functions within organization. Functional differentiation (more responsibility over areas of manufacturing) was linked to formality of budgetary processes (Merchant, 1984). Hayes (1977) found that the importance of evaluating factors related to internal operations, external conditions and interdependencies depended on the functional nature of departments. In production departments, overall effectiveness was associated with factors related to the performance of internal factors. For marketing, performance of factors related to the external operating conditions and interdependencies were most important. Functional differentiation has been linked to environmental uncertainty to demonstrate how R&D units, compared to marketing, are better suited to participative budgeting (Brownell, 1985). Mia & Chenhall (1994) found that marketing, compared to production, involves higher task uncertainty and this explained why marketing managers used broad scope information more effectively than those in production. Concerning particular functional decisions, Foster & Gupta (1994) identified that improvements in MCS would be valued for pricing decisions, customer mix, sales force or promotions and product mix. Costing information was perceived as useful for decisions concerning

products and customers. There was a difference between potential and actual use of MCS in the area of marketing.

Budgetary participation has been studied extensively and associated with a wide variety of contextual elements (see Shields & Shields, 1988, for a review). Structural contingencies linked to effective participative budgeting have included functional differentiation, specifically R&D compared to marketing (Brownell, 1985); leadership style employing high compared to low budget emphasis (Brownell, 1982a); a consideration rather than initiating style of leadership (Brownell, 1983); decentralization (Gul et al., 1995), as well as the findings, mentioned above, related to decentralization (Merchant, 1981). As noted, the theories used to examine functional differentiation relied on links to external environmental uncertainty, rather than structure, *per se* (Brownell, 1985).

The ways in which MCS combine with elements of organizational structure to provide differentiation and integration within contemporary organizational structures provide many opportunities for worthwhile research. Particularly, there are few studies that have considered the fit between organic structures and MCS. Organizational theory would suggest a need for flexible, open information systems rather than tight budgetary systems. Gordon & Narayanan (1984) found that organic structures were best served by broad scope and future-oriented information. Some researchers have found that more organic, behaviourally-oriented implementation is required to ensure the success of activity-based accounting (Foster & Swenson, 1997; Shields, 1995). Gosselin (1997) found that activity-based costing is adopted and implemented in organizations with more mechanistic structures. Particularly, mechanistic structures (vertical differentiation or bureaucratic decision processes) facilitate adoption of activity-based costing (an administrative innovation) and centralization and formalization were associated with implementing activity-based costing. Organic structures were more suited to activity analysis and activity–cost analysis (technical innovation). Presumably, organizations proceeding from activity analysis to activity-based costing would require elements of organic and mechanistic structures to carry them through the stages of activity analysis to activity-based costing.

An important element of contemporary structures is teams. As yet there are few studies that have considered the role of MCS within team-based structures. Young & Selto (1993) predicted that teamwork and problem-solving abilities of shop-floor employees would be associated with high performance related to JIT outcomes. Their study in a single organization did not reveal these associations due, in part, to an inability of workers to address process problems and poor implementation of JIT-compatible management controls.

Scott & Tiessen (1999) reported that team-based structures were associated with high task complexity and that team performance was associated with the use of comprehensive performance measures (financial and non-financial), formulated participatively and used for compensation. In an experimental study, Drake et al. (1999) found that in team structures the interaction between ABC (cf. volume-based accounting) and rewards based on group incentives (cf. assessment of individuals compared to other workers) was associated with cooperative innovations, lower costs and higher profits. Chalos & Poon (2000) identified that participation in capital budgeting teams was associated with improved performance with information sharing and an emphasis on performance-based budget, intervening in this relationship. Chenhall & Langfield-Smith (2003) found that formal performance measures based on productivity and an associated gain-sharing scheme were inconsistent with developing the high levels of trust necessary for self-empowered teams to operate effectively.

5.4.2. Propositions Concerning Organizational Structure and MCS

Large organizations with sophisticated technologies and high diversity that have more decentralized structures are associated with more formal, traditional MCS (e.g. budgets and formal communications).

R&D departments compared to marketing departments, which face higher levels of task uncertainty, are associated with participative budgeting; and marketing compared to production departments, which face higher levels of external environmental uncertainty, are associated with more open, informal MCS.

The structural characteristics of functional differentiation based on R&D compared to marketing, leadership style characterized by a consideration compared to initiating style, and higher levels of decentralization are associated with participative budgeting.

Decentralization is associated with the MCS characteristics of aggregation and integration.

Team-based structures are associated with participation and comprehensive performance measures used for compensation.

Organic organizational structures are associated with perceptions that future-orientated MCS are more useful, and with the effective implementation of activity analysis and activity–cost analysis.

5.4.3. Critical Evaluation

Structural mechanisms have been conceived of as involving differentiation and integration (Lawrence & Lorsch, 1967). Concerning differentiation, conventional thinking in management accounting proposes that decentralization should be combined with profit centre responsibility accounting systems. To achieve integration, simple mechanisms such as operating procedures and formal budgets have been recommended. It is of interest to observe the extent to which these recommendations appear somewhat inconsistent with the suggestions of Lawrence & Lorsch (1967) that highly differentiated organizations should employ complex liaison mechanisms to achieve integration. Closer inspection of empirical findings suggests that comprehensive and formal mechanistic controls might be only one aspect of coordinative efforts in differentiated organizations. Khandwalla (1972, 1977) found that large decentralized companies employed sophisticated controls but also utilized high levels of participation and human relations approaches to coordinate activities. Certainly, participation in budgeting has been linked to decentralized organizations. Merchant (1981) found participation was one aspect of administrative controls. Gul et al. (1995) found an association between decentralization and participative budgeting. How the participation of individuals in formal budgets might link to more organic forms of control is an interesting area for further research. Most of the participation studies examine participation from the perspective of the subordinate. However, Clinton & Hunton (2001) showed that performance effects depended on participation congruence, or the difference between the perceived need and the degree of participation allowed (See also Chenhall, 1986, who found that the dyadic configuration between superior and subordinates' approach to participation, captured by their level of authoritarianism, affected job satisfaction). The role of budgets within organizations that have developed structures based on delayering, developing teams and empowering employees should be investigated. Galbraith (1973, p. 145) alludes to the need to focus on the process of decision making and conflict resolution in situations in which there is ambiguity and conflict between the various structural units and roles within organizations (See Chenhall & Langfield-Smith, 1998b, for a study of the role of management accounting in firms developing change programs focused on teams).

Care should be employed in selecting measurement instruments related to structure. Structure has been measured in terms of decentralization of authority (Abernethy et al., 2004; Bruns & Waterhouse, 1975; Chenhall & Morris, 1986; Chia, 1995; Gul et al., 1995; Libby & Waterhouse, 1996; Merchant, 1981), structuring of activities (Bruns & Waterhouse, 1975), interdependence (Abernethy et al., 2004; Chenhall & Morris, 1986; Gerdin, 2005a; Macintosh & Daft, 1987) and organic–mechanistic orientations (Gordon & Narayanan, 1984). Measures of decentralization, structuring of activities and interdependence have relied, in the main, on those developed by the Aston school (Pugh et al., 1968, 1969). The organic–mechanistic nature of structure has been derived from Khandwalla (1977). The Aston measures have been subjected to considerable scrutiny and empirical testing for validity and reliability in the organizational literature. The use of more novel measures, such as those related to team-based structures, will require consideration of work that has developed these measures (Cohen et al., 1996).

As with other elements of context, in contemporary settings, structure remains an important factor in understanding MCS design. Many argue that adjustments to structure are required to ensure employee commitment to organizational goals related to continuous improvement (Katzenbach & Smith, 1993). Structural innovations, such as delayering, flat structures, networking, process orientations and team-based work groups concern the removal of barriers between organizational activities. Such seamless organizational structures appear to be inconsistent with traditional profit centres and responsibility accounting, yet many organizations maintain these hierarchical structures. Empowerment and teamwork have replaced participation as the appropriate concept for understanding the efforts of many organizations to gain employee involvement. Team-based structures, either as permanent work-based teams or special-purpose teams, are widespread. Issues of coordination, performance evaluation and reward systems in team-based organizations are important research areas. Much can be learned from linking MCS research agendas with work of human resource management researchers.

5.5. Size

Growth in size has enabled firms to improve efficiency, providing opportunities for specialization and the division of labour. Large organizations tend to have more power in controlling their operating environment, and when employing large-scale mass-production techniques have reduced task uncertainty. However, as organizations become larger the need for managers to handle greater quantities of information increases to a point where they have to institute controls such as rules, documentation, specialization of roles and functions,

extended hierarchies and greater decentralization of hierarchical structures (Child & Mansfield, 1972). Contemporary large organizations often develop close associations with suppliers and customers, which blurs the boundaries between organizations, thereby increasing further the size of the entity. Size has also provided organizations with the resources to expand into global operations, sometimes by way of mergers, takeovers, licensing or other collaborative arrangements. These developments create additional administrative concerns due to increased levels of complexity within the production processes and with managing interdependencies with global partners.

5.5.1. Findings: Size and MCS

Few MCS studies have explicitly considered size as a contextual variable. In the main, studies have examined relatively large organizations, usually justifying this as large firms tend to adopt the type of practices incorporated within more formal MCS.

Studies that have examined size have considered its effects together with other elements of context such as technology, product diversity and have examined an array of controls. Khandwalla (1972, 1977) found that large firms were more diversified in product lines, employed mass-production techniques, were more divisionalized and made greater use of sophisticated controls and environmental information gathering such as forecasting and market research. The papers by Bruns & Waterhouse (1975) and Merchant (1981), discussed earlier in terms of organizational structure, provide evidence related to size. Bruns & Waterhouse (1975) identified two forms of control associated with size: administrative with large firms and personal with small firms. Administrative control comprised more sophisticated technologies, formalized operating procedures, high levels of specialists and work-related rules. Managers perceived that employees had high levels of control and had high levels of participation in setting standards and spent more time in budgeting. They perceived budgets as limiting innovation and flexibility in structuring organizations. Interpersonal control involved centralized decision making, individuals saw themselves as having more interaction on budget-related matters, not having their methods of reaching budgets accepted and being required to explain budget variances. Individuals were satisfied with their superior–subordinate relationships. Merchant's (1981) study also considered size as an aspect of a multiple variable approach. Large, diverse firms were more decentralized, used sophisticated budgets in a participative way and employed more formal communications.

5.5.2. Propositions Concerning Size and MCS

Large organizations are associated with more diversified operations, formalization of procedures and specialization of functions.

Large organizations are associated with more divisionalized organizational structures.

Large organizations are associated with an emphasis on and participation in budgets and sophisticated controls.

5.5.3. Critical Evaluation

Most contingency-based MCS research has studied larger organizations but has not considered size variation within larger entities. This is unfortunate as there is evidence from early organizational contingency studies that the relationship between size and administrative arrangements such as specialization, formalization and the vertical span increases with size but at a declining rate. Thus, while it is reasonable to assume that large firms employ formal MCS, it is possible that different types of controls will be appropriate within these large firms, depending on size.

The role of MCS in smaller or medium-sized entities has received little attention in the contingency-based MCS literature (for an example see, Reid & Smith, 2000); even, the role of MCS in firms that change size due to rapid internal growth, takeover or merger has not been explored. It seems likely that the role of formal and interpersonal controls would differ depending on size and rate of change in size. Many opportunities for contingency-based MCS research are likely to be found in the area of small- and medium-sized business (see for example articles in the *Journal of Small Business Management* and the *International Small Business Journal*).

An impact of technological change and structural reform has been to reduce the number of employees, both shop-floor employees and the number of middle-level managers. In as much as the number of employees is associated with coordination and control issues, reduced size, due to the substitution of capital for labour, will have implications for MCS. For example, the combination of process controls to monitor machines and informal controls for evaluating people will likely become more important where there are fewer employees operating and managing capital intensive technologies.

Concerning measurement, there are several ways of estimating size including profits, sales volume, assets, share valuation and employees. The use of financial measures can make comparisons between organizations difficult as different accounting treatments can be found between firms. Most contingency-based

MCS studies have defined and measured size as the number of employees. Numbers of employees have been found to correlate with net assets (Pugh et al., 1968, 1969).

It is possible that the precise measure of size could be important depending on the element of context and dimensions of MCS being studied. If the theory is considering the effectiveness of budgets to coordinate individual activities, then employees is appropriate. If, however, the study is examining the effects of environment on the effectiveness of customer-focused accounting then sales and assets might be more appropriate, as these measures capture market power that can lead to barriers to entry or industry concentration. Khandwalla (1972) argues that forecast sales are the best indicator and he discusses how size may relate to planning, budgeting and structural modification.

5.6. Strategy

Strategy is somewhat different from other contingency variables. In a sense, it is not an element of context, rather it is the means whereby managers can influence the nature of the external environment, the technologies of the organization, the structural arrangements and the control culture and the MCS. The role of strategy is important as it addresses the criticism that contingency-based research assumes that an organization's MCS is determined by context and that managers are captured by their operating situation.

Recently, MCS research has recognized that managers have 'strategic choice' whereby they can position their organizations in particular environments. Thus, if the current product range is too uncertain, reformulating product strategy into a market that is more predictable may remove the pressure from the environment. It may, also, limit potential opportunities and therefore require the organization to examine its attitudes to the trade-off between potential returns and acceptable risk and uncertainty. Notwithstanding the strategic direction selected by the organization, contingency-based research predicts that certain types of MCS will be more suited to particular strategies. The powerful influence of strategy is evidenced by the popular use of terms such as strategies of TQM, the strategic imperative of an empowered workforce and strategic management accounting. Langfield-Smith (2006) provides a summary of research into MCS and strategy.

Several generic strategy taxonomies have been developed including entrepreneurial-conservative (Miller & Friesen, 1982); prospectors-analysers-defenders (Miles & Snow, 1978); build-hold-harvest (Gupta & Govindarajan, 1984); and product differentiation-cost leadership (Porter, 1980). Evidence from the strategy-organizational design research suggests that strategies characterized by a conservative orientation, defenders, harvest and cost leadership are best served by centralized control systems, specialized and formalized work, simple coordination mechanisms and attention directing to problem areas (Miller & Friesen, 1982; Miles & Snow, 1978; Porter, 1980). Strategies characterized by an entrepreneurial orientation, prospectors, build and product differentiation are linked to lack of standardized procedures, decentralized and results-oriented evaluation, flexible structures and processes, complex coordination of overlapping project teams, and attention directing to curb excess innovation. Simons (1994) argues that four dimensions of MCS link to strategy: belief systems to communicate and reinforce basic values and missions, boundary systems to establish limits and rules to be respected, diagnostic controls to monitor outcomes and correct deviations and interactive controls to enable top managers to personally involve themselves with subordinates and operations with a view to forcing dialogue and learning.

5.6.1. Findings: Strategy and MCS

From MCS research, evidence suggests links between strategy and cost control and to formality of performance evaluation. The studies are focused on strategy at the strategic business unit level, rather than corporate or functional levels. Most of the studies explore the association between MCS and strategic typologies. Conservatives, defenders and cost leadership strategies find cost control and specific operating goals and budgets more appropriate than entrepreneurs, prospectors and product differentiation strategies (Chenhall & Morris, 1995; Dent, 1990; Simons, 1987). Simons (1991) found that entities with little sense of urgency about creating a vision did not employ interactive controls. These generalizations are fairly simplistic. Merchant (1990) found no association between different growth strategies and pressure to meet financial targets. Simons (1987) demonstrated that tight controls were apparent in more entrepreneurial strategies, perhaps to balance excessive innovation and to help learning in uncertain environments. Chenhall & Morris (1995) found that tight control was suitable for conservative strategies; however, tight control was also found in entrepreneurial situations but, importantly, operating together with organic decision styles and communications. Again, the apparent paradox can be explained by the need for organic systems to encourage innovation and tight controls to curb excessive innovation.

Concerning performance measurement, build compared to harvest strategies and a reliance on long-term and subjective evaluation for managers' bonuses were associated with enhanced effectiveness. However, the association between strategy and effectiveness did not depend on short-term criteria for evaluation (Govindarajan & Gupta, 1985). Product differentiation (low cost) was associated with a de-emphasis (emphasis) on budgetary goals for performance evaluation (Govindarajan, 1988). Also, product differentiation with high (low) sharing of resources, and a reliance on behaviour (output) controls, was associated with enhanced effectiveness (Govindarajan & Fisher, 1990). Resource sharing was defined in terms of sharing the functional activities of marketing, production and R&D, and behaviour controls were considered to require more subjective performance evaluation. A study by Abernethy & Brownell (1999) found that hospitals undergoing strategic change (a more prospector type of strategy) used budgets interactively, focusing on dialogue, communication and learning (more organic styles of control). Van der Stede (2000) showed that product differentiation strategies were associated with less rigid budgetary control, which in turn, was associated with increased budgetary slack, although there were no direct effects between strategy and slack. Chenhall (2005) found that integrative performance measurement systems (strategic & operational linkages, customer orientation and a supplier orientation) assisted organizations to develop competitive strategies related to delivery and flexibility, and low cost-price. These effects were mediated, in part, by the intervening roles of strategic alignment of manufacturing and organizational learning.

Evidence on the usefulness of more broad scope planning information for prospector companies and for those following build compared to harvest strategies was found by Guilding (1999). In this study, the scope of the information related to competitor-focused accounting that incorporated competitor cost assessment, competitive position monitoring, competitor appraisal based on published financial statements, strategic costing and strategic pricing. Bouwens & Abernethy (2000) found that the level of importance to operational decision making of more integrated, aggregated and timely information was correlated with customization strategies. While associations with broad scope information were not found, the study focused on importance for 'operational' decisions, which presumably excluded decisions concerning markets and customer requirements that are more likely to involve broad scope information.

5.6.2. Propositions Concerning Strategy and MCS

Strategies characterized by conservatism, defender orientations and cost leadership are more associated with formal, traditional MCS focused on cost control, specific operating goals and budgets and rigid budget controls, than entrepreneurial, build and product differentiation strategies.

Concerning product differentiation, competitor-focused strategies are associated with broad scope MCS for planning purposes, and customization strategies are associated with aggregated, integrated and timely MCS for operational decisions.

Entrepreneurial strategies are associated with both formal, traditional MCS and organic decision making and communications.

Strategies characterized by defender and harvest orientations and following cost leadership are associated with formal performance measurement systems including objective budget performance targets, compared to more prospector strategies that require informal, open MCS characterized by more subjective long-term controls and interactive use of budgets focused on informal communications.

5.6.3. Critical Evaluation

Ideally, the role of strategy is dynamic involving managers in continually assessing the way combinations of environmental conditions, technologies and structures enhance performance. MCS has the potential to aid managers in this process by assisting them in formulating strategy related to markets and products, required technologies and appropriate structures. MCS can then be implicated in the implementation and monitoring of strategies, providing feedback for learning and information to be used interactively to formulate strategy. Few studies in MCS have investigated these issues (see Simons, 1987, 1991, 1994), rather most have been restricted to identifying MCS that are appropriate for different strategic archetypes.

While there are some common elements in these different strategic archetypes, there are significant differences; consequently, care is needed in developing theory that is specific to the archetypes employed in the study. For example, Fisher & Govindarajan (1993) develop theory to examine strategy and alternative controls based on the different needs derived from combinations of strategic mission, using concepts of build, hold and harvest, and competitive strategy, using product differentiation and low-cost taxonomies.

The extent to which these archetypes, which were developed in the 1970s and 1980s, maintain their

relevance to contemporary settings is questionable (Kotha & Vadlamani, 1995; Miller & Roth, 1994; Shortell & Zajac, 1990). Strategies are being complicated by the need for most organizations to be both low-cost producers and to provide customers with high-quality, timely and reliable delivery. More meaningful associations between strategy, environment and internal operations may become apparent if specific elements of strategic priorities are investigated. Relevant research is available based on contemporary strategic priorities (Miller et al., 1992) and has been applied in management accounting research (Chenhall & Langfield-Smith, 1998a; Chenhall, 2005).

Contemporary notions of strategy may also be employed usefully to investigate the role of MCS in change and innovation. While, some insights can be gained by examining movement across dimensions of archetypes, such as a change from harvest to prospector orientations (Abernethy & Brownell, 1999), greater understanding is possible by considering theories that relate to the dynamics of strategy. These include differences between incremental, synthetic and discontinuous change (Tushman & Nadler, 1986), the role of strategic intent (Hamel & Prahlad, 1989) and strategic resources (Amit & Schoemaker, 1993), the difference between intended and emerging strategies (Mintzberg, 1994), styles of management that encourage change (Kanter, 1982), the impediments to change of any formal resource allocation process (Quinn, 1985), and the way MCS can be used to manage both evolutionary and revolutionary change (Simons, 1994).

There have been concerns with the measurement of strategy. Measures used to study strategy have been criticized as mixing up elements of the environment with organizational attributes (thus studies of strategy and environment would be invalid). Measures tend not to relate to competitors; and this makes comparisons across industry groups problematic. Managers have difficulty relating to descriptions used to capture generic typologies such as build, harvest and prospect (see Langfield-Smith, 2006, for discussion of strategy measures). Strategy research should consider work that has attempted to validate strategy measures such as Dess & Davis (1984), Miller & Friesen (1986), Shortell & Zajac (1990), Miller & Roth (1994) and Kotha & Vadlamani (1995).

5.7. Culture

The relationship between the design of MCS and national culture represents an extension of contingency-based research from its organizational foundations into more sociological concerns. The basic proposition is that different countries possess particular cultural characteristics that predispose individuals from within these cultures to respond in distinctive ways to MCS. Culture has become important in the design of MCS over the past 20 yr as many companies have developed multinational operations. These companies face the issue of whether to transfer their domestic MCS overseas, or redesign their systems to fit the cultural characteristics of the offshore entities. Compared to studies of other contextual variables, research into culture has been limited and is somewhat exploratory.

There is a plethora of meanings of culture. However, Kaplan (1965) claims there is consensus among anthropologists that culture is composed of patterned and interrelated traditions, which are transmitted over time and space by non-biological mechanisms based on man's uniquely developed linguistic and non-linguistic symbolizing capabilities. Culture can be described by inherent traits such as knowledge, belief, art, morals, law, custom and other capabilities and habits acquired by man as a member of society (Seymour-Smith, 1986). However, often culture is conceptualized as a set of characteristics isolated to suit the methodological and scientific needs of the research community. The most widely used characteristics were developed by Hofstede (1984) who described the cultural values as power distance (acceptance of unequal distribution of power), individualism vs. collectivism (placing self-interest ahead of the group), uncertainty avoidance (preference to avoid uncertainty and rely on rules and structures), masculinity vs. femininity (achievement, assertiveness and material success vs. modesty and preference for quality of life) and, subsequently, Confucian dynamism (status, respect for tradition and protecting one's face) (Hofstede & Bond, 1988). Virtually all MCS contingency-based studies have used these values to study the influence of culture.

5.7.1. Findings: Culture and MCS

Contingency-based research in MCS has examined associations between cultural dimensions and elements of structure such as standardization, decentralization and control system characteristics such as formality of controls, reliance of accounting performance measures and budgetary participation. Overall, the research has provided mixed results as to whether culture does have effects across aspects of MCS. There are few areas where consensus can be drawn. This is because studies have examined different combinations of cultural dimensions and have considered aspects of MCS in different ways. As a

consequence, there is little overlap between studies to enable themes to be drawn or comparisons made and generalizations developed. The following are examples of studies that have examined accounting controls. Harrison (1992) demonstrated that differences between Singapore and Australian managers did not moderate the relationship between budget emphasis in evaluation and either job-related tension or job satisfaction. However, the relationship between reliance on accounting performance measures and low job-related tension and high job satisfaction was stronger for Singapore managers, the explanation being that these managers had low individualism and high power distance compared to Australian managers (Harrison, 1993). O'Conner (1995) argued that the low power distance found in western parent companies would dominate over high power distance found in their local Singapore subsidiaries, thereby enhancing the effectiveness of the parent MCS. Using these arguments he found that the relationship between role ambiguity and superior–subordinate relationships (perceptions of competence and trustworthiness) and both participation in budgeting and in performance evaluation were stronger in foreign subsidiaries than local Singapore entities. Merchant et al. (1995) studied Taiwanese and US firms and found that culture was not important in explaining use or effectiveness of the degree of subjectivity in profit centre manager's performance evaluation. However, they found that the use of long-term incentives was more important in Taiwanese firms.

Several studies have considered broader aspects of MCS with less equivocal results. Snodgrass & Grant (1986) found that Japanese, compared to US, companies experience less explicit controls and more implicit controls in monitoring, evaluation and rewarding. Ueno & Wu (1993) also found differences between Japanese and US managers on MCS characteristics. They theoretically linked individualism with US managers and found, empirically, that they used more formal communications, built slack, used controllability in budgeting and long-term horizons for performance evaluation. Uncertainty avoidance was linked to Japanese firms to explain a preference for broad time horizons and structured budgetary processes. These associations were not supported empirically, leading to the conclusion that individualism is the dominant predictor of MCS. Vance et al. (1992) studied formality of controls, team development, appraisal systems, intrinsic or extrinsic rewards and frequency of feedback in Indonesian, Malaysian, Thai and US firms. Significant differences were found not only between US and Asian firms but also among the different Asian firms. This study is distinctive as it used both Hofstede's dimensions plus other concepts of culture drawn from anthropology. Finally, studies using experimental methods have failed to support expected effects and have revealed ambiguous findings (Chow et al., 1991, 1994).

Given the exploratory nature of research examining culture and the lack of consensus on findings, only a general proposition relating culture to MCS is presented.

5.7.2. Proposition Concerning Culture and MCS

National culture is associated with the design of MCS.

5.7.3. Critical Evaluation

The dominant notion of culture employed in MCS-culture research has been the Hofstede (1984) values. However, several criticisms can be made as to how this approach to defining and measuring culture has been employed (Harrison & McKinnon 1999; see Baskerville, 2003, and Hofstede, 2003 for a discussion of Hofstede's approach to studying culture). First, it assumes that the different values have the same intensity within a culture. If this is not the case, then some value may be more dominant than others and have a prominent effect. Second, some studies do not consider all of Hofstede's values. It is possible that omitted values may have effects that are relevant to the study. Third, most studies assume that countries differ on values and proceed to test for differences between countries without directly assessing cultural values; however, countries' cultures maybe changing due to education and globalization. It is, therefore, important to check that the assumed values of a country are still apparent in contemporary studies. Fourth, while the Hofstede's values provide a convenient tool for research, it does represent a restricted view of culture. Its exclusive use has prohibited development of understanding how behaviour is influenced by the fundamental traits that influence how individuals think, feel and respond. More subtle notions of culture involving myths and ritual, language and narrative are not considered. It seems likely that theories and methods drawn from anthropology and sociology are more suited to understanding how these subtle factors combine to influence how individuals respond to MCS.

While national culture has been studied extensively, it seems likely that other variables such as markets and technologies may interact with cultures in systematic ways to effect MCS design. For example, the adoption of certain types of advanced technologies appears to work most effectively if attributes of collectivism are apparent. This combination of

technology and culture may suggest that certain types of performance measures, suited to the technology but consistent with collectivism, would be more appropriate. One variable that offers promise in the study of culture is organizational culture (Martin, 1992). It is possible that a strong organizational culture may dominate national culture in the work situation. Little work has been completed in the area of organizational culture and MCS design. Henri (2005) identified the 'competing values' model of organizational culture (Quinn, 1988) and used the control–flexibility aspects to study variations in the use of performance measures, employing survey-based methods. As with national culture, the meaning of organizational culture and its study are well served by the application of the research paradigms and methods from sociology and anthropology.

5.8. Continuing Relevance of Traditional Elements of Context

Insights into the present-day context of MCS can be gained by reflecting on the issues drawn from traditional contingency-based work. The environment will become more uncertain, hostile and complex as a result of contemporary pressures. There will be a need for organizations to develop increased environmental responsibility. Technologies will be found to have varying degrees of complexity, uncertainty and interdependencies that promote control issues. Structures will be employed that not only assist in developing more organic ways to communicate, but also provide enhanced differentiation to motivate and position individuals close to the business operations. Additionally, structures that empower individuals will be sought, with the purpose of providing a healthy and fulfilling work environment while better equipping the organization to achieve best practices. The challenges to coordination derived from size will increasingly become important as organizations enlarge due to developing close relationships with suppliers and customers and engaging in global operations by direct expansion, acquisition and merger. Notions of strategy are likely to be redefined and it will be necessary for MCS researchers to keep abreast of strategy commentators who reflect on the relevance of concepts developed by earlier writers. Culture will increase in relevance as firms continue to develop multinational operations and will likely best be researched by conceiving culture in richer terms than the value systems of Hofstede.

6. Issues Related to Theory Development

There are various forms of theoretical fit that have been used to classify contingency-based research in MCS: selection, fit (congruence and interaction) and systems (Donaldson, 2001; Drazin & Van de Ven, 1985).[10] Selection studies examine the way contextual factors are related to aspects of MCS with no attempt to assess whether this association is linked to performance (Chenhall & Morris, 1986; Merchant, 1985b). Fit approaches include studies that examine how organizational context influences the relationship between MCS and organizational performance (Brownell, 1983, 1985; Dunk, 1993; Govindarajan & Gupta, 1985). Systems models consider the way in which multiple aspects of controls systems and dimensions of context interact in a variety of ways to enhance performance (Chenhall & Langfield-Smith, 1998a; Gerdin, 2005c; Selto et al., 1995). Luft & Shields (2003) provide a refinement to classify and discuss theories employed in contingency-based MCS research. This involves considering the structural relations between variables, the nature of the causality between the variables and the levels of analysis.[11]

6.1. Structural Relationships between Variables

There are several forms of structural relationships. Selection studies are concerned with examining the extent to which MCS are related to elements of context and involve additive models. For example, it might be predicted that the use of balanced scorecards might be more extensive in conditions of low, compared to high, environmental uncertainty. To investigate these relationships, tests of association such as correlation analysis, or if there are multiple elements of context, multivariate techniques such as regression analysis are used (Anderson & Young, 1999; Bruns & Waterhouse, 1975; Guilding, 1999; Merchant, 1984).

[10]There is variation in the use of terminology to describe various forms of fit. Gerdin & Greve (2004) distinguish congruence and contingency approaches. Congruence is where there is no attempt to include performance in the study, whereas contingency includes performance. Donaldson (2001) defines contingency as congruence that includes performance in the study. In this chapter, the term selection is used when studies exclude performance (see also Drazin & Van de Ven, 1985) and congruence fit when they do include performance.

[11]See also Briers & Hirst (1990) and Fisher (1995, 1998) for discussions of theory development within MCS contingency research, Ittner & Larcker (2000) for issues related to MCS research in general and Gerdin & Greve (2004) for a discussion of different forms of contingency models used in MCS research and the dangers of loosely drawing on one form of model to support another form. See also a debate between Gerdin (2005a,b) and Hartmann (2005) on the distinction between contingency models.

Contingency fit may be defined as congruence (Donaldson, 2001). The congruence perspective sees fit as a 'combination of the levels of the contingency variable and MCS that produces higher performance than other combinations' (Donaldson, 2001, p. 186). That means, for each level or score of a contextual variable there is a unique MCS value that will maximize organizational performance, with all other MCS values at that level of the contextual variable resulting in lower performance. For each level of a contextual variable, say environmental uncertainty, a unique score for a MCS variable becomes appropriate; say the degree to which budgets are used in a flexible way. Any mismatch between the specific level of the contextual variable and the appropriate MCS score results in a decrease in performance (Donaldson, 2001, p. 186). This type of model has not been used widely in MCS research. The method to test the relationships is to assess the difference, or deviation, between the ideal and actual fit and to assess the extent to which these deviations are negatively associated with performance. There are several ways to calculate deviations from fit. One way is to use 'residual analysis' (Duncan & Moores, 1989). This approach regresses the MCS variable against the contextual variable, arguing from theory that a significant association will be apparent, indicating fit, and any misfit will be captured in the equation's residuals. To test for the effects of misfit, the residuals are regressed against performance, predicting that performance will be negatively associated with the residuals (or lack of fit). (See Ittner, et al., 2002, for a recent application of this technique). Another method to determine deviation is to subtract actual fit from ideal fit by way of 'Euclidean distance' with high deviation scores being predicted to be associated with negative performance (Drazin & Van de Ven, 1985). Fit may be determined theoretically (Drazin & Van de Ven, 1985) or empirically by regressing MCS with the contextual variable and using the regression to predict the MCS that fits the level of context. It is often recommended that the regression should be performed on a sub-sample of the best performers, selected from the full sample, thereby ensuring that fit represents high performance. However, this technique was not developed as way of examining how a single MCS variable fits with an element of context, rather it is used to examine multiple variables that form a systems fit (Govindarajan, 1988; Selto et al., 1995). An alterative measure for measuring misfit is by matching. Matching involves determining fit and misfit by subtracting the score for the MCS variable from the contextual variable, measured on the same scale, with scores of zero indicating fit and movement away from zero indicating degrees of misfit.[12] Again, the matching score is regressed against performance predicting that high scores will be associated with lower performance.

Interaction models are used where the nature or strength of a relationship between MCS and an outcome criterion will depend on the influence of particular aspects of context (Brownell, 1982a, 1983, 1985; Davila, 2000). Interaction approaches share with congruence fit the idea that there are appropriate combinations of context and MCS that produce effective performance. However, rather than specifying fit that relates unique scores of the MCS variable to each level, or aspect, of the contextual variable, interaction suggests that certain combinations of context and the MCS will be more effective than other combinations of context and MCS. Interaction variable models have been the dominant forms in contingency-based research. For linear interaction models, moderated regression analysis or analysis of variance is appropriate. Hartmann & Moers (1999) provide an extensive review of the shortcomings of interaction or moderated regression models as applied to budgetary research over the past 25 yr.

A third form of modelling involves systems approaches that also describe fit but do so by testing multiple fits simultaneously, involving a wider variety of dimensions of context and MCS. Variation in performance stems from variations in overall systemic fit, with multiple, equally effective alternatives being possible. Techniques to test systems models include the use of Euclidean distance (Selto et al., 1995) and cluster analysis (Chenhall & Langfield-Smith, 1998a; Gerdin, 2005c). These approaches are less rigorous than regression and require many decisions in terms of the type of analysis and given the complexity of the relationships between variables, interpretation and theory building can be difficult.[13] They do, however,

[12]Studies of the contingency relationship between participation and locus of control by Brownell (1982b) and Frucot & Shearon (1991) use 'matching' to test their data. The 'matched score is regressed against performance, predicting that high score are associated with lower performance. However, the theory and the form of the hypothesized relationships are of an interaction model, while the test using 'matching' is consistent with a congruence fit model (see Hartmann & Moers, 1999, p. 298–299, for a discussion of this point).

[13]Chenhall & Langfield-Smith (1998a) use cluster analysis in an exploratory way to links many aspect of MCS to a wide variety of strategy and manufacturing variables, whereas Gerdin (2005c) argues from theory that technological interdependence, organizational structure and MAS theoretically combine in predictable ways and then uses cluster analysis to test the prediction.

provide a way of addressing the criticism that contingency-based research provides only a partial understanding of MCS and its context. For exploratory research, Ittner & Larcker (2001) note the potential of recursive partitioning to split samples into a sequence of sub-groups thereby generating a tree-like structure that describes a nesting of independent variables (Ittner et al., 1999).

Intervening variable models represent a fourth form of modelling that have been employed in researching the relationships between MCS and outcomes. These models do not examine contingency relationships in that they do not aim to study the effects of context on the effectiveness of MCS. Rather, intervening variable models examine how MCS have their effects and provide evidence on the assumed causal mechanisms that lie behind the association between MCS and outcomes. Often, intervening models involve the specification of causal paths between MCS, context and outcomes (Shields et al., 2000; Van der Stede, 2000). It is possible that the same variable could be used as a contextual variable or as an intervening variable. It is essential that the nature of the relationship is supported by theory that argues for either contingency or intervening variable relationships. Bisbe and Otley (2004) show how arguments can support the relationships between interactive control systems, innovation and performance with the relationships being either a contingent or intervening variable effect. Separate tests supported the contingent relationships between innovation and interactive controls affecting performance but not the intervening role of innovation in the relationship between interactive controls and performance. (See Gerdin, 2005b, and Hartmann, 2005, for an exchange of views on the distinction between intervening and contingent modelling).

Intervening variable models may identify the antecedents to MCS, or they may demonstrate how the relationship between MCS and outcomes are explained by intervening variables. It is often important to decompose the association between MCS and outcomes into indirect effects operating through the intervening variable and the direct effect that captures all remaining effects influencing the association between MCS and outcomes. Initially, studies examining intervening models used a combination of linear regression and simple correlations to identify paths between variables and then used these paths to decompose correlations of interest into direct and indirect effects (Chenhall & Brownell, 1988; Shields & Young, 1993). More recently, powerful structural equation models (SEM), such as EQS, LISREL, AMOS and PLS, have been employed that enable latent variables to be constructed from multi-item questionnaires and to identify, simultaneously, statistical significance with multiple dependent variables (Anderson & Young, 1999; Baines & Langfield-Smith, 2003; Chenhall, 2005; Shields et al., 2000). It is possible to combine moderating variables within an intervening model by examining the extent to which a variable moderates the effects on one or more of the paths (Scott & Tiessen, 1999). Also, SEM models provide methods to examine moderating effects within path models. Given the recent criticism directed towards moderating variable models, there is a danger that researchers will try and force arguments about interaction effects into intervening variable models. As indicated above, it is possible to examine both moderating and intervening models as competing models; each based on strong theory, and then test both separately to identify which is a better explanation (Bisbe & Otley, 2004).

6.2. Causality

Concerning causality, contingency-based research within MCS research has, in the main, been survey based and this tends to limit the scope of the studies to consider situations involving unidirectional relationships (MCS determines outcomes) or bi-directional relationships (MCS determines outcomes, which then determines MCS). Most of the MCS research implicitly assumes unidirectional relationships. If the relationships are bi-directional, then it is possible that they are simultaneously determined representing a situation in equilibrium, or they are related cyclically where MCS determines outcomes, then outcomes determine MCS, followed by MCS effecting outcomes and so on. Given the existence of cyclical relationships, the predictions from contingency-based theory may differ depending on which stage of the cycle is being proposed (Donaldson, 2001, p. 246–271). Moreover, given that most contingency-based research has used cross-sectional survey methods, the results are relevant to only one stage of the cycle. Recent critiques of contingency research recommend that researchers study the dynamics of how organizations move between misfit and fit, through time as they adjust to changing circumstances (Donaldson, 2001, p. 275–289; Gerdin, 2005b; Hartmann, 2005). Donalson (2001: p. 280) refers to this approach as SARFIT, 'structural adaptation to regain fit'.

6.3. Levels of Analysis

The issue of levels of analysis is important to theory construction within contingency-based research. Care is required in maintaining consistency between the theory, the unit or level of analysis and the source of measurement. Consider examining the usefulness of budgets to evaluate sub-unit performance. Budget

usefulness is considered to depend on environmental uncertainty and managers' experience with budgets. The usefulness of budgets may be considered as a sub-unit variable and the appropriate concept of environment is one that applies to the particular sub-units, such as uncertainty with sub-unit products or suppliers. The assumption is that all managers within the sub-unit will be expected to respond to the environmental uncertainty in the same way. Any difference at the individual level that may potentially affect budget usefulness is noise. However, if individuals within the sub-unit are expected to respond differently because of different experience with budgets, an issue arises as to what is the appropriate level of analysis. The usefulness of budgets and environmental uncertainty are sub-unit variables and experience with budgets is an individual level. If an individual level is adopted then the usefulness of budgets at the sub-unit level and the environmental uncertainty facing the sub-unit are inappropriate as the uncertainty is assumed to be the same for all individuals within the sub-unit. If the theory is cross-level and includes both sub-unit and individual levels, then the sub-unit level of analysis can be preserved by splitting the existing sub-units into new sub-units based on different degrees of the individual level variable. For example, new sub-units would be created that capture the four combinations of high or low uncertainty and high or low experience with budgeting. More generally, the appropriate model for this is an interaction model (Luft & Shields, 2003: p. 199).

Luft and Shields (2003: p. 197) also note the distinction between cross-level studies that require interaction models and multiple-level models. Multiple-level models include variables at different levels that do not affect a variable at another level. In this situation, the multiple effects are additive, with the use of nested or hierarchical models to partial out additive effects at different levels. In addition, Luft & Shields (2003: p. 196) indicate how sample size can be affected by levels of analysis. They show that it is important to identify if the effects of MCS are related to individuals (e.g. 4,000), the organizations within which they work (e.g. 40) or the industries (e.g. 4). The sample size will be dependent on the level of analysis, be that 4,000 for individual level, 40 for organizational level and 4 for industry level. For a comprehensive discussion of these issues and an evaluation of an extensive list of MCS studies, see Luft & Shields (2003).

7. Alternate Theories and Contingency-Based Research

The term contingency means that something is true only under specified conditions. As such there is no 'contingency theory', rather a variety of theories may be used to explain and predict the conditions under which particular MCS will be found or whether they will be associated with enhanced performance. Contingency-based research has its foundations in organizational theory, which considers only organizational and environmental contextual variables. The early MCS contingency-based research used organizational theories developed in the 1960s and 1970s. Theorists such as Woodward (1965), Burns & Stalker (1961), Perrow (1970), Thompson (1967) and Galbraith (1973) considered generic notions of context and provided persuasive arguments as to how they relate to organizational structures and systems. There is a viewpoint that advances in contingency-based research will be best served by developing and refining theory within its organizational core. Certainly, the concepts and ideas from organizational theory continue to provide a coherent and rich foundation to examine traditional and new MCS within contemporary settings. Much can be gained in understanding the implications of contemporary elements of environment, technology and structure to the design and implementation of MCS by considering the insights provided by these early theoreticians. For example, Chapman (1997) examined the role of uncertainty in MCS design by reflecting on Galbraith's (1973) theories relating uncertainty to the supply and demand for information. Kalagnanam & Lindsay (1999) develop theory on the importance of organic controls for JIT situations by employing ideas from Woodward (1965).

Given the fairly obvious proposition that most events and the outcomes of those events are likely to depend on the contextual settings, an important issue is whether future contingency-based frameworks can be advanced by integrating insights from alternate theoretical perspectives into organizational adaptation and functioning. Theories from economics and psychology, as well as organizational theories, have much to say about the adoption and implementation of MCS. These theories follow a functionalist approach that considers the utility of MCS in achieving purposeful outcomes.

Theories from economics, such as agency theory have, in the main, considered the role of incentive schemes to gain employee commitment to those organizational goals prescribed by principals. Agents are assumed to be self-serving and opportunistic (see Baiman, 1982, 1990, for reviews of agency theory related to MCS research). Most studies have employed analytic research techniques. A number of studies employing agency theory have used survey methods to study organizational slack (Dunk, 1993), responsibility accounting (Baiman et al., 1995), performance measures (Bushman et al., 1995) and participative

budgeting (Shields & Young, 1993). Shields (1997) provides a review of various types of MCS research, including studies that have employed agency theory.

Agency theories have been criticized for not considering the context in which principals and agents contract and for not investigating the trade-offs with other elements of control systems (Merchant & Simons, 1986; Shields, 1997). These ideas may be developed by considering self-serving behaviour as a variable influencing the relationship between incentives and performance, with more organizationally focused attitudes being an alternative requiring different forms of incentive schemes (Davis, 1997a,b). Concerning the role of non-financial considerations, Luft (1997) argues that agency theory relationships may be supported empirically but the inclusion of factors important to agents, such as ethical and fairness considerations, may affect these findings. Evans et al. (2001) found that managers will sacrifice wealth to make honest or partially honest reports and they do not lie more as payoff for lying increases. In an experimental study, they showed that more effective employment contracts than those suggested by conventional economic analysis can be devised by using managers' preferences for honest reporting. Kunz & Pfaff (2002) identified that that under certain specific conditions, high intrinsic motivation undermines agency theory predictions related to performance pay in corporations. However, the conditions within which this may occur are special and are easily avoidable in real life. While concern with intrinsic–extrinsic motivation did not seem promising in understanding agency theory predictions, the authors recommend that agency theory could well include consideration of implicit contracts, self-perception and social interactions, fairness and reciprocity, social norms and the analyses of fuzzy incentives.

Population–ecology theory asserts that fit is attained by a process of Darwinian natural selection working through births and deaths in the population of organizations (Hannan & Freeman, 1989). Organizations that have appropriate adaptive mechanisms and do not fail are selected for survival. The analysis is done at the aggregate population level, without explicitly considering how individual organizations adapt. While population–ecology has been criticized as it does not consider individual organization adaptation, it does examine issues concerned with the birth and death of organizations, areas that are neglected by contingency researchers. Population–ecology and contingency-based research might be developed by examining the preconditions that are associated with those organizations selected for birth and those associated with mortality. For example, environments rich in opportunities may be associated with new start-up firms, or certain interactions between strategies, internal structures and control systems might be associated with those populations experiencing higher levels of mortality.

The area of psychology has relevance to understanding MCS and has provided the basis for some research over the past 20 yr.This research has attempted to identify if individual characteristics such as personality or cognitive style affect the way individuals react and respond to different aspects of MCS. For example, studies have found that the effectiveness of budgetary participation is moderated by an individual's locus of control (Brownell, 1981), or the levels of authoritarianism of superiors and subordinates (Chenhall, 1986). It is possible that personality factors may be important moderators in the relationship between conventional organizational contextual variables and the usefulness of MCS. For example, Hartmann (2000) argues that the relationship between the acceptance of RAPM and environmental uncertainty may be moderated by an individual's tolerance for ambiguity with low tolerance individuals more readily accepting RAPM in conditions of uncertainty as it helps reduce ambiguity. Individual cognitive style has been associated with a proclivity for individuals to use different forms of information, such as opportunity cost (Chenhall & Morris, 1991). It has been shown that MCS success is likely to depend on the extent to which individuals have organizational commitment (Nouri & Parker, 1998), the generation of high levels of trust between employees and managers (Ross, 1994), or whether organizational justice is achieved in implementing MCS (Libby, 1999).

Concern with individual attributes can usefully be combined with organizational context by examining the compatibility between individuals and their work situation. This has been referred to as person–environment fit (Deci, 1980) and person–organization fit (Kristof, 1996). These approaches assert that environmental or organizational factors provide explanations of behaviour based on observable events but that consideration of individuals can enhance predictions as they bring a unique interpretation to the situation. Often person–environment fit examines the extent to which individuals demand for financial, physical and psychological resources, as well as task-related opportunities, fits with the supply of these attributes from the organization. Alternatively, fit is seen as the extent to which the individual's abilities fit the organization's requirements for contributions. Shields et al. (2000) draw on person–environment fit to argue that stress may be derived from differences between performance demands of a task and the individual's performance capabilities. Participation in standard setting was shown to decrease stress by increasing individual's feeling of control. Fisher (1996) found that

the usefulness of MCS could be determined from considering individuals' locus of control and the levels of uncertainty in the environment. Contrary to expectations, individuals with an external locus of control found broad scope and timely information more useful when they perceived the environment as uncertain compared to those with an internal locus of control. Govindarajan (1988) demonstrated that managers with an internal locus of control operating in decentralized situations with a low emphasis on meeting budgets were associated with high performance in strategic business units employing product differentiation strategies. Gupta & Govindarajan (1984) provided evidence linking a strategic business unit's build (harvest) strategy with the individual manager characteristics of greater (less) marketing or sales experience and willingness to take risk, and greater (lower) tolerance for ambiguity.

It seems likely that personality, cognitive style and issues associated with commitment, trust and organizational justice could help explain the way individuals react to information in different contextual settings, and as such can be included readily within contingency-based frameworks. When combining different levels of analysis, care is required in theory development and method to ensure that combinations of individual and organizational variables are theoretically and empirically legitimate.

Another area that draws on concerns with the way managers take decisions is behavioural economics. This approach emphasizes what actually happens, rather than the logical conditions necessary for things to happen, to generate a strong descriptive base for economic research. A large body of research, originally associated with the Carnegie school (Cyert & March, 1963; March & Simon, 1958;), but also explicit in the psychology of economic decision making (Kahneman & Tversky, 1984; Katona, 1951), has suggested that individuals have cognitive limitations that influence decision making. Factors such as limited information-processing capacity, selective perception and satisficing rather than optimizing and bounded rationality all help explain why individuals behave in ways that may be inconsistent with predictions based on assumptions of rational economic decision making.

Behavioural economics presents important challenges to understanding the way managers approach resource allocation decisions. These include ideas of muddling through by Braybrooke & Lindblom (1970). They argue that rather than using formal, analytical, rational-comprehensive planning, managers use seat-of-the-pants judgement to muddle through. Cohen et al.'s (1972) garbage-can model of behaviour suggests that mangers have a repertoire of problem responses. Managers recognize problems when they match situations in which they have developed solutions. A difficulty with these observations for functionalist contingency-based research is that there is little that is prescriptive in terms of designing MCS. However, these types of issues are important to understand, as they may provide the diagnostics for why the design of MCS, which appears to fit context, still do not generate effective organizational performance.

The work of Williamson (1985, 1986) focused on information problems and how managers take decisions. A major contribution of relevance to organizational control concerns identifying when the performance of the firm is influenced by its organizational structure. Williamson examines the issue of when transactions are better completed within firms and when they are best executed by markets. Issues of divisional structures, profit centres and transfer pricing have been informed by these theories (Colbert & Spicer, 1995; Spicer, 1988; Spicer & Ballow, 1983; Swieringa & Waterhouse, 1982). Importantly, Williamsons's work recognizes that there is no obvious single optimal method for internal organization. At any one time, the appropriate structures and controls will depend on product portfolios or the extent of vertical integration. Gilad et al. (1988) provide a brief overview of the development and contribution of behavioural economics.

A criticism of contingency-based research is that it has relied on traditional, functionalist theories and has not applied more interpretive and critical views. Alternative approaches, derived from sociology literature, have been used in MCS research to provide this interpretive and critical focus. In the main, these approaches have rejected the assumptions upon which functionalist contingency research is based.[14] A strength of 'alternative' approaches is that they show the potential conflict between individuals and groups and how MCS may be implicated in these struggles. For example, MCS are not assumed to lead

[14]MCS are not seen as passive mechanisms to be used by managers to assist in optimizing resource allocation. Rather, they may be used to legitimate particular power relationships within organizations or enable groups within society to maintain their command over resources or political direction. MCS may be motivated by mimicry and compliance rather than a need for enhanced efficiency. Managers may espouse intent for efficiency but respond to MCS in ways constrained by bounded rationality, limited information processing capacity, selective perception and satisficing rather than optimizing behaviour. MCS may be instrumental in limiting progress because it inhibits innovative thought or it may have a role in assisting in the adoption of change by providing the basis to control the new initiatives.

necessarily to enhanced effectiveness, rather they are used for political and power purposes by groups within the organization or within the society at large, and are not associated with the welfare of the organization. These themes are attractive to research approaches that are radical or socially critical. Baxter & Chua (2003) provide a review of the various streams of sociology that have been used in MCS research.

Often sociological approaches involve examining novel relationships, processes and their contextual setting. The preferred method to collect and interpret data is case studies. Case studies are very powerful for identifying research problems and in developing and generalizing theory (Covaleski et al., 1996). (See Baxter & Chua, 1998, 2003, for a summary and synthesis of this form of research, Atkinson & Shaffir, 1998, for a discussion of the case study method of research in MCS, and Young & Selto, 1993, for difficulties in case research). However, restricting research to cases limits the possibilities for causal inference and generalizability to broader populations. Also, it is difficult to make progress in understanding the more subtle insights derived from alternate approaches without attempting to identify general patterns of causation (Donaldson, 1985). Much can be gained by combining case evidence with surveys within contingency-based frameworks. For example, Young & Selto (1993), Shields & Young (1993), Kalagnanam & Lindsay (1999) and Davila (2000) present site visits or case studies as part of problem identification and theory construction to propose relationships between MCS and contextual variables that are then tested by the use of survey methods.

An important issue is whether 'alternate' theories of MCS research can be combined with traditional, functionalist models. While these paradigms have different theoretical and philosophical bases, some researchers have used contingency-based ideas to develop convergence between these approaches. Many of the insights concerning the role of institutions within society on the adoption of MCS can be combined readily with contingency concepts (Gieger & Ittner, 1996; Scott, 1987). Also, the way in which power is implicated in the adoption and use of MCS to effect resource distribution or induce change can be examined within contingency-based approaches (Bariff and Galbriath, 1978; Hage, 1980). Moreover, understanding of the influence of power and politics may be illuminated by considering theories related to environmental, technical and structural context. A contingency-based approach attempts to map variables and demonstrate potential relationships between these variables, which may include power and politics, and indicate potential links with outcomes.

Caution must be directed at any approach providing some unification between functionalist and 'alternate' approaches. Literature examining MCS from various organizational, economic and psychological perspectives assume that the study of MCS is conducted within situations that can be well specified and understood. The search is for generalizable findings; unique situations are seen as anomalies and are important only as they help understand how to move towards well-structured and ordered solutions. Sociological approaches use a variety of theories to understand organizational settings that are often so ill structured that regularities cannot be meaningfully represented. Some commentators claim that different theories offer fundamentally different insights into the nature of MCS and should not be blended but kept separate providing alternative ways of understanding the multiple roles of MCS in organizations. Any attempt at amalgamation is unlikely to attain a true synthesis as one theory inevitable subsumes others (Covaleski et al., 1996; Dirsmith et al., 1985). However, a proliferation of theoretical alternatives, without an integrative framework, can be confusing to both managers and students and much is lost in fragmentation across many unconnected streams of research. Some contingency-based researchers see a challenge in providing an integrating framework that combines structure and process, to assist managers, students and researchers find a path through the many diverse paradigms used to study MCS (see Donaldson, 1995, for an attempt to integrate a variety of theories using structural contingency frameworks as the unifying theme). Also, attempts to assimilate ideas from alternative theories could generate constructive debate on competing organizational ends, the role of different groups within organizations and stakeholders, and a variety of values and purposes associated with MCS including the implications of alternatives to traditional rational economic values, and the role of different elements of organizational context (Jonsson & Macintosh, 1997).

8. Conclusion

Contingency-based research has approached the study of MCS assuming that managers act with an intent to adapt their organizations to changes in contingencies in order to attain fit and enhanced performance. There is a considerable body of literature, which while not without imperfections in method, has provided a basis for generalized propositions between elements of MCS and context. The basic framework and potential strength of the method provide a basis to persist with contingency-based research to uncover generalizable findings that can enhance desired

organizational outcomes. To maintain the relevance of MCS contingency-based research, scholars will need to focus their attention on contemporary dimensions of MCS, context and organizational and social outcomes. Notwithstanding the need to study issues of contemporary relevance, much can be gained by reflecting on the work of original organizational theorists and more recent thinking in areas such as strategy, organizational and cultural change, manufacturing, information technology and human resource management. Other approaches based on economics and psychology can readily be included within contingency-based frameworks. While founded on non-functionalist approaches to studying MCS, insights drawn from 'alternate' theories can also assist in elaborating the traditional contingency-based model. Moreover, contingency-based research can provide an ordered way to integrate thinking about the sociological processes effecting MCS in action, perhaps combining these insights with conventional elements of contingency-based models. Such a research agenda involves many issues concerning theory development and model construction that provide challenges for researchers.

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