Organizational contexts and management accounting systems: an evaluation of contingency frameworks

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"Organizational Contexts and Management Accounting Systems: An Evaluation of Contingency Frameworks"

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ORGANIZATIONAL CONTEXTS AND MANAGEMENT ACCOUNTING SYSTEMS:
AN EVALUATION OF CONTINGENCY FRAMEWORKS

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ABSTRACT

Application of contingency frameworks to management accounting research commenced in the mid 1970s and dominated organizational level research throughout the 1980s. Despite this popularity there have been persistent criticisms directed at issues of theory and method. This paper reviews developments in contingency style research over the past decade and attempts to provide support for an emergent contingency framework for the design of management accounting systems (MAS). This framework includes characteristics of MAS and organizational effectiveness, and the contextual variables of external environment, technology, organizational structure, size, strategy, and organizational culture. Evidence on the effect of these variables acting singly and in combination is examined. The paper discusses concerns with theory development and evaluates the methods that have been applied within empirical studies. Directions for future developments in theory construction and empirical investigation are suggested.

Keywords: Management accounting system; management control system; contingency; contextual factors; environmental uncertainty; technology; organization structure; size; strategy; culture.
ORGANIZATIONAL CONTEXTS AND MANAGEMENT ACCOUNTING SYSTEMS:
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The central propositions of contingency theory assert that organizational effectiveness is a product of an appropriate matching between internal organizational characteristics and the demands created by elements of context such as technology and external environments (Burrell and Morgan, 1979). This line of thinking developed in the mid 1960s with the work of a number of organizational design researchers such as Burns and Stalker (1961), Woodward (1965), Lawrence and Lorsch (1967), Perrow (1967), Thompson (1967), and Pugh et al (1969).

Application of contingency thinking to management accounting research commenced in the mid 1970s with studies by Bruns and Waterhouse (1975), Watson (1975), Sathe (1975), Gordon and Miller (1976), Ansari (1977), Daft and Macintosh (1978), and Waterhouse and Tiessen (1978). These works included the development of a variety of conceptual schemes for investigating management accounting systems (MAS) and several large scale survey-based empirical studies. The aim of this early work was to identify contextual elements which were seen as important considerations in the design of MAS. The findings concerning the external environment, organizational structure, size, and production technology encouraged further studies in the area with a consequence that contingency research dominated organizational level research in management accounting throughout the 1980s.

However, despite its intuitively appealing nature contingency theory generally, and in particular its application to MAS, has attracted persistent criticism. These criticisms, as they apply to MAS, may be categorized as concerning the inadequate specification of the control model within which MAS are embedded, imprecise conceptualization and measurement of
variables used to specify context, and a dominance of cross-sectional survey methods at the expense of longitudinal case research.

This paper assesses the status of contingency theory as exemplified by the extant MAS literature, and examines how knowledge of MAS design has been assisted by contingency research over the decade of the 1980s. This assessment is prompted by the major criticisms levelled at contingency theory, generally, and by a concern for the contemporaneity of the MAS literature given on-going developments in the organizational theory literature. Finally, we discuss future directions for research into the design of MAS. The orientation of the review is from a "structural-functional" viewpoint, although the importance of alternative views of organizational behaviour is considered throughout. Also the review draws on existing literature for illustrative purposes and is not fully comprehensive.

STATUS OF CONTINGENCY THEORY

Despite the popularity of contingency research during the past 25 years a series of commentators have called for basic changes in theory and method (Wood, 1979; Otley, 1980; Schreyogg, 1980; Schoonhoven, 1981; Mohr, 1982; Tosi and Slocum, 1984; Van de Ven and Drazin, 1985; Dent, 1986; Fry and Smith, 1987; Otley and Wilkinson, 1988). A central concern of many critics has been the inadequacy of underlying models used in contingency research. It is useful when considering these concerns to identify the nature of conceptual frameworks applied in the area. According to Drazin and Van de Ven (1985) all contingency research shares an underlying premise that context and structure must somehow fit together if...

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1 At a basic theoretical level some commentators have claimed that contingency frameworks are not theories but rather an orientating strategy or metatheory (Schoonhoven, 1981; Tosi and Slocum, 1984). An alternative view is proposed by Dubin (1978) who argued that all theories are contingency theories. This follows because propositions derived from theory hold only within specific assumptions about contextual conditions and circumstances.
the organization is to perform well. It is the definition of 'fit' that is central to the development of theory, the collection of data and the statistical analysis of the propositions. Drazin and Van de Ven (1985) suggested that at least three different conceptual approaches to fit have emerged: selection or congruence, interaction, and systems.

Under the selection approach, congruence propositions have been tested that relate contextual variables to organizational variables without examining whether these relationships affected organizational performance. In the accounting situation, a congruence proposition would be that increased environmental uncertainty is associated with a greater level of sophistication in the MAS. Interaction approaches seek to explain variations in organizational performance from the interaction between context and organizational variables. For example, in situations of high environmental uncertainty, the application of sophisticated MAS will be associated with high performance. Fry and Smith (1987, p 120) concluded that "congruence is a prior requirement for contingency and is a necessary but not sufficient condition for contingency". Congruence and interaction approaches have tended to focus on how single factors of context affect single organizational characteristics and how, in the case of the later approaches, these pairs interact to explain performance. Systems approaches seek to examine the effects on performance of internally consistent multiple contingencies.

In accounting contingency research, empirical studies throughout the 1980s were dominated by limited variable, congruence and interaction studies with little attention to holistic systems approaches. Typically, research has considered an aspect of MAS and, at most, two or three contextual variables. Part of the reason for this is the apparent preference contingency researchers have for using conventional scientific method employing cross-sectional survey data collection. In addition it seems likely that researchers have felt more confident in developing propositions that explain how two or three variables interrelate to effect outcomes. The consequences of the dominance of survey based work is the paucity of studies that have
examined holistic, systems models and investigations of the processes involved in the application of MAS to organizational control.

EMERGENT FRAMEWORK: EVIDENCE FROM EMPIRICAL STUDIES

Notwithstanding the dominance of congruence and interaction models and the lack of research on holistic models, there has been some convergence on what appear to be salient contingencies for MAS design. This pattern of development has coincided with the use of increasing sophistication in terms of conventional scientific method in accounting studies. This section outlines the elements of an emergent contingency framework that includes characteristics of MAS, performance variables associated with MAS design, and contextual variables implicated in the relationship between MAS and outcomes. The framework is suggestive of simple bi-variate associations. At the conclusion of this discussion, developments in multi-variable studies are considered. Figure 1 presents this framework, while Table 1 provides illustrations of studies completed during the past decade and indicates the nature of the contingency approach, the research method, the contingent variables, aspects of MAS and other controls, and outcome criteria.

INCLUDE FIGURE 1 HERE

Characteristics of MAS

MAS design may be characterised as relating to strategic, managerial and operational areas of management (Anthony and Dearden, 1980). While MAS involves many linkages between these categories (Puxty, 1985), the taxonomy is useful in classifying the characteristics of MAS studied by contingency researchers. Early contingency research was concerned primarily with the area of management control. For example, researchers have studied the contingent design
of operating budgets (Giroux et al, 1986; Macintosh & Daft, 1987), budget related behaviour (Kenis, 1979; Merchant, 1984; Abernethy & Stoelwinder, 1991), budgetary participation (Brownell, 1982), budgetary slack (Merchant, 1985b), budgetary biasing (Lukka, 1988), zero based budgeting (Gordon et al, 1984; Williams and Hinings, 1988), the budget cycle (Giroux et al, 1986), sophistication of control systems (Khandwalla, 1972; Jones, 1985), characteristics of information (Gordon and Narayanan, 1984; Chenhall and Morris, 1986), and operating budgets- statistical reports-operating procedures (Macintosh and Daft, 1987). Very few studies have examined characteristics of MAS which relate to strategic management. Examples include the design of MAS for the various stages of capital budgeting (Gordon and Pinches, 1984), the use of discounted cash flow techniques for capital budgeting (Haka et al, 1985; Haka, 1987), the nature of MAS for firms following different strategic orientations such as harvester or prospector (Govindarajan and Gupta, 1985; Simons, 1987; 1990), and more recently the role of MAS for entities pursuing manufacturing strategies such as flexibility, quality and delivery (Kaplan, 1983, 1990; Johnson, 1988; Shank, 1989). Similarly, it is only recently that researchers have focused on role of MAS in operational controls (Vollman, 1990; Hall, 1990; Hall et al, 1991).

Another important distinction recognised in the early conceptual contributions of Gordon and Miller (1976) and Amigoni (1978) was that MAS have both form and content "characteristics". Amigoni (1978) in particular stressed how these were likely to interact in that environmental and structural factors would determine the desired form features of the MAS and that these features could be designed into a system by the use of particular control tools. While the studies referred to above include the study of both form and content characteristics the nature of any interaction between the two has yet to be subjected to empirical investigation.
Organizational effectiveness

While congruence approaches consider associations between contextual variables and characteristics of MAS, interaction and systems frameworks have sought to relate the contingent design of MAS to organizational performance. The specification of the exact nature of effectiveness within these frameworks is not without difficulty. The assumption of most contingency research is that MAS are embedded within organizations which are inherently goal seeking (Steers, 1977) and it is therefore important to consider what outcomes are sought from designing MAS. This approach takes a 'rational-analytical' perspective of the research and practice into MAS design. An alternate view suggests that an understanding of the application of MAS should account for the way it is used symbolically (Covaleski and Dirsmith, 1988) or in ceremonial ways (Meyer and Rowan, 1977; Boland and Pondy, 1983 1986; Berry et al, 1985). Dent (1986) asserts that the rational-analytical perspective is at best a partial view and at worst is potentially misleading. However, Hopwood (1986) notes the pro-active role of MAS claiming that it can assist in imposing a normalizing intention upon organizations while at the same time bringing attention to individual differences identified in this process. Certainly most contingency research has assumed that the application of MAS may proceed in rational ways. However, a contingency framework does not necessarily have to exclude the study of how social and political factors interact to effect the design of MAS and consequent outcomes (Roberts and Scapens, 1985). This becomes an issue of the selection of the phenomena to be examined. It is however, unlikely that such studies could be developed within the conventional scientific approach to research using cross-sectional survey data collection methods. Alternate methods drawing on in-depth case studies would be required.

Even within the rational-analytical perspective the notion of effectiveness is not without difficulties. While a general definition of organizational goals such as "the desired state of affairs that organizations attempt to realize" (Etzioni, 1975) may be accepted, the concept can
be problematic when used in empirical MAS research. For example, whose goals are to direct systems design? Are the goals related to existing situations or future states? Given that there are likely to be multiple and competing goals, how are they ranked in importance?

Given the complexity of the notion of organizational goals it is perhaps not surprising that MAS research has tended to avoid considering the effects of contingency relationships on organizational effectiveness. Rather outcomes have ranged from attitudinal factors such as job satisfaction (Brownell, 1982), attitudes to budgets (Kenis, 1979; Merchant, 1984), self-reporting of sub-unit performance (Brownell, 1982; Merchant, 1984; Govindarajan, 1984), and occasionally external measures including accounting and stock market data (Haka, 1987; Mak, 1989; Moores and Duncan, 1989). While several critics have been impatient with the lack of progress in contingency research to consider organizational effectiveness (Otley, 1980; Merchant & Simons, 1986; Otley and Wilkinson, 1988), it may be that the development of understanding of links between MAS, context and overall organizational performance is too ambitious given the complexity of the concepts. Rather it may be more meaningful to develop theory which predicts that particular aspects of MAS and context are related to desired information characteristics, attitudinal outcomes, or highly precise dimensions or organizational outcomes which do not always readily translate into global performance. For example, studies might usefully investigate the impact of MAS on employee turnover, market growth, organizational innovation and learning, or growth in the administrative component of the organization. Abernethy and Stoelwinder (1991) is an example of a study that used multiple criteria relating to outcomes/products, systems and derived goals.

An added complication is that what is effective performance is likely to be different at each stage during an organization’s life cycle (Moores, 1990). Critical success variables at the initiation and development stages of an organization will likely be different than at mature stages. Similar complications in specifying effectiveness are apparent in distinguishing short
and long term objectives. It seems likely that a comprehensive appreciation of the effects of MAS on specific outcomes might be a more effective way of building knowledge than identification of atheoretic associations of systems with aggregate performance.

External Environment

External environmental uncertainty has long been recognized as an influential variable in contingency-based theories of organizational design (e.g. Burns and Stalker, 1961; Lawrence and Lorsch, 1967; Thompson, 1967; Ewusi-Mensah, 1981). Its importance has now been extended to the concerns of organizational control. Congruence studies have considered the influence of environmental uncertainty on information usage (Hirst, 1981; Govindarajan, 1984; Evans et al, 1986), information characteristics (Gordon and Narayanan, 1984; Chenhall and Morris, 1986), while Govindarajan (1984) and Brownell (1985, 1987) explored an interaction between environment, organizational variables and MAS on performance.

Both Gordon and Narayanan (1984) and Chenhall and Morris (1986) found strong correlations between the type of information managers’ perceived to be useful and external environmental uncertainty. While these studies only tested congruence propositions it may be argued that because studied firms were selected from a homogeneous group of successful firms, the results suggest effective patterns of fit.

A more explicit interaction approach relating uncertainty, use of information and performance was presented in Govindarajan (1984). He considered the impact of environmental uncertainty and evaluation styles on strategic business unit performance. While no relationship was found between evaluative style and performance, it was clear that managers facing high uncertainty were likely to be evaluated in a more subjective manner than managers facing lower uncertainty. A relationship between effectiveness and evaluative style being contingent upon
Hirst's (1981) theoretical study of uncertainty related to task may also be considered an interaction approach. He considered a number of earlier empirical studies and concluded that high reliance on accounting performance measures (RAPM) under conditions of task uncertainty will not contribute to effectiveness. Instead he suggested that the perceptions and behaviour of subordinates would depend upon the level of task uncertainty to which they are exposed and the extent to which their superior had a RAPM in evaluating them. His contingency-style conclusion was that a medium to high (medium to low) RAPM minimises the incidence of dysfunctional behaviour in situations of low (high) task uncertainty. While Govindarajan’s and Brownell’s results are not directly comparable with Hirst they do provide argument and evidence of an interaction proposition that performance evaluation systems should have less reliance on formal accounting controls in uncertain conditions. Briers and Hirst (1990) provide an extended review of the MAS findings related to the role of budgetary information for performance evaluation.

Technology

The importance of technology to MAS design is apparent from the widespread belief in the need for different costing systems to account for job or process technologies. More recently, there have been calls for changes in accounting systems to provide appropriate information in technologies characterized by robotics. JIT, CAD/CAM production facilities and FMS (e.g.
Kaplan, 1983; 1990). In MAS contingency research all empirical studies examining technology have followed a congruence approach. A variety of studies have identified associations between different dimensions of technology and characteristics of MAS. The following associations are illustrative of the main findings: nature of technical processes (standardized, mass production) with the increased sophistication of the management control system (Khandwalla, 1977); degree of automation with formality of budget use (Merchant, 1984); predictability of production process with budgetary slack (Merchant, 1985b); interdependence within production process with characteristics of information perceived to be useful (broad scope, aggregation and integration)(Chenhall and Morris, 1986); departmental interdependence with low emphasis placed on standard operating procedures, budget and statistical reports (Macintosh and Daft, 1987), and the influence of the functional technologies of marketing and research and development on the effectiveness of flexible budgets (Brownell and Merchant, 1990).

While these studies draw on different notions of technology the results indicate that dimensions of technology seem relevant to MAS design when they relate to the relative ease of control. Complex, non-programmable, or interdependent processes do not lend themselves to conventional MAS and provide opportunities for dysfunctional behaviour if MAS are relied upon for control. There is evidence from existing MAS studies that understanding of the role of MAS in complex technologies requires consideration of other aspects of the organizational control systems including structural arrangements and other control systems (Bruns and Waterhouse, 1975; Merchant, 1984; Chenhall and Morris, 1986).

Organizational structure

Organizational structure is one of the primary considerations in establishing the overall control system within the organization. It is concerned with the formal specification of the different
roles for organizational members, or tasks for groups, to ensure that the activities of the organization are carried out. MAS forms an important part of the information and control systems that reinforce and support the basic intent of the formal structure.

MAS studies that have included structure have considered congruence associations. The following results are again illustrative of these associations: large and technically sophisticated firms were associated with administrative control strategies defined by decentralization and structuring with a strong emphasis on MAS, whereas small and dependent firms were associated with interpersonal control strategies described by centralization and lack of autonomy (Bruns and Waterhouse, 1975); functional differentiation with formality of the budgetary process (Merchant, 1984); organic structures with future orientated information (Gordon and Naranayan, 1984); decentralization with perceived usefulness of aggregated and integrated information (Chenhall and Morris, 1986). It appears from existing MAS studies that organizations with high levels of formal decentralization or mechanistic structural arrangements employ more formal and comprehensive MAS. However, it is apparent from these studies that understanding of the impact of structure is enhanced if variables such as environment, technology, and size are considered. That is, it appears that the design of MAS may be best examined by considering the way in which structure and other contextual variables interact. We will return to the combined effect of contextual factors in the following section.

Organization size

Despite being one of the more obvious factors influencing the development of contingent theories of control system, organizational size has been subject to less attention in management accounting than external environmental uncertainty, technology and structure. One of the difficulties in considering size as an element of context is that the nature of its effects are
unclear as it seems often to be a surrogate for other factors such as large scale production, entrenched administrative structures and the like (Kimberly, 1976).

A series of MAS studies have considered congruence associations between size and MAS. Overall these studies found that size was related to increased use of more sophisticated and administrative MAS. Illustrations of these findings include: increased size was associated with sophistication of control and information system (Khandwalla, 1977; Moores & Stuart, 1985; Lal, 1991/2); large, diverse and decentralized firms employed administrative rather than personal control strategies with greater emphasis on achieving budget plans, greater middle-management participation in budget related matters, had more formal patterns of communications and used more sophisticated budget reports (Merchant, 1981); increased size with the degree of formality associated with the budgetary process (Merchant, 1984). It is noteworthy that Merchant's (1981) study found that the interaction between large size and more administrative approach to budgeting, and small size and a more interpersonal approach to budgeting, improved performance.

While size has played a relatively minor role in MAS contingency research, evidence does suggest that large size increases the administrative complexity with a consequent increase in a reliance on more formal administrative arrangement including traditional MAS support. Because size seems to influence many other aspects of organizational functioning its consideration illustrates the need to study the way in which multiple characteristics combine to describe context.

Strategy

Early contingency studies found that perceived usefulness and increased use of MAS was associated with the type of competition in a firm's industry (Khandwalla, 1972) or the
uncertainty in the environment (Gordon and Naranayan, 1984). More recently researchers have considered the influence on MAS design of the way in which firms position themselves within their environments by way of competitive strategy. This has involved the identification of a firm's strategic orientation and how this affects the way in which MAS are developed and used (Dent, 1990). Notions of strategic orientation have been derived from the findings of Mintzberg (1973) who classified strategy as either entrepreneurial, adaptive or planning mode; Miles and Snow (1978) who identified defender, prospector, analyzer and reactor strategic archetypes; and Porter (1980) who dichotomized strategy into overall cost leadership, differentiation and focussed market or niche strategy.

Miller and Friesen (1982) found that comprehensive controls were positively associated with innovation in conservative firms but a negative association was identified for entrepreneurial firms. However, Simons (1987) found that high performing prospector firms seemed to attach a great deal of importance to forecast data, the setting of tight budgets, and the careful monitoring of outputs. On the other hand, defenders, particularly large firms, appeared to use their control systems less intensively. Simons' (1990) study extended prior analysis by considering how various parts of the MAS help resolve strategic uncertainties in firms following either a cost leadership or product innovation strategy. He found that a studied firm that faced strategic uncertainties due to rapidly changing markets used planning and budgeting interactively to set agendas to debate strategy and action plans, while a firm following a low cost strategy within relatively stable environments used the MAS in a programmed rather than interactive way.

Govindarajan and Gupta (1985) examined the links between strategy, reward systems and effectiveness. They concluded that long run evaluation criteria and subjective, non-formula bonus calculations are effective for business units following a build strategy, but not for business units following a harvest strategy. Recent calls for the development of strategic cost
management are based on the perception that traditional systems are inadequate in providing information to assist in developing manufacturing strategies that enable the firm to compete on quality, reliable delivery, flexibility as well as low cost (Kaplan, 1983; Shank, 1989; Cooper & Kaplan, 1991; Foster & Horngren, 1988).

An important aspect of research into strategy is the assumption that the design of MAS is not simply determined by contingent forces. Rather, the research underscores the dynamic process between contextual factors and strategic positioning, and the way systems evolve interactively with strategy as the firm positions itself within its environment (Child, 1984). More specifically, an important conclusion is the potential role for MAS, for firms following prospector strategies, to focus attention on tactics and targets and the strategic imperatives generated within competitive markets. More defensive strategies appear to have a more internally focussed MAS relying on more traditional programmed approaches.

Culture

When it is recognized that MAS are part of more comprehensive control systems and processes (Merchant, 1985), it becomes important to consider the consistency between the intent and structure of MAS, and the broader values and beliefs that provide meaning to the way individuals relate to their organizations. Despite recognition of the potential importance of culture to MAS design, there has been little attention to it within contingency-based MAS research. Several authors have warned of the dangers of developing MAS in ways that are inconsistent with the values and attitudes of individuals (Flamholtz, 1983; Markus and Pfeffer, 1983; Dent, 1986; Williams and Hinings, 1988). Furthermore, many accounting researchers have suggested that MAS are not passive mechanisms within established cultures but they can shape the values and attitudes within organizations (Dent, 1986; Hopwood, 1987; Ansari and
Euske, 1987; Swieringa and Weick, 1987; Richardson, 1987), sometimes with untoward effects (Gambling, 1987).

The notion of power is an associated concept in that MAS may represent a source of influence for those who control the MAS function (Bariff and Galbraith, 1978; Covaleski and Dirsmith, 1986; 1988). Markus and Pfeffer (1983) examined how the introduction of new controls was resisted by those whose existing power relationships were threatened by the new systems. Williams and Hinings (1988) found that managers' perceived benefits from zero based budgets was influenced by ideological values and beliefs. Finally, recent debate on the powerful role of accounting to articulate the goals of economic rationality (Hopwood, 1990; Colignon and Covaleski, 1988), are consistent with the view that the specification of particular MAS controls can legitimize policies to pursue particular outcomes. For example, Jones (1985) found that MAS had a powerful role in effecting control and integration following acquisitions. The nature of this role was complex and appropriate use of MAS caused dysfunctional effects. Recent calls for the use of direct measures of manufacturing excellence as part of MAS, may involve issues concerned with legitimizing concern, within the organization, with the new 'strategic manufacturing priorities'.

Combined effects

The results of existing accounting studies have improved our understanding by identifying particular important elements of context. While identification of key variables is a first step in contingency research, it is important to understand how these variables combine to affect MAS design. Virtually all of the reviewed empirical studies are either congruence or interaction studies. Only Miller and Friesen (1982) adopted a systems approach and combined holistically, a wide selection of contextual characteristics with control systems. There is, however, sufficient evidence from many of the other studies that understanding of MAS design
requires specification of multiple contextual factors. While it is impossible, from existing studies, to articulate how all identified variables are interrelated, it is possible to tentatively suggest how certain contextual variables combine in consistent ways to affect MAS design.

Gordon and Miller (1976) appear to have anticipated the likelihood that many of the variables found to have some effect upon MAS would cluster together when they suggested various archetypes. While again these archetypes have yet to be extensively investigated the "clusters" emerging from the use of strategic taxonomies and life cycle theory appear to hold promise for dealing with the increasing proliferation of contingent variables.

In the style of cross-sectional research that is the subject of this review, the early work of Bruns and Waterhouse (1975) and its extension by Merchant (1981) are especially noteworthy as empirical forerunners of work that seeks to identify the nature of archetypes. In particular they identified administrative and interpersonal control strategies and the contexts in which these emerge. According to Bruns and Waterhouse (1975) an administrative control strategy was seen to evolve within a context described by a decentralized structure with high structuring of activities combined with technological sophistication and large size. Merchant (1981) provided supportive evidence for associations between administrative control strategies and large, diverse firms with high levels of decentralization. Chenhall and Morris (1986) further suggested that part of the effects of technological interdependence on managers' perceptions of the usefulness of MAS was indirect through the influence of interdependence on firms' decisions to decentralize.

This tends to imply a package of controls (structural, systems and other) as a firm's response to its prevailing uncertainties. The primary source of these uncertainties has been identified as the nature of the firm's environment and its technology. A firm's size and strategic response to these factors can however moderate its control response. For example, Simons (1987) found
both strategies and size to be associated with MAS with association between defenders and less intensive use of MAS being more apparent in large firms.

External environmental uncertainty appears to play an important role in influencing other elements of context. In particular, uncertainty has been linked to increased levels of decentralization and organic forms of structure (Gordon and Narayanan, 1984; Chenhall and Morris, 1986). It seems likely that the nature of the task influences the effects of uncertainty. Evans et al (1986) found that uncertainty in the planning task increased the utility of broadly based, external information. However, for control tasks, uncertainty can reduce the need for control system information. Rather subjective, non accounting information may be more useful. An implication is that the function and role of other systems, including informal arrangements, should be considered when evaluating MAS for control purposes in uncertain situations.

A further important linkage is the combination of environment and the firm’s strategy. Consideration of strategy necessitates an appreciation of the firm’s decision orientation and levels of competition, external technologies and the like. The response of firms to develop highly automated technologies, CAD/CAM, JIT and FMS in response to increased global competition is a further illustration of the need to consider the combined effects of environment, strategy, and technology on MAS design.

Studies examining the association between strategy and MAS necessarily must consider many aspects of context as the development of a particular strategy usually has implications for decisions on structure, technology and environment (Lindsay and Rue, 1980; Boulton et al, 1982), and within both managerial and operations control (Puxty, 1985; Mak, 1989). Similarly, notions of culture tend to have pervasive implications for the nature of the structure and strategies (Pfeffer and Salancik, 1978; Flamholtz, 1983; Emmanuel et al, 1990), and for
the effects of introducing new technologies and consequent implications for MAS (Hopwood, 1990).

EVALUATION OF THE FRAMEWORK

Contingency MAS studies undertaken during the 1980s predominantly reflect selection and interaction definitions of fit in their study of factors influencing the design and operation of MAS. This restricted conceptualization together with the limitations imposed by available methods has lead to a number of shortcomings in the consistency and applicability of the findings.

Underspecification

Concerns about model specification have tended to focus on the comprehensiveness of the investigation. Contingency research in MAS has been criticized as applying underspecified models of the phenomena being studied (Otley, 1980; Dent, 1986; Otley and Wilkinson, 1988). Most of the early empirical accounting contingency studies were in fact congruence studies because they simply hypothesized that organizational context was related to MAS (e.g., Gordon and Narayanan, 1984). As indicated earlier, several accounting commentators have criticised these studies as inadequate because they did not relate findings to organizational performance (Waterhouse & Tiessen, 1978; Otley, 1980; Merchant and Simons 1986; Otley and Wilkinson, 1988). A response to this limitation contends that natural selection and managerial selection perspectives imply that any congruent fit is a result of an evolutionary process of adaptation which ensures that only the best performing firms survive (Drazin and Van de Ven, 1985). The implication being that the congruent patterns of fit are associated with successful performance. In the managerial selection case, particularistic control is restricted
by the specification of uniform practices and prescriptions from a macro-level, and involves sub-units switching between imposed rules depending on context.

A further concern of the underspecification of contingency studies is that they present only a small element of the overall context and control framework of an organization. Figure 1 and the discussion in the prior section identified variables that have been shown to be implicated in the effective design of MAS. It is important to note that these, and other potentially important factors, will change as the context within which they operate modifies through time. For example, changes in the technologies employed by many organizations have encouraged the development of strategic costing systems, and the implementation of specific measures of manufacturing performance (Kaplan, 1983; Drucker, 1990). Increased pressure for public company accountability may provide pressure for increased disclosure and a more public role for budgetary and segment level accounting information. The current concern with strategy as an element of context suggests that the life cycle of organizations will become important in designing MAS. A number of researchers have described patterns of organizational development which may have differential impacts upon the form and content of MAS (Adizes, 1979; Miller, 1979; Kimberly and Miles, 1980; Quinn and Cameron, 1983; Miller and Friesen, 1984; Moores, 1990). Similarly, the issue of short and long term consequences of congruence and interaction is relevant to the question of how long a certain MAS, with its relationships to context, should persist.

Notwithstanding the importance of identifying particular aspects of context important to understanding MAS design, a question remains as to the validity of restricted variable approaches which do not provide a comprehensive appreciation of the studied phenomenon. As long as additional variables are not systematically associated with the studied variables, they will not exert a biased influence on outcomes, and the results will legitimately reflect the impact of the selected variables. However, if omitted variables are closely associated with
studied variables then it is possible that the results identified in the study will be due to the unspecified effects of the omitted variable.

It is noteworthy that studies using only one or two contingency variables tend not to generate high levels of explanatory power. In statistical terms it is not unusual for these studies to explain less than 30% of the variance observed in the studied phenomenon. This contrasts with studies in econometrics or finance which use many variables and can explain up to 90% of the observed variance. This relatively low explanatory power is to be expected given that these studies seek to examine only a small part of a more complex situation. Notwithstanding the low explanatory power of individual studies, the large number of statistically significant findings over the last decade suggests that contingency variables do influence effective MAS design.

Deterministic assumptions

A further criticism of contingency researchers following congruence or interaction approaches is that they adopt a deterministic view, wherein it is assumed that specific formulations of MAS fit particular contingencies to effect enhanced outcomes. Commentators point out that notions of equifinality discussed in the writings of systems theorists suggest that there are often many ways of designing organizational structures and processes to cope with particular contextual settings (Katz & Kahn, 1966). This implies that the search for a single best design to match a contextual setting may be too restricted. Rather it may be more productive to recognize that there is likely to be a variety of MAS designs that will fit particular circumstances. Alternative approaches based on systems conceptualizations of fit provide the opportunity to identify sets of equally effective alternative designs, each of which is internally consistent and effective in enhancing performance (Miller, 1981; Child, 1984; Mak, 1989).
A final concern related to model specification is that contingency models have been specified in static terms, focusing on the structure of systems and context (Burchell et al., 1980; Simons, 1990; Hopwood, 1986). There has been little concern with the dynamic processes that describe how MAS evolve within their organizational setting. Process approaches enable the researcher to consider directly the pattern of causality involved in the associations between MAS, context and performance. Usually, consideration of process will engage the researcher in describing organizational processes at a more micro-level than has typically been the case in contingency studies to date. Characteristics of the organization such as culture and power are likely to be important in understanding the role of MAS (Flamholtz, 1983; Giroux et al., 1986; Denz, 1986). As yet there are few attempts at developing process models of MAS design (Dent, 1987; Ansari and Euske, 1988; Simon, 1990; Bruns and Kaplan, 1987).

Variable definition

While progress has been made in identifying contextual variables that appear to be important to MAS design, there are multiple dimensions within many of the variables. The variables of external environment, technology, structure, size, strategy have all been defined in diverse ways within the contingency literature. Often the dimensions within a variable are sufficiently dissimilar that comparisons of findings at the aggregate variable level are not meaningful. This is not to say that individual studies are necessarily problematic. On the contrary, research which explains and predicts outcomes using argument and evidence related to a specifically defined dimension of context will enhance our knowledge of the importance of that dimension of context. However, a danger exists that arguments may be drawn from one dimension of an element of context and erroneously applied to a different dimension in an effort to support a theoretical proposition.
By way of illustration, an example of the need for careful identification of the dimensions of a variable may be found by considering environmental uncertainty. While there is widespread acceptance that uncertainty is a central concept in theories that seek to explain the nature of the relationship between organizations and their environments (Dill, 1958; Duncan, 1972; Lawrence and Lorsch, 1967; Thompson, 1967), empirical research generally has yielded inconsistent results which are also often difficult to interpret (see for example, Duncan, 1972; Downey et al, 1975).

Apart from the problems that arise in connection with measurement via perceptions and/or objective measures, there are additional problems that stem largely from the widespread use of a unidimensional conceptualization (environmental uncertainty) of uncertainty. A number of researchers (Duncan, 1972; Miles & Snow, 1978; Tosi & Slocum, 1984; Milliken, 1987) have suggested that a broad conceptualization of environmental uncertainty may not be particularly useful. They have instead suggested that uncertainty should be studied in relation to specific components of the environment that underlie both the source and type of uncertainty.

Tosi and Slocum (1984) identified input, technological, and output sources as being the primary determinants of uncertainty, whereas Milliken (1987) has suggested state, effect, and response types of uncertainty. State uncertainty arises where managers do not understand how components of the environment might be changing. Unpredictable specific or general environmental changes lead managers to experience this type of uncertainty. They are uncertain about what actions relevant organizations or key constituencies might take. It can also arise when managers are uncertain as to the probability and/or nature of general changes in the state of the relevant environment. Effect uncertainty is a manager's inability to predict what the nature of the impact of a future state of the environment or environmental change will
be on the organization. Response uncertainty is the lack of knowledge of response options and/or an inability to predict the likely consequences of a response choice. This form of uncertainty is likely to be salient when there is a perceived need to act.

Consider the following MAS example of how imprecise definition of variables could be misleading. In designing an MAS it may be possible to argue that the complexity of tasks may generate circumstances in which highly precise measures of manufacturing will be most effective in evaluating managers. Given that task complexity is identified as the theoretically relevant variable, a measure of this aspect of uncertainty should be applied and not aggregate measures combining task uncertainty and complexity. Brownell and Dunk (1991) found that budget participation was effective when matched with a high level of budget emphasis in evaluation within conditions of task difficulty, but that this result did not hold for task variability. Attention to this type of detail is likely to result in a more orderly development of contingency studies.

Despite the criticisms made of contingency research it is possible to conclude that research over the 1980s has assisted in identifying key contextual variables important to the design of MAS. Consideration of the findings of this research, together with an appraisal of the limitations of research methods, provides us with a foundation to develop an understanding of the nature of contextual settings that are implicated in the design of MAS.

Framework for the Future

The progress made through the empirical studies of the past decade provides a base from which to advance our understanding of MAS design. In considering the development of more comprehensive approaches it becomes important for researchers to indicate how the results of existing studies might be modified by the inclusion of additional variables. It is possible that
additional variables may reconcile inconsistent findings, or they might build on the prior studies in additive ways improving the richness of descriptive details within the model. An example of the former is the extensive series of studies examining the inconsistent findings of Hopwood (1973) and Otley (1978). Briers and Hirst (1990) provide an extensive review of the development of this body of literature. The study of participative budgeting is an example of the inclusion of a series of variables which have an influence in developing effective budgetary participation. Brownell (1982) has reviewed the development of this literature.

The belief that model specification is enhanced by the piecemeal inclusion of additional variables is based on the view that organizations can be decomposed into their elements which can be examined independently. Knowledge gained from each element can then be aggregated to assist in appreciating the whole organization. Some researchers have asserted that an understanding of contingency relationships can only be achieved by considering, simultaneously, the many contextual variables of relevance to the research problem (Miller 1981; Van de Ven and Drazin, 1985; Gresov, 1989). Systems approaches have been suggested as a way to overcome the reductionism inherent in congruence and interaction approaches. Advocates of systems approaches explore how multiple contingencies and multiple characteristics of MAS combine to form ideal type designs which should result in enhanced performance (Miller, 1981; Van de Ven and Drazin, 1985).

The systems approach enables researchers to develop a richer description of context within which MAS operate. It is possible that congruent and interaction studies may not identify significant results, yet when studied variables are placed within a broader framework the relevance may become apparent (Drazin and Van de Ven, 1985). While the development of gestalts or archetypes may enrich the study of MAS, explanation of the observed associations may become difficult. Prior analysis and theory related to parts of the system can provide some guidance for interpretation. Similarly, prior analysis of interactions between pairs of
some guidance for interpretation. Similarly, prior analysis of interactions between pairs of variables can identify the more salient predictors of performance within the broader archetype. Systems approaches have the additional advantage of addressing the possibility that a variety of MAS designs may fit contextual settings.

In evaluating the relative strengths of limited variable, congruence or interaction models and holistic, systems approaches to contingency research the role of theory construction becomes an important consideration. Limited variable approaches have tended to apply conventional construction and testing of hypotheses, while holistic approaches tend to be more exploratory and descriptive in nature. It becomes difficult to include more than two or three variables when constructing a tightly argued set of hypothesized relationships that explain how variables will interrelate to effect an outcome. Clearly there is a trade-off between the advantages of a clearly articulated explanation for the way in which a part of a MAS interrelates with a restricted set of contingencies, and atheoretical observations of the way many diverse variables combine to describe the context within which MAS are grounded.

EVALUATION OF METHODS

Over the past decade the majority of congruence and interaction contingency MAS studies have collected data from managers using survey methods which apply questionnaires to investigate contextual variables and outcomes. This has evolved using established instruments to measure context and performance as well as the development of new instruments to collect data on aspects of MAS. As mentioned earlier—there are often different dimensions of an element of context and often particular instruments relate to these specific dimensions of the contextual characteristic (e.g. decentralization v organic, uncertainty and turbulence, technological interdependence and task predictability).
Dominance of Cross-Sectional Methods

There are three types of research method that may be employed in MAS contingency research: large scale cross-sectional survey studies; longitudinal small sample case studies; and laboratory experiments. As contingency research is grounded mainly in organizational settings, laboratory studies will not be discussed, although it is noted that experimental studies can be applied readily to situations within organizations using managers as subjects.

Both cross-sectional survey research and longitudinal case studies have advantages and disadvantages. These are discussed widely in the literature on research methods (Campbell and Stanley, 1966; Morgan, 1983; Abdel-khalik and Ajinkya, 1979). In summary, cross-sectional surveys provide large data sets appropriate for the testing of formal hypothesis using conventional scientific methods. They provide the opportunity to use instruments to measure variables of interest in ways that enable the researcher to test their validity and reliability. An important consequence of this is that instruments can be developed and refined with repeated testing. This enhances confidence in the comparability of findings between different studies using the same instruments.

Criticisms of cross-sectional survey method focus on the inflexible nature of the measurement process. While the instruments may be perceived as having high reliability and validity, they are developed by researchers and may not reflect the respondents' own perceptions of studied variables. This may lead to a superficial approach to research, particularly if respondents are not given the opportunity to comment on the research issues. The use of structured questionnaires does not enable the researcher to explore the processes that bring about the structures, contexts and outcomes measured by the questionnaires. There is also the possibility that questionnaire data may suffer from bias resulting from non-random selection of respondents or no-response bias. This means that respondents may not represent the broader
population to which the results are to be generalized. Finally, there is a potential problem of common response bias where respondents tend to answer each set of new questions in ways consistent with prior responses. Clearly, the reliability of any research method will depend, to a large part, on careful attention to data collection and conclusions of studies should be considered within the limitations of data collection.

Cross sectional survey studies enable the researcher to statistically test, formally specified hypotheses. Given careful attention to the validity and reliability of the measurements, cross sectional research provides a powerful basis for confirming the expectations developed from appropriate theories. If the studied sample is free from serious bias the results have a high degree of external validity in that they may be generalized to the broader population of interest.

Given the dominance of cross sectional studies throughout the 1980s, the primary form of analysis in contingency research has been correlational and regression techniques. These have become increasingly sophisticated as they progressed from the simple interpretation of zero-order correlations (Merchant, 1981) to the application of regression techniques which seek to identify the statistical interaction between variables (Brownell, 1982), to decompose correlations into direct and intervening effects (Chenhall and Morris, 1986; Collins et al., 1987), and to measure lack of fit to explain its consequences for effectiveness through a residual analysis method (Kim, 1988; Duncan and Moores, 1989). These regression techniques enable the researcher to investigate interaction models that specify the effects of variables acting in combination. Another powerful regression-based application involves the further testing of variables for contingency versus universalistic effects by examining partial derivatives of independent variables (Govindarajan, 1986; Duncan and Moores, 1989).
Because surveys typically collect data at a single point in time they do not provide a basis to establish the pattern of causality between variables studied. It is not possible to examine the question: if there is a change in an aspect of MAS what will be the effect on managers' performance? The researcher must rely on the strength of theory construction to provide a convincing argument about the direction of cause and effect between studied variables. The data, at best, will be either consistent or inconsistent with the proposed cause-effect relationship. Given the complexity of the organizational phenomena within which MAS are embedded it is often possible to argue for reversed or reciprocal causality in contingency models. For example, many studies of participation claim that it enhances manager's performance. However, it is possible that high performing managers will be encouraged to participate and that such participation may stimulate further improvements in performance. Clearly, any research method which examines data at one point in time will not be able to isolate the way in which participation and performance affect each other through time. While not common in contingency research, it is possible to use surveys to collect data at different point in time and thus observe the effects of change. This form of data collection has been referred to as "processual analysis" and has been proposed as a critical second state in structuralist research (Pugh, 1983).

Methods for the Future

Systems approaches seek to explore holistic configurations of MAS and context. The techniques of factor analysis and cluster analysis provide a means of exploring how a large variety of variables are statistically grouped, and distance from N-dimensional ideal space has been developed for considering links to outcome criteria (Drazen and Van de Ven, 1985). While there has been use of factor analytic techniques for data reduction purposes in MAS studies, there has been little progress in applying these techniques to systems approaches in

In case research, data collection involves interviews and direct observation, sometimes structured around formal protocols. Often the cases are developed using data collected over relatively long periods of time, up to several years. Data collection is much less structured in scope and form than in survey based methods. It is usual to identify an area of interest and to discover variables that are important during the process of investigation. An advantage of case research is that many variables can be considered and the opinions of organizational members can be elicited. This makes it an appropriate method to collect data in systems approaches to contingency research. A disadvantage is that the nature of the identified variables are specific to the particular case. It is difficult to verify their meaning and measurement, and to determine the extent of biased response. A further limitation is that the type of measures used do not typically enable formal statistical analysis to be performed. As a consequence measures of statistical association are not possible. These factors limit the generalizability of findings.

The use of case studies has generated considerable interest in organizational research with many commentators asserting that cases should be used more extensively as they enable us to increase our knowledge of the processes by which systems such as MAS operate within organizations. Some commentators argue that case research is particularly suited to identifying specific problems in the design of MAS and of relating such problems to the organization as a whole. Others argue that case research can be used legitimately to test hypothesized interrelationships (Hagg and Hedlund, 1979). Techniques of pattern matching and multi-site analysis are of interest in this area (Miles and Huberman, 1985). While calls for a movement in research towards case method have persisted over the last decade, proponents of the method have been careful to argue that cases should not be mere descriptive exercises devoid of any theoretical content (Hopwood, 1989).
FUTURE DIRECTIONS

As noted in the introduction of this paper the definition of fit is central to the development of theory, the collection of data and the statistical analysis of propositions. Furthermore it has been reported here that MAS studies have adopted the more limited selection and interaction approaches to fit. Notwithstanding the progress that has been made during the last decade this more limited conceptualization of the central notion of fit lies at the heart of the theoretical and methodological shortcomings of contingent-based MAS research.

Not surprising therefore is the suggestion that the greatest advances will be made by moving to adopt a systems approach to fit and the methods congruent with such an approach. This will see the specification of more variables and the delineation of more dimensions of these variables. The task of modelling such increased complexity is likely to be accomplished by using archetypal clusters generated either by theoretical insight (e.g. life cycle theory, strategic taxonomies) or through data reduction techniques, or by case study methods.

Systems approaches seek to explore holistic configurations of MAS and context and hence will facilitate movement to notions of multiple contingencies being equally congruent with a particular context. Furthermore, the adoption of methods consistent with exploration of multiple contingencies will enable researchers to explore the processes that bring about the structures, contexts and outcomes.

Within the context of this research agenda the additional variables may not only reconcile inconsistent findings but also they will need to build on prior studies in additive ways to improve the richness of descriptive details within the model. Furthermore, attention to the
MAS variable itself calls for a more conscious examination of the interactions between the form and content characteristics of MAS.

From the above discussion it is possible to distil a series of more specific suggestions to enhance theory development and empirical analysis within contingency frameworks. In regard to theory development, given that particular aspects of context have been identified as potentially important considerations in MAS design, further research is required which advances our knowledge of how MAS are implicated in the interaction between multiple aspects of context. In addition, it is likely that theories will have to accommodate new aspects of context as the operating situation and dynamics of organizations change through time. Dramatic changes in manufacturing technology, market structures, strategic priorities, information technology, and social pressures for accountability have already had important influences on the practice of MAS.

Given the complexity of the studied phenomena, a less deterministic approach would enable researchers to explore how different MAS designs may be appropriate in particular organizational circumstances. Recognition of the complexities involved in organizational functioning inevitably requires consideration of the subtle, informal practices within organizations. Contingency research can increase the comprehensiveness of its research agenda by extending research beyond the conventional formal properties of organizations to examine informal processes and the two-way interaction between them and the formal factors. The development of our understanding of the way MAS operates within these more complex contextual settings will require concern with issues of both content and process and will require insights from the traditional rational-technical perspective and increasingly from other theories grounded in social and organizational processes.
In relation to empirical investigations, many commentators have asserted that there has been an imbalance in the mixture of cross-sectional survey studies and longitudinal case studies. As a consequence there have been calls to consider the limitations of survey studies and to employ case research which provide the opportunity to investigate broader systems models of organizational control and the processes within which accounting is embedded. Where cross-sectional survey data are used to test statistically formal hypotheses, appropriate attention to issues of scientific method should be paramount. Generally, researchers should consider appropriate construction of theory, recognise the limitations of the method in regard to assumptions of causality and linearity, and apply appropriate analytical techniques for exploring interaction and systems approaches.

There are specific matters related to the reliability of data collected in cross-sectional, survey-based research. In particular, there are concerns that associations derived from questionnaires may reflect a common response bias. This is particularly important in situations where participants are responding to their perceptions of studied phenomena. The discovery of a significant interaction will usually control for such a bias, as it would be necessary to have differential response bias depending on how the respondents are characterised on the variables involved in the interaction. A more direct approach is to attempt to gain a second independent measure to test the validity of the response. It is likely that cross validation, particularly of performance measures, would enhance greatly the confidence in results of MAS contingency studies. In instances where confidentiality is to be assured and self-assessment is used, validation becomes difficult. However, in situations where external measures are available researchers should be encouraged to use multiple measures. Max (1989) and Haks (1987) provide examples of contingency studies that used multiple, external financial measures to evaluate performance.

While MAS contingency research has progressed from examining correlations to applying regression techniques involving multiple variables using interaction terms, it is only recently that restrictions on interpreting the mathematical analysis have been addressed. In particular, Southward (1978) pointed out that in regression equations, that include both main and interaction effects, the coefficients of ordinal scale, main effect variables are meaningless. Thus while the interaction term is interpretable the main effects are not. An alternative approach is the residual analysis method. This approach examines the extent of lack of fit between two congruent variables as measured by the absolute residuals from the linear relationship between the variables. This lack of fit is associated with performance to identify if a negative relationship exists (Drazin and Van de Ven, 1985). While this method is an interaction method, it is quite different statistically from the interaction approaches used in the majority of MAS studies. Examples of residual analysis in MAS research include Kim (1988) and Duncan and Moores (1989).

When considering the applications of regression analysis, as used in MAS contingency research, a difference is apparent between interaction and intervening approaches. While interaction approaches are based on theories which suggest an MAS will be more or less effective depending on a particular contextual setting, the theory does not implicate causality between the MAS and the contextual characteristics. By contrast, intervening variable approaches suggest that the association between MAS and performance can be explained, in part, by the effect of MAS on the control needs generated by the intervening factor and the subsequent effect on performance. For example, technological interdependence may be associated with the usefulness of a MAS, but part of this effect may be explained by technological interdependence inducing firms to decentralize which, in turn, creates a situation

2 The term interaction is used here in its conventional statistical sense, and should be distinguished from its use by Drazin and Van de Ven (1985) where it is a generic term covering both interaction and intervening as discussed in this section.
in which managers find the MAS particularly useful (Chenhall and Morris, 1986). In this situation decentralization is a variable intervening between interdependence and the utility of MAS. It is, of course, possible to develop somewhat more complex models by combining both interaction and intervening relationships. For example, Collins et al (1987) studied the effects of budgetary "game playing" as a variable intervening between leadership style and budget attitudes. It was also demonstrated that role stress acted within the intervening variable model by separately interacting with leadership style and game playing to affect budget attitudes. In addition to these approaches developments in the statistical testing of multiple variable, intervening variable models such as LISREL provide the opportunity to address the concerns that reductionist modelling underspecifies the phenomena being studied (Bray and Maxwell, 1985). As yet there are no applications of this technique in the MAS contingency literature.

As indicated above the development of systems models has not been widespread in MAS research. However, empirical analysis to develop gestalts has been developed in organizational research. Drazin and Van de Ven (1985) suggest tests to examine the distance from an ideal profile described as a point in an N-dimensional space. To test for the contingency effects, the Euclidean distance measures were correlated with performance. The development of archetypes which include control systems as developed by Miller and Friesen (1982, 1984) illustrates this approach. Typically these studies indicate that a variety of archetypes or gestalts may be related to enhanced performance. While this form of analysis tends to be exploratory rather than to formally test hypotheses, the approach does address the concern that contingency research is deterministic in nature and does not accommodate principles of equifinality.

Finally, many of the concerns that contingency research under specifies the control model within which MAS operate and ignores issues of organizational processes can be addressed
readily by using case research to collect and analyse data. While early contingency researchers were reluctant to employ case research there has been increasing output of case research in recent years. The results of these studies have appeared in both leading journals and in books. An evaluation of this research is beyond the scope of this review, however the following illustrations indicate the growth in application of case research. Early studies include the National Association of Accountants sponsored project by Caplan and Champoux (1973). More recently examples include Eccles (1985), Patell (1987), Ansari and Bell (1991) and collections of cases within Bruns and Kaplan (1987) and Kaplan (1990).

CONCLUDING REMARKS

Contingency research has become well established in accounting as an approach to assist understanding of how different types and characteristics of MAS are appropriate in differing contextual settings. This review has suggested that advances have been made over the past decade that are important to the design of MAS. Research has established a set of contextual variables that have been important considerations in the design of MAS, albeit providing only a partial understanding of the organizational setting. Insights have been gained into how parts of the total organizational setting interrelate to effect desired outcomes. There are, however, some notable variables that have not been adequately investigated. In particular, contingency models should consider more explicitly how MAS relate to other controls, including informal processes. In addition, our understanding of the impact of contingency models is likely to be enhanced if research focuses more explicitly on the effects of MAS on specific dimensions of effectiveness and performance.

In drawing conclusions on the contribution of contingency research it is important to recognize that the research process has been one of evolution. As our understanding improves it becomes possible to address higher levels of complexity in contingency modelling. One aspect
of this process is the acceptance that different approaches to MAS design can bring about desired effects within the same set of contingencies. This movement away from a research agenda predicated on identifying universal laws also recognizes that there is an inherent instability within contextual settings. Researching the design of MAS will need an appreciation of the perturbations in context which can impact on organizational practices and change the demands placed on structures and support mechanisms such as MAS. The need to incorporate changing context into contingency research is evidenced by recent developments in new manufacturing technologies, changing work practices, and the growth in the global nature of many organization's competitive environments.

There has been considerable progress in the quality of research in the contingency area over the past decade. The dominant approach to research has involved conventional scientific method. Clearly cross-sectional survey based research has been well received by the research "market place" and as such passes the market test. Increasingly over the decade these studies have reflected concern of editors and referees of journals with theory construction, data collection and analysis. Given continued attention to relevant research problems and close attention to issues of legitimacy in method, including the application of techniques to explore complexity within models, it may be expected that survey based research will continue to provide valuable insights. A particularly useful extension for survey based research might be longitudinal surveys using processual analysis. In regard to case research, it does appear that the role of case work within contingency research is being recognized. In addition to AOS, which has pioneered discussion and illustration of case research, other leading journals and book editors are now publishing research based on alternate methodologies such as case work. The further development of case work may be expected as the accounting research community develops the considerable sophistication in skills required to produce insightful knowledge into the way in which organizations function and develop.
As management accounting research moves into the 1990s the MAS research community should be encouraged that contingency research has provided many insights and has evolved to a situation where there are high expectations in terms of the quality of research. The importance of research problems be they either atomistic or holistic, and an acceptance of the legitimacy of both conventional scientific method and alternate methodologies including case work. It may be hoped that by triangulating the results of a variety of research approaches our understanding of MAS structures and processes within organizational contexts will continue to improve.
<table>
<thead>
<tr>
<th>Study</th>
<th>Contingent Variables Considered</th>
<th>Aspects of MCS Considered</th>
<th>Dimensions of Organizational Effectiveness</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Bruns &amp; Waitehouse 1975 (Survey)</td>
<td>Organizational context (origin, size, technology, dependence)</td>
<td>Structuring of activities, Concentration of authority</td>
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<tr>
<td>2</td>
<td>Hayes 1977 (Survey)</td>
<td>Environmental factors, interdependence factors, internal factors</td>
<td>Appropriate performance evaluation techniques</td>
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<td>3</td>
<td>Dalt &amp; Macintosh 1978 (Cases, Anecdotal)</td>
<td>Technology (task variety, search procedures)</td>
<td>IS style (amount, focus and use of data)</td>
</tr>
<tr>
<td>4</td>
<td>Piper 1978 (Case studies)</td>
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<td>Decentralization of decision making</td>
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</tbody>
</table>
### Table 1: Continued
Comparison of Empirical Contingency Studies in Management Accounting

**Panel B: Post-Otley (1980)**

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<thead>
<tr>
<th>Study</th>
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<th>Aspects of MCS Considered</th>
<th>Dimensions of Organizational Effectiveness</th>
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<tr>
<td>5</td>
<td>Brownell 1982 (Survey)</td>
<td>Evaluative style</td>
<td>Participation in Budgeting</td>
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<td></td>
<td></td>
<td>Managerial performance (self-assessed)</td>
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<td>6</td>
<td>Brownell 1983 (Survey)</td>
<td>Leadership Style</td>
<td>Participation in budgeting and leadership style</td>
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<td>Managerial performance and job satisfaction</td>
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<tr>
<td>7</td>
<td>Markus &amp; Pfaff 1983 (Cases, anecdotal)</td>
<td>Culture, goals, environment</td>
<td>Structure</td>
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<td></td>
<td></td>
<td></td>
<td>Design and implementation of AIS and other controls</td>
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<td></td>
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<td></td>
<td>Tendency towards dysfunctional behaviour</td>
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<tr>
<td>8</td>
<td>Gordon &amp; Narayanan 1984 (Survey)</td>
<td>Perceived environmental uncertainty</td>
<td>Structure-organic/mechanistic</td>
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<td></td>
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<td></td>
<td>Importance of non-financial information</td>
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<td>9</td>
<td>Govindarajan 1984 (Survey)</td>
<td>Environmental uncertainty</td>
<td>Style of performance evaluation</td>
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<td></td>
<td></td>
<td>Managerial performance (self-assessed)</td>
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<tr>
<td>10</td>
<td>Govindarajan &amp; Gupta 1985 (Survey)</td>
<td>Strategy</td>
<td>Style of performance evaluation</td>
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<td>Production technology, size</td>
<td>Functional differentiation</td>
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<td>Formality of budget use</td>
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<td>Organizational performance (assessed by manager)</td>
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<td>Style of use of AIS and other controls</td>
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<td>Extent of meeting budgetary targets</td>
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<td>Predictability of task</td>
<td>Participation in budgeting</td>
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<td>Preponatal to create 'budgetary slack'</td>
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<td>14</td>
<td>Jones 1985 (Survey)</td>
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<td>Sophistication and use of planning and control systems, pre-versus post-acquisitions</td>
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<td>Giroux et al 1986 (Case Studies)</td>
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<td>16</td>
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<td>Environmental uncertainty</td>
<td>Participation</td>
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<td>Managerial performance, managerial attitudes and motivation</td>
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<td>No.</td>
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<td>Methodology</td>
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<td>Chenhall &amp; Morris</td>
<td>1986</td>
<td>Survey</td>
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<td>Haka</td>
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<td>MacIntosh &amp; Dalt</td>
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<td>Simons</td>
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<td>Brownell &amp; Merchant</td>
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<td>22</td>
<td>Mak</td>
<td>1989</td>
<td>(Survey)</td>
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<td>23</td>
<td>Rayburn &amp; Rayburn</td>
<td>1991</td>
<td>(Survey)</td>
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<td><strong>INTERVENING</strong></td>
<td><strong>DEPENDENT</strong></td>
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<td>ORGANIZATIONAL CONTROL FEATURES</td>
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<td>ORGANIZATIONAL EFFECTIVENESS</td>
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<td>Job satisfaction</td>
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<td>Form scope timeliness aggregation</td>
<td>Attitudes to budgets budget related behaviour</td>
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<td>Strategy (objectives)</td>
<td>Capital budgeting operational controls management controls strategic planning</td>
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<td>Culture</td>
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**FIGURE 1: ANALYTICAL FRAMEWORK**

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1. The labels "anteecedent", "independent", "intervening," and "dependent" apply to the total framework. Individual studies have for example employed intervening variables as dependent variables.

2. A number of contingency-based studies have focused on the supervisory style aspects of MAS. These studies adopt group and individual levels of analyses as distinct from the organizational level focus of this review. Details of variables discussed in those studies are excluded here. See Briars and Hirst (1994) for a review of these studies.
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