12-1-1993

Contextual and strategic impacts on the form of management accounting systems

Ken Moores  
_Bond University, Ken_Moores@bond.edu.au_

Joseph Mula  
_Bond University_

Follow this and additional works at: _http://epublications.bond.edu.au/discussion_papers_

_Recommended Citation_

_http://epublications.bond.edu.au/discussion_papers/49_

This Discussion Paper is brought to you by the Bond Business School at ePublications@bond. It has been accepted for inclusion in School of Business Discussion Papers by an authorized administrator of ePublications@bond. For more information, please contact Bond University's Repository Coordinator.
"Contextual and Strategic Impacts on the Form of Management Accounting Systems"

by

Ken Moores and Joseph Mula
Bond University
SCHOOL OF BUSINESS
DISCUSSION PAPERS

Bond University was established by Act of Parliament in 1987 as an independent, private University. The first student intake occurred in May 1989. The School of Business offers degrees in the undergraduate (BCom and Diploma) and the graduate (MBA, MAcc, MCom and PhD) levels.

The School teaches and sponsors research in accounting, economics, econometrics, finance, marketing, management, organisational behaviour and related disciplines in hospitality and real estate fields.

The Discussion Paper series is intended to foster research and comments are invited. The views expressed in the papers are the opinion of the authors and do not necessarily reflect the views of the School or the University.

Lists of available Discussion Papers and copies of the papers (which are free of charge) may be obtained from:

The Senior School Administrator
School of Business
Bond University
GOLD COAST QLD 4229

Telephone: (075) 95 2244
Fax: (075) 95 1160

Dean: Professor Ashley W. Goldsworthy AO OBE
CONTEXTUAL AND STRATEGIC IMPACTS ON THE FORM OF MANAGEMENT ACCOUNTING SYSTEMS

Ken Moores and Joseph Mula
School of Business
Bond University
Gold Coast Qld 4229
Australia

October 1993

The authors wish to acknowledge the funding support received from Horwath and Horwath as well as a Bond University Vice-Chancellor's Research Grant. In addition, Apple Computers provided equipment which was invaluable to this project.

Not to be quoted or cited without the authors' permission.

Comments welcomed
Abstract

Previous studies have shown that both environmental uncertainty and organization structure are systematically associated with the perceived usefulness of management accounting system (MAS) attributes. The evidence to date however has been mixed with some suggesting that environmental uncertainty (PEU) is the dominant driver of MAS attributes while other have suggested that the effects of PEU are indirect through their association with decentralisation. This paper re-examines these associations by examining the dimensionality of these global constructs and by introducing strategy in an attempt to more fully understand the effect of context on MAS. Our results show that while PEU and structure both affect MAS attributes (external, non-financial and ex ante characteristics) the pattern of associations is very different for firms that pursue product differentiation strategies than for those that pursue marketing and cost oriented strategies.
INTRODUCTION

In an exploratory study of the relationship between an organization's environment, structure, and its management accounting system (MAS), Gordon and Narayanan (1984) concluded that structure was not significantly related to MAS. Instead they found that environmental uncertainty was of paramount importance for system designers in that it positively affected the perceived level of importance of external, non-financial, and *ex ante* information. Chenhall and Morris (1986) also found strong correlations between the type of information managers perceived to be useful and external environmental uncertainty.

However neither of these studies considered the way in which firms position themselves within their environments as influencing MAS. That is they ignored competitive strategies as factors affecting systems design. Only recently have researchers begun considering the influence of strategies on management accounting and control systems design (Simons, 1987, 1990; Cunningham, 1992). The research reported here re-examines the associations between environment, structures, and MAS form attributes and compares these for firms that pursue different strategies.

THEORETICAL FRAMEWORK

Over the last twenty years many researchers have advocated contingency approaches to understand the influences of context on the design of MAS (Sathe, 1975; Gordon and Miller, 1976; Ansari, 1977, 1979; Amigoni, 1978; Gordon, et al., 1978; Waterhouse and Tiessen, 1978; Banbury and Nahapet, 1979; Gordon and Narayanan, 1984; Chenhall and Morris, 1986). In the majority of empirical studies similar contextual variables, representing external (environmental uncertainty) and internal (structure and size) characteristics, have been examined.

Context

External environmental uncertainty has long been recognised an influential variable in contingency-based theories of organizational design (e.g. Burns and Stalker, 1961; Lawrence and Lorsch, 1967; Thompson, 1967). As a major source of uncertainty for organizations it was not surprising that investigations of information systems to resolve uncertainty soon included this variable. Both Gordon and Narayanan (1984) and Chenhall and Morris (1986) sought to understand the relationship between environmental uncertainty and management accounting systems.
Gordon and Narayanan (1984) found that information systems and organization structures are both functions of environmental uncertainty. In particular, as levels of uncertainty increased organizations adopted more organic structures and rated more highly external, non-financial, and \textit{ex ante} information. However it was environmental uncertainty that was the driving force influencing these MAS characteristics moreso than the organizational structure.

While Chenhall and Morris (1986) report similar associations between broad scope and PEU they also found that firms consider the levels of organizational interdependence and environmental uncertainty before decentralising. Furthermore decentralisation was associated with a preference for aggregated and integrated information. They concluded that managers facing uncertainty should be provided with broad information to improve their decision response time and to aid their environmental scanning.

Organizational structure is one of the primary factors in establishing the overall control system within an 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.

Because of the theoretical association between organization structure and responsibility accounting, management accounting researchers have investigated this link in a variety of empirical studies. Illustrative of the findings of this line of inquiry are: large and technically sophisticated firms were associated with administrative control strategies defined by decentralisation and structuring with a strong emphasis on MAS, whereas small and dependent firms were associated with interpersonal control strategies described by centralisation 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 Naranyan, 1984); decentralisation with perceived usefulness of aggregated and integrated information (Chenhall and Morris, 1986).

The overall consensus from the literature is that the design and use of MAS and control processes are contingent upon the context of the organizational setting in which these controls operate. Contingency researchers have argued that MAS and control systems structures and processes are influenced by environmental uncertainty (Burns and Stalker, 1961), task uncertainty (Galbraith, 1973), production technology (Woodward, 1965; Hayes, 1977; Merchant, 1984), shared organizational knowledge of goals and throughput mechanisms (Thompson, 1967), and organization size (Bruns and
Waterhouse, 1975; Merchant, 1981). But more recently, strategy has also been suggested as a variable affecting MAS (Simons, 1987, 1990; Cunningham, 1992).

**Strategy**

Early contingency studies found that increased use of control information was associated with the type of competition in a firm's industry (Khandwalla, 1972) or the uncertainty in the environment (Gordon and Narayanan, 1984). More recently researchers have considered the influence on MAS design of the way in which firm's 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. 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, analyser and reactor strategic archetypes; and Porter (1980) who categorised strategy into overall cost leadership, differentiation and focused 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, 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.

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, 1984; Shank and Govindarajan, 1989).

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. 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 focused MAS relying on more traditional programmed approaches.

Given this extant literature we would propose that perceived environmental uncertainty and structure both influence MAS characteristics. In testing this proposition we seek to establish the robustness of prior findings. However as earlier empirical studies did not measure the effect strategy might have on these relationships, our primary concern is to ascertain whether firm strategies moderate these relationships between contextual factors and MAS. Specifically, this paper reports an examination of the associations between three contextual variables (environmental uncertainty, structure and strategy) and three MAS form characteristics (external, non-financial and ex ante oriented information). This underlying theoretical framework is shown in Figure 1.

**FIGURE 1**

**THEORETICAL FRAMEWORK**

![Theoretical Framework Diagram]

**EMPIRICAL STUDY**

**Method**

In order to test the above propositions, an empirical study was conducted in which we collected data in two ways: a mailed questionnaire and follow-up detailed interviews with selected respondents. Cross-sectional data from 278 Australian family-owned business was collated to arrive at a set of descriptive statistics. All industry sectors were well represented by these mainly privately owned (ninety-four percent) family firms.
The average firm employed 171 people and had been in business for 46 years with turnover in the $10 - $20 million range. By Australian standards these firms are medium sized enterprises that operate in competitive local and overseas markets. This study was confined to firms of at least five years standing managed by second or later generation family members. By invoking a natural selection argument (Drazin and Van de Ven, 1985) these firms were deemed to be successful on the grounds of their survival beyond the five year hurdle.

Besides firm characteristics, the questionnaire provided data on competitive environment, strategies, structure, and MAS features. Responses by CEOs to questions in these areas were sought on seven-point Likert-type scales anchored at both ends to facilitate statistical analysis. For ease of response the short form type of questionnaires adapted from various previous studies (Khandwalla, 1977; Gordon and Narayanan, 1984; Chenhall and Morris, 1986; Miller, 1988; Miller & Friesen, 1984) were used.

Responses were factor analysed to reduce the level of detail by ascertaining the underlying dimensions of our data set. Scree tests were applied to the eigen plots to extract factors which were then orthogonally rotated using varimax procedures available in the SPSS statistical computer package. Associations between the reduced set of variables derived from the factor analysis were examined using correlation techniques. Both simple and partial correlations were computed to aid in the analysis and interpretation of responses.

Perceived environmental uncertainty (PEU) was measured by a series of seven questions (some with sub-parts) using the same constructs as Gordon and Narayanan (1984). A factor analysis of responses revealed the multidimensionality of this construct. Two factors were extracted from the operating environment uncertainty questions that suggest this construct is seen in terms of both change and complexity. Managers see the dynamics of change largely in terms of technological changes arising from the frequency of scientific discoveries that emerge in their industry. On the other hand complexity is associated with the intensity of competition for both inputs and outputs and the increase in legal, political, and economic constraints surrounding firms. The factors identified were labelled technoeconomic stability (Cronbach alpha = 0.65) and competition and constraints (Cronbach alpha = 0.51).

Organizational structure (STRUCT) was assessed in terms of six questions adapted from Khandwalla (1977). The responses to the structure questions reflect the characteristic two-factor pattern for this construct. The delegation questions all loaded together to produce a structure of authority factor (Cronbach alpha = 0.82). The
questions relating to the *structure of activities* (departments, divisions) loaded on a second factor (Cronbach alpha = 0.60) so labelled.

*Strategy (STRAT)* was measured using twenty-three questions adapted from Miller, (1988) and Miller and Friesen (1984). The factor analysis of this variable again revealed a multidimensional structure with three underlying factors emerging from the pattern of responses. Family businesses appear to view their strategic options in terms of what we have labelled *product differentiation, marketing, and diversification* alternatives.

The *product differentiation* factor (Cronbach alpha = 0.71) was dominated by the importance of new product introductions and market segmentation. All other questions loading on this factor such as leading competitors in the introduction of new products, the use of prestige pricing and advertising, the dominance of distribution channels, having many different products, and the importance of quality also represent forms of product differentiation. On the other hand, the combination of price cutting, frequent product innovations, cooperation with competitors, and the risk attitude of senior managers conveys some notion of *marketing* and cost oriented strategies. However given the diversity of the questions which loaded on this factor it has an understandably a low level of reliability (Cronbach alpha = 0.45). Very few firms (eight) pursued *diversification* strategies.

**MAS**

The specific form attributes of management accounting systems considered were the importance of external, non-financial and *ex ante* oriented aspects. External information relates to broad factors external to the firm such as economic conditions, population growth, and technological developments. Non-financial product type information included output rates, scrap levels, machine efficiency, and employee absenteeism and turnover, which were internal to the firm. *Ex ante* information incorporates historical data internal to the firm which related to possible future events. The importance of each characteristic was ascertained by a question within a large set of control information questions.

**RESULTS AND ANALYSIS**

**Comparative Factor Patterns**

The factor patterns for PEV and firm structure in this Australian study evidence multi-dimensional patterns in contrast to the uni-dimensional patterns found in the US study

\[1\] Consequently the number of firms analysed for this paper was reduced from 278 to 270.
of Gordon and Narayanan (1984). It should be pointed out however, that the much smaller sample size in the American study renders the stability of its factor patterns somewhat suspect. Our patterns coincide with theoretical expectations.

The multidimensionality of the PEU construct found in this research is consistent with theoretical (eg Milliken, 1987) and empirical (eg Lawrence and Lorsch, 1967; and Tosi and Slocum, 1984) work. In particular the two dimensions technoeconomic stability and competition and constraints closely approximate the three dimensional structures of Tosi and Slocum (1984) and Lawrence and Lorsch (1967). Tosi and Slocum (1984) identified input sources, users of output and external regulators as sources of environmental uncertainty while Lawrence and Lorsch (1967) noted market, technoeconomic and scientific sources of uncertainty. Our first factor technoeconomic stability encompasses input sources along with technoeconomic & scientific sources of uncertainty. The second factor competition and constraints combines both user of output and external regulators, that coincides with Lawrence and Lorsch (1967).

During the 1970s the Aston Group (Pugh, et al., 1968,1969) identified six primary structure dimensions from the literature: specialisation, standardisation, formalisation; centralisation; configuration; and flexibility. These were empirically refined leading to a subsequent concentration of their research efforts on two dimensions: structuring of activities and concentration of authority. Bruns and Waterhouse (1975) utilised these dimensions when investigating budgetary controls. They measured the specialisation, standardisation and formalisation of activities and the concentration of authority by centralisation and lack of autonomy. Our emergent factors structure of authority and structure of activities thus coincide with these theoretical expectations.

Apart from the similarities and differences in patterns the intensity of responses show some important differences. These differences need to be interpreted with caution because the nature of the differences in the timing and settings of the studies are of greater significance when looking at this aspect of the comparisons.

However the following tentative conclusions arise from the comparative analysis. It appears as though Australian family owned businesses perceive much higher levels of price competition than US medium sized firms. The environments generally do not appear to be as dynamic down under than is the case for North American businesses. However what does seem to be markedly different is the high levels of perceived regulation in Australian. At a structural level it appears as though Australian family owned businesses delegate authority less than do medium sized American firms but surprisingly operating decisions tend to be taken at lower levels down under.
Correlational Analysis

To maintain comparison of our results with those of Gordon and Narayanan (1984), we tested our propositions by similar correlation analyses. The analysis was in two parts, the first being simple (first-order) Pearson correlations among the variables for perceived environmental uncertainty (PEU)\(^2\), structure (STRUCT)\(^3\) and each of external non-financial, and ex ante oriented information characteristics. Second, partial (second-order) correlations were calculated taking two variables at a time while controlling for the third. These partials were calculated to determine if any one variable was the driving force in the simple correlation.

The correlation results for both studies are presented in Table 1, where solid lines join the variables for which the correlations were significant. For example, high PEU was significantly correlated with externally oriented information for Australian firms. The results show a number of differences in patterns between the two studies. Most notably, there are no significant correlations (first and second-order) between PEU and STRUCT which is contrary to the US study’s highly significant correlations for both first and second-order correlations. The second notable difference is the insignificant correlations between PEU and each information characteristic. The American study maintained highly significant correlations between PEU and all three information characteristics at first and second-order levels. In our results there are different patterns across the three information characteristics with only non-financial oriented information maintaining significant correlations with PEU at both the first and second-order levels.

Thirdly, in strong contrast to the Gordon and Narayanan (1984) study which found that structure was not the driving force behind the design of MAS, our study reveals that it is and at a highly significant level for all three information characteristics.

Gordon and Narayanan (1984) derived three major implications for the designers of management accounting systems. First, the higher the perceived environmental uncertainty, the greater the need for external, non-financial and ex ante information. They concluded, it was important to consider environment in the design of management accounting systems. Second, organizational structure appeared to be of minor importance relative to environmental uncertainty. They indicated however that given the influence of perceived environmental uncertainty on structure, the appropriate structure is conditional on a decision maker’s response to the environment. Third, organization structure was an intervening variable between environmental conditions and information system characteristics. As management accounting systems do not logically follow structures, they can be used proactively to change organizational structures.

---

\(^2\) The factor used to represent PEU was competition and constraints.
\(^3\) The factor used for STRUCT was structure of authority.
TABLE 1

CORRELATION ANALYSIS

All Australian Family Firms
(n= 270 firms)

Simple (First-Order) Correlations

<table>
<thead>
<tr>
<th></th>
<th>PEU 0.080*</th>
<th>External 0.131**</th>
<th>PEU 0.115***</th>
<th>Non Financial 0.295***</th>
<th>PEU 0.056</th>
<th>Ex Ante 0.110**</th>
</tr>
</thead>
<tbody>
<tr>
<td>STRUCT</td>
<td>0.077</td>
<td></td>
<td></td>
<td></td>
<td>0.077</td>
<td></td>
</tr>
</tbody>
</table>

Partial (Second-Order) Correlations

<table>
<thead>
<tr>
<th></th>
<th>PEU 0.070</th>
<th>External 0.126**</th>
<th>PEU 0.097*</th>
<th>Non Financial 0.289***</th>
<th>PEU 0.048</th>
<th>Ex Ante 0.106**</th>
</tr>
</thead>
<tbody>
<tr>
<td>STRUCT</td>
<td>0.068</td>
<td></td>
<td>0.046</td>
<td></td>
<td>0.072</td>
<td></td>
</tr>
</tbody>
</table>

USA Firms
(n= 34 firms)

Simple (First-Order) Correlations

<table>
<thead>
<tr>
<th></th>
<th>PEU 0.52***</th>
<th>External 0.38**</th>
<th>PEU 0.58***</th>
<th>Non Financial 0.34**</th>
<th>PEU 0.42***</th>
<th>Ex Ante 0.31**</th>
</tr>
</thead>
<tbody>
<tr>
<td>STRUCT</td>
<td>0.51***</td>
<td></td>
<td>0.51***</td>
<td></td>
<td>0.51***</td>
<td></td>
</tr>
</tbody>
</table>

Partial (Second-Order) Correlations

<table>
<thead>
<tr>
<th></th>
<th>PEU 0.41***</th>
<th>External 0.15</th>
<th>PEU 0.50***</th>
<th>Non Financial 0.05</th>
<th>PEU 0.32**</th>
<th>Ex Ante 0.12</th>
</tr>
</thead>
<tbody>
<tr>
<td>STRUCT</td>
<td>0.39**</td>
<td></td>
<td>0.41***</td>
<td></td>
<td>0.44***</td>
<td></td>
</tr>
</tbody>
</table>

* p < 0.10, ** p < 0.05, *** p < 0.01

4 Both parametric and non-parametric tests were run. Both tests yielded the same patterns for all correlations.
5 Gordon and Narayanan, 1984 p41

Moores & Mula
In contrast to the US study, our results indicate the following:

1. The higher the perceived environmental uncertainty, the greater the need for only non-financially oriented information. Thus PEU has only limited influence on the design of MAS information characteristics.

2. Organizational structure appears to be of major importance relative to environmental uncertainty in the design of management accounting systems. As perceived environmental uncertainty does not appear to have any influence on organizational structure, it does not follow that appropriate structures are conditional on the response to the perceived environment.

3. Organisation structure is the driving force behind the design of MAS. It would appear that management accounting systems and structures are perhaps designed contemporaneously as internally consistent control packages.

The proposition that perceived environmental uncertainty and structure influence MAS characteristics is only partly supported. Perceived environmental uncertainty has an influence on only non-financially oriented information characteristics, but structure has a relatively greater influence on MAS design. Increased levels of decentralisation are positively associated with all three information form characteristics. These results imply that perhaps an internal consistency between structures and systems may dominate the need for congruence with external environmental conditions. The pattern of control change is thus evolutionary rather than revolutionary (Miller, 1992).

The Impact of Strategy

To analyse the effect of strategy on the design of MAS which was our primary concern, firms were classified into three groups based on the set of strategies most pursued. In the main, family firms pursued product differentiation strategies (161 firms) but a significant number of others pursued marketing strategies (109 firms) which included some characteristics of cost leadership strategies. The very few (eight) which pursued mainly diversification strategies were eliminated from the sample. Correlation analysis was again carried out in two steps and the results are graphically displayed in Table 2.
### TABLE 2

**CORRELATION ANALYSIS BY STRATEGY TYPE**

#### Product Differentiation Strategies Firms

_(_n= 161 firms_)

<table>
<thead>
<tr>
<th>Simple (First-Order) Correlations</th>
<th>Partial (Second-Order) Correlations</th>
</tr>
</thead>
<tbody>
<tr>
<td>PEU 0.058 External 0.176** 0.096</td>
<td>PEU 0.186*** Non Financial 0.138*** 0.096</td>
</tr>
<tr>
<td>STRUCT</td>
<td>STRUCT</td>
</tr>
<tr>
<td></td>
<td>Ex Ante 0.090 0.140**</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>PEU 0.087 External 0.171** 0.087</td>
<td>PEU 0.164** Non Financial 0.327*** 0.084</td>
</tr>
<tr>
<td>STRUCT</td>
<td>STRUCT</td>
</tr>
<tr>
<td></td>
<td>Ex Ante 0.078 0.133**</td>
</tr>
</tbody>
</table>

#### Marketing and Cost Oriented Strategies Firms

_(_n= 109 firms_)

<table>
<thead>
<tr>
<th>Simple (First-Order) Correlations</th>
<th>Partial (Second-Order) Correlations</th>
</tr>
</thead>
<tbody>
<tr>
<td>PEU 0.125* External 0.053 0.044</td>
<td>PEU 0.044 Non Financial 0.214** 0.053</td>
</tr>
<tr>
<td>STRUCT</td>
<td>STRUCT</td>
</tr>
<tr>
<td></td>
<td>Ex Ante 0.024 0.034</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>PEU 0.123* External 0.048 0.038</td>
<td>PEU -0.011 Non Financial 0.215** 0.053</td>
</tr>
<tr>
<td>STRUCT</td>
<td>STRUCT</td>
</tr>
<tr>
<td></td>
<td>Ex Ante 0.022 0.034</td>
</tr>
</tbody>
</table>

* * p < 0.10, ** p < 0.05, *** p < 0.01*

---

Both parametric and non-parametric tests were run and they yielded similar correlations for each strategic option.

---

*Moores & Mula*
For product differentiation strategies firms, significant first-order correlations were found between structure and all three information system characteristics. That is, the more decentralised an organization's structure the more significantly the perceived importance it attaches to each of external, non-financial and ex ante oriented information. However, the only significant correlation with PEU was non-financial information. In other words, higher perceived environmental uncertainty is significantly correlated with higher perceived importance attached to non-financial information. The same patterns emerged in the partial correlations. Thus structure would appear to be the driving force behind all three information system characteristics for firms pursuing differentiation strategies. The importance attached to non-financially oriented information is however positively associated with levels of uncertainty arising from competition and constraints sources.

In the case of marketing and cost oriented strategy firms, significant first-order correlations are limited to the relationship between PEU and externally oriented information characteristic as well as between STRUCT and non-financially oriented information characteristic. Higher perceived environmental uncertainty is significantly correlated with higher perceived importance of external information system characteristic. Additionally, a more decentralised organizational structure is significantly correlated with non-financial information system characteristic. From second-order correlations PEU drives externally oriented information and organizational structure drives non-financially oriented information characteristic.

These results show that different information system characteristics are adopted by firms pursuing product differentiation strategies as opposed to marketing and cost oriented strategies. Those that adopt product differentiation strategies will value highly all three forms of information to support their decentralised structures. On the other hand, firms that adopt marketing strategies will highly value external forms of information when PEU is high and non-financial forms of information when decentralised structures are in place. Thus it would appear that our proposition is supported, namely that strategy has a moderating influence on the relationship between organizational context (external - perceived environmental uncertainty; internal - structure) and control (information system characteristics).

CONCLUSION

The interrelationship between management capabilities and the information systems that support decision making has become more crucial in information eras characterised by environmental change and uncertainty. Accordingly, the design of appropriate management accounting systems becomes a key issue in ensuring the survival of
businesses. Furthermore, if these MAS are designed by taking account of prevailing contingencies they can facilitate the achievement of objectives beyond mere survival. That is, a firm's chances of success are enhanced by developing MAS that measure performance in a manner congruent with firm goals and strategies.

Our empirical evidence not only confirms the theoretical expectations of multidimensional environment, structure, and strategy constructs but also unearths a moderate effect of strategy on the relationship between context and MAS. This has especial implications for the design of strategic management accounting systems. Firms which pursue product differentiation strategies need to ensure that the traditional accounting systems and reports are supplemented by a broader set of information from both internal and external sources. When such firms have decentralised their decision making authorities managers assign greater importance to external, non-financial, and ex ante information. On the other hand, firms that pursue marketing and cost oriented strategies have less need to supplement conventional management accounting information. Only when their levels of prevailing uncertainty are high will they value external information, and non-financial information is only valued by managers operating in decentralised authority structures.

Our results however must be interpreted with caution given the limitations of this exploratory study. These limitations emerge from our comparative objective, the emergence of multidimensional constructs, the classification of firms and cross-sectional data collection methods. To maximise our bases for comparison we have relied upon measures and correlational methods used in prior studies. However given the emergent multidimensional nature of constructs in more limited associations were infact examined in our correlations than those of prior studies. For example, the PEU-structure associations in our case are really competition and constraint associations with decentralisation. This limits our comparative results.

To measure the impact of strategy, firms were categorised as product differentiators or cost leaders based on an index that was derived by averaging a number of questions which loaded on the respective factors. Thus if a firm's average response to the differentiation questions exceeded their response to the marketing and cost leadership questions, they were classified as mainly pursuing product differentiation strategies. This is an imprecise measure of the strategies pursued by firms and in future work we will attempt to more closely identify strategies that firms pursue by introducing some of our case studies data.

---

7 See Duncan and Moores (1989) and Moores and Duncan (1989) which illustrate more advanced methods for examining contingency relationships.
Cross-sectional research examines statistical associations at one point in time and as a consequence statements about relationships can only be made in terms of the consistency of the results with the effects suggested by the theoretical framework (Chenhall and Morris, 1986). We attempted to compensate for this deficiency by conducting extended visits and interviews with a cross section of respondent family firms. While details of these cases are not reported here they did facilitate our interpretation of cross-sectional results.

Notwithstanding these limitations our results provide empirical evidence that support the proposition that strategy has an influence on the relationship between context and management accounting systems. Thus designers of MAS need to consider both the strategy pursued and structure adopted before providing information for decision makers. In this way our results confirm Otley's (1980) notion of control packages being necessarily designed to ensure organizational effectiveness. Furthermore the design approach seems more evolutionary than revolutionary so as to maintain internal consistency (Child, 1984).
Bibliography


