

AN EMPIRICAL ASSESSMENT OF THE "FIT" BETWEEN STRATEGY AND MANAGEMENT INFORMATION SYSTEM DESIGN

by

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Abstract

This paper was motivated by the limited understanding of the role of accounting *vis a vis* other information in supporting the needs of management. The paper reports the findings of a study which examined differences in the design parameters of management information systems in firms adopting different strategic priorities. Based on a sample of 49 business unit general managers, the findings indicate that the effectiveness of business units is dependent on a match between the design of the information system and the firm's strategic posture. Information systems which have the characteristics of a broad scope system were found to be more effective in firms employing a strategy of continuous product/market development and innovation (Prospectors) than in firms which were protecting a comparatively narrow and stable product-market (Defenders). The results have important implications for management accountants involved in the design and implementation of management information systems, especially in firms adopting a more innovative strategic posture. In particular, the study sheds light on the role of accounting as part of the "mosaic" of information provided to managers for decision making.

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1. Introduction

Understanding the impact of strategic choices on the design and implementation of management accounting systems has been identified as a research imperative [Otley, 1980; Dent, 1990; Simons, 1990]. The empirical research to date, however, has been, at best, equivocal. While the research is based on well-recognized strategic frameworks [e.g. Porter, 1980; Miles & Snow, 1978], the results have been fragmentary and conflicting [Dent, 1990; Simons, 1990]. For example, Merchant [1985] and Simons [1987] both found that the emphasis on accounting information was greater in firms adopting build or prospector-type strategies while Govindarajan's [1988] evidence indicates that such firms place a significantly lower emphasis on accounting information. On the other hand, Govindarajan and Gupta [1985] found that short-term performance measures, such as those based on accounting information, were equally important for both harvest and build-type strategies.¹ The findings of this empirical research have thus created considerable confusion as to the role of accounting in firms pursuing different strategic priorities.

To provide a better understanding of the strategy/accounting link, calls are now being made for the development of models which enable a study of the relative importance of accounting *vis a vis* other forms of information in managing strategic contingencies [Simons, 1990; Dent, 1990]. This stems from the recognition that accountants need to adopt a 'wider vision' when designing and implementing accounting systems [Hopwood, 1976; Otley, 1980]. Improving our understanding of accounting in its organizational context is particularly important as it directly impacts on the role and function of the management accountant in providing information to management. As noted by Kaplan [1990] and others, this role has changed dramatically in the last ten years. To remain viable, the management accountant's role has expanded from a manager of financial information to an "information" manager [Macintosh, 1985]. There are, however, very few studies which have explored how accounting fits into the overall 'mosaic' of an organization's information system [McKinnon & Bruns, 1992]. This study attempts to improve our understanding of the factors which influence managers' choice of accounting and non-accounting information by developing a framework for assessing how strategic priorities influence the effective design of an organization's management information system (MIS). The paper is organized as follows. The following section develops the theoretical framework and the hypothesis to be tested. Subsequent sections address, in turn, variable measurement, methodology, results, discussion, limitations and directions for future research.

2. Theoretical Framework

This section describes the way in which strategy has been conceptualized and the particular dimension of information systems explored in the study. This is followed by the theoretical model and statement of hypothesis.

1. The literature has conceptualized strategy using different typologies. However, there is general consensus that build, differentiation and prospector-type strategies are conceptually similar, as are harvest, cost leadership and defender-type strategies [Chrisman et al., 1988].

The Concept of Strategy

Typologies have been developed to study strategy at three organizational levels - the corporate level, the strategic business unit (SBU) level, and the functional level [Chrisman et al., 1988]. Following other researchers, we focus on the strategic business unit level as it is at this level that the responsibility for designing effective MIS often lies [Simons, 1987; Govindarajan, 1988]. While numerous typologies have been developed to study strategy at the business unit level, the Miles and Snow [1978] typology is used in this study. We chose this typology for a number of reasons. First, Miles and Snow are "very clear in their statement that the control system of a firm should be congruent with its strategy" and provide a theoretical framework which is useful for identifying the characteristics of information systems which will be appropriate in different strategic contexts [Simons, 1987, p. 359]. Furthermore, the typology is one of the most widely used, it is applicable to a wide range of industries and it has been subjected to considerable psychometric assessment [Shortell and Zajac, 1990].

Miles and Snow studied the different strategic priorities pursued by business units and classified firms based on the rate of change in the product market. Three viable and one non-viable strategic types were identified. Following other researchers [Simons, 1987; Govindarajan, 1988; Merchant, 1985], we chose the two strategic archetypes which represent the opposite ends of the product change continuum - prospectors and defenders. Prospectors are innovators, flexible and entrepreneurial in their outlook and continually pioneering changes in their product market. In contrast, defenders undertake a relatively lower rate of product market innovation, emphasizing stability in their operations, and focusing on maintaining market share through efficiency. Typing firms into archetypal groups is particularly appropriate to studying the design characteristics of MIS as prior research has indicated that defenders and prospectors require very different internal structures and administrative processes [Snow and Hrebiniak, 1980; Simons, 1987; Shortell et al., 1990; Hambrick, 1983]. The findings of this research are thus supportive of the notion that the design parameters of MISs in defender and prospector-type firms are also likely to differ. While we recognize that some firms are likely to display characteristics of both archetypes, the limited understanding of the relationship between information system design and strategic priorities suggests that it may be more appropriate to study this relationship using relatively simple models at this stage.

Management Information Systems (MISs)

Numerous researchers have recognized that accounting information is only one of a multitude of information subsystems² which a manager can draw on for information support [Simons et al., 1954; Anthony, 1985; McKinnon and Bruns, 1992]. The term MIS is used here to refer to the numerous subsystems which are available in an organization to provide historical, current and future oriented information about both internal operations and external intelligence [Szilagyi, 1988]. Accounting information has characteristics

2. Davis and Olson [1985] identify seven information subsystems and Kanter [1977] claims the number could reach 40 or 50 if the major subsystems were further subdivided.

which make it particularly well suited to the management of routine and regular occurring activities [Anthony, 1985]. These activities are often programmable and, therefore, quantifiable. Historical and internally-based information is generally relevant for decisions relating to these activities [McKinnon and Bruns, 1992]. There are, however, numerous managerial decisions which do not relate to programmable activities and require information which possesses other attributes. The different types of information used by managers can be characterized along the following dimensions: accuracy, source and focus, quantifiability, frequency of use, time horizon, relevance, completeness, level of aggregation, timeliness and medium of presentation [Anthony, 1985; Dermer, 1973; Senn, 1982].

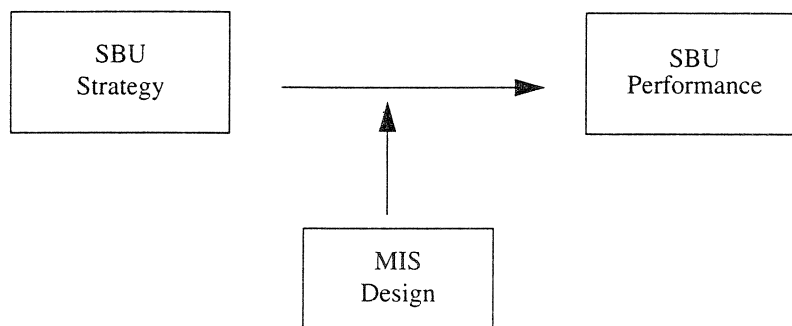
This paper examines three information attributes considered to be important in understanding the role of accounting *vis a vis* other types of information for managerial decision making [Dermer, 1973; Larcker, 1981; Gordon and Narayanan, 1984; Chenhall and Morris, 1986] - the focus, the form of quantification and the time horizon of information.³ The focus of information describes the degree to which it is focused internally on the organization alone, or has an external focus on the organization's operating environment [Larcker, 1981]. *Quantification* describes the actual structure or form of information [Senn, 1982] according to the measure used to express or derive information - whether it be in financial or in operational terms [Dermer, 1973]. *Time horizon* refers to whether information has a future (*ex ante*) or historical (*ex post*) orientation [Larcker, 1981].

These three dimensions are considered together in this paper to represent the scope or breadth of an information system [Chenhall and Morris, 1986].⁴ A narrow scope information system focuses on events within the organization, provides financial information and has an historical orientation. An information system dominated by traditional accounting-based systems is indicative of a narrow scope information system [Gordon and Miller, 1976; Gordon and Narayanan, 1984; Chenhall and Morris, 1986]. On the other hand, *broad scope* information includes information relating to the external environment, which may be economic or non-economic in nature, non-financial factors pertaining to the operations of the organization, and future-oriented information [Chenhall and Morris, 1986].

The Theoretical Model

According to Miles and Snow [1978], in order for an organization to adapt to, remain aligned with, and compete in its environment, management must make strategic choices to solve three major organizational problems-entrepreneurial, engineering and administrative.

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3. These information characteristics are generic and have been applied at different organizational levels and across different functional groupings [Dermer, 1973; Chenhall and Morris, 1986].
 4. It should be noted that Chenhall and Morris [1986] used the term broad scope management accounting system (MAS) to study these dimensions. We chose to follow Otley's [1980] distinction and view the information provided by the accounting system as an element in a firm's total information system and thus use the term MIS.

FIGURE 1 : The Conceptual Model

They describe effective organizations as those which have the appropriate "fit" between these three elements. Solutions to the entrepreneurial problem involve the choice of a product-market domain and solution to the engineering problem involves decisions concerning the production and distribution technology to serve that domain. Once a SBU defines the domain in which it intends to operate and the means by which it will compete, it must solve the administrative problem. The appropriate "fit" occurs when a SBU implements administrative systems which support its product-market strategy by ensuring that activities are co-ordinated, controlled and monitored [Miles and Snow, 1978]. Miles and Snow [1978] provide a useful framework which demonstrates how successful firms solve the three problems which arise from different strategic choices. The "solutions" for defenders and prospectors are summarized in Table 1.

While the case data collected by Miles and Snow [1978] enabled them to make predictions concerning the nature of a firm's information system, there is no research, of which the authors are aware, which has systematically examined differences in the nature of the information used by management in firms pursuing alternative strategic priorities, nor has there been any research assessing the impact of the appropriate "fit" on the effectiveness of the SBU. This paper extends prior research by explicitly testing the relationship between strategic priorities, design characteristics of MISs and firm performance. The model studied is depicted in Figure 1.

Miles and Snow's research provides clear guidelines as to the design characteristics of MIS in prospector and defender type firms. We draw on the theoretical propositions summarized in Table 1 to support the relationship between MIS design and strategic priorities. A firm pursuing a defender-type strategy focuses on a limited and stable set of products or services. Its objective is to "defend" its domain by focussing on its current set of products and services. The firm does this by producing and distributing goods and services as efficiently as possible. This often requires the investment in manufacturing technology which enables long production runs of a standardized product [Dean and Susman, 1989; Buffa, 1984; Chase, 1990; Simons, 1987].

TABLE 1 : Characteristics of Prospector/Defender-type Firms
(adapted from Miles & Snow, 1978, p. 48, 66)

	Prospector	Defender
Entrepreneurial Problem	How to locate and exploit new product and market opportunities?	How to "seal off" market and create a stability in product and customers?
Solution	Broad and continuous development of domain Broad monitoring of external environment Become a change agent in market Pursue growth through product/market development	Narrow and stable domain Aggressive maintenance of domain, eg. cost minimizer Ignore developments outside domain Incremental growth Focus on past and current goods or services
Engineering Problem	How to avoid long term commitment to mass production of a single product?	How to produce and distribute goods as efficiently as possible?
Solution	Implement flexible production technology Use of multiple technologies Low degree of production routinization/mechanization	Cost-efficient technology Single technology Reduce uncertainties through vertical integration Improvements based on maintenance of efficiency
Administrative Problem	How to facilitate co-ordination and control of numerous and diverse operations?	How to maintain strict control in order to ensure efficiency?
Solution	Marketing/research experts are dominant coalition Develop broad-based information systems Organic structure Low degree of formalization Short-looped horizontal information systems Performance measures are external and broad based	Financial and production experts are dominant coalition Information systems are cost-oriented Planning is completed before action Mechanistic structure High degree of formalization Centralized control, long-looped vertical information systems Performance measured against previous year's performance

Traditional accounting systems were designed for implementation into this setting and there is considerable evidence that the financial information provided by these systems is particularly well suited in firms with high product standardization and relatively stable production processes [Macintosh, 1985; Miller, 1988; Hirst, 1983; Brownell and Merchant, 1990; Govindarajan, 1988]. These systems work in this setting because they provide information which is relevant for managing the strategic uncertainties faced by the firm [Simons, 1990, 1991]. As these firms focus on the maintenance of internal efficiencies, it follows that an effective information system will have design characteristics which also have an internal rather than an external focus. Managing the external environment will not be as critical for firm performance. This is not to say that the management will not scan the external environment. However, top management's time is limited and for information systems to be effective, they will need to be designed to provide information which is most important for managing in the firm's strategic environment [Simons, 1990]. It is, therefore, expected that the system will focus on the narrow range of external stimuli expected to influence the organization, such as technological process developments.

The strategic priority of cost minimization, that generally accompanies a defender strategy [Shortell et al., 1990; Simons, 1987; Govindarajan, 1988], also suggests that financial information which focuses on internal production and distribution efficiencies will be appropriate for monitoring performance in this setting [Gordon and Narayanan, 1984; Govindarajan, 1986]. As noted by Miles and Snow [1978], the stability faced in the product domain suggests that the information important to management would typically have a current or historical orientation. Historical information is likely to be an accurate representation of future events and, therefore, will be important for planning purposes and for setting targets against which current performance can be measured [Simons, 1990].

Much of the prior research has argued that the characteristics of a prospector-type control system are likely to be in direct contrast to those found in defender-type firms [Simons, 1987; Govindarajan, 1988; Govindarajan & Gupta, 1985]. Prospectors are innovators - they are continually developing and shaping their product domain through innovation of products and services [Miles & Snow, 1978]. These firms are proactive in their environmental interactions. They seek out and exploit new product market opportunities and continuously monitor a wide range of environmental conditions and events [Miles and Snow, 1978; Govindarajan, 1988]. This suggests that firms pursuing a prospector strategy will design their MIS to include information which focuses on the external environment and will not be limited to describing events and situations in merely financial terms [Ewusi-Mensah, 1981]. Managers of prospector-type firms will require information which monitors the strategic uncertainties (both current uncertainties and those which may arise in the future) associated with factors external to the firm [Simons, 1990]. It follows that the information likely to be appropriate for managing these uncertainties will be external-based and future-oriented [Gordon and Miller, 1976; Chenhall and Morris, 1986]. The findings of research which has examined the effectiveness of financial performance measures indicate that firms pursuing prospector-type strategies will move away from financial and efficiency-based type information for planning and control purposes towards non-financial, qualitative and broader-based performance measures [Miller, 1988; Parthasarthy and Sethi, 1992; Eccles, 1991]. In sum, these characteristics form what is referred to in this paper, as

a *broad scope* information system. The design parameters of a MIS effective for achieving competitive advantage in prospector-type firms, are most likely to incorporate these characteristics.

Statement of Hypothesis

In the light of the above discussion, it is expected that the design of a firm's information system will influence the effective implementation of strategic priorities. In other words, performance will be enhanced when there is an appropriate match between strategy and the design of the MIS. In particular, the theoretical proposition is that managers of firms pursuing a prospector-type strategy will view broad scope information as more important than managers in firms pursuing defender-type strategies. As the effective implementation and management of a prospector strategy requires the support of broad-based information, it is expected that management will place more importance on the characteristics associated with a broad scope information system in such firms. It is implicitly assumed here that if management considers these characteristics to be important, they will be in a position to ensure that such information is available in their business unit and thus use the information in decision making.

The information characteristics associated with a broad scope information system are not expected to be as critical to managers of defender-type firms. We, therefore, expect the match between broad scope information and strategy will result in a less positive impact on performance in these firms. The hypothesis to be tested is stated below.

Broad scope information will have a more positive effect on performance in prospector-type firms than in defender-type firms.

2. The Empirical Study

The Sample

The sample consisted of 49 strategic business unit (SBU) managers. The SBUs were autonomous divisions of two large diversified corporations located in Australia. The SBUs represented a variety of industries.⁵ The sample was identified by top management at corporate headquarters and, therefore, was non-random. Questionnaires were mailed to each SBU manager and were accompanied by a memorandum from corporate office encouraging participation in the study. To ensure confidentiality of responses, envelopes, addressed to the researcher, were provided for return of the completed questionnaires. A letter was sent (and in some instances a telephone call was made), where necessary, to

5. The business units represented in the sample were in the construction and building, automotive supplies and parts, steel products, electrical products, rubber and tyre, wire and cable, clothing and footwear, consumer durables, industrial products, packaging, medical and health care products, and branded food products industries. Post hoc statistical analysis (not presented here) of the means of the key variables at test confirmed the expectation of no significant differences between the two organizations. There were insufficient firms in each industrial classification to test for differences in responses.

TABLE 2 : Descriptive statistics and intercorrelations of the variables at test. ^(a)

	Range	Min	Max	Mean	S.D.	1.	2.	3.
1 Business unit strategy	0/1	0	1			1.00		
2 Scope of management information system	7-42	23	42	32.76	4.32	.28*	1.00	
3 Weighted average performance score	1-7	1.90	5.51	3.55	0.75	.08	.47***	1.00

* Significant at .10 level

** Significant at .05 level

*** Significant at .01 level

(a) Significance levels are based on a two-tailed test.

(b) Point-biserial correlations (Baggley, 1964) were performed for the dichotomous variables.

solicit unreturned questionnaires. All 49 SBU managers completed and returned useable questionnaires.

Measures

Three variables were measured in the questionnaire: SBU strategy, MIS scope, and SBU performance. Respondents were instructed to answer each item in the questionnaire for the business unit for which they were responsible. The questionnaire was pilot tested prior to the study and adjustments made where required.⁶ Table 2 provides descriptive statistics and the zero-order correlation matrix for the variables measured. The measurement of each variable is discussed in turn.

Business unit strategy. Strategy was measured based on Miles and Snow's [1978] strategic typology and using an instrument which has been subjected to considerable psychometric assessment [Snow and Hrebiniak, 1980; Hambrick, 1983; Shortell and Zajac, 1990].⁷ Managers were presented with a brief description of a "defender-type" firm and a "prospector-type" firm and asked to select which description better represented their business unit, relative to other firms in the industry [Hambrick, 1983].⁸ A subsample of

6. Six academics from accounting, finance, information systems and organizational psychology and four senior business executives, not included in the sample, were used to test the questionnaire.

7. Shortell and Zajac [1990] performed validity tests on an instrument which required respondents to place their firm's strategic orientation on a scale of one to seven. They found that the results of the validity tests were more powerful when the scale was collapsed and the firms grouped into defenders, analyzers and prospectors.

8. Previous researchers have used a paragraph description of the strategic types, but pilot testing revealed a point-form description to be most effective and so it was used here. The wording used, however, was exactly the same as that used in prior research.

SBU managers' responses and those of their respective marketing managers were compared using a chi-square test to assess the construct validity of the instrument.⁹ The result ($\chi^2 = 6.86, p < 0.008$) provides support for the validity of the measure and reinforces that of Shortell and Zajac [1990] who also tested the validity of self-typing by comparing top management and key informants. Further support for the measure was obtained by assessing the relationship between strategy and perceived environmental uncertainty.¹⁰ As prior literature has established that managers of prospector-type firms are likely to perceive a significantly higher level of environmental uncertainty than defender-type firms [Miller, 1988; Govindarajan, 1988; Miles and Snow, 1978], a point-biserial correlation¹¹ was computed between strategy and perceived environmental uncertainty. The relationship was significant and in the predicted direction ($r=0.38, p=0.004$), thus providing some indirect support for the validity of the strategy construct.

MIS Scope. To assess the relation between strategy, MIS scope and performance, we used an adaptation of the instrument developed by Chenhall and Morris [1986] to measure MIS scope. Managers were asked to rate the importance of the focus, extent of quantification, and time horizon of information to their decision making on a seven-point Likert-type scale, ranging from "not important" to "extremely important". There were two questions for each information characteristic. Managers were asked to consider the importance of these information characteristics within the context of their day-to-day decision making.¹²

Following Chenhall and Morris [1986], the six items were summed and used to describe the scope of the information system. Higher scores reflected that more importance was attached to broad scope information. The Cronbach [1951] coefficient alpha statistic obtained for the six items was 0.74 indicating that the items are a reasonable measure of the construct [Carmines and Zeller, 1979].

Effectiveness. Effectiveness was measured along ten performance dimensions¹³ using a self-rating instrument developed by Govindarajan and Gupta [1985]. Self-ratings were

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9. A second study, undertaken at the same time but using marketing managers, provided the authors with the relevant data. There were 16 pairs of marketing and SBU managers in the subsample. Thirteen out of the 16 agreed on the SBU's strategic orientation.
 10. This study was part of a larger study which included the Gordon and Narayanan [1984] perceived environmental uncertainty instrument.
 11. A point-biserial correlation rather than a Pearson correlation was performed due to the dichotomous nature of the strategy variable [see Baggaley, 1964].
 12. As noted earlier, asking the importance of each information dimension assumes that if the dimension is important, top management will design systems to ensure that such information is available. Much of the literature examining the usefulness or importance of information systems has made similar assumptions [see Dermer, 1973; Larcker and Lessig, 1980; Larcker, 1981; Chenhall & Morris, 1986]. For example, Larcker and Lessig [1980] focus only on the dimensions associated with information usefulness. The two dimensions proposed are perceived importance and perceived usability. Chenhall and Morris [1986] also only examine dimensions similar to the ones examined in this study. They focus on the usefulness of these dimensions.
 13. The ten performance criteria used were investment, profit, cash flow from operations, cost control, development of new products, sales volume, market share, market development, personnel development and political-public affairs.

used in order to preserve anonymity which could not be guaranteed with superior evaluations. While it has been suggested that self-rated measures are subject to leniency bias, evidence to the contrary also exists [Nealey and Owen, 1970; Venkatraman and Ramanujam, 1987].

SBU managers were asked to rate subunit performance on a seven point Likert-type scale (ranging from "significantly below average" to "significantly above average"). This rating was not an absolute measure, but rather a measure based on a comparison between actual performance and expected performance. This was done to take into account the anticipated impact of the strategy itself and, thereby indirectly controls for the effects of strategic choice on performance [Govindarajan and Gupta, 1985]. Each performance dimension was weighted according its relative importance.

Using the data on the importance of each dimension as weights, a weighted average performance index was obtained for each SBU by multiplying the weight given for each performance criterion by the rating given for that criterion. Only those criteria that were considered by the respondent to be important were included in determining the average performance index. This approach follows that advocated by Steers [1977], Pennings [1975], and Quinn and Rohrbaugh [1983] and is "particularly appropriate in a context in which, by definition, different strategic missions imply quite different sets of priorities" [Gupta and Govindarajan, 1984].¹⁴ The Cronbach alpha statistic for the weighted performance criteria was 0.71.

3. Estimation Procedures and Results

The analysis relating to the hypothesis was based on the assumption that the following model was a true representation of the relationships between the specified variables:

$$Y = \beta_0 + \beta_1 X + \beta_2 Z + \beta_3 XZ + \varepsilon \quad (1)$$

where

Y is weighted average performance score.

X is broad scope information.

Z is a 0/1 binary variable for SBU strategy.
(0 for a defender strategy, 1 for a prospector strategy)

XZ is the interaction term between broad scope information and strategy.

The hypothesis was tested by examining the sign and significance of the coefficient for the interaction term (β_3). Note that the β_1 and β_2 in Equation (1) can not be interpreted since

14. While for substantive reasons we chose to use the weighted score in the analysis, there was a 0.92 ($p < .001$) correlation between the weighted score and the score obtained from summing the unweighted items.

TABLE : 3 Regression Results Relating to the Relationship between Strategy, (β_2) MIS Design (β_1) and their Interaction (β_3) on Performance.^(a)

Coefficient	Value	Standard error	t	Probability
β_0	1.50	0.88	1.71	.09
β_1	0.06	0.03	2.32	.02
β_2	-3.33	1.91	-1.74	.09
β_3	0.10	0.05	1.71	.09

$R^2 = 0.27$

$F = 5.44$

$p = .002$ $df=45$

(a) Significance levels are based on a two-tailed test.

their values can be altered by shifting the origin points of X and Z [see Allison, 1977; Southwood, 1978].

Results

The results of this regression are presented in Table 3. The coefficient on the interaction term, β_3 , is both positive and significant ($p=0.09$) using a two-tailed test. As the direction of the relationship was predicted it is not unreasonable to use a one-tailed test. Thus, since β_3 is both positive and significant ($t=1.71$, $p<0.05$, one-tailed test), our expectations that performance is a significantly more positive function of broad scope information for prospector firms than for defender firms is supported.¹⁵

4. Discussion, Limitations, and Conclusions

Strategy has come to be viewed as the critical variable in the design of organizational structures and administrative processes [Govindarajan, 1988; Dent, 1990]. The accounting literature to date has tended to focus on the use of accounting information in support of competitive priorities. This focus ignores the role of other non-financial information for managing in differing strategic environments. This paper extends existing research by shedding some light on the characteristics of the information required for firms pursuing different strategic postures. The results support prior literature which has argued that the effectiveness of an SBU is likely to be enhanced when its administrative system is designed

15. Further support (not presented here) for the hypothesis was obtained by splitting the sample into the two strategic groups and computing a Pearson correlation coefficient between performance and broad scope information for each group. Using the Fisher transformation test [Winkler and Hayes, 1975] these correlations were found to be significantly different at the five per cent level and in the predicted direction. In other words, the relationship between broad scope information and performance was significantly higher for prospector-type firms than for defender-type firms.

to support management's entrepreneurial and engineering decision making [Ackoff, 1967; King and Cleland, 1975; Daft and MacIntosh, 1978].

Our findings confirm the importance of broad scope information on the relation between SBU strategy and performance. In particular, broad scope information had a more positive effect on performance in prospector firms than the effect on performance in defender firms. Since management accountants are implicated in the design and implementation of MISs [NAA, 1982], these results provide some guidance for the development of effective systems, particularly in firms adopting a more innovative strategic posture. The evidence presented here suggests that prospector-type firms will require traditional accounting-based information systems to be supplemented with information which has a broader focus. The results indicate that information which has an external focus, is non-financial and future orientated is required. It would appear that these types of information are more appropriate for monitoring and controlling those factors which are critical to entrepreneurial and engineering decision making in prospector-type firms.

These results should be interpreted in light of several limitations of the study. One is that the sample was small and non-random. Although there is nothing to suggest that this has introduced systematic bias, the use of a large random sample would increase confidence in the statistical techniques employed and enhance the generalizability of results.

There are also potential limitations with the instruments used to measure the variables. First, the instrument used to measure the scope of the MIS requires further refinement. The instrument does not enable an assessment of the relative importance of broad scope information, *vis a vis* other information which may be narrow in focus. Since information is not costless, the provision of a particular type of information will only be cost-effective if it is used for decision making. What is required is a measure which forces respondents to make a trade-off between broad and narrow scope information. This could be achieved by asking respondents to weight the importance of each type of information. The operationalization of the construct also implicitly assumes that managers are supplied and, therefore, use information which is considered by them to be important. This assumption requires testing, and future research could measure the construct by asking three questions for each information dimension: Is the information available? To what extent is the information used for decision making? What information not currently available should be provided to improve the quality of decision making?

Second, the measurement of performance was based on self-ratings. Such ratings have been criticized on the grounds of objectivity. However, no multidimensional objective measures are apparent, nor is there any clear evidence that such objective measures would be either more reliable or valid [Brownell and Dunk, 1991]. Nevertheless, it may be possible, in some settings, to obtain superiors' ratings to compare with respondents' self-ratings as a means of assessing the validity of the construct.

Finally, the incomplete specification of the strategy variable may have influenced the results. Subjects were forced to choose between the two extreme strategies in the Miles and Snow [1978] typology - the prospector or the defender. There may have been SBUs

pursuing joint strategies, which might best have been typed as "Analyzers". Miles and Snow identified this strategy as viable and indicated that these firms combine the "administrative solutions" of both defenders and prospectors. The more recent literature has recognized the prevalence of firms pursuing joint strategies and has identified some of the implications for organizational structures and processes [Drucker, 1990]. It is likely that the information needs of management in analyzer-type firms will be some combination of those identified for defenders and prospectors [Miles and Snow, 1978], in which case the design parameters of the MIS would also reflect these information requirements. The findings of this study, however, do provide some guidance as to what might be important in designing MISs in firms moving away from a defender-type strategy toward an analyzer or prospector-type strategic posture. Further research extending the model developed here would provide additional insight into the implications for the design of MISs in such circumstances. In addition, future research might consider the use of in-depth case studies as a methodology for exploring these relationships. Such methods would not only add significantly to our understanding of the relationship between strategic priorities and the design MIS but also assist in the development of measures which are better able to capture the multi-dimensional nature of these constructs [Dent, 1990; Simons, 1990].

Notwithstanding these potential limitations, the results of the study provide evidence of the significant impact of the design of MISs on effective strategy implementation. Since accounting is an important element of these systems, the study provides some useful insights into the role of accounting as part of the "information mosaic" used by managers to support the achievement of their strategic priorities.

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