



Market competition, management accounting systems and business unit performance

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Increasing competition in the market, due to the application of modern manufacturing technology, deregulation of economies, and privatization or corporatization of government owned enterprises, makes decision makers use of management accounting systems more important (Bromwich, 1990). There have been calls for research into the use of management accounting systems under the changing circumstances (Kaplan, 1983; Shank and Govindarajan, 1989; Bromwich, 1990; Bromwich and Bhimani, 1994).

This paper reports the results of a study which offers an explanation for the relationship between intensity of market competition and business unit performance, by incorporating into the model managers use of the information provided by the management accounting system (MAS). To assess the relationship, data were collected from 61 business unit managers by way of personal interviews. The results indicate that the intensity of market competition is a determinant of the use of the information which, in turn, is a determinant of business unit performance. In other words, managers use of the information plays a mediating role in the relationship between the intensity of market competition and business unit (BU) performance. An interpretation of the results is that those organizations which use the information can effectively face competition in the market and thereby improve performance.

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Key words: intensity of competition; management accounting systems; business unit performance.

1. Introduction

Changes in manufacturing systems, such as the introduction of just-in-time, application of new technology like CAD/CAM, removal of trade barriers, deregulation of economies, and corporatization or privatization of government owned enterprises, make markets (business environments) more competitive (Tyndall, 1988; Spicer, 1992). Market competition creates turbulence, stress, risk and uncertainty for organizations. It demands that organizations mount appropriate responses to the threats and opportunities in the competitive environment, and that they design and use

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appropriate control systems for this purpose (Khandwalla, 1972, 1973; Burchell *et al.*, 1980; Haas, 1987; Bromwich and Bhimani, 1994).

Managers' use of the information provided by the MAS can help organizations to adopt and implement plans in response to their competitive environment. For purposes of this study, the MAS is viewed as a system which provides benchmarking and monitoring information in addition to the internal and historical information traditionally generated by management accounting systems.¹ Benchmarking involves the comparison of a firm with its competitors on relevant factors, including costs and cost structures, productivity, quality, price, customer service, and profitability. Monitoring involves the provision of feedback on the implementation of a firm's strategies in regard to the above factors (see Bromwich, 1990).

Bromwich (1990) suggests that a manager's use of the benchmarking and monitoring information provided by the MAS (henceforth referred to as MAS information) can aid in meeting an organization's challenges resulting from competition in its market and assist its value-added efforts relative to its competitors. Although researchers have called for studies into the use of management accounting systems in a competitive environment (Kaplan, 1983; Shank and Govindarajan, 1989; Bromwich, 1990; Bromwich and Bhimani, 1994), empirical research in the area has been lacking (see Foster and Gupta, 1994). This study attempts to provide empirical support for the benefits of using the MAS information in competitive market conditions.

Anecdotal evidence suggests that as market competition intensifies, many organizations perform better (see *The Australian Financial Review*, October 3, 1995). Yet, Khandwalla (1972) reports negative relationships between price, product and marketing (distribution) channel competition and the organizations performance. This represents an anomaly between empirical evidence on the issue and reality, and we argue that managers use of the MAS information offers an explanation for the anomaly. To empirically test the argument is the other objective of the study.

The rest of the paper is organized as follows. Section 2 discusses the relationship between the intensity of market competition and BU performance. Section 3 discusses the relationship between the intensity of market competition and managers use of the MAS information, and Section 4 discusses the relationship between the use of the MAS information and BU performance. Section 5 describes the research method and Section 6 presents the results. The discussion, limitations and conclusions are presented in Sections 7.

2. Market competition and business unit performance

In order to achieve and maintain competitive advantages, organizations need to adapt quickly to their market environment (DeGeus, 1988; Senge, 1990; Day, 1991). Consequently, if an organization faces increasing competition in its market yet fails to adopt and implement appropriate strategies to deal with such competition, its performance is likely to deteriorate. This is perhaps a reason why Khandwalla (1972) reports a negative correlation between the firms' profitability and the level of price

¹ This is not to deny that a MAS in an organization can also provide information relating to measurement, control, evaluation and reporting of costs, activities and performance. The current study concentrates on managerial use of the benchmarking and monitoring information provided by the system.

product, and marketing channel competition.² Khandwalla says:

My data suggest that different forms of competition apparently have varying effects on firms profitability. While all three competitions are negatively correlated with profitability, as we should expect, price competitions' correlation is nearly twice (in absolute terms) that of product competition, with marketing competition's being of intermediate size' (p. 284)

There are two problems with Khandwalla's (1972) results. First, Khandwalla only considered the relationships between price, product, and marketing channel competition and the firms profitability. However, an organization's competition may not only be triggered by price, product and marketing channel competition, but also by factors, such as the number of competitors in the market, technological change in the industry, changes in government regulations or policy, and package deals for customers offered by competitors. Moreover, these factors are likely to apply simultaneously and in combination to affect competition. Porter (1979), for example, suggests that the intensity or degree of competition in an industry depends on the collective strength of different factors in action within the industry. Anecdotal evidence supports the composite nature of competition argued by Porter.

A marketing academic who was a participant in the pilot test of the questionnaire for the study (discussed under measurement of variables) said:

It would be unrealistic to consider market competition to be affected by a particular aspect, such as introduction of new products independently of everything else. An organization would take multiple actions simultaneously to defend and increase its slice of the market. Look at the automobile market in the country. Through reducing tariff policy, the Government is allowing imported cars in the market which force the local companies to take actions like new products introduction, quality improvements, extensive warranty services, and package deals.

The marketing academic's view was echoed by a number of business unit managers who participated in the pilot study. The general manager of a large car dealer, for example, said:

There are so many competitors in the market offering different cars with package deals that we cannot survive just by doing one or two things; we have to take a broad outlook of the situation. We offer our customers a combination of goodies like new models, competitive price, free extras, cheaper loan, extended warranty, and 24-hour roadside services. The bottom line is that we got to act skilfully to beat the competitors.

According to the general manager of a food processing company, competition in the processed food market is tough, and is getting tougher. In explaining his view, the manager said:

So many new products in the market plus the imported items from overseas are the real worries. We have to fight tooth and nail in getting access to the best shelves in supermarkets, and offer our big customers deals like extended credit, supply products when ordered, and better than match our competitors' price. The government is a big headache too as it is making the market more and more open to our overseas competitors. To survive, we have to be innovative, most cost effective, quality and price competitive and skilful in marketing.

² In this study we define and measure the degree or intensity of market competition in terms of multiple factors or elements (discussion follows) including the types of competition that Khandwalla refers to.

Following Porter (1979) and the insight gained through the interviews with the participants in the pilot test, it is argued that all or a number of the factors collectively affect an organizations market competition. By considering only price, product, and marketing channel competition separately, Khandwalla (1972) provides at best a partial assessment of the construct. Day and Wensley (1988), for example, suggest that giving consideration to a single factor in assessing competition could lead to a partial and biased picture of reality.

There is anecdotal evidence of improved organizational profit under increasing competition. For example, a number of banks in Australia have been reporting increasing profit levels for the last few years, although the banking industry itself has recently become highly competitive due to deregulation. Increasing profits have also been reported by companies operating in other highly competitive industries, like aviation, automotive, electronic, paper, and mining (see *The Australian Financial Review*, October 3, 1995). The Australian Telecom Industry is a more recent example of an organization reporting increased profit levels in an increasingly competitive environment. Until 1993, the industry's sole representative, Telecom Australia (a government owned entity), was enjoying a monopoly market. In 1993, a private company called 'Optus' was allowed entry into the market. Within a period of approximately three years, both 'Optus' and Telecom Australia (now called 'Telstra') are reporting profits. Indeed, Telstra has reported record profits of 2.3 billion dollars for 1996 (see *The Weekend Australian*, 14–15 September 1996). The anecdotal evidence therefore suggests that there is a positive relationship between the intensity of market competition and organizational performance. However, due to the lack of previous research and empirical evidence in this area, particularly incorporating the possible role of managers' use of the MAS information (see Foster and Gupta, 1994), our prediction is tentative. Therefore the relationship is formally stated in its null form below:

'H₁: There is no relationship between the intensity of market competition and business unit performance'.

The second problem with Khandwalla's results is that he considered only the direct (bi-variate) relationship between the three types of competition (namely price, product, and marketing channel) and the organizations' profitability. This simplistic approach may be a reason why he did not find a significant relationship between the types of competition and the organizations' profitability. Interviews for this study with academics and BU managers revealed that in practice, organizations facing a high level of market competition adopt multiple strategies to combat the competition. Kohli and Jaworski (1990) argue that the greater the competition the more a business must be market orientated in the sense that it must discover customer desires and create superior customer value to satisfy them. They also argue that an organization must carefully assess the expected costs and benefits of pursuing its strategy of increased market orientation. This is because where the costs of implementing such strategies outweigh the associated benefits, the increased market orientated approach may hamper performance. The MAS, by providing benchmarking and monitoring information (discussed in the next section) can assist organizations in the identification, evaluation and implementation of appropriate strategies, and to improve perfor-

mance. In other words, managerial use of the MAS information is likely to mediate the relationship between market competition and an organization's performance.

3. Market competition and managers' use of the MAS information

As market competition intensifies, firms often increase product range, experience decreasing product life cycles, introduce new distribution channels affecting the customer supply chain, face increased market sensitivity, and target products and services to smaller and smaller customer segments (Rolfe, 1992). These changes create competitive threats and challenges. To deal with these threats and challenges, organizations adopt strategies including differentiation in products, services and prices (Lynn, 1994).

In following a product differentiation strategy, an organization attempts to overcome competitive threats by offering its customers a package of product attributes³ which provide better value than that offered by its competitors.⁴ The formulation and implementation of a product differentiation strategy requires an accurate approximation of product attribute-costs, and monitoring of these costs over time. A major emphasis of such an approach is that an organization needs to look into its external environment (market) and position itself with a competitive edge. For this purpose, the firm needs to also identify and monitor the strategy of each of its competitors (current and potential) so that it can determine the right combination of product attributes and cost structures which will give it a competitive advantage. Ward (1993) says:

'...by definition, any competitive advantage is a relative concept, which can only be assessed by comparison with the external environment. Thus the management accounting system must add an external focus (including competitors', suppliers' and customers' perceptions of value) in addition to the traditional inward emphasis of the accounting analysis, planning and control cycle' (p. 36).

The benchmarking and monitoring information provided by the MAS can play a significant role in this regard. The provision of benchmarking and monitoring information is one of the ways that the MAS can assist an organization in its pursuit of product differentiation and pricing strategies. Managers use of the information enables them to ascertain whether their organization, compared to its rivals, is offering a competitive package of product attributes to the customers at a competitive price, thereby assisting the organization in dealing with its market competition effectively. As Bromwich (1990) argues:

³A product constitutes a bundle of attributes, which include shape, size, weight, quantity, quality, reliability and warranty, finish and trim, and after sales services. Under the product attributes perspective, a product's share of the market depends on the package of attributes it offers to customers and its price (Lancaster, 1979; Bromwich, 1990). From this perspective, an increase in a product's market share can be achieved by offering a greater package of its attributes at a competitive price, i.e. by offering better value for money. This is not to deny that the magnitude of the increase in market share for a product may depend partly on the elasticity of its demand with respect to the changes in the package of the product attributes, i. e., customers' preferences.

⁴This strategy is applicable under conditions of 'horizontal product differentiation', which characterises the setting where a group of products differ only in terms of their detailed specification and the consumers decide to purchase from a given group of similar products (see Lancaster, 1979; Shaked and Sutton, 1986).

'...accountant might play a more important role in strategic decisions, especially in diversification decisions by costing attributes and monitoring the performance of these attributes over time. This perspective provides a clear role for strategic management accounting because... the costs of the attributes provided by the enterprise's products are often crucial to the sustainability of the enterprise's product strategies in that entry by competitors is unprofitable in the face of these strategies.

Following the above discussion we argue that as market competition intensifies, managers make a greater use of the information provided by the MAS:

H₂: As the intensity of market competition increases, managers use of the MAS information increases.

4. Managers use of the MAS information and business unit performance

For the purposes of this study, a business unit (BU) is defined as either an organization, or a segment of an organization, which is comprised of the usual business activities, such as marketing, production, finance, personnel, distribution, customer services, and R&D. The performance of a BU is defined as the extent to which the unit is successful in achieving its planned targets.

Use of benchmarking and monitoring information provided by the MAS helps managers to improve their organization's performance in two ways.

Firstly, the use of such information assists managers in positioning their organization in the competitive market. An organization's proper positioning in the competitive market is crucial to its ability to subsequently sustain the package of product attributes it offers to customers. Achieving a cost advantage over competitors is the basis for such positioning (Simmonds, 1981; Bromwich and Bhimani, 1994).

Porter (1985) argues that an organization, to survive and succeed in a competitive market, must scan and monitor its environment with respect to threats from potential competitors, threats from substitute products and services, the nature and intensity of competition within the industry, and the bargaining power of suppliers and customers. To successfully deal with each of the above threats (factors), an organization can use the MAS information to scan its environment and identify any change in the industry and in competitors' strategies. For example, the magnitude of the threat from substitute products and services depends to a large extent on the attributes and costs of such products and services. The MAS information can help to assess the attributes, price, and costs of the substitute products in the market. The bargaining power of suppliers depends on the availability of alternative customers in the market and the price offered by those customers. Similarly, customers' bargaining power (or their opportunity to choose) is dependent upon the attributes of alternative products and the price of those products offered by competing suppliers in the market. Benchmarking and monitoring information can facilitate the assessment of the competitors and customers bargaining power. Also, the MAS information can assist an organization in identifying opportunities for increasing customer value, thus retaining existing customers and increasing market share. Many firms state their key objectives in terms of total sales or market share as this is a good basis for long term profitability (Pogue, 1990).

Secondly, the use of the MAS information can also promote an organization's

performance by providing feedback on the implementation of plans and completion of jobs. Feedback is information sent to a recipient pertaining to the recipient's behaviour (Ashford and Cummings, 1983). Previous research suggests that feedback helps managers to improve their performance as it allows them to identify and correct errors, and reduce task uncertainty by providing relevant information or cues (Vroom, 1964; Bourne, 1966). Feedback facilitates organizational performance by directing managers efforts to those goals and behaviours which are valued by the organization (Ashford and Cummings, 1983).

Benchmarking and monitoring information can provide feedback on various aspects of performance, such as costs and cost structures, inventory levels, market share, sales volume, profitability, and productivity (Kaplan, 1983), thereby improving organizational performance. A report comparing an organizations current years performance on costs, market share, inventory levels or sales volume to that of previous years or with those of similar organizations in the industry, is an example of such feedback. The feedback role of accounting information in improving performance⁵ is supported by Mock (1973) and Kenis (1979). The hypothesis below formally presents the above discussion:

H₃: There is a positive relationship between managers use of the MAS information and their business unit performance.

The discussion on hypotheses two and three supports the argument that the use of the information plays a mediating role in the relationship between the intensity of market competition and BU performance. When the relationship between two variables exists at least partly through a third variable, then the third variable plays the mediating role in the relationship between the other two variables (Chenhall and Brownell, 1988; Mia, 1988, 1993). For this study, support for hypotheses two and three would suggest that managers use of the benchmarking and monitoring information provided by the MAS plays a mediating role in the relationship between the intensity of market competition and the BUs' performance (see Figure 1), thereby also offering an explanation for the results reported by Khandwalla (1972).

5. Research method

The sample

To assess the hypothesized relationships, we sought a sample of firms that addressed the key issues in this study. A sample of 90 large (annual sales revenue of Australian \$50,000,000 and more) manufacturing firms was invited to participate in the study. Size was used as an indicator of the likelihood that the firms would possess formal and computerised accounting systems having the potential of providing benchmarking and monitoring information on time. The firms were selected using the Dunn and Bradstreet 'Salescan' database and covered industries including food processing,

⁵In an experimental study of the effect of feedback provided by management accounting on decision makers' performance, Mock (1973) found that the experimental group receiving the feedback outperformed the control group not receiving the feedback. In a field study involving 169 managers, Kenis (1979) found that feedback on performance provided by budgets was significantly associated with managerial performance (see also Cook, 1968; Harrell, 1977; Chhokar and Wallin, 1984 and Hirst and Luckett, 1992).

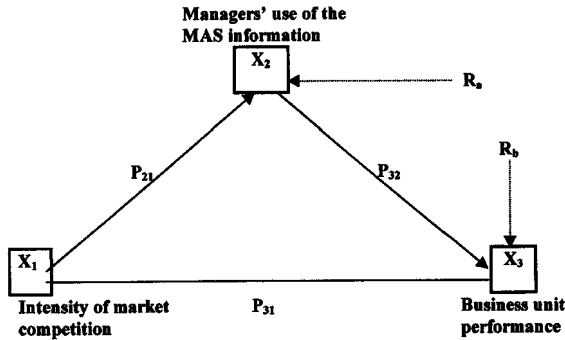


Figure 1. The model.

dairy products, beverage, building products, paper and pulp, chemicals, aluminium, automobile, and plastic. Initial contact was made with the chief executive officer (CEO) of each firm to gain the participation of the firm in the study and to nominate one BU manager (the executive in charge of the BU) for interview. Sixty-one firms agreed to participate in the study. All the firms had computerized accounting systems and information was available on line.

The CEOs were requested to select only those BU managers who had been in their current position for at least 1 year prior to this study. This was considered necessary to ensure that the managers had an understanding of the market in which their BU was operating. Moreover, to answer the questions on the use of the MAS providing benchmarking and monitoring information, the managers had to have experience in using such information in their current position. On average, the managers had been in their current position for 3.5 years and were in charge of five functional managers including marketing, production, personnel, finance, and distribution. Each BU manager was interviewed using a structured questionnaire. Interviews lasted from 40 to 90 min. The data for this study were collected over 9 months.

In addition to getting the questionnaire completed by the managers during the interviews, the researchers had discussions with the managers on their perceived importance of the factors with respect to their organization's competition in the market, their use of MAS information, and the assessment of their business units performance. At the end of the discussion the managers were asked to rank (in order of importance) as low, medium or high the factors affecting competition. Table 1 presents the results, which indicate by industry the number of managers participated in the study, and the level of the managers perceived importance of the selected factors. The results reveal that each of the selected factors was perceived important for market competition in each industry, although the level of the importance varied from one industry to another. For example, while 56% of the managers in the food processing industry considered new product introduction to be of high importance for the competition, 38% of the managers in the building products industry thought the factor had low importance. In the case of competition for access to marketing channel (i.e. marketing channel competition), the variation in the importance of the factor for competition as perceived by the managers appeared to be more prominent. It can be observed from the Table that while 100% of the managers in the food processing and 75% in the dairy product industries perceived access to marketing

channel to be of medium to high importance for competition, approximately 88% of the managers in the building products and 80% in the automobile industries thought that the factor was of medium to low importance. A reason for the high importance of access to marketing channels for competition in the food processing and the dairy products industry, as explained by the managers, is that the location (height) of shelves in supermarkets and other food stores is critical for attracting customers attention to the products. Therefore every company competes for access to the 'waist to shoulder high shelves'. However, this is not the case in the building products or the automobile industry. Organizations in these industries generally promote their products through media, showrooms and agents or dealers.

Following Porter (1979), and the insight gained through the interviews with the participants in the pilot test, it is argued that all or a number of the factors together and in combination are likely to affect an organizations market competition. By considering only price, product, and marketing channel competition separately, Khandwalla (1972) provides at best a partial assessment of the construct. Day and Wensley (1988), for example, suggest that giving considerations to a single factor in assessing competition could lead to a partial and biased picture of reality. Therefore we consider that multiple factors together and in combination act as determinants of market competition. This argument is consistent with the anecdotes gathered during the interviews, which revealed that managers take not single but multiple actions to deal with market competition.

Interviews, rather than mailed questionnaires were used for two reasons. First, managers can use accounting information only if the information is available to them. Since this study was concerned with the use of information, availability of the information to the managers was a minimum requirement which the data for the study had to satisfy. Thus, assessing the availability of the information to managers was essential. To ensure as far as possible that managers could differentiate between availability and accessibility of the MAS information for management purposes, it was decided to interview the managers. To assess the availability of the information, the managers were requested at the end of the interview to call up a set of five information items on the screen of either their own personal computer or their subordinates. The items were on the BU's (a) per unit price of the highest selling product and its comparison with the price of a similar product in the market (b) actual cost compared with the target cost of the most used (in value) material (c) market share and that of a competitor (d) trend in production capacity utilization, and (e) forecast of future capital investment required. If the solicited information on any four of the five items above was displayed on screen, availability of the information was considered satisfactory. This procedure confirmed that all 61 BU managers had satisfactory availability of the appropriate information. Items (a) to (e) above were selected for assessing the availability of the MAS information as the items were considered useful for strategic decision making. As a result of the researchers personal assurance of strict confidentiality of any information gathered during the interviews, all 61 BU managers agreed to comply with the above request to call up the information. In each case, a subordinate to the BU manager displayed the information on a computer screen fairly quickly (within 30 to 40 min).

Second, personal interviews provide an opportunity for obtaining anecdotal information to support/explain the empirical results. Notes made during the interviews for the current study have been used to include managers' comments in the paper. It

is believed that including such information in the paper is useful for making the paper more informative (Yashikawa *et al.*, 1989).

Nature of benchmarking and monitoring information of the MAS

While the management accounting facilities cannot be fully described within the confines of this paper, some clarification as to their nature is possible by reference to few selected comments.

‘The BU (general) manager in an aluminium company demonstrated the potential of his management accounting facilities on the computer screen in his office. He showed that he could retrieve information of world market price for different aluminium products, his companys monthly production volume, spoilage rates, finished goods inventory, production costs and past and projected sales volume and those of the industry on average. He also could access comparative data on the performance criteria including production volume, spoilage rates, inventory level, and sales volume’.

‘An assistant to the general manager in a chemical manufacturing company was observed using the on-line management accounting facilities in putting together information for a budgetary meeting. The assistant prepared reports on actual sales, costs, and wastage rates for the month just ended, and comparing these figures with the monthly targets. The general manager explained how the monthly figures were used to prepare half-yearly reports, which were then compared with the industry average, and competitors figures’.

‘On instruction of the general manager of a food processing company, the management accountant demonstrated on her machine how they collected and stored data on industry as well as their companys performance indicators including production volume, defects, material waste, costs, sales and market share of products’.

Applications of benchmarking and monitoring information of the MAS

During the interviews, the BU managers indicated (in some cases by examples) that they use the MAS information in making decisions including product costing, product pricing, forecasting market demand, planning marketing and material purchase, productivity, and upgrading or replacing equipment and facilities. We found that the management accounting systems in all of the firms provided information for capital budgeting, including discounted cash flow techniques and cost-volume-profit analysis. With respect to marketing strategy, we found organizations to be concerned with product characteristics, which satisfy customer expectation for product attributes, such as finishing, quality, reliability, durability, delivery, and after-sale services. The benchmarking and monitoring information generated by the management accounting facilities included comparative analysis of various factors related to product attributes, demand factors, such as customer characteristics (e.g. age, gender, income), government regulations, industry and in-house surveys of customer preferences. A factor of importance for the paper and pulp companies was the impact of government policy on the supply of inputs. Regulations on the import of cheeses were of concern to the dairy product firms.

Several anecdotes are illustrative of the role of the management accounting facilities for business unit managers.

'The general manager in a beverage manufacturing company said, we decided to upgrade our waste treatment facility last year. Given the project involved a large investment, the company had to consider a range of factors including environmental movements, present and future government actions on environmental protection, and of course, the expected short and long-term benefits from the investment. Our accounting section was asked to consider all the above factors and come up with a recommendation for management. The section did an excellent job as the consultants, appointed by the company sometimes later, came up with more or less the same recommendation'.

'The general manager in another manufacturing company said, as you know, the greenhouse issue has direct bearing on the supply of our raw materials. Therefore we are in constant touch with developments including the green movement, management of environment, and treatment and disposal of waste. Our management accounting section is responsible to manage information on these issues and to come up with proposed action plans supported by cost-benefit analysis. The bottom line is, we must be seen as an environmentally clean and friendly organization. We must also always be in close contact with the local and world market for our products, the competition is fierce. We continuously work on cost, price, quality, and variety, and on innovative marketing of our products. Our management accounting system, always on line, is actively involved in the whole exercise. Our R&D, marketing and management accounting people work hand in hand on product innovation'.

Measurement of variables

Intensity of market competition. Competition is essentially strife in the market place (Khandwalla, 1972, 1973). Given that market competition for organizations operating in an industry is likely to be determined collectively by more than one factor, as discussed earlier in the paper, this study assessed the intensity of market competition incorporating all factors relevant to a BU. It was done by giving the various BU managers the freedom to assess their market competition taking into account those factors which they believed relevant to their BU's market. An alternative to this procedure would have been to obtain managers assessment of competition on each of the factors prescribed by the researchers. For the current study, the alternative procedure was not used because of the possibility that a BU manager, for the sake of fully completing the measure, would assess the intensity of his/her BU's market competition on factors which may be irrelevant to the BU and thereby distort the assessment.

A literature review failed to identify a measure which required managers to assess the intensity of competition by taking into account the influence of all relevant factors. Therefore the instrument used in this study (see Appendix A) was developed by reference to previous research (Khandwalla, 1972) and the insight gained from the pilot test. The pilot test involved five academics in marketing and five BU managers (not included in the main sample). The managers were: one from food processing, one from beverage, one from building products, one from automobile, and one from plastic product industry. Each participant in the pilot study was requested, during a personal interview, to complete the questionnaire containing the draft measures (revised after each interview) on a 7-point scale. They were requested to comment on and suggest improvements on the measures. The discussions on the measures with the marketing academics and the BU managers lasted from 45 to 70 min.

Table 2
Descriptive statistics

Variables	Mean	SD	Actual range		Theoretical range	
			Min.	Max.	Min.	Max.
X ₁ Intensity of market competition.	5.80	1.25	3	7	1	7
X ₂ Use of the MAS information	12.61	5.34	4	21	3	21
X ₃ Business unit performance	4.20	1.78	2	7	1	7

The questionnaire explained the intensity of market competition to the BU managers and requested them to indicate the intensity of the competition in their organizations market on a 7-point Likert scale anchored at 1 representing very low competition and 7 representing very high competition (see Appendix A). Table 2 presents the descriptive statistics for the variable.

Managers use of the benchmarking and monitoring information. The current study is concerned with the managers use of benchmarking and monitoring information provided by the MAS. The BU managers use of the information was assessed with a three-item instrument (see Appendix B). Item one in the instrument represents benchmarking information. It includes examples of information which BU managers are likely to use in comparing their BUs with similar organizations in the industry. Items two and three represent information which the managers are likely to use in monitoring performance of their BUs over time. As discussed earlier in the paper under ‘intensity of market competition and managers’ use of the information, both external and internal comparisons of a BU’s performance on selected criteria are critical under competitive conditions. The type of information represented in item one allows BU managers to compare their BU’s performance externally with similar BUs in the industry, thus facilitating benchmarking. The types of information represented in items two and three allow BU managers to compare the performance internally with that of previous periods, thus facilitating monitoring.

Again, a literature review failed to identify an appropriate instrument for assessing managers use of the information provided by the MAS. Therefore following relevant previous research, such as Simons (1990), the instrument was developed. The pilot study mentioned above was used to check and improve the validity of the instrument and also the one utilized for assessing BU performance. Table 2 presents the descriptive statistics for the variable.

For each item in the instrument the BU managers were requested to indicate, on a 7-point Likert scale anchored at both ends, the extent to which they used the information for decision making. On the scale, 1 represented very low use and 7 represented very high use. A check of internal reliability yielded a Cronbach (1951) alpha coefficient of 0.85 for this measure. Moreover, a factor analysis of the scores yielded one eigenvalue greater than unity, suggesting that the measure is unidimensional. The factor accounted for 78% of the variance (see Appendix B). Following the

factor analysis results, a managers scores for the three items were added to compute the managers overall score for the use of the information.

Business unit performance. A business units performance was defined as the extent to which the unit had been successful in achieving its planned target(s), such as achievement of planned productivity, costs, quality, delivery schedule, sales volume, market share, and level of profit. BU managers were asked to indicate, on a 7-point Likert scale, their BUs last years actual performance compared to the planned performance. On the scale, 1 represented poor performance and 7 represented excellent performance (see Appendix C). The managers were reminded that in evaluating their BUs performance, they consider only those performance targets which were relevant to their BU. An advantage of this broad approach over the ‘return on investment’ (ROI) or input output ratio method of performance measure is that it incorporates all aspects (quantitative and qualitative, financial and non-financial) of a BUs performance in the assessment. Under the conventional performance evaluation methods like ROI and input/output ratio, only the quantitative aspects can be considered. Table 2 presents the descriptive statistics for the variable.

6. Results

The results presented in Table 3 provide preliminary support for rejection of hypothesis one as the correlation between the intensity of market competition (X_1) and BU performance (X_3) is positive and significant. This result is consistent with the anecdotal evidence which suggests that organizations can improve performance under increasing competition. Since the correlations between (X_1) and BU performance (X_3), and between (X_2) and (X_3) are positive and significant, the results provide preliminary support for hypotheses two and three also.

A path analytic technique was used to test the model of the study as shown in Figure 1. In the model, the relationships between variables were specified by a series of path coefficients (P_{ij}) which are equivalent to standardized beta coefficients (β). The R_n ($n = a$, and b) in the model denotes the unexplained variance associated with X_2 , and X_3 , respectively. The path analysis technique allows computation (therefore an evaluation) of the magnitude of the relationship between the intensity of market competition and BU performance which exists partly through the use of the MAS

Table 3
Correlation matrix

	X_1	X_2	X_3
X_1 Intensity of market competition.	1.00	0.31*	0.23†
X_2 Use of the MAS information		1.00	0.38**
X_3 Business unit performance			1.00

Note: * $p < 0.05$, † $p < 0.01$

information in the current study (see Pedhajur, 1982). A computation of the magnitude of the above relationship existing through the use of the MAS information allows an evaluation of the mediating role played by the use of the information. The model is presented below in equation form:

$$X_2 = P_{21} X_1 + P_{2a} R_a \tag{1}$$

$$X_3 = P_{31} X_1 + P_{32} X_2 + P_{3b} R_b \tag{2}$$

where:

- X_1 = intensity of market competition,
- X_2 = managers' use of the MAS information, and
- X_3 = business unit performance.

The path analysis required the running of two regression equations—one for managers use of the MAS information, and the other for BU performance. Fig. 2 presents the path coefficients obtained for all the relationships hypothesized.

The first equation treated the use of the MAS information (X_2) as the dependent variable and the intensity of market competition (X_1) as the independent variable. The results presented in Table 4 indicate a positive and significant relationship ($\beta_1 = 0.31, p < 0.015$) between the market competition and the use of the MAS information, thereby supporting hypothesis H_2 .

The second regression equation treated BU performance (X_3) as the dependent variable and the use of the MAS information (X_2), and the intensity of market competition (X_1) as the independent variables. The results presented in Table 5 reveal a positive and significant relationship ($\beta_2 = 0.34, p < 0.008$) between the use of the MAS information and BU performance, providing support for hypothesis H_3 . However, although the relationship between the intensity of market competition and BU performance was positive, it was not significant. Therefore H_1 could not be rejected. A discussion on this result is offered in the next section.

The results presented in Tables 4 and 5 were used to compute the magnitude of the direct and indirect relationships in the model (see Figure 2). These results are presented in Table 6. Theoretically, the sum of the magnitudes of direct, indirect and spurious⁶ (if any) relationships between two variables (say, X_1 and X_3 , in Table 5) must be equal to the correlation between the same variables. The results presented in

FIGURE 2				
Decomposition of the direct and indirect relationships in the model				
Combination of variables	Observed correlations	Direct impact	Indirect impact	Spurious impact
X_2 with X_1	$r_{12} =$	P_{21}		
X_3 with X_1	$r_{13} =$	$P_{31} +$	$P_{32} r_{12}$	
X_3 with X_2	$r_{23} =$	$P_{32} +$		$P_{31} r_{12}$

Figure 2. Decomposition of the direct and indirect relationships in the model.

Table 4

Regression of managers use of the MAS information (X_2) against the intensity of market competition (X_1)

	Variables	Regression coefficient	T value	Significance $p <$
X_1	Intensity of market competition (β_1)	0.31	2.5	0.015

$R^2 = 9.50\%$; Adj $R^2 = 8.00\%$; $F(1,59) = 6.18$; $p < 0.015$, $n = 61$

Table 5

Regression of BU performance (X_3) against the use of the MAS information (X_2) and the intensity of market competition (X_1)

	Variables	Regression coefficient	T value	Significance $p <$
X_2	Use of the MAS information (β_2)	0.34	2.73	0.008
X_1	Intensity of market competition (β_1)	0.12	1.00	ns

$R^2 = 16.00\%$; Adj $R^2 = 13.00\%$; $F_{(2,58)} = 5.54$; $p < 0.01$, $n = 61$

Table 6 indicate the presence of a positive relationship between the intensity of market competition and the use of the MAS information (X_2 with X_1); and between the use of the information and BU performance (X_3 with X_2). Given the statistical significance and the positive direction of these relationships, the results indicate the presence of an indirect relationship between the intensity of market competition and BU performance through the use of the information. In other words, the mediating role of the use of the MAS information that is discussed earlier in the paper is supported.

7. Discussion, limitations and conclusions

The objective of the study was to examine empirically the mediating role of managers use of the MAS information in the relationship between the intensity of market competition and BU performance. It was pursued by testing the relationships between (1) the intensity of market competition and managers use of the information; and (2) the use of the MAS information and BU performance. The results reveal that increasing intensity of market competition is associated with increasing managerial use of the MAS information. The results also reveal that increasing managerial use of the information is associated with improved BU performance. An explanation for the results is that as an organizations' competition in the market

⁶See Asher (1976) for a discussion of spurious relationship. It is also noted that path analysis provides empirical evidence on relations found in the data. These relations do not represent proof of the direction or significance of the direct and indirect impacts (Chenhall and Morris, 1986, Mia and Goyal, 1991).

Table 6
Decomposition of correlations

Combination of variables	Correlation	Direct relations	Indirect relations	Spurious relations
X_2 with X_1	$0.31 =$	0.31		
X_3 with X_1	$0.23 =$	$0.12 +$	$0.31 * 0.34$	
X_3 with X_2	$0.38 =$	$0.34 +$		$0.12 * 0.31$

intensifies, the organization makes greater use of its MAS information in formulating, implementing and monitoring its strategies to deal with the competition (Bromwich, 1990; Bromwich and Bhimani, 1994). An outcome of the process is improved organizational performance. Thus, the study provides empirical support for the theoretical argument put forward by Bromwich (1990) that:

‘...there is a need to release management accounting from the factory floor to allow it also to aid directly in meeting these market challenges. Such a reorientation would permit management accounting additionally to focus on the firms value added relative to its competitors. It could also aid in monitoring the firms performance in the market place using a whole range of strategic variables over a decision horizon sufficiently long for strategic plans to come to fruition’ (p. 28).

Given that market competition is a factor in environmental uncertainty, the study supports Gordon and Narayanan (1984), Chenhall and Morris (1986), and Mia (1993). These studies report that the usefulness of management accounting systems increases with the increased environmental uncertainty.

The study extends Khandwalla (1972) by offering an explanation for the relationship between the intensity of market competition and organizational performance. Recall, Khandwalla (1972) failed to report a significant direct relationship between competition and the firms performance. The results presented in Table 5 ($\beta_1 = 0.12$) is not statistically significant, hence, consistent with Khandwalla’s. However, since both hypotheses two and three are supported, the fundamental argument put forward in this study is supported. The argument is that managerial use of the MAS information plays a mediating role in the relationship between the intensity of market competition and BU performance. The positive and significant correlation ($r_{13} = 0.23$, $p < 0.05$) between the intensity of market competition and the BU performance (Table 3) is explained by the direct relationship ($\beta_1 = 0.12$) between intensity of market competition and BU performance and the indirect relationship which exists through the use of the benchmarking and monitoring information provided by MAS ($\beta_1 * \beta_2 = 0.31 * 0.34 = 0.11$, Tables 4 and 5). It is noted that about half of the total relationship (r_{13}) is explained by the indirect relationship (see Table 6). This indicates the importance of the mediating role played by the use of the MAS information in an organization’s attempt to manage its market competition and improve performance. As Bartol (1983) argues that a β coefficient of the value of 0.06 or greater is important in explaining a relationship in a study using the path analysis technique, we consider that the magnitudes (coefficients) of the indirect

relationship (0.11) and of the direct relationship (0.12) above are large enough to be meaningful.

The study also extends previous research on the role of management accounting systems by incorporating organizational performance into the model. The importance of incorporating organizational performance into the model in a study of the role of management accounting systems has been stressed in the literature (Mia and Chenhall, 1994; Chenhall and Morris, 1986).

There are at least three limitations to the study which are worth noting. First, the instrument for assessing the intensity of market competition is novel. The instrument consists of a broad measure incorporating six different factors of competition. Perhaps an alternative measure assessing separately each of the different factors of competition may unfold the relationships in the model more clearly. However, the BU managers who participated in the study appeared to have no problem with the instrument. Moreover, the anecdotal evidence suggests that either all or a number of factors concurrently and in combination rather than separately affect an organization's market competition. Similar to the instrument assessing the intensity of market competition, the instrument assessing managerial use of the MAS information is novel. Further study is necessary to test the validity of the instruments.

Second, the study concentrates on the use of the MAS under conditions of market competition only. There are other circumstances which may require managerial use of the MAS. Examples of these circumstances are strategic cost analysis for long-term planning for new product introductions, for pricing decisions, application and evaluation of new manufacturing technology like CAD/CAM, just-in-time manufacturing systems, and use of the MAS information in performance evaluations of managers who work under CAD/CAM or JIT situations. Moreover, this study does not differentiate between growing markets and saturated markets in regards to competition. Organizations may adopt different strategies, and therefore, may use different types of MAS information to deal with competition in different markets (growing or saturated). Future studies will benefit from looking into these issues.

Third, the study covers only privately owned organizations within manufacturing industries. It is possible that under competitive conditions, applications of the MAS by private organizations within service industries or by public sector organizations are different from those in the privately owned manufacturing organizations (Mia and Goyal, 1991). For example, given that the cost structures in service industries are different from those in manufacturing industries, application of the MAS for decision making in service organizations facing market competition may be different from that in manufacturing organizations. Therefore any generalization of the results to organizations within service industries or public sector requires caution.

Conditional upon the limitations described above, the study offers empirical support for Bromwich's (1990) theoretical argument that organizations operating in a competitive environment can benefit from using MAS information for decision making. Moreover, the study extends Khandwalla (1972) by explaining the mediating role of the use of MAS information in the relationship between the intensity of market competition and organizational performance.

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Appendix A

Intensity of market competition

The intensity of competition faced by an organization in its market depends on a number of factors. Examples of these factors are; (1) number of major competitors; (2) frequency of technological change in the industry; (3) frequency of new product introduction; (4) extent of price manipulations; (5) package deals for customers; (6) access to marketing channels; and (7) changes in government regulation or policy, such as tariff reductions.

Taking into account all the factors which are relevant to your organization/division, please indicate the intensity of competition faced by your organization or division.

Appendix B

Managers use of the MAS information

Please indicate the extent to which you use the following information for decision making.

	Items	Factor loadings
1	I use information comparing my organization/division with similar organizations in the industry. Examples of criteria for the comparison are: achievement of targets related to scrap, production volume, production costs, delivery times, delivery costs, sales volume, sales revenue, market share, customer services, customer services costs, and profit (if applicable).	0.78
2	I use information on fluctuations (trend) in performance of my organization/division during previous years.	0.95
3	I use information on explanation (in writing) for the fluctuations in my organization/division's performance during previous years	0.90
Eigenvalue, 2.33; Variance Explained, 78%; Cronbach Alpha, 0.85		

Appendix C

Business unit performance

Performance of your organization/division may be viewed as the extent to which the organization/division has been successful in attaining its planned target(s). Examples of performance criteria are: attainment of targets related to productivity, costs, quality, delivery, service, sales volume, market share, and profit (if applicable).

Taking into consideration all the performance criteria relevant to your organization/division, please indicate the overall performance of your organization/division for last year.