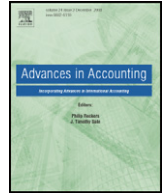




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The relations among competition, delegation, management accounting systems change and performance: A path model

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ABSTRACT

This paper is concerned with an empirical investigation into the relations among competition, delegation, management accounting and control systems (MACS) change and organizational performance. It follows a standard contingency type path modeling to propose that intensity of competition causes firms to change their MACS and that this change enhances their performance. Delegation of authority is implicated in the model as competition encourages delegation, and this in turn causes the change in MACS, as well as enhancing performance directly. The results from a sample of Australian strategic business units indicate that (1) increased competition results in improved organizational performance indirectly through a greater number of changes in MACS, and (2) increased delegation of authority to lower level management leads to higher organizational performance. These results contribute to the management accounting change literature by providing empirical evidence that the relationship between competition and organizational performance is mediated by a decentralized organizational form and changes in MACS of the firm.

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1. Introduction

In recent years, scholars have suggested that today's organizations need modern management accounting and control systems (MACS)¹ to adapt to the rapidly changing organizational and social environment (Abernethy & Bouwens, 2005; Abernethy & Lillis, 1995, 2001; Abernethy & Stoelwinder, 1991; Baines & Langfield-Smith, 2003; Cavalluzzo & Ittner, 2004; Emsley, Nevicky, & Harrison, 2006; Foster & Swensocx, 1997; Libby & Waterhouse, 1996; Shields, 1995; Shields & McEwen, 1996; Williams & Seaman, 2001). There is the view that modern MACS (such as activity-based costing, activity-based management, target costing, product life cycle costing, and balanced scorecard-type performance measures) produce relevant information that provides senior executives and other personnel with continuous signals as to what is most important in their daily organizational decision-making and operational activities (Anderson, 1995; Anderson & Young, 1999; Chenhall, 2003; Drake & Haka, 2008; Hoque & James, 2000; Kaplan & Norton, 1996; Moers, 2006).

While prior management accounting studies have examined the relationships among environments, organizational characteristics, control systems, and performance (e.g. Abernethy & Bouwens,

2005; Baines & Langfield-Smith, 2003; Brownell & McInnes, 1986; Cavalluzzo & Ittner, 2004; Chenhall & Brownell, 1988; Emsley et al., 2006; Kren, 1992; Nouri & Parker, 1998), there has been little systematic empirical examination of whether organizational performance² is influenced by competition, delegation of decision making authority to lower level managers and changes in MACS.³ This study fills this knowledge gap in current management accounting research. It makes several contributions to our understanding of the antecedents or environmental conditions under which MACS might be used to impact performance. Firstly, it extends prior MACS change studies of Libby and Waterhouse (1996) and Williams and Seaman (2001) by providing additional evidence on linking antecedents of changes in MACS with organizational performance, which has not been explored by these two studies. Secondly, this study provides additional insights into our understanding of the mediating effects of delegation of authority and changes in MACS, individually and jointly, on the relationship between competition and performance. This issue is not well developed in the current management accounting research

² Organizational performance or firm performance throughout the paper refers to performance of a strategic business unit, which is a division of a corporation or an independent firm.

³ This paper acknowledges that numerous factors affect performance and performance affects many other factors. But, given the need to limit the scope of this study, it focuses on this subset of variables because links between contextual variables like competition in the external environment, management control systems design and performance form the essence of a contingency theory of management accounting, and striving to understand empirically such a phenomenon has a long tradition in the management accounting literature.

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¹ Management accounting and control systems (MACS) refer to a variety of accounting and control systems that are implemented in a firm to produce information for managerial planning and decision making (Daft & Backer, 1978; Damanpour, 1987; Libby & Waterhouse, 1996).

literature. Finally, the study's use of a path approach in theorizing the research problems facilitates the generation of valuable insights into the subject phenomenon.

The next section presents a literature review and develops the hypotheses. Section 3 describes the research method. Next, Section 4 presents the research results. The final section offers conclusions and outlines the limitations of the study.

2. Literature and hypotheses

This study uses the mediating or intervening notion of contingency theory (Chenhall & Chapman, 2006; Drazin & Van de Ven, 1985; Gerdin & Greeve, 2004) to examine whether delegation of authority and changes in MACS mediate, or intervene the relationship between competition and performance. Fig. 1 presents the theoretical model of the study. As shown in Fig. 1, both the delegation of authority and changes in MACS are the intervening variables, competition is the independent variable and performance is the dependent variable. The expected relationships among the variables are presented in turn.

2.1. Competition and delegation of authority

Chandler (1962) suggests that delegation of authority is necessary for firms that wish to respond to changes in the marketplace. Another landmark study by Lawrence and Lorsch (1967) puts forward the idea that firms whose internal organizational processes are consistent with their external environmental demands tend to be organizationally more effective. Several studies in the organizational and accounting fields have followed this tradition and have found empirical support (for example, see Aiken & Hage, 1971; Bruns & Waterhouse, 1975; Chenhall & Morris, 1986; Damanpour, 1991; Khandwalla, 1972, 1973; Kimberly & Evanisko, 1981; Libby & Waterhouse, 1996; Merchant, 1984; Merchant & Manzoni, 1989; Moch & Morse, 1977; Moers, 2006; Thompson, 1967). These studies suggest that the problem of managing external environments such as competition involves a balance between allowing each organization the independence to react to its environmental demands through organizational changes and needing to control and integrate the work of all divisions that make up the firm (Libby & Waterhouse, 1996). There is also the view that broadening the scope of lower-level managers' activities by delegating more decision-making authority provides business units with significant degrees of freedom to make trade-offs among these activities (Jensen, 2001; Prendergast, 2002; see also Moers, 2006, p. 900).

In this study, it is deemed that competition would affect delegation choice. Market competition is one of the key elements of a firm's external environment (Krishnan, 2005; Krishnan, Luft, & Shields, 2002; Libby & Waterhouse, 1996; Mia & Chenhall, 1994). The study uses Khandwalla's (1972) five sources of competition, namely (a) competition for raw materials, parts and equipment, (b) competition for technical personnel such as engineers, accountants, programmers, (c) competition in promotion, advertising, selling and distribution, (d) competition in quality and variety of products, and (e) price competition in their main line of business. Intensity of these competition factors has an immense impact on the internal organization of the firm (Khandwalla, 1972, 1977; Lawrence & Lorsch, 1967). Gailbraith's (1977) core "exogenous" variable is environmental uncertainty, much of which is caused by competition. Gailbraith (1977) recognized that companies have multiple responses to uncertainty. Delegation of authority is one possible response.

The above discussion suggests that as market competition intensifies often in today's rapidly changing business environment, the level of delegation of authority should also change as an adaptive strategy. Thus, this study predicts that intensity of competition may lead senior management of the firm to delegate more authority to lower-level managers or divisions to deal with their day-to-day affairs. Stated formally in the form of the following hypothesis:

H1. Intensity of competition will be positively related to delegation of authority.

2.2. Competition and changes in MACS

Prior contingency studies (e.g. Hemmer, 1996; Hoque & Hopper, 1997; Khandwalla, 1972, 1974; Krishnan, 2005; Krishnan et al., 2002; Libby & Waterhouse, 1996; Merchant, 1984) suggest that today's firms need MACS that can provide timely, accurate and relevant information on a wide range of issues, including product costs, productivity, quality, customer service, customer satisfaction, and profitability. Kaplan (1995, p. 6) suggests that "The new competitive environment demands much more accurate cost and performance information on the firm's activities, processes, products, services, and customers." He (Kaplan, 1995, p. 6) further argues that in competitive environments, managers must also have timely and accurate information to guide their learning and improvement activities – information that will help make processes more efficient and more customer-focused.

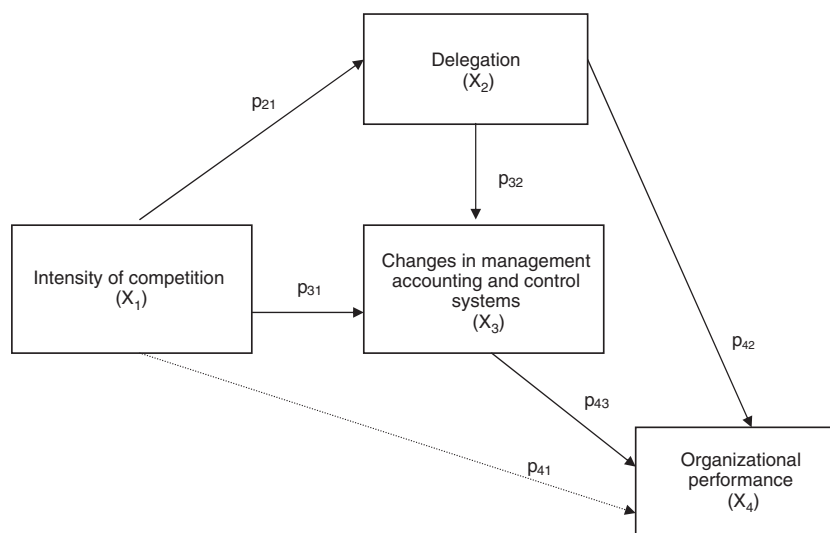


Fig. 1. Theoretical model of the study (path diagram for organizational performance).

Traditional MACS provide mainly financial, quantitative and historical information, which is often inadequate for performance evaluation, planning and decision-making in today's environment of global competition. Consequently, there have been calls for developments in MACS that assist firms to adapt to the changed business environment (Bromwich, 1990; Bruggeman & Slagmulder, 1995; Cavalluzzo, Ittner, & Larcker, 1998; Hemmer, 1996; Kaplan, 1995; Miller & O'Leary, 1990; Young & Selto, 1991). Bromwich (1990) asserts that MACS should be changed or developed to focus on a firm's value-adding activities relative to its competitors, and Hemmer (1996) argues that a significant catalyst for initiating such change is an increase in foreign competition. The work by Libby and Waterhouse (1996, p. 140) reinforces the view that increasing market competition provides an incentive for changes in MACS. Krishnan (2005) has found a positive association between competition for price and demand for accounting information. Others (e.g. Cavalluzzo et al., 1998 and Hill, 2000) have found a positive association between increased competition and the use of more refined management accounting systems (cited in Krishnan, 2005, p. 269). There is also the view that in rapidly changing market conditions, the firm's MACS should be adaptive and therefore, change in MACS would be necessary (Chenhall, 2003; Chenhall & Chapman, 2006; Hoque, Mia, & Alam, 2001; Mia & Chenhall, 1994).

In summary, based on the above discussion, it can be argued that due to increased level of competition most existing MACS may not be appropriate, and firms should therefore adopt more MACS practices or change them. It is thus expected that increased competition is likely to lead a firm to make an increased number of changes to its MACS so that the necessary information can be generated to address issues arising from factors related to competition. Restated as a hypothesis:

H2. Intensity of competition will be positively associated with changes in management accounting and control systems.

2.3. Delegation and changes in MACS

The preceding discussion on delegation implies that delegation of authority creates the opportunity for the firm's lower-level managers to change their MACS, as needed (Abernethy & Bouwens, 2005). There is also the view that (Thompson, 1967) due to the spread of decision-making authority in decentralized business units delegation promotes a predisposition towards innovation. This implies that with increased delegation of authority, the firm's MACS would need to change in order for management and employees to adopt the new skills and innovations involved with an increased level of delegation. Kaplan and Atkinson (1998) argue that delegated managers need reliable information about their products and services so that appropriate decisions can be made to meet local needs. As a result, managers need well-designed MACS where the relevant information can be processed and used. This discussion leads to a prediction that increased delegation of authority is likely to be associated with a firm's attempt to change its existing MACS. This idea is formally expressed in the following hypothesis:

H3. Delegation of authority will be positively related to changes in management accounting and control systems.

2.4. Delegation, changes in MACS and performance

Prior research suggests that greater delegation provides incentives for lower-level managers to make better economic decisions, which, in turn, may result in enhanced firm performance (see e.g. Prendergast, 2002). With delegation of authority, business units then may focus on timely response to their local customers and other stakeholders as they do not have to wait for approval from higher authority for business decisions. Kaplan and Atkinson (1998, p. 293) suggest that decentralized managers become "more motivated and interested in

their assignments when they are permitted more discretion in performing their tasks". They further note: "allowing for decision-making at a local level encourages managers to be more aggressive in their acquisition of local information and more entrepreneurial and strategic in their actions" (Kaplan & Atkinson, 1998, p. 293). These arguments imply that the better the economic and strategic decisions by lower- or local-level managers, the better the performance of the firm. This implies a direct effect of delegation of authority on performance. Further, as shown in Fig. 1, and based on the above discussion, one would also expect an indirect effect of the level of delegation of authority on performance via changes in MACS. In other words, changes in MACS mediate the relationship between delegation of authority and performance. Therefore, stated formally:

H4. Delegation of authority will be positively associated with organizational performance directly and indirectly via changes in management accounting and control systems.

2.5. Changes in MACS and performance

As discussed above, changes in MACS allow managers to obtain information necessary to make successful economic decisions (see also Chenhall & Morris, 1986; Mia & Chenhall, 1994). Contingency theory of management accounting choice suggests that firms are likely to perform more effectively if they implement and use MACS that suit their organizational and social environmental situations (Chapman, 1997; Chenhall, 2003; Chenhall & Chapman, 2006; Otley, 1980). There is also an increasing recognition in the management accounting literature that firms tend to implement accounting innovations or change their existing MACS to improve decision-making as well as the performance of the firm (for details, see Abernethy & Bouwens, 2005). Empirical evidence on this issue is rather limited (Abernethy & Bouwens, 2005). The current study attempts to shed further light on this phenomenon.⁴ This endeavor is reflected in the following hypothesis:

H5. Changes in management accounting and control systems will be positively associated with organizational performance.

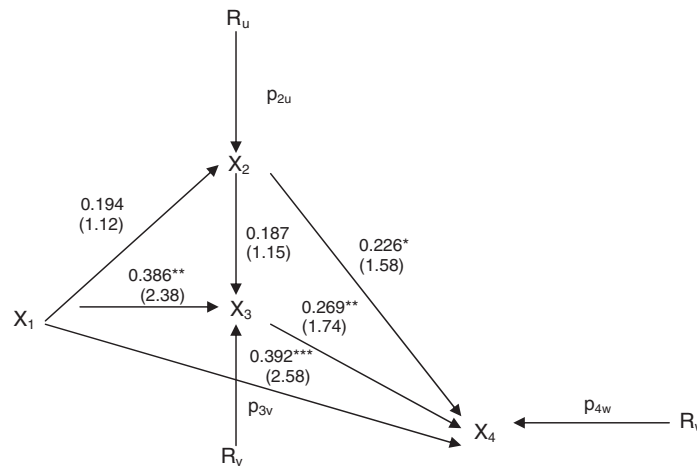
2.6. Competition, delegation, changes in MACS and performance

As discussed above, increased competition positively and directly influences both delegation of authority and changes in MACS. Further, both delegation of authority and changes in MACS individually and jointly affect performance. As a result, one would expect that increased competition is likely to have a positive association with performance indirectly through delegation and changes in MACS, individually and jointly. In other words, as illustrated in Fig. 2, both delegation of authority and changes in MACS mediate the relationship between competition and performance. Stated formally:

H6. The relationship between intensity of competition and organizational performance operates via delegation of authority and changes in management accounting and control systems.⁵

⁴ Associations between contextual variables like competition in the external environment and existing management control systems reflect an equilibrium condition. If the right "fit" is achieved between management control systems and context, then higher performance would necessarily result. In addition, if fit was not right between these variables, the firm would fail. On this basis, one could argue that linking MACS change to changes in performance in this study is unnecessary. However, as this study is about a path analysis of the relations between competition, delegation, changes in MACS and performance, it is believed that a direct linkage between changes in MACS and performance is necessary. In addition, such an analysis will shed further light on the debate between the direct linkage between accounting innovation and performance (for details, see Abernethy & Bouwens, 2005).

⁵ Due to lack of theoretical support, this study does not attempt to formally hypothesize that increased competition directly leads to increased performance.



X_1 : Intensity of competition (COMPET)
 X_2 : Delegation of authority (DELG)
 X_3 : Number of changes in management accounting and control systems (NMACS)
 X_4 : organizational performance (PERF)

Path coefficients with t values in parentheses; levels of significance, * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$)
 Source: Table 4

Fig. 2. Path diagram with path coefficients for organizational performance.

3. Method

3.1. Sample and data

Consistent with prior management accounting research of this kind, and given the research focus, in this study the respondents were typically financial controllers or chief financial officers of firms with over 100 employees. This selection criterion resulted in the study's use of a total of 120 manufacturing strategic business units from the list of top 200 published in the 2004⁶ *Business Review Weekly*. Table 1 presents the profile of the participating firms. Table 1 shows that the responding firms represent a variety of simple and complex industries, including steel, chemicals, automotive, textile, clothing, footwear, glass, building products, publishing, food and beverage, engineering, petroleum and grease oil. The mean number of employees is 1168, with a median of 429.

Each company secretary was phoned to collect the name and contact details of the financial controller or chief financial officer (CFO). Each CFO was then invited via telephone to participate in the study. Eighty-two firms expressed interests in participating in the study and requested the details about the study in writing along with a copy of the survey instrument. The mail-out survey package included a cover letter explaining the purpose of the research, a copy of the survey, and two postage-paid envelopes – one for returning the survey, and the second to allow respondents to request a copy of the survey results. The survey was distributed in early June 2006 with a request for reply within four weeks of receipt of the survey. The first mail-out resulted in only 30 completed responses. A reminder was sent to all 82 firms four weeks after the initial mail-out. This resulted in the return of 10 further responses. Therefore, of the 82 questionnaires distributed, a total of 40 (48.78%) questionnaires were returned. Of the 40 returned questionnaires, six responses were not completed fully and therefore were not useable. Thus, the useable response for this study is 34 (a usable response rate of 41.46%). A comparative analysis of the means on the variables of interest (t-tests) between the early and late respondents indicated no significant differences. Further, no significant differences between the

respondents and non-respondents were found on the basis of firm size and industry grouping. Taken together, these results suggest no response bias in the empirical data of this study.

3.2. Operationalization of variables

3.2.1. Organizational performance

Based on the instrument developed by Govindarajan (1984), which was subsequently used by several studies (e.g. Abernethy & Stoelwinder, 1991; Chenhall & Langfield-Smith, 1998; Govindarajan & Fisher, 1990; Hoque & James, 2000), respondents were asked to indicate the performance of their firms relative to that of their competitors over the last three years in each of the stated 10 performance items⁷ on a scale ranging from one ('very unsatisfactory') to five ('outstanding'). Respondents were also asked to indicate how important they would rate, on a scale from one ('not important') to five ('extremely important'), each item of the performance to the long-term growth of their firm over the last three years. The overall organizational performance measure was constructed by multiplying, for each item of performance, the ratings of importance by intensity and summing the ten products to obtain a measure of performance for each firm (for a similar approach, see Baines & Langfield-Smith, 2003; Govindarajan & Fisher, 1990).⁸ The Cronbach alpha statistics for the measure was 0.76 indicating that its internal reliability is high. Table 3 presents the descriptive statistics.

3.2.2. Intensity of competition

To assess the intensity of competition, the survey used a five-item instrument, originally developed by Khandwalla (1972) and subsequently used by several researchers including Mia and Chenhall (1994), Libby and Waterhouse (1996), Hoque et al. (2001), Williams

⁷ The ten performance items are: operating profit; return on investment; sales growth rate; market share; cash flow from operation; new product development; market development; research and development; cost reduction programs; and personnel development.

⁸ The current study also explores whether the relationships between the subject variables change if the 10-item performance measures instrument is used on its own without multiplying dimensions by importance of these dimensions; results are similar throughout.

⁶ This was the latest edition at the time of this study.

Table 1
Profile of responding firms.

Number of employees	N	Organizational type
100–249	10	Chemicals 2 Grease and oil Filtration wholesale and distribution Automotive components 2 Food and beverage equipment 2
250–499	12	Building products 2 Chemicals 2 Publishing Clothing Footwear Wine manufacturing and sales 2 Semi trailer manufacturing Styron and derivatives Building products 3
500–999	5	Forklift manufacture and sales Chemicals Textiles Truck manufacture Automotive components
1000 or greater	7	Glass manufacture Electronic systems Steel products 2 Engineering and development Alumina refining Logistics
Total	34	

and Seaman (2001), and Moers (2006). The instrument used two questions: the first question asked respondents to indicate how intense, on a five-point scale ranging from one ('negligible') to five ('extremely intense'), each of the following types of competition was in their firm's main line of business for the past three years (2003–2005): (1) competition for raw materials, parts and equipment, (2) competition for technical personnel such as engineers, accountants, programmers, (3) competition in promotion, advertising, selling, distribution, etc., (4) competition in quality and variety of products, and (5) price competition in their main line of business. The second question asked respondents to indicate how important they would rate, on a scale from one ('not important') to five ('extremely important'), each form of competition to the long-term profitability and growth of their firms. The overall intensity of competition was constructed by multiplying, for each type of competition, the ratings of importance by intensity, and summing the five products to obtain a measure of competitive pressure for each firm.⁹ The Cronbach alpha coefficient (Cronbach, 1951) of 0.84 indicates that the items used in the measure are internally consistent and reliable. Table 3 presents the descriptive statistics.

3.2.3. Delegation of authority

Following Libby and Waterhouse (1996), to assess the level of delegation of authority the instrument asked respondents to identify the most junior level of job that had the authority to make decisions on the following operating policies during the period 2003–2005: (a) spend unbudgeted or unallocated money on capital items; (b) determine new products or services; (c) which market to be aimed for; (d) what should be costed (i.e. to what the costing system, if any, should be applied); (e) what should be inspected (i.e. to what the inspection system, if any, should be applied); (f) determine which suppliers of material are to be used; (g) what type and how many benefits are to be provided to employees; (h) the price of output;

(i) alter responsibilities/areas of work of staff departments; (j) labor force requirements for the plant/branch; (k) delivery dates or the priority of orders; (l) what production schedules are set; (m) which machinery/equipment is to be used; (n) allocation of work to be done among available workers. Five possible levels were included, ranging from production worker (scored as 5) to someone outside the particular location sampled for the study (scored as 1). The sum of the scores assigned to each of the firm's policies on the list was used to indicate the level of delegation of authority within the sampled firms (Libby & Waterhouse, 1996, p. 140). Firms where operating decisions can be made at relatively low levels (i.e., obtaining relatively high scores) were considered to be decentralized (Libby & Waterhouse, 1996, pp. 140–41; Williams & Seaman, 2001). The Cronbach coefficient alpha for this measure was 0.95. Table 3 presents the descriptive statistics.

3.2.4. Changes in MACS

To measure changes in MACS, the survey used Libby and Waterhouse's (1996) 23-item scale which was divided into five main elements: a) planning, b) controlling, c) costing, d) directing, and e) decision-making (see Appendix A). This 23-item scale captures both conventional and newer management accounting tools. Respondents were also given an opportunity to add other tools and techniques not listed in the scale. The reliability of this instrument has been verified in a subsequent study by Williams and Seaman in 2001. Further, in this study this instrument has also been subject to pilot tests with four CFOs. The instrument asked respondents to indicate whether changes had occurred in any of these MACS components during the period 2003–2005. On a similar note to Libby and Waterhouse (1996) and Williams and Seaman (2001), the present study examined the number of changes in MACS that were implemented in a particular ORGANIZATIONAL between 2003 and 2005. Table 3 presents the descriptive statistics.

3.3. The path model

To examine the pattern of the causal connections between the variables, as outlined in the form of hypotheses above, a path analysis (Asher, 1983; Davis, 1985; Land, 1969; Pedhazur, 1982) is used. Fig. 2 highlights the path diagram which makes explicit the causal connections between competition (COMPET), delegation of authority (DELG), number of changes in MACS (NMACS), and organizational performance (PERF). The relationships between these variables are indicated by arrows, p (path), which can be statistically expressed by path coefficients. The path model in Fig. 2 proposes that COMPET has indirect effects on PERF, as follows: COMPET affects NMACS (p_{31}) which in turn affects PERF (p_{43}); COMPET affects DELG (p_{21}) which in turn affects PERF (p_{42}); and COMPET affects DELG (p_{21}) again, but this time passes through NMACS (p_{32}) to affect PERF (p_{43}). Further, DELG has a direct effect on PERF (p_{42}) and an indirect effect whereby it affects NMACS (p_{32}) which in turn affects PERF (p_{43}). NMACS have a direct effect on PERF (p_{43}), but no indirect effects.

Fig. 2 also shows that additional arrows directed to DELG, NMACS and PERF variables from outside indicate the amount of unexplained variance for each variable respectively. The error from R_u to DELG (p_{2u}) refers to the amount of variance in DELG that is not accounted for by COMPET. Similarly, the arrow from R_w to PERF (p_{4w}) denotes the amount of error arising from the variance in PERF that is not explained by COMPET, DELG, and NMACS. Finally, the arrow from R_v to NMACS (p_{3v}) denotes the amount of variance that is unexplained by COMPET and DELG. Overall, these error terms suggest that there are other variables that have an impact on DELG, NMACS and PERF, but which are not included in the path model in Fig. 2.

In order to assess these direct and indirect relationships, path coefficients (standardized regressions) are computed using partial least square (PLS) regression procedures (Chin, 1998; Cohen, 2003). To

⁹ This study used the similar approach as in the performance scale (footnote 4), results are similar throughout.

Table 2
Formulae for the decomposition of the observed correlations in the path model of Fig. 2.

Combination of variables	Observed correlation	=	Direct effect	+	Indirect effect	+	Spurious effect
X ₁ with X ₂	r ₁₂	=	p ₂₁	+	-	+	-
X ₁ with X ₃	r ₁₃	=	p ₃₁	+	p ₂₁ p ₃₂	+	-
X ₁ with X ₄	r ₁₄	=	p ₄₁	+	p ₂₁ p ₄₂ + p ₂₁ p ₃₂ p ₄₃ + p ₃₁ p ₄₃	+	-
X ₂ with X ₃	r ₂₃	=	p ₃₂	+	-	+	p ₂₁ p ₃₁
X ₂ with X ₄	r ₂₄	=	p ₄₂	+	p ₃₂ p ₄₃	+	p ₂₁ p ₃₁ p ₄₃
X ₃ with X ₄	r ₃₄	=	p ₄₃	+	-	+	p ₃₁ p ₄₁ + p ₃₂ p ₄₂ + p ₃₁ p ₂₁ p ₄₂

X₁ = intensity of competition (COMPET); X₂ = delegation of authority (DELG); X₃ = number of changes in management accounting control systems (NMACS); X₄ = organizational performance (PERF).

generate the path coefficients, the following three structural equations are used¹⁰:

$$X_2 = p_{21}X_1 + p_{2u}R_{vu} \tag{1}$$

$$X_3 = p_{31}X_1 + p_{32}X_2 + p_{3v}R_v \tag{2}$$

$$X_4 = p_{41}X_1 + p_{42}X_2 + p_{43}X_3 + p_{4w}R_w \tag{3}$$

where, X₁ = intensity of competition (COMPET), X₂ = level of delegation of authority (DELG), X₃ = number of changes in management accounting and control systems (NMACS), and X₄ = Organizational performance (PERF), P_{ij} = the standardized path coefficients, and R_i = the standardized residuals.

The relative magnitude of these direct and indirect effects is assessed by decomposing observed correlations among COMPET, DELG, NMACS and PERF. The formulae for the decomposition of the observed correlations are presented in Table 2. As shown in this table, there are three components in this process: direct effects, indirect effects, and spurious effects.¹¹ These are discussed in the next section.

4. Results

4.1. Descriptive statistics

Table 3 presents the descriptive statistics for all the variables of interest. The correlation matrix for the variables is presented in Table 4. The relationships between the contextual variables are not highly correlated to each other, suggesting that multicollinearity is unlikely (Tabachnick & Fidell, 1996). Also, tests of nonlinearity and heteroskedasticity of the data indicate no major problem for structural regression analysis (Tabachnick & Fidell, 1996).

4.2. Regression (path) results

Table 5 presents the results of the three structural equations (PLS regressions) outlined above. H1 postulates a positive association between intensity of competition (COMPET) and delegation of authority (DELG). Although the path coefficient p₂₁ is positive

¹⁰ As the structural equations are linear in the P_{ij} they do not have a constant term. As Asher (1983) suggests, in a structural equation, a constant term can be omitted if the experimental variables are standardized by giving them a mean of zero and a standard deviation of one, and if it is assumed that the unmeasured residual terms are also standardized.

¹¹ The spurious effects refer to “those compound paths that are mathematically part of the decomposition but that do not represent substantively meaningful indirect effects” (Asher, 1983, p. 34). In other words, the relationship between two variables may not be a ‘true’ relationship; the difference exhibited by each variable is affected by a third variable (Bryman & Cramer, 1995).

Table 3
Descriptive statistics.

Variable	Mean	Median	Standard deviation	Theoretical range	Observed range
COMPET	18.76	19.24	2.97	5–25	12.94–23.94
DELG	38.19	39.00	6.50	14–70	24–51
NMACS	5.29	5.00	3.69	0–23	0–14
NPLAN	1.26	1.00	0.99	0–5	0–3
NCONTROL	1.41	1.00	1.52	0–5	0–5
NCOSTING	0.41	1.00	0.70	0–5	0–2
NDIRECT	0.71	1.00	0.94	0–3	0–3
NDECISION	1.50	1.00	1.33	0–5	0–4
PERF	35.32	35.24	5.99	10–50	23.21–49.47
SIZE_EMPL	1168.57	429.00	2297.33	>100	100–11,650

n = 34.

COMPET = intensity of competition; DELG = delegation of authority; NMACS = number of changes in MACS; NPLAN = number of planning systems changes; NCONTROL = number of controlling systems changes; NCOSTING = number of costing systems changes; NDIRECT = number of directing systems changes; NDECISION = number of decision-making systems changes; PERF = organizational performance; SIZE_EMPL = number of employees.

(0.194), it is not statistically significant (p = 0.271). Further, the overall structural model for the independent variable explains only 3.8% (R₂) of the variance in the dependent variable (F = 1.256, p = 0.271). Therefore, these results do not support H1.

H2 predicts that a firm facing increased competition is likely to respond to such an environment by attempting a greater number of changes in its MACS. A positive path coefficient p₃₁ (0.386, t-value = 2.376, p = 0.024) and a high R₂ (0.212) provide evidence to support H2. The associated F value is 4.176 at p = 0.025. These results indicate that increased competition is positively related to the greater number of changes in MACS.

The results in Table 5 indicate that the 0.187 path coefficient p₃₂ is not significant (p = 0.258), suggesting no support for H3. These results imply a lack of conclusive evidence to support the idea that increased delegation of authority may result in a greater number of changes in MACS.

H4 conjectures that increased delegation of authority affects performance directly and indirectly through the number of changes in MACS. The results in Table 5 indicate a positive and significant path coefficient p₄₂ (0.226, t-value = 1.582, p = 0.031), thereby providing support for H4 regarding the direct positive effect of DELG on PERF. On the other hand, the results presented in Table 5 indicate a low path coefficient (0.050) for an indirect effect. Therefore, the idea that increased delegation has an indirect effect on organizational performance via changes in MACS cannot be supported, as predicted in H4.

It appears from the results in Table 5 that the path coefficient p₄₃ between NMACS and PERF is positive (p₄₃ = 0.269) and significant (p = 0.045, t-value = 1.738), with a high R₂ of 0.433. These results

Table 4
Zero-order correlations matrix and reliability coefficients (Cronbach alpha).

Variables	COMPET	DELG	NMACS	PERF	LnSIZE
COMPET	0.84				
DELG	0.194	0.95			
NMACS	0.423***	0.262*	n/a		
PERF	0.550***	0.373**	0.494***	0.76	
LnSIZE	-0.01	-0.17	0.20*	0.02	n/a

n = 34.

Cronbach alpha reliabilities appear in the diagonal cells.

COMPET = intensity of competition; DELG = delegation of authority; NMACS = number of changes in MACS; PERF = organizational performance.

* p < 0.10 (2-tailed).

** p < 0.05 (2-tailed).

*** p < 0.01 (2-tailed).

Table 5
Path analysis.

Dependent variable	Independent variable	Relevant hypothesis	Relevant path	Path coefficient ^a	t-value	p-value ^b	R ²
X ₂ DELG	X ₁ COMPET	H1	p ₂₁	0.194	1.120	0.271	0.038
X ₃ NMACS	X ₁ COMPET	H2	p ₃₁	0.386	2.376	0.024	0.212
X ₃ NMACS	X ₂ DELG	H3	p ₃₂	0.187	1.152	0.258	–
X ₄ PERF	X ₂ DELG	H4	p ₄₂	0.226	1.582	0.062	–
X ₄ PERF	X ₃ NMACS	H5	p ₄₃	0.269	1.738	0.045	–
X ₄ PERF	X ₁ COMPET	H6	p ₄₁	0.392	2.575	0.015	0.323

COMPET = intensity of competition; DELG = delegation of authority; NMACS = number of changes in MACS; PERF = organizational performance.

F values for:

X₂ = p₂₁X₁ + p_{2u}R_{vu}: 1.255 (p = 0.271).

X₃ = p₃₁X₁ + p₃₂X₂ + p_{3v}R_v: 4.176 (p = 0.025).

X₄ = p₄₁X₁ + p₄₂X₂ + p₄₃X₃ + p_{4w}R_w: 4.772 (p = 0.008).

^a Standardized partial least squares (PLS) path coefficients.

^b Two-tailed level of significance.

support the hypothesis (H5) that the number of changes in MACS is positively associated with organizational performance.¹²

With regard to H6, the results in Table 5 show that the path coefficient p₄₁ is positive (0.392) and significant (t-value = 2.575, p = 0.015). Based on these results, it can be concluded that changes in intensity of competition is associated with organizational performance. Further, it appears from the results (indirect coefficient = 0.158) in Table 5 that increased competition also affects organizational performance indirectly through both delegation and changes in MACS.

4.3. Decomposition of observed correlations

The causal diagram in Fig. 2 indicates that one variable can go directly from one variable to another, which is represented by a simple path, for example, p₂₁. However, a variable also can go to a target variable via another variable, for example in Fig. 2, X₁ to X₂ to X₃, which is a product of p₂₁p₃₁. This section decomposes an observed correlation between two variables, which is a product of three components: direct effects, indirect effects, and spurious effects.¹³ These effects are examined using the formulae presented in Table 2. The results are presented in Table 6.

The intervening effects¹⁴ depicted in Fig. 2 can be summarized, as follows:

- X₁ to X₂ (intervening) to X₃,
- X₁ to X₃ (intervening) to X₄,
- X₁ to X₂ (intervening) to X₃ (intervening) to X₄,
- X₁ to X₂ (intervening) to X₄, and
- X₂ to X₃ (intervening) to X₄.

The analysis presented in Table 6 with regard to (a) above indicates that the observed correlation (r₁₃) of 0.423 is composed of a positive and significant direct effect of competition on the number of changes in MACS (p₃₁ = 0.386) plus an indirect effect via delegation (p₂₁p₃₁ = 0.037). The low magnitude of the indirect effect suggests that the

¹² One may argue that short-term changes in MACS might lead to lower profits because many of the MACS changes could be quite costly. Many of the benefits that might be forthcoming would come later. Therefore, this study has also attempted to reverse the causal ordering, that is, to see whether poor organizational performance leads to changes in MACS. While not presented here, it has been found that poor organizational performance is not significantly associated with changes in MACS. Future research may wish to explore this further with a larger set of sample in similar or alternative settings.

¹³ There is a possibility of the fourth component, *unanalyzed effects*, which may arise when no causal ordering is imposed among the exogenous variables. Note that any compound path, including an unanalyzed correlation, cannot be considered a causally interpretable indirect effect (Asher, 1983, p. 35).

¹⁴ For a detailed discussion about the intervening model, see Asher (1983) and Bryman and Cramer (1995).

delegation of authority to lower-level managers is not an intervening variable of competition and the number of changes in MACS.

In regards to (b), (c) and (d) above, the observed correlation (r₁₄ = 0.550) is composed of a positive and significant direct effect of competition on organizational performance (p₄₁ = 0.392) plus three indirect effects via two intervening variables, DELG and number of changes in MACS, (0.158). This is composed of the following three indirect components as in (b), (c) and (d) above:

- Competition (X₁) on organizational performance (X₄) via delegation (X₂) (p₂₁p₄₂) = 0.044 [0.194*0.226]
- Competition (X₁) on organizational performance (X₄) via both delegation (X₂) and number of changes in MACS (X₃) (p₂₁p₃₂p₄₃) = 0.010 [0.194*0.187*0.269]
- Competition (X₁) on organizational performance (X₄) via number of changes in MACS (X₃) (p₃₁p₄₃) = 0.104 [0.386*0.269].

The total causal effect of each of these three variables on organizational performance would be: direct effect (p₂₁) 0.392 plus a total of the above three indirect effects, 0.158 (0.044 + 0.010 + 0.104), which is 0.550. Note that, of the three indirect effects, the path or the relationship between competition and the number of changes in MACS has the greater overall indirect effect (0.104) on organizational performance (the outcome variable). These results indicate that the change in MACS has significant intervening (or mediating) effect on the relationship between competition and organizational performance.

Sequence (e) above indicates the number of changes in MACS as an intervening variable of the delegation of authority variable and the organizational performance variable. The observed correlation is composed of a direct effect of delegation on organizational

Table 6

Computation of the decomposition of the observed correlations in the model of Fig. 2. (Source: Tables 3 and 4).

Combination of variables	Observed correlation	=	Direct effect	+	Indirect effect	+	Spurious effect	Total effects ^a
X ₁ with X ₂	0.194	=	0.194	+	–	+	–	0.194
X ₁ with X ₃	0.423	=	0.386***	+	0.037	+	–	0.423
X ₁ with X ₄	0.550	=	0.392***	+	0.158*	+	–	0.550
X ₂ with X ₃	0.262	=	0.187	+	–	+	0.075	0.262
X ₂ with X ₄	0.373	=	0.226*	+	0.050	+	0.017	0.373
X ₃ with X ₄	0.494	=	0.269***	+	–	+	0.219	0.494

X₁ = intensity of competition (COMPET); X₂ = delegation of authority (DELG); X₃ = number of changes in management accounting control systems (NMACS); X₄ = organizational performance (PERF).

^a Total effects = direct effect + indirect effect + spurious effect.

* p < 0.10 (2-tailed).

** p < 0.05 (2-tailed).

*** p < 0.01 (2-tailed).

Table 7
Additional path analysis^a for change in components of MACS.

Dependent variable	Independent variable	Hypothesis (path)	NPLAN	NCONTROL	NCOSTING	NDIRECT	NDECISION
X ₂ DELG	X ₁ COMPET	H1 (p ₂₁)	0.194 (1.12)	0.194 (1.12)	0.194 (1.12)	0.194 (1.12)	0.194 (1.12)
X ₃ NMACS	X ₁ COMPET	H2 (p ₃₁)	0.291 (1.694*)	0.372 (2.186**)	0.001 (0.007)	0.336 (2.120**)	0.205 (1.175)
X ₃ NMACS	X ₂ DELG	H3 (p ₃₂)	-0.256 (-1.488)	-0.095 (-0.557)	0.252 (1.422)	0.312 (1.968**)	0.191 (1.095)
X ₄ PERF	X ₂ DELG	H4 (p ₄₂)	0.257 (1.694*)	0.278 (1.885*)	0.264 (1.746*)	0.316 (2.049**)	0.256 (1.724*)
X ₄ PERF	X ₃ NMACS	H5 (p ₄₃)	-0.078 (-0.511)	0.019 (0.121)	0.049 (0.328)	-0.127 (-0.772)	0.108 (0.719)
X ₄ PERF	X ₁ COMPET	H6 (p ₄₁)	0.519 (3.392***)	0.489 (3.099***)	0.496 (3.381***)	0.539 (3.460***)	0.474 (3.183***)

COMPET = intensity of competition; DELG = delegation of authority; NMACS = number of changes in MACS; NPLAN = number of planning systems changes; NCONTROL = number of controlling systems changes; NCOSTING = number of costing systems changes; NDIRECT = number of directing systems changes; NDECISION = number of decision-making systems changes; PERF = organizational performance.

^a Standardized partial least squares (PLS) path coefficients (t-value).

* p < 0.010 (Two-tailed level of significance).

** p < 0.05 (Two-tailed level of significance).

*** p < 0.01 (Two-tailed level of significance).

performance (p₄₂ = 0.226) plus an intervening (indirect) effect via the number of changes in MACS (p₃₂p₄₃ = 0.050) and a spurious effect.¹⁵ The low value of p₃₂p₄₃ suggests that the indirect effect of the number of changes in MACS on the relationship between delegation and organizational performance is likely to be minimal. These results provide no support for the view that increased delegation has an indirect effect on performance acting through the number of changes in MACS.

4.4. Additional analysis – changes in components of MACS

The analysis presented above is based on the overall index of the five components of MACS. To further explore the relationships predicted in the research model, this study undertook an additional path analysis using each of the five components of MACS individually. The results of this analysis are presented in Table 7.

The results presented in Table 7 indicate that the change in competition is positively associated with three of the five components of MACS: NPLAN (p₃₁ = 0.291, t = 1.694, p < 0.10), NCONTROL (p₃₁ = 0.372, t = 2.186, p < 0.01), and NDIRECT (p₃₁ = 0.336, t = 2.1200,

p < 0.05). Delegation directly affects only the NDIRECT component of MACS (p₃₂ = 0.312, t = 1.968, p < 0.05). Delegation has also produced significant and positive associations with organizational performance for all components of MACS. Surprisingly, no components of MACS appear to have any significant direct influence on organizational performance. Consistent with earlier results, the change in competition is positively and significantly associated with organizational performance for all components of MACS at the 0.01 level of significance with t-values of greater than 3.00. Further, the analysis of the indirect effects for MACS components (not shown) indicates no significant indirect effects. Taken together, these results reinforce the earlier view put forward above based on the overall number of changes in MACS.¹⁶

5. Conclusions

This study makes several contributions to the management accounting literature. First, the positive association between competition and delegation of authority reported in this paper suggests that when firms face increased competition in the marketplace they tend to delegate more decision-making powers to lower- or local-level managers, so that quicker and more effective decisions can be made at the local entity level. This result is consistent with the view put forward by organizational theorists that in a highly competitive environment a greater emphasis should be placed by senior management on delegating more authority to lower-level management (e.g. Burns & Stalker, 1961; Chandler, 1962). In the management accounting research literature, it is also evident that the greater the environmental complexity, the greater the level of delegation of authority to lower-level management of the firm (e.g. Bruns & Waterhouse, 1975; Chenhall & Morris, 1986; Hoque & Hopper, 1997; Merchant, 1984).

Second, it appears from the results presented in this paper that delegation does not lead to changes in MACS to affect organizational performance. Such an insignificant link between the delegation of

¹⁵ Fig. 2 and Table 2 depict three spurious effects. Firstly, whether the relationship between delegation (X₂) and changes in MACS (X₃) is spurious as competition affects both delegation and changes in MACS (p₂₁p₃₁) has been tested. If the relationship is spurious, one would expect the relationship between delegation and number of changes in MACS to disappear (Bryman & Cramer, 1995). The analysis presented in Table 6 indicates that of the observed correlation of 0.262, the value of spurious effect is only 0.075, suggesting that the spurious effect of competition on delegation (the independent variable) and number of changes in MACS (the dependent variable) is minimal. In other words, the relationship between delegation and number of changes in MACS appears to be a 'true' relationship. Secondly, this paper examines whether the relationship between delegation (X₂) and organizational performance (X₄) is significantly affected by both competition and the number of changes in MACS (p₂₁p₃₁p₄₃). The analysis in Table 6 indicates the existence of a very low spuriousness (p₂₁p₃₁p₄₃ = 0.017) for the relationship between delegation and organizational performance, suggesting that this relationship is a 'true' relationship. That is, the greater the delegation of authority, the higher the organizational performance. Thirdly, the data presented in Table 6 indicate that, of the observed correlation between the number of changes in MACS and organizational performance (r₃₄) of 0.488, the direct effect (p₄₃) is 0.269 and the spurious effect of competition and delegation is 0.219, which is relatively high. These results suggest that the relationship between the number of changes in MACS and organizational performance is relatively spurious. In other words, both competition and delegation may affect (or control) the relationship between the number of changes in MACS and organizational performance.

¹⁶ In order to validate the results presented above and to further explore the hypothesized relationships, this study repeated the path analysis using factor scores that were saved as variables using SPSS programs. The Cronbach alphas reported in the research method section have supported that the variables being used in the analyses are unidimensional, and this study found no discernible differences between the two sets of results.

authority and changes in MACS could be due to little variation in the delegation of authority variable in the sampled organizations. Further, this evidence also indicates that the delegation of authority and management accounting practices can be simultaneously determined because they can be complement or substitutes.

Third, the results also provide support for a positive association between competition and changes in MACS. An interpretation of this result is that when organizations experience an intense competitive business environment, they become less stable and face market uncertainty; therefore these firms tend to initiate more changes in MACS to address issues resulting from high competitive uncertainty. This result is also consistent with the view put forward by prior management accounting research that the greater the competition, the greater the need for sophisticated management control tools that can provide managers with high quality information for improved decision-making, so that organizations are able to enhance their competitiveness (e.g. Cooper, 1995; DeFond & Park, 1999; Hoque et al., 2001; Hoque & James, 2000; Kaplan & Norton, 1996; Khandwalla, 1972; Krishnan, 2005; Lynch & Cross, 1991). In addition to this direct relationship, the results in this study also indicate that those organizations that face intense competition become more interested in attempting a greater number of changes in MACS, which in turn, heighten their organization's performance. In other words, we should see more change or less change in MACS depending on the level of environmental uncertainty.

Fourth, in the current study the change in MACS was found to be an important influential factor of organizational performance, which was evidenced by a significant direct association between the number of changes in MACS and organizational performance. This result suggests that more changes in MACS mean greater organizational capacity to build accurate and useful information for effective decision making processes, which in turn, will have a positive impact on organizational performance. This finding does not support prior studies (for example, see Abernethy & Lillis, 2001; Abernethy & Bouwens, 2005; Bruns, 1987; Cavalluzzo & Ittner, 2004; Cooper, Kaplan, Maisel, Morrissey, & Oehm, 1992; Innes & Mitchell, 1991), with the exception of Baines and Langfield-Smith (2003), which suggests that management accounting innovations do not always lead to improve organizational performance.

Fifth, a significant finding of this study is the presence of a relationship between competition and organizational performance which is due to two important mediators – delegation of authority and changes in MACS. These results suggest that competition affects organizational performance via the organization's level of delegation of authority to lower-level managers and changes in MACS.

However, one may argue that if a firm has already developed an appropriate management accounting system given its level of competition and delegation of authority, why change it? Based on the empirical evidence in this paper, it can be argued that as competition and level of delegation increase, most existing MACS no longer appropriate or there have been so many MACS innovations in the previous few years that existing MACS have become outdated.

As discussed above, the two options under study here – delegating powers to lower level managers and changing existing MACS – appear to be influential forces for a positive relationship between competition and firm performance. This study opens up avenues for future research to explore what other ways the relationship between competition and firm performance might be improved. Should more resources be channeled into hiring more skilled or technical people to increase firm capacity to learn and grow? Or should firms implement more sophisticated production technology and IT support to address increased competitiveness facing the firm? What should be the role of management accounting control systems in this context? Further, it might be possible that delegation may encourage the adoption of one practice, such as budgets to act as an integrative mechanism, while intensity of competition may encourage firms to move to a beyond

budgeting agenda and drop conventional budgets. Future research may be undertaken to explore this idea that will provide much insights into the processes involved in MACS change.

As in most prior studies, the results presented in this paper should be interpreted in terms of the study's limitations that might be addressed by future research. Firstly, due to the study's small number of cases (34), any generalization of the study's results to manufacturing firms or beyond cannot be made without considerable caution. Further research with a large cross sectional dataset needs to be conducted to establish a firm conclusion on the phenomena under study. Secondly, the firm performance is measured perceptually, which is a common choice of survey researchers. This study asked the respondents (CFOs) in the survey to provide "hard" performance measures, such as profitability and growth rates, but about 80% of the respondents did not provide any such hard measures of performance. Consistent with most prior management accounting research, this study used "soft" measures of firm performance. Future research can explore whether the theoretical model in Fig. 1 in this paper fits the data better than other specifications of models with the study's four categories of variables – intensity of competition, delegation of authority, changes in MACS, and organizational performance. Such tests require much more data than is available in the current study. Finally, future research could come up with an improved measurement of changes in MACS, which would be a useful extension.

Notwithstanding the above limitations, this study has added to the limited body of knowledge concerning the linkages between environment, MACS, and performance by providing evidence that the relationship between intensity of competition and organizational performance is likely to be mediated by delegation of authority and changes in management accounting systems of the firm.

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Appendix A. The survey instrument

(Adapted from: Libby & Waterhouse, 1996).

Changes in management accounting and control systems

Respondents were provided with the following list of 23 management accounting control systems that had been divided into five main components, as follows. Respondents were asked the following two questions:

- (a) Did you have the following system at your business unit during the period 2003–2005: (Yes or No)?
- (b) Has a change occurred in the following system during the period 2003–2005? (Yes or No)

Planning systems

1. Budgeting
 2. Operations planning (production)
 3. Capital budgeting
 4. Strategic planning
 5. Any other planning systems? Please specify here:
-

Controlling systems

- 6. Individual or team-based performance measurement
- 7. Firm performance measurement
- 8. Measurement of performance in terms of quality
- 9. Measurement of performance in terms of customer satisfaction
- 10. Other types of performance measures? Please specify here:

Costing systems

- 11. Direct allocation of manufacturing overheads
- 12. Direct allocation of other overhead
- 13. Direct allocation of marketing costs
- 14. Internal (dept. or divisional) product transfers
- 15. Other costing systems – please specify here

Directing systems

- 16. Reward systems - bonuses
- 17. Reward systems – pay for performance plans based
- 18. Other reward systems – please specify here

Decision-making systems

- 19. Information reported more frequently
- 20. Use of more non-financial measures
- 21. Information reported more broadly
- 22. Other changes to reporting systems
- 23. If there is any other changes to systems that do not appear on this list, please specify here:

Intensity of competition

- (a) Respondents were asked to indicate how intense, on the following scale ranging from 1 to 5, each of the following types of competition was in their main line of business during the period 2003–2005? 1 = negligible; 2 = moderately competitive; 3 = competitive; 4 = intense; 5 = extremely intense.
- (b) Respondents were also asked to indicate how important they would rate, on a scale from 1 to 5, each form of competition to the long-term profitability and growth of their ORGANIZATIONAL in 2005, 2004 and 2003. 1 = not important; 2 = of little importance; 3 = moderately important; 4 = important; 5 = extremely important.

2005 2004 2003

- | | 2005 | 2004 | 2003 |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------|------|
| 1 (a) Competition for raw materials, parts and equipment.
(b) How important would you rate this form of competition on long-term profitability and growth of the firm? | | | |
| 2 (a) Competition for technical personnel such as engineers, accountants, programmers.
(b) How important would you rate this form of competition on long-term profitability and growth of the firm? | | | |
| 3 (a) Competition in promotion, advertising, selling, distribution, etc., in your main line of business.
(b) How important would you rate this form of competition on long-term profitability and growth of the firm? | | | |
| 4 (a) Competition in quality and variety of products.
(b) How important would you rate this form of competition on long-term profitability and growth of the firm? | | | |
| 5 (a) Price competition in your main line of business.
(b) How important would you rate this form of competition on long-term profitability and growth of the firm? | | | |

Delegation of authority

Respondents were asked to identify, using the following scale, the most junior level of job that has the authority to make decisions on the following list of operating policies (authority = action can be taken on the decision without waiting for confirmation from above).

1 = off site; 2 = most senior person at this location; 3 = department manager (or next most senior person); 4 = supervisor; 5 = production worker.

During 2005? Has this changed in the last 3 years?

- | | During 2005? | Has this changed in the last 3 years? |
|---------------------------------------------------------------------------------------------|--------------|---------------------------------------|
| 1) The number of supervisory personnel | | |
| 2) Spend unbudgeted or unallocated money on capital items | | |
| 3) Determine new products or services | | |
| 4) Which market to be aimed for | | |
| 5) What should be costed (i.e. to what the costing system, if any, should be applied) | | |
| 6) What should be inspected (i.e. to what the inspection system, if any, should be applied) | | |
| 7) Determine which suppliers of material are to be used | | |
| 8) What type and how many benefits are to be provided to employees | | |
| 9) The price of output | | |
| 10) Alter responsibilities/areas of work of staff departments | | |
| 11) Labor force requirements for the plant/branch | | |
| 12) Delivery dates or the priority of orders | | |
| 13) What production schedules are set | | |
| 14) Which machinery/equipment is to be used | | |
| 15) Allocation of work to be done among available workers | | |

Organizational performance

Respondents were asked to indicate their business unit's performance relative to their competitors, on the following scale in 2005, 2004 and 2003.

1 = very unsatisfactory; 2 = unsatisfactory; 3 = neither poor nor good; 4 = good; 5 = outstanding.

Respondents were also asked to indicate how important they would rate on the following scale, each form of performance dimensions to the long-term growth of their organization in 2005, 2004 and 2003.

1 = not important; 2 = of little importance; 3 = moderately important; 4 important; 5 = extremely important.

2005 2004 2003

- | | 2005 | 2004 | 2003 |
|-----------------------------------------------------------------------------------------------------------------------------------|------|------|------|
| 1 (a) Operating profit
(b) How important would you rate this dimension of performance on long-term growth of the firm? | | | |
| 2 (a) Return on investment
(b) How important would you rate this dimension of performance on long-term growth of the firm? | | | |
| 3 (a) Sales growth rate
(b) How important would you rate this dimension of performance on long-term growth of the firm? | | | |
| 4 (a) Market share
(b) How important would you rate this dimension of performance on long-term growth of the firm? | | | |
| 5 (a) Cash flow from operation
(b) How important would you rate this dimension of performance on long-term growth of the firm? | | | |
| 6 (a) New product development
(b) How important would you rate this dimension of performance on long-term growth of the firm? | | | |
| 7 (a) Market development
(b) How important would you rate this dimension of performance on long-term growth of the firm? | | | |
| 8 (a) Research & development
(b) How important would you rate this dimension of performance on long-term growth of the firm? | | | |
| 9 (a) Cost reduction programs
(b) How important would you rate this dimension of performance on long-term growth of the firm? | | | |
| 10 (a) Personnel development
(b) How important would you rate this dimension of performance on long-term growth of the firm? | | | |

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