

# “Predicting change in management accounting systems: a contingent approach”

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## SECTION 3. General issues in management

Nelson Waweru (Canada), Enrico Uliana (South Africa)

### Predicting change in management accounting systems: a contingent approach

#### Abstract

This study investigated the frequency and location of changes in management accounting and control systems in a sample of Canadian manufacturing companies. Using regression and path analysis the study attempted to understand how five environmental variables influenced change in the management accounting and control systems through the organizational structure. The findings indicate that changes in management accounting were best predicted by organization capacity to learn. Such changes mostly occur in systems that support planning and control followed by those that support decision making. The intensity of competition was found to affect management accounting change through the organizational structure. Organizations that placed a high emphasis on differentiation strategies reported significant changes in their management accounting and control systems.

**Keywords:** management accounting and control systems, management accounting change, contingency theory, competitive strategy, organizational structure.

**JEL Classification:** M40.

#### Introduction and motivation

Environmental forces drive organizational change in ways that are not well understood. During the last few decades, the environment in which management accounting is practised appears to have changed as a result of information technology, economic swings, new management strategies and a new focus on quality and customer services (Innes and Mitchell, 1995; Libby and Waterhouse, 1996; Kaplan and Norton, 1996; Burns and Vaivio, 2001; Waweru et al., 2004). Baines and Langfield-Smith (2003) argue that managers need specific forms of management accounting information to support their decision needs within increasingly uncertain environments and to assist them monitor progress against strategies. Research in management accounting also suggests that changes in an organization's external environment should lead to change in an organization's management accounting systems (Atkinson et al., 1997; Haldma and Laats, 2002; Waweru et al., 2004).

According to Burns and Scapens (2000), management accounting change has become a topic of much debate in recent years. Whether management accounting has changed, has not changed, or should change have all been discussed (Innes and Mitchell, 1990; Burns and Vaivio, 2001; Haldma and Laats, 2002; Hoque, 2003; Waweru et al., 2004). Yet little empirical evidence exists on the actual rate of adoption of changes in management accounting systems and/or the forces that motivate or act to impede changes in management accounting systems (Libby and Waterhouse, 1996; Williams and Seaman, 2001; Baines and Langfield-Smith, 2003; Waweru and Uliana, 2005).

This study investigated the volume and location of MAC and the role played by organizational structure in influencing MAC. The study enhances existing knowledge by introducing a new variable, viz., competitive strategy (Porter, 1980) to the known predictors of MAC and demonstrates that the intensity of competition affects MAC in organizations through its influence on the organizational structure. Previous studies (Libby and Waterhouse, 1996; Seaman and Williams, 2001; and Waweru and Uliana, 2005) concluded that there is no relationship between MAC and the intensity of competition. Furthermore, the study also reports on the perceived benefits and problems encountered during the process of MAC.

The remainder of this paper is organized as follows: Section 1 presents the study theoretical framework and previous literature. The research method and the definition of the study variables are explained in section 2. Section 3 presents a discussion of the results followed by conclusions and implications in the final section.

#### 1. Theoretical framework and literature review

Contingency theory (Burns and Stalker, 1961; Lawrence and Lorsch, 1967) provides an explanation of why management accounting systems vary between firms operating in different settings (Otley, 1980; Innes and Mitchell, 1990; Fisher, 1995; Chapman, 1997; Drury, 2000; Chenhall, 2003). The contingency theory of management accounting is based on the premise that there is no universally appropriate accounting system applicable to all organizations in all circumstances (Emmanuel et al., 1990, p. 57). Rather the contingency theory attempts to identify specific aspects of an accounting system that are

associated with certain defined circumstances and to demonstrate an appropriate matching.

Management accounting systems are adopted to provide information that will assist managers in achieving the organizational objectives (Mia and Chenhall, 1994; Haldma and Laats, 2002). A management accounting system will therefore be useful to a manager if it can enhance the nature and quality of the information required. The need for an appropriate fit between the environment and organizational systems is an underlying assumption of much of the empirical contingency style management accounting research, as is the need for management accounting systems to change to support managers' new information requirements (Baines and Langfield-Smith, 2003, p. 675). How effective the design of an accounting system is depends on its ability to adapt to changes in the external circumstances and internal factors (Haldma and Laats, 2002, p. 383).

Organizations are open systems that receive resource inputs from the external environment and return the resultant output to the environment (Otley and Berry, 1980). To succeed, organizations have to maintain a consistent relationship with the environment (Otley, 1980). Consequently, changes in the environment cause changes in organizations, which in turn cause changes in management accounting practices (Shields, 1997). While Scapens (1999) notes that the environment in which management accounting is practiced appears to have changed, we have little understanding of why organizations tend

to change their management accounting systems (Pettigrew and Whipp, 1991; Pettigrew et al., 1992; Atkinson et al., 1997).

According to Waweru and Uliana (2005), an understanding of practice lies in the identification of the set of influential structural, characteristics within which management accounting is designed and used. Innes and Mitchell (1990) and Fisher (1995) suggest that the specific circumstances influencing management accounting comprise a set of contingent variables which may include, but are not limited to, (1) the external environment, (2) the technology, (3) the organization structure, and (4) the firm's competitive strategy. These contingencies are regarded as important determinants of the design of a management accounting system.

The external environment contains certain factors, which may affect the organization, but over which the organization has little or no control. These factors, including economic, political/legal, and social/cultural ones, influence an organization and may shape its structure and processes, including its information systems (Ming-te and Farrel, 1990).

This study identified the following factors as the main predictors of MAC: size; organization capacity to learn; intensity of competition; decentralization (organization structure); technological changes and competitive strategies. These factors are shown on the theoretical framework below and discussed later in section 2.

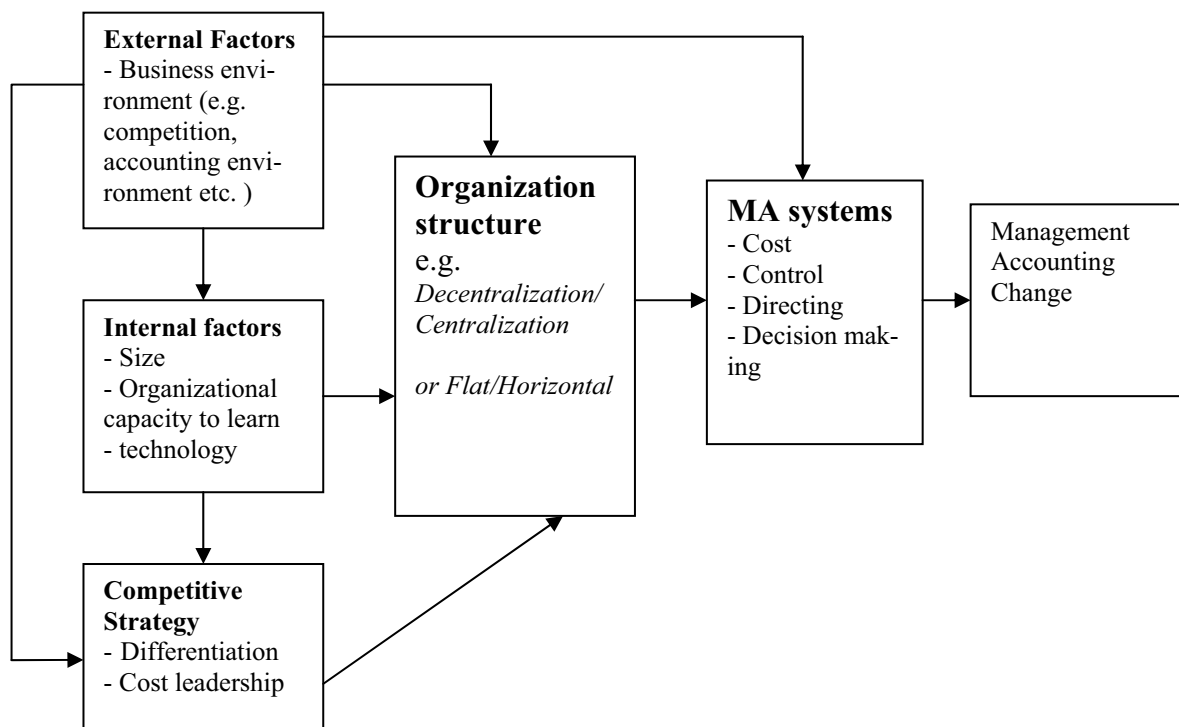


Fig. 1. Theoretical framework

Figure 1 shows the contingency based theoretical framework of this study. The contingencies are divided into two groups: external factors and internal factors. We also include two organizational choices that are conditioned by the environment: competitive strategy and organizational structure. The external factors indicate the features in the external environment that affect the operations of the organization; including the management accounting and control system. However, Innes and Mitchell (1990) point out that it is not clear whether the contingent variables affect management accounting directly or through their impact on the organizational structure. Therefore organization structure is introduced in the study framework as a mediating variable. Following previous studies (Chenhall and Moris, 1986; Chia, 1995) this study measured organizational structure in terms of decentralization of authority. Management accounting literature finds support for decentralization as a predictor of MAC (Damanpour, 1991).

Internal contingencies are determined as size, organizational capacity to learn, and technology (Libby and Waterhouse, 1996; Hyvonen, 2007). Haldma and Laats (2002) argue that intensive competition influences the choice of strategy, organization structure as well as the application of appropriate cost management and control. Furthermore, successful implementation of competitive strategies (Porter, 1980, 1985) involves different resources and skills, supportive organizational arrangements and control systems. In this study we use the broad generic taxonomy for strategy suggested by Porter (1985) who argues that for a firm to compete effectively, it must derive its competitive advantage either from product differentiation or cost leadership.

Xydias-Lobo and Tilt (2004) have also classified the key drivers of change into two groups: environmental and organizational factors. However, as argued by Haldma and Laats (2002) and Seal (2001), the list of contingencies and relations in a theoretical framework cannot be considered exhaustive, since it is not possible to identify and include all the factors and impact. Moreover, the main focus of this study is the volume and location of management accounting change at the level of the organization and not within firms.

Libby and Waterhouse (1996) examined the extent and correlates of changes in management accounting and control systems in a sample of 24 Canadian manufacturing firms. They reported that on average, 31 percent of the management accounting systems in the organizations had changed during the period of 1991-1993. Further, the components of management accounting that support decision making and control changed more frequently than components

that support planning or directing. Organizational capacity to learn was the best predictor of MAC. However the study found no significant relationship between MAC and decentralization.

Williams and Seaman (2001) investigated whether Libby and Waterhouse (1996) results were transferable to firms operating in Singapore. They confirmed the findings that organizational capacity to learn is a strong determinant of change. However, contrary to Libby and Waterhouse (1996), who reported a moderate support for the relationship between a more intensively competitive environment and MAC, Williams and Seaman found that the relationship between the two variables was significantly negative. Unlike the Libby and Waterhouse (1996) study, Williams and Seaman also found a strong positive relationship between decentralization and MAC. Further, they found that size had no effect on MAC, unlike Libby and Waterhouse who reported a significant positive relationship between size and MAC. The inconsistencies in the results of these two studies clearly support the need for further research.

Baines and Langfield-Smith (2003) examined the relationship between the changing competitive environment and a range of organizational variables as antecedents to MAC. They found that the increasingly competitive environment had resulted in increased focus on differentiation strategies, which had in turn influenced changes in organizational design and advanced management accounting practices. Hyvonen (2007) investigated the relationships between organizational performance and customer focused strategies, performance measures and information technology. He found a significant negative relationship between customer performance and the three-way interaction involving strategy, contemporary management accounting systems and information technology. The study concluded that formal strategic control systems could actually hinder performance in some circumstances.

Sulaiman and Mitchell (2005) explored the forms which MAC has taken in a sample of 92 Malaysian manufacturing companies during the period of 1997-2001. In particular they investigated the volume of MAC and its location in terms of the subsystems in which it occurred. They reported that 89 out of the 92 responding companies had changed their management accounting systems during the five-year period. The planning and controlling subsystems accounted for the greatest number of total changes (27.5% and 25.3% respectively), while the decision making sub-system ranked third (21.8%). Their findings are inconsistent with those of Libby and Waterhouse (1996) and Williams and Seaman

(2001) who had reported that the most frequent systems to change were decision making systems (32% and 27% respectively). While looking at the location of change, this study attempted to shed more light on these inconsistencies in prior research.

Based on the above theoretically defined pattern and the inconsistent findings in previous research, this study seeks to determine:

- 1) *The frequency and location of MAC in the subject organizations.*
- 2) *The predictors and/ or motivators of MAC.*
- 3) *The role of the organizational structure in influencing MAC.*
- 4) *The perceived benefits and/or problems that have been encountered as a result of the changes that have occurred in management accounting and control systems.*

## 2. Research method and variable definition

A questionnaire, covering letter and a self addressed stamped envelop were sent to a sample 120 controllers of manufacturing companies in South Western Ontario. The questionnaire was pre-tested using a group of academicians and practitioners. The sample was randomly selected from a list of companies that was compiled using the Hoovers data base. The criteria used were as follows: a) manufacturers (SIC code 20-39), b) number of employees (between 100 and 6000), and c) area telephone codes (416, 905, 519, and 647). This yielded a total of 1,628 manufacturers. The companies were divided into five groups based on the number of employees. The stratified sampling approach was then used by selecting firms proportional to the number of companies in each group.

The names of the contact persons (controllers) were obtained from the Dunn & Bradstreet directory listing of key personnel. Only six responses were obtained from the first mail out. A reminder letter was sent to the non responding companies three weeks after the first mail out. This was followed by a telephone call where the controllers were encouraged to complete the questionnaires. A total of 33 responses (27.5%) were received. However two of these responses were unusable due to missing data on management accounting systems and change. A total of 31 usable responses (25.8%) were therefore received. Characteristics of early respondents were compared to those of late respondents, but no significant differences were identified. Follow-up calls to the non-responding companies revealed that the reasons for non response were mainly lack of time. Tests also revealed no significant differences between the characteristics of the respondents and those of non respondents.

A list of 28 different management accounting and control systems divided into five main types (Appendix A) – planning, controlling, costing, directing and decision-making – was provided to the respondents. The respondents were asked to indicate whether the systems existed in their organization and whether any changes had been made during the last three years. Although the participants were invited to add any other system that existed in their organisation, none did.

Within the firm (taking a contingency theory perspective of management accounting research) the following variables are identified as predictors of MAC: (1) intensity of competition, (2) decentralization, (3) size, and (4) organizational capacity to learn (Libby and Waterhouse, 1996; Williams and Seaman, 2001). To this list we add technological changes (Waweru and Uliana, 2005) and competitive strategy. These measures that are summarized in section 3 (Table 1) were determined as follows:

- ◆ The perceived intensity of competition faced by the responding organizations was measured using a competitive pressure scale developed by Khandwalla (1977). This scale consisted of six questions rating the intensity of competition for raw materials, technical personnel, selling and distribution, quality, variety of products, price and customer service on a scale from 1 (negligible) to 5 (extremely intense). Each question related to the intensity of competition had a corresponding scale for the importance of that type of competition to long-term profitability and growth ranging from 1 (not important) to 5 (extremely important).

To compute the competitive pressure, the ratings for each type of competition were multiplied by their respective ratings on importance by intensity. The square root of the product (to better reflect a normal distribution) was then obtained to arrive at the competitive pressure score. The competitive scores of the variables were then aggregated to arrive at the competitive pressure facing the firm.

- ◆ To measure the degree of decentralization in the responding firms, this study relied on a method used by Libby and Waterhouse (1996). Respondents were asked to indicate the level of authority required to make certain operating decisions, starting with the production worker (scored as 5) to a person outside the department (scored as 1). A list of six operating decisions was included in the survey questionnaire.

The scores assigned to all operating policies in the organization were then aggregated to arrive at the decentralization score. Organizations that obtained

high scores were considered to be more decentralized than those with low scores, since this was an indication that more decision-making authority was placed further down in the organization hierarchy. We used decentralization as the proxy for organizational structure.

- ◆ For the purpose of this study size is defined as the number of employees working for an organization (Libby and Waterhouse, 1996; and Williams and Seaman, 2001). Although it may be argued that large systems are difficult to change, this study conceptualized that larger organizations are more likely to change their management accounting practices as the operating environment changes since they have more resources.

Williams and Seaman (2001), Libby and Waterhouse (1996) and Damanpour (1991) measured organizational size as the natural logarithm of the number of employees in the organization. Size was measured in this manner since it will result in the values being more normally distributed. The minimum number of employees in the responding organizations was 100 while the highest was 5800 (mean 2180, SD 1550).

- ◆ Management accounting literature supports technological changes as predictors of MAC. To measure technological change, respondents were asked to rate on a scale of 1 (irrelevant) to 5 (extremely important) how several technological changes had affected MAC. The sum of the scores assigned to each technological change was aggregated to arrive at the firm's technological change score.
- ◆ Organizations that have invested in a large number of management accounting systems and personnel may respond to changes in or challenges arising from their environments by changing their management accounting systems. A high degree of organizational capacity to learn may facilitate change in management accounting systems because the expertise and personnel to educate managers about the benefits of change will be available. This study conceptualizes that organizations with higher organizational capacity to learn will experience higher rates of MAC. The number of management accounting systems present in the organization at a particular point in time was used to measure the organizational capacity to learn (Williams and Seaman, 2001; and Libby and Waterhouse 1996).
- ◆ Hyvonen (2007) argues that the successful implementation of strategy involves different resources and skills, supportive organizational ar-

rangements and control systems. We argue that changes in the company strategy will call for changes in the company's management accounting and control systems.

To measure the competitive strategy score, this study relied on the items designed by Miller et al. (1992) and used by Hyvonen (2007). Respondents were asked to indicate the emphasis placed by their organization on certain strategic priorities over the last three years on a scale of 1 (no emphasis) to 5 (great emphasis). The sums of the scores assigned to each strategic priority item were aggregated to arrive at the firm's competitive strategy score (low cost or differentiation).

To summarize, change in management accounting systems in organizations is expected to be positively and significantly associated with:

- ◆ greater organizational capacity to learn;
- ◆ larger size;
- ◆ a decentralized organizational structure;
- ◆ a more intensely competitive environment;
- ◆ higher number of technological changes;
- ◆ high emphasis on differentiation strategies;
- ◆ high emphasis on low cost strategies.

The data were analyzed using Stata. Internal consistency of the multi item scales was analyzed using Cronbach's alpha. In this study all the alpha values obtained were above 0.6 and therefore considered acceptable. Confirmatory factor analysis was used to test the reliability of the individual items in the multi item scales, while the t-test was used to test for significant differences between the mean scores. Correlation and regression analysis were used to test the relationship between MAC (the dependent variable) and the above independent variables while path analysis was used to test the indirect relationship between MAC (the dependent variable) and the above independent variables.

### 3. Results and discussions

Table 1. A summary of descriptive statistics of the determinates of MAC (n = 31)

Variable	Mean	Standard deviation	Theoretical range	Actual range
Number of changes	11.8	4.4	0-28	3-20
Capacity to learn	18.4	3.8	0-28	13-25
Competition	22.8	1.9	6-30	17.6-27.0
Decentralization (Organ. structure)	16.6	2.3	6-30	12-20
Technology	15.5	1.9	4-20	12-18
Competitive strategy Low Cost	6.37	.43	2-10	4-8
Competitive strategy Differentiation	14.96	0.7	4-20	7-18
Size (ln)	7.2	1.0	-	4.6-8.7

Table 1 shows a summary of the descriptive statistics computed on the factors facilitating MAC in the

responding companies. The results indicate that the actual ranges matched the theoretical ranges satisfactorily.

**3.1. Frequency and location of change.** All the responding companies reported changes in their management accounting systems during the period of the study. The results are shown in Table 2.

Table 2. Volume of management accounting change

Total number of changes	366
Number of companies	31
Average changes per company	11.8
Actual range	3-20
Period of study	3 years
Average annual rate of change per company	3.9

According to the results, the average number of changes in each company during the period was

Table 3. Location MAC

Management accounting sub system	Number of changes	Proportion	Rank	Average number of changes per company	Average annual rate of change per company
Planning	106	29%	1	3.4	1.1
Controlling	83	22.6%	2	2.7	0.9
Decision making	80	21.9%	3	2.6	0.87
Costing	64	17.4%	4	2.0	0.67
Directing	33	9.1%	5	1.1	0.36
Total	366	100%		11.8	3.9

According to the results, the planning sub-system accounts for the greatest number of changes (29%), followed by controlling (22.6%), decision making (21.9%), and costing (17.4%). Directing experienced the lowest number of changes (9.1%). The high rate of planning systems may be attributed to the high levels of environmental uncertainty which has resulted from the intensive global and local competition. Again this may be attributed to the globalization and liberalization of the world economy.

Overall, the study indicated that, on average, the responding organizations had implemented 11 changes in their management accounting and control systems during the period of 2004-2006. When this is interpreted as the number of changes given the number of systems existing in the organization in 2006, on average 61% of the systems in a given organization changed. We may therefore conclude that the management accounting and control systems in the subject organizations had changed significantly during the last three years.

11.8, which translates into a 3.9 average annual rate of change per company. The minimum number of changes reported was three while the maximum number was 20. All the responding companies experienced change during the three-year period while over 80% of the respondents reported more than five changes during this period. The high level of MAC may be attributed to the globalization of the world economy which has altered the manner in which companies operate. Consistent with the findings of Seaman and Williams (2001), the results strongly support a trend in management accounting and control system that does not appear to be resistant to change. We further investigated the location of change across the five components of the management accounting system (Appendix A). The results are shown in Table 3.

**3.2. Predictors of changes in management accounting.** This study used correlation and regression analysis to test the relationship between the dependent and independent variables discussed in section 2. The study set the following hypotheses:

Management accounting change (MAC) in the subject organization is associated with:

$H_1$  – greater organizational capacity to learn ( $G\_Cap$ );

$H_2$  – larger size (size);

$H_3$  – a more intensely competitive environment ( $I\_Comp$ );

$H_4$  – a decentralized organizational structure ( $Decen$ );

$H_5$  – higher technological changes ( $H\_Tech$ );

$H_6$  – a higher emphasis on differentiation strategies ( $Str\_Dif$ ); and

$H_7$  – a higher emphasis on low cost strategies ( $Str\_Low$ )

The correlation coefficient matrix results are presented in Table 4.

Table 4. Correlation matrix (Pearson)

	MAC	G_Cap	Size	I_Comp	Decen	H_Tech	Str_Dif	Str_Low
MAC	1.0000							
G_Cap	0.7520***	1.0000						

Table 4 (cont.). Correlation matrix (Pearson)

Size	0.6884**	0.6462**	1.0000					
I_Comp	0.3030	0.1873	-0.02004	1.0000				
Decen	0.2710	0.2766	0.2578	0.3646	1.0000			
H_Tech	-0.4646*	-0.3571	-0.4751	0.1475	-0.0662	1.0000		
Str_Dif	0.5814**	-0.2319	-0.3343	0.3567	0.5437**	0.3292	1.0000	
Str_Low	0.1643	0.2417	0.1894	0.3265	0.0273	0.3761	0.2910	1.000

Note: \*\*\* P < 0.001, \*\* P < 0.01, \* P < 0.05 for a two tail test.

We set the following regression equation to test the above hypotheses:

$$MAC = a + b_1 G\_Cap + b_2 Size + b_3 I\_Comp + b_4 Decen + b_5 H\_Tech + b_6 Str\_Dif + b_7 Str\_Low + e$$

Table 5. Regression analysis results

Variable	Coefficient	t-value	P-value
Constant	5.435	4.608	0.01
G_Cap	2.784	6.917	0.001
Size	0.698	3.587	0.01
Comp	1.191	1.328	0.107
Decen	-0.112	0.714	0.482
H_Tech	-1.077	-2.481	0.035
Str_Dif	0.983	3.116	0.006
Str_Low	2.178	0.872	0.673
Adjusted R <sup>2</sup>	0.65		
F	22.40		
P	0.000		

The correlation coefficients are shown in Table 4. Tests for multicollinearity failed to reveal a serious problem in interpreting the data. Moreover, Kaplan (1982) points out that multicollinearity should not be considered a serious problem where the main aim is to measure the effect of all the independent variables on the dependent variable. In this case the issue is to measure how variations in MAC can be explained by the independent variables rather than the accuracy of the individual coefficients.

According to the results, organizational capacity to learn, size, technological changes and differentiation strategy are significantly related to MAC. However, the relationship between MAC and technological changes is negative suggesting that higher changes in technology may hinder MAC (Hyvonen, 2007). The limited resources in a firm may require a trade-off between changing technology or management accounting systems.

The independent variables are generally not significantly correlated amongst themselves. However there is a strong positive correlation between size and organization capacity to learn suggesting that large organizations have more resources and hence

more management accounting systems. These findings are consistent with theory, which states that more changes are expected where an organization has the expertise and personnel to educate managers on the benefits of change (Argyris and Kaplan, 1994). There is also a strong significant positive relationship between decentralization and higher emphasis on differentiation strategies. This relationship suggests that highly decentralized organizations may pay more attention to their product attributes, mainly due to the fact that most decisions can be made on the shop floor (Waweru and Uliana, 2005).

Consistent with previous studies, we find no direct relationship between intensity of competition and MAC. There is also no direct significant relationship between the use of low cost strategy and MAC, suggesting that companies adopting this strategy seldom change their management accounting systems.

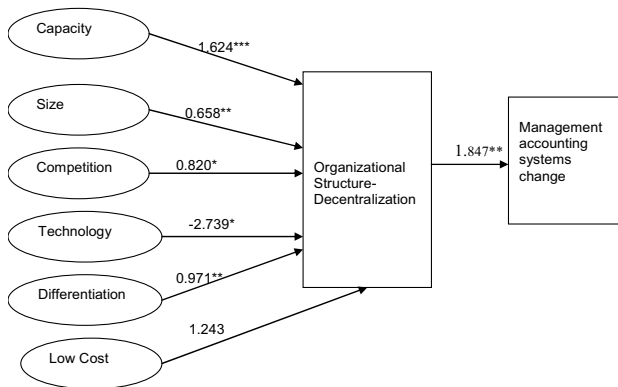
Results of the regression analysis are summarized in Table 5. According to the results, the six independent variables together explain 65% of the variance in the dependent variable. Change in management accounting and control systems was best predicted by organization capacity to learn followed by size. The results are consistent with the hypothesis that MAC is associated with organizational capacity to learn, size, technology and differentiation strategies. However the results are inconsistent with the hypothesis that change in MACS is associated with more intensely competitive environment, higher emphasis on low cost strategies and more decentralized structures.

**3.3. The role of organizational structure in influencing MAC.** We used path analysis (Baron and Kenny, 1986; Gerdin and Greeve, 2004) to test the indirect relationship between the dependent variable (MAC) and internal/external factors and competitive strategy acting through organizational structure (decentralization). The results are shown in Figure 1.

There is a strong significant positive relationship between organizational structure and MAC. Consistent with previous studies, the results suggest that highly decentralized organizations are more likely to change their management accounting systems. Fur-



thermore the study found a strong positive relationship between competition and organization structure. We may therefore conclude that competition does not affect MAC directly but rather through the effect on organization structure. However, no significant relationship was found between the use of the low cost strategy and higher levels of decentralization (organizational structure). All the other factors had a significant relationship with organization structure suggesting that at higher levels of decentralization, organizations are able react faster to the challenges emanating from environment.



Note: \*\*\* P < 0.001, \*\* P < 0.01, \* P < 0.05 for a two tail test.

Fig. 1. Path analysis

3.3.1. Other factors influencing/hindering MAC. This section reports on the findings of how certain organizational changes affected MAC and the factors that the respondents considered as hindrances of MAC. The first factor loading reported indicates how the variables are weighted for each factor and the correlation between the variables and the factor.

Respondents were asked to rank in order of importance how certain organizational changes had influenced MAC on a scale of 1 (irrelevant) to 5 (extremely important). The results are shown in Table 6.

Table 6 . Organizational factors influencing MA change

Organizational change	Level of importance (mean score)	Rank	First factor loading
Retrenchment	3.2	3	0.66
New auditors	2.2	5	0.44
New software	3.0	4	0.46
New products	3.7	2	0.54
Poor financial performance	4.4	1	0.72
Cronbach alpha			0.70

According to the results, poor financial performance was ranked first (mean 4.4), followed by new products (mean 3.7), while retrenchment was ranked third (mean 3.2). The results suggest that companies experiencing financial difficulties are more likely to

change their management accounting and control systems than those that are performing well, which could be interpreted as management accounting practices being perceived as value adding tools by the respondents. The high ranking of new products suggests that companies faced with stiff competition and hence poor financial performance are more likely to introduce new products so as to appease their customers. Although new computer packages, an indication of technological change, was ranked a distant fourth (mean 3.0), the results suggest that companies that perform poorly are more likely to change their MACS so as to increase control over their company’s resources, reduce waste and hence improve performance.

Respondents were asked to rate the importance of certain factors in relation to the hindrance of MAC on a scale of 1 (irrelevant) to 5 extremely important). The results are shown in Table 7.

Table 7. Hindrances of MAC

Factor	Level of importance (mean)	Rank	First factor loading
Accounting staff shortage	3.7	1	0.82
Lack of adequate computing resources	3.5	3	0.85
Management inertia	3.6	2	0.92
Poor communication with line management	2.5	5	0.37
Lack of authority of accountant	2.1	6	0.24
Need to meet statutory requirements	2.8	4	0.73
Lack of autonomy from parent company	1.2	7	0.31
Cronbach alpha			0.85

The findings indicate that shortage of accounting staff was considered the main factor hindering changes in management accounting and control system (mean 3.7). Indeed most of the non-responding companies cited lack of time as the reason why they could not complete the survey. Management inertia was ranked second (mean 3.6) while lack of computing resources was ranked third (mean 3.5). Lack of authority of accountant was ranked a distant sixth. This is not surprising, considering the fact that almost all the respondents were controllers in their organization. Our findings are consistent to those of Innes and Mitchell (1990) and Waweru and Uliana (2005).

3.4. Benefits and problems of MA change. When the respondents were asked to indicate some of the benefits that resulted from the changes that had been made to their management accounting and control systems, quality of information and quicker reporting were the most frequently mentioned. Other benefits that were mentioned (in order of frequency)

include: more control over expenses, cost savings, ability to identify non-performing customers and products and ability to understand the business better. Several respondents also mentioned accurate product costing and better financial forecasting, which had significantly reduced end of period variance analysis and explanation.

When respondents were asked to indicate the problems that had been encountered as a result of the changes, resistance by organization staff and lack of resources to educate staff on the changes made were the most frequently mentioned. For example, several respondents indicated that it took a lot of time and effort for them to convince senior management that the changes were necessary. Other problems mentioned include: not being able to match the changes with the existing accounting software (hence the need to change the software and this was considered expensive) and obtaining details from the new reports. In the first year following the changes, problems were encountered when comparing the actual results with the budgeted results.

### Conclusions and implications

This study examined the volume and location of MAC, the predictors of changes in management accounting and control systems and the role of organizational structure in the MAC process. The results indicate that the different components of management accounting and control systems change at different rates. For example, the systems that support planning and control changed more frequently than those that support costing and decision-making. The findings are consistent with those of Sulaiman and Mitchell (2005). The need to increase shareholder value, improve the quality of products and increase customer response time may require frequent changes in the firm's profit and production planning systems.

The results show a direct significant positive relationship between MAC and organizational capacity to learn, size and differentiation strategy. MAC was best predicted by organizational capacity to learn, suggesting that organizations with greater numbers of management accounting systems are more likely to change their management accounting practices. These findings are consistent with theory, which states that more changes are expected where an organization has the expertise and personnel to educate managers on the benefits of change (Argyris and Kaplan, 1994). Furthermore organizations placing high emphasis on differentiation strategies are more likely to change their management accounting systems, probably to cater for the ever increasing and changing demands of the customers.

The analysis supports an indirect positive significant relationship between MAC and the intensity of competition. Competition does not appear to affect management accounting directly, but rather through its influence on organizational structure. The findings are consistent with the theoretical expectations, since managers faced with high levels of competition are expected to require more and different types of information from their systems before making crucial decisions (Libby and Waterhouse, 1996).

Shortage of accounting staff and management inertia were the two main factors that hindered changes in management accounting and control systems. The findings are consistent with those of Waweru et al. (2004) who reported lack of resources to fund change and fear of change as the dominant factors that hindered management accounting in South Africa.

This study makes several contributions to MAC research. First, our results indicate that the intensity of competition affects MAC through its influence on the organizational structure. Previous studies e.g. Libby and Waterhouse (1996), William and Seaman (2001) and Waweru and Uliana (2005) reported no significant relationship between the intensity of competition and organizational structure. However these previous studies investigated the direct relationship between the intensity of competition and MAC.

Secondly, to our knowledge, this study represents the first attempt to examine the impact of competitive strategy on MAC. Our findings report a strong positive relationship between differentiation strategy and MAC, suggesting that firms following such strategies may change their management accounting system more frequently.

Finally, our findings extend the limited insights that currently exist on how management accounting systems change at the level of the firm. We provide further evidence to discount the view that management accounting is generally resistant to change (Burns and Scapens, 2000; Drury et al., 1993; Johnson and Kaplan, 1987). This study reinforces the idea of how the formal aspects of management control systems respond to pressures from the internal and external environments – that is how change is levered through strategy, structure and operational processes (Schein, 1988; Dawson, 1994; Senior, 1997; Scapens et al., 2003).

As is the case with any mailed survey, limitations affecting the generalization of this study are related to the perception of the respondents and a potential of self-selection bias. Furthermore, the study respondents were accountants who worked as controllers. They may be more familiar with change in this area than in organizational structure or the competitive market. Generalization of the results of this study should be done with these limitations in mind.

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## Appendix A

### Management accounting change

Which of the following management accounting systems are present in your organization? Please also tick the systems that have changed during the last three years.

Planning systems	Exist in your organization	Have changed in the last three years
1. Budgeting		
2. Profit planning		
3. Production planning		
4. Capital budgeting		
5. Strategic planning		
6. Other planning systems		
<b>Control systems</b>		
7. Individual performance measurements		
8. Team based performance measurements		
9. Organization performance measurements		
10. Measurement of performance in terms of quality		
11. Measurement of performance in terms of customer satisfaction		
12. Measurement of performance in terms of delivery innovations		
13. Other performance measures		

<b>Costing systems</b>		
14. Direct allocation of manufacturing overheads		
15. Direct allocation of marketing costs		
16. Direct allocations of other overheads		
17. Internal (dept. or divisional) transfers		
18. Other costing systems		
<b>Directing systems</b>		
19. Reward systems – bonuses		
20. Reward systems – pay for performance plans		
21. Reward systems – stock options		
22. Other reward systems		
<b>Decision making</b>		
23. Information reported more frequently		
24. Use for more non – financial measures		
25. Information reported more broadly		
26. Use of existing systems but interpreting the results differently		
27. Other changes to reporting systems		
28. Other changes to systems that do not appear in the list		

### Intensity of competition

Please indicate the perceived intensity of competition faced by your organization in respect to the following variables.

Competition	Negligible 1	2	3	4	Extremely intense 5
Raw materials	( )	( )	( )	( )	( )
Technical personnel	( )	( )	( )	( )	( )
Selling and distribution	( )	( )	( )	( )	( )
Quality	( )	( )	( )	( )	( )
Variety of products	( )	( )	( )	( )	( )
Price	( )	( )	( )	( )	( )
Other please specify	( )	( )	( )	( )	( )

Rank in order of importance the types of competition to long-term profitability and growth.

Competition	Not important 1	2	3	4	Extremely important 5
Raw materials	( )	( )	( )	( )	( )
Technical personnel	( )	( )	( )	( )	( )
Selling and distribution	( )	( )	( )	( )	( )
Quality	( )	( )	( )	( )	( )
Variety of products	( )	( )	( )	( )	( )
Price	( )	( )	( )	( )	( )
Other please specify	( )	( )	( )	( )	( )

### Decentralization

As regards decentralization, which level of authority is required to make the following operating decisions?

	Officer outside dept. 1	2	3	4	Production worker 5
Product design	( )	( )	( )	( )	( )
Process redesign	( )	( )	( )	( )	( )
How much to produce	( )	( )	( )	( )	( )
Inventory levels	( )	( )	( )	( )	( )
Leave schedule	( )	( )	( )	( )	( )
Training	( )	( )	( )	( )	( )
Other please specify	( )	( )	( )	( )	( )

**Technology**

Rank in order of importance how the following technological changes have affected management accounting change.

Technology	Not important 1	2	3	4	Extremely important 5
Automation	( )	( )	( )	( )	( )
Short production cycle	( )	( )	( )	( )	( )
Increase in overheads	( )	( )	( )	( )	( )
Quality requirements	( )	( )	( )	( )	( )
Other please specify	( )	( )	( )	( )	( )

**Competitive strategy**

Please indicate the emphasis placed by your organization on the following Product/Market strategic priorities over the last 3 years.

Strategic priorities	No emphasis 1	2	3	4	Great emphasis 5
Provide high quality products	( )	( )	( )	( )	( )
Low production costs	( )	( )	( )	( )	( )
Provide unique product features	( )	( )	( )	( )	( )
Lower prices than competitors	( )	( )	( )	( )	( )
Customized products (flexible)	( )	( )	( )	( )	( )
Serve only a given mkt segment	( )	( )	( )	( )	( )

**Factors influencing MA change**

Rank in order of importance how the following organizational changes may have influenced changes in management accounting (*Based on your experience*).

	Irrelevant 1	2	3	4	Extremely important 5
Retrenchment	( )	( )	( )	( )	( )
New auditors	( )	( )	( )	( )	( )
New software	( )	( )	( )	( )	( )
New products	( )	( )	( )	( )	( )
Poor financial performance	( )	( )	( )	( )	( )
Other: please specify	( )	( )	( )	( )	( )

Rank in order of importance the influence of the following factors in relation to hindrance of management accounting change (*Based on your experience*).

	Irrelevant 1	2	3	4	Extremely important 5
Accounting staff shortage	( )	( )	( )	( )	( )
Lack of adequate computing resources	( )	( )	( )	( )	( )
Management inertia	( )	( )	( )	( )	( )
Poor communication with line mgt	( )	( )	( )	( )	( )
Lack of authority of accountant	( )	( )	( )	( )	( )
Need to meet statutory requirements	( )	( )	( )	( )	( )
Lack of autonomy from parent Co.	( )	( )	( )	( )	( )
Other please specify	( )	( )	( )	( )	( )