THE USE OF HIERARCHIHCAL-BASED REWARD SYSTEMS IN MODERATING THE RELATIONSHIP BETWEEN MANAGEMENT ACCOUNTING SYSTEM AND ORGANISATIONAL LEARNING

Wee Shu Hui
Faculty of Accountancy,
Universiti Teknologi MARA

and

Foong Soon Yau
Graduate School of Management,
Universiti Putra Malaysia

Abstract

This study empirically investigates the relationship between management accounting systems (MAS) and organizational learning and also explores the effect of decentralization on this relationship based on a cross-sectional sample of 262 Malaysian companies. Questionnaires were sent to managers of Malaysian companies. It is hypothesized that there is a positive relationship between MAS and organizational learning and secondly, hierarchical-based reward systems moderate this relationship. MAS was designed in terms of its informational characteristics (timeliness, scope, level of aggregation and integration) and its use in improving learning, focusing attention, scorekeeping and improving understanding. This paper contributes to an understanding of the relationship between MAS and organizational learning which is defined as process of knowledge acquisition, information distribution, information interpretation and organisation memory. It is expected that a hierarchical-based system promotes a greater use of MAS information resulting in greater organizational learning. This paper highlights the importance of MAS as an important tool in promoting organisational learning. MAS as a primary source of information in an organisation can be proactively used to facilitate organizational learning. The results indicate support for a positive relationship between MAS and organizational learning and the moderating effect of hierachical-based reward system on this relationship.

INTRODUCTION

Organisations constantly face unavoidable changing and challenging environmental uncertainty. Such changes demand appropriate and often quick response from organizations for organizations to maintain competitive advantages. The characteristics of MAS (Chenhall and Morris, 1986) and managers' use of information provided by MAS can facilitate organizational learning, which improves organizational performance. Designing and implementing an appropriate reward system, as a part of MAS, is also critical for effective promotion of organizational learning. This study examines how certain MAS characteristics acting in combination with the hierarchy-based rewards system affect organizational learning and performance.

The rest of this paper is organized as follows. First, the theoretical discussion of the variables used in the framework, including a statement of the hypotheses. The sections that follow address the research method, results and conclusion of the study.

VARIABLES AND HYPOTHESES

This section derives three hypotheses for empirical investigation. A review of the literature on the potential effects of the use and characteristics of MAS in organisational learning, the interactive effects between MAS and a hierarchy-based reward system on organizational learning, and the relationship between organizational learning and organizational performance is given as follows.

MAS and Organizational Learning

In a world of constant and rapid environmental change, organizations have to find ways to survive and organizational learning can be broadly defined as the process of changing the organization to fit the changed environment (Kloot, 1997). Organisations facing uncertain and changing market conditions need to be able to learn (Edmondson and Moingeon, 1996) to sustain competitive advantage. Organisational learning may either be adaptive (single loop learning which does not involve any paradigm shift) and generative (second loop learning which involves a paradigm shift) (Argyris, 1976; 1977a; 1977b; Senge, 1990). MAS may help or hinder this organizational change. MAS may be reactive by changing passively to accommodate environmental change or proactively used to reinforce to bring about change in the organization. MAS, in particular the budgeting systems, are designed to ensure that problems or errors of environmental fits are detected. Huber (1991) argues that learning is inherent to all organizations and defines organizational learning as taking place when through its processing of information, the range of its behaviour is changed.

MAS is perceived in terms of its characteristics and uses in improving understanding, focusing attention, scorekeeping, improving learning and feedback. Kloot (1997) suggests that MAS can play a critical role in detecting and solving problems caused by change, resulting in a paradigm shift (generative learning or double loop learning). Shields and Young (1993) attribute one of the demands for participative budgeting as being related to organizational learning particularly the aspects of how an organization learns and stores information in organizational memory for future use (Fiol and Lyles, 1985; Levitt and March, 1988). Kloot (1997) suggests that management accounting procedures can be interpreted as components of organisational

learning. An example can be found in the budgeting process, which organizations use to solve problems through learning better ways to perform activities, share this information across vertical and horizontal levels, and to serve as organizational memory for storing information. Kloot (1997) further argues that the four constructs of Huber (1991), knowledge acquisition, information distribution, information interpretation and organizational memory are inextricable linked to MAS. Information systems such as MAS need to be designed to support organizational learning (Stata, 1989).

The availability of broad scope, timely, aggregated and integrated information is important but the available information from an accounting system has to be utilized for it to be effective in promoting organizational learning. Timely information is important because it is collected and therefore, is available as an input to decision making. MAS help to focus attention on problem areas and provide problem solving information as a result of improved understanding.

An organization learns if any of its units acquires knowledge that it recognizes as potentially useful to the organization even if not every one of its components learns that something (Huber, 1991). The organizational learning cycle starts with the acquisition of both internal and external information (Dixon, 1994). Timely and broad scope information would be particularly useful at this stage.

MAS has been positioned as an information-gathering tool aimed at providing managers with knowledge for better decision-making (Cooper at al., 1992). Information gathered from MAS for the purpose of focusing attention on problematic areas and improving understanding often can be used to question whether the current strategies and structures are still relevant in a changing environment.

Traditionally, accounting reports generate knowledge and information gets distributed through the organization on a hierarchical basis. Banker et al. (1993) provide empirical evidence that the frequency of reporting manufacturing performance measures to workers is positively related to the implementation of teamwork and total quality management practices. In addition to more frequent performance feedback, workers' learning rates are increased if they receive no financial performance measures. Performance evaluation adopting a more flexible reward that is not based on financial data alone encourages learning.

Information distribution is the process by which information from different sources is shared. The degree and depth of organizational learning is determined by how much is shared (Cyert and March, 1963; Huber, 1991). The more widely distributed the information, the more individuals and units are likely to learn (Huber, 1991; Garvin, 1993). This process addresses the breadth of organizational learning. The higher the hierarchy the more aggregated the information. The wider distribution of information would also reflect in greater use of more integrative and aggregated information thereby improving understanding.

Information interpretation is the process through which information is given meaning. Meaning has to be attached to the information collected and distributed. Huber (1991) argues that more organizational learning takes place when more organizational units develop uniform comprehensions of the various interpretations. This process is characterised by Huber (1991) as being concerned with the thoroughness of organizational learning. The use of MAS in scorekeeping and focusing attention helps to bring about a more uniform interpretation of occurring events.

Argyris (1978) pointed out that organizational learning does not take place unless and until the knowledge gets embedded. Where does it get embedded? Levitt and March (1988) believed that knowledge gets embedded in an organization's routines and standard operating procedures and MAS is one source of formal organization memory where information gets embedded. Accounting information, usually technical and formal in nature, gets embedded in the memory of organizations and they form a large part of this organizational memory. The use of MAS in scorekeeping provides historical records from which information can be retrieved, integrated and distributed to relevant parties (Virkkunen and Kuuti, 2000).

Hypothesis H1: There is a positive relationship between MAS characteristics and organizational learning.

Reward System and Organisational Learning

Reward systems can also be used to motivate learning. Reward systems in learning organizations recognize and reinforce learning through pay and promotion practices tied to risk-taking, flexibility, continuous improvement, and other behaviours congruent with organizational learning (McGill and Slocum, 1993). An organisation's reward system can play a pivotal role in influencing organizational learning because reward systems have direct impact on managerial behaviours and actions (Lei, Slocum and Pitts, 1997). Kerr and Slocum (1987) identified two primary types of reward systems: hierarchy-based systems, and performance-based systems.

The hierarchy-based systems stress on the supervisor's subjective evaluation and definition of a subordinate's performance. Qualitative factors such as team performance and cooperation with other units are also considered in addition to quantitative factors such as financial returns and cost reductions. Managers using this form of reward system try to socialize and transmit desired behaviour to their subordinates. Lei et al (1997) explain that this system is an effective means to achieving a strong bond between the organization and its members and reinforcing cooperation across formal organizational boundaries. Since team output and sharing are important measures of performance, hierarchy-based reward systems encourage organizational learning through the transfer and flow of information across organizational boundaries. It thereby facilitates a long-term outlook on performance where organizational learning is just as important as achieving financial targets.

On the other hand, performance-based systems emphasise on achieving quantitative measures of performance such as return on investment (ROI) and gains in market share whereby promotion and bonuses are based on well-defined quantitative output. The reliance on well-defined measures of performance discourages close cooperation and interaction among organizational members due to the emphasis on individual results. Performance-based reward systems tend to discourage team-based and cross-unit activities. Extensive use of performance-based reward system tends to limit organizational learning since learning behaviours are not typically rewarded.

Reward systems will best support organizational learning by incorporating team rewards (Sahraoui, 2002) particularly through extensive use of a hierarchy-based reward system. Performance evaluation through feedback and rewards are two main key issues in reward systems. Performance includes defining and evaluating performance and providing members

with feedback. Feedback, a dimension of the MAS, enables managers to compare results with expectations and to manage by exception (Simons, 1991; Mia and Chenhall, 1994; Otley, 1999). Feedback shapes dialogues and debates (McGill, Slocum and Lei, 1992) and provides managers with a means to improve understanding and facilitate double loop learning through questioning the underlying basis of targets.

Hypothesis H2: Hierarchical-based reward systems moderate the relationship between MAS characteristics and organisational learning.

Organisational Learning and Performance

One major claim is that organizational learning is key to achieving organisational goal. Emmanuel et al (1990) suggests that a major aim of a management control system is to induce individuals to behave in ways, which would contribute to overall organisational performance. Organisations facing uncertain and changing market conditions need to be able to learn continuously (Edmondson and Moingeon, 1996) to sustain competitive advantage.

Organisational learning, in particular generative learning or double loop learning, helps the organizations to sustain or improve its competitive edge and therefore, improves overall organizational performance, which can be reflected in the traditional financial measures and also non-traditional measures, such as improved quality of existing products or services, improved customer satisfaction or new products or services.

Bontis, Crossan and Hulland's (2002) empirical study on the relationship between the stocks and flows of learning indicates that organizational level learning is more closely related than either individual or group level learning to organizational performance. Ellinger, Ellinger, Yang and Howton's (2002) exploratory study yields a positive association between organizational learning and objective measures of organisations' financial performance.

Two main constructs were used in this study: financial measures and non-financial measures. The perceived organizational performance variable measures important issues, such as product quality, customer satisfaction, and new product development together with the traditional financial measures, such as profit and ROI. The measures are conceptually consistent with Kaplan and Norton's (1992; 1996) concept of a balanced scorecard (BSC). These non-financial factors are important in capturing outcomes of learning (Ittner and Larcker, 1997). The outcome of learning is manifested in new products, better quality products or services and customer satisfaction.

Hypothesis H3: There is a positive relationship between organizational learning and organizational performance.

RESEARCH METHOD

A structured questionnaire was prepared and pre-tested. Then, 3,500 copies of the questionnaire were mailed to CEOs/MDs of various organizations in the manufacturing and service industries within Malaysia. The organizations were randomly selected from published databases of industry associations. A total of 272 questionnaires were completed and returned.

However, 50 outliers were excluded from the subsequent analysis. Normality and non-response bias tests were carried out and results indicate normality of data and no significant differences in the means of variables before and after the reminder letters. Table 1 indicates 75 respondents were from top management and 75 financial controllers. 68% of the top management had been in their current position for more than 3 years and 53% of the financial controllers had been in their current position for more than 3 years.

Table 1
Profile Of Respondents

Job position	Years in current position		Total
	< 3 years	> 3 years	
CEO/MD/Director	24	51	75
Finance Controller/Finance Manager	35	40	75
Production/Plant/Service Manager	3	3	6
Sales/Marketing/Retail Manager	2	2	4
Others	37	25	62
Total	101	121	222

RESULTS

The results of the correlation between MAS characteristics and organizational learning, MAS characteristics and reward system, and organisational learning and organizational are summarized in Table A1, Table A2, and Table A3 in Appendix A. The relevant correlation coefficients are positive and significant and thus, providing preliminary support for all three hypotheses. The results of the multiple regressions were used to examine the nature of these associations. The results of the regression analysis that are presented in Table 2 to test hypothesis H_1 on the relationship between organizational learning and MAS characteristics indicate that hypothesis H_1 is supported. There is a significant positive relationship between organizational learning and MAS characteristics and MAS uses. The results of the moderated regression analysis as shown in Table 2 also provided support for hypothesis H_2. The R^2 change of 0.05 is significant, supporting the hypothesis that hierarchical reward system moderates the relationship between MAS characteristics and organizational learning. The hypothesized relationship between organizational learning and organizational performance, H_3, is supported; organizational performance was significantly associated with knowledge acquisition, information interpretation and organisation memory, but not with information distribution.

Table 2
Results Of Multiple Regressions

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
Hypothesis H1 **Organisational Learning**					
Constant	1.788	.216		8.265	.000
MAS characteristics	.195	.057	.244	3.408	.001
MAS uses	.355	.066	.383	5.347	.000

$R^2 = 0.31$, F = 44.07, p < 0.001

	B	Std. Error	Beta	t	Sig.
Hypothesis H2 **Organisational Learning**					
Constant	2.326	.244		9.541	.000
MAS	.179	.110	.184	1.623	.106
Reward*MAS	.062	.016	.426	3.766	.000

$R^2 = 0.35$, F =52.48, p = 0.001
R^2 change = 0.05, p = 0.001; F change = 14.18, p < 0.001

	B		Beta	t	Sig.
Hypothesis H3 **Organisational Performance**					
Constant	1.837			7.365	.000
Knowledge acquisition	.196		.202	2.420	.016
Information distribution	.018		.022	.264	.792 ns
Information interpretation	.160		.185	2.234	.027
Organisation memory	.123		.170	1.997	.047

$R^2 = 0.24$, F = 15.86, p < 0.001

CONCLUSIONS

One of the major aims of this study is to seek to improve our understanding of the present characteristics of MAS, its uses and its role in facilitating organizational learning. Prior research designed MAS characteristics in terms of its perceived usefulness but while MAS characteristics can be perceived to be useful, the importance lies in its availability and its uses.

The study indicates the MAS characteristics in terms of the availability of broad scope, timely, aggregated and integrated information and MAS uses in improving understanding, focusing attention, scorekeeping, improving learning and feedback play a crucial role in facilitating organizational learning. The result is consistent with Kloot's (1997) claims that Huber's (1991) four constructs of organizational learning are inextricable linked to MAS.

The study also indicates that hierarchical reward systems moderate the relationship between MAS and organizational learning. This supports the view that an extensive use of hierarchical

reward system would promote organizational learning (Kerr and Slocum, 1987; Lei, Slocum and Pitts, 1997). While MAS is positively related to organizational learning, the strength of this relationship improves with use of hierarchical reward systems.

Another important result of this study is the relationship between organizational learning and organizational performance. The findings support the view that there is positive relationship between organizational learning and organizational performance. Of particular interest is the insignificant effect of information distribution on organizational performance. Apparently, the use and sharing of information is not extensive enough to have an impact on organizational performance.

Several limitations of the current study may be noted. The study examines statistical associations at one point in time, further longitudinal research could investigate the process of organizational learning and relate the different uses of MAS in facilitating organizational learning in different types of managerial work. Secondly, only a single manager from an organisation completed the questionnaire. The use of MAS may differ in different business units and hence varying degrees organizational learning. It is most likely that a R & D unit would exhibit a greater degree of learning. This may create the potential for bias.

Despite these limitations, the study does provide evidence that the availability of broad scope, timely, aggregated and integrated MAS information and the use of such information facilitate organizational learning, which leads to improved organizational performance. Additionally, the results also indicate the interactive effects between MAS and hierarchical reward systems on organizational learning.

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APPENDIX A

Table A1
Correlations Between Mas And Organizational Learning

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
(1) scope	1												
(2) integration	.501**	1											
(3) timeliness	.517**	.474**	1										
(4) aggregation	.533**	.584**	.566**	1									
(5) improve understanding	.447**	.470**	.322**	.465**	1								
(6) focus attention	.395**	.438**	.313**	.443**	.658**	1							
(7) scorekeeping	.339**	.244**	.326**	.392**	.573**	.515**	1						
(8) improve learning	.385**	.304**	.271**	.329**	.544**	.600**	.593**	1					
(9) feedback	.347**	.376**	.349**	.439**	.431**	.486**	.519**	.408**	1				
(10) knowledge acquisition	.293**	.357**	.312**	.323**	.439**	.353**	.415**	.374**	.466**	1			
(11) information distribution	.303**	.318**	.373**	.361**	.352**	.367**	.346**	.279**	.426**	.624**	1		
(12) information interpretation	.275**	.196**	.284**	.247**	.360**	.240**	.357**	.289**	.412**	.562**	.513**	1	
(13) organization	.252**	.291**	.346**	.335**	.359**	.228**	.364**	.216**	.456**	.517**	.568**	.630**	1

** Correlation is significant at the 0.01 level (1-tailed).

Table A2
Correlations Between Reward Systems And Mas Characteristics

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
(1) reward	1									
(2) scope	.323**	1								
(3) integration	.303**	.501**	1							
(4) timeliness	.319**	.517**	.474**	1						
(5) aggregation	.342**	.533**	.584**	.566**	1					
(6) Improve understanding	.369**	.447**	.470**	.322**	.465**	1				
(7) focus attention	.396**	.395**	.438**	.313**	.443**	.658**	1			
(8) scorekeeping	.485**	.339**	.244**	.326**	.392**	.573**	.515**	1		
(9) Improve learning	.415**	.385**	.304**	.271**	.329**	.544**	.600**	.593**	1	
(10) feedback	.491**	.347**	.376**	.349**	.439**	.431**	.486**	.519**	.408**	1

** Correlation is significant at the 0.01 level (1-tailed).

Table A3
Correlations Between Organizational Learning And Performance

	(1)	(2)	(3)	(4)	(5)	(6)
(1) Knowledge acquisition	1					
(2) Information distribution	.624**	1				
(3) Information interpretation	.562**	.513**	1			
(4) Organization memory	.517**	.568**	.630**	1		
(5) Qualitative performance	.377**	.254**	.318**	.317**	1	
(6) Quantitative performance	.340**	.333**	.390**	.359**	.418**	1

** Correlation is significant at the 0.01 level (1-tailed)

APPENDIX B

REWARD SYSTEM

		Strongly Disagree				Strongly Agree
1	Performance evaluation is based on team achievement.	1	2	3	4	5
2	Individual performance is based on contribution to team's attainment of financial targets e.g. profit.	1	2	3	4	5
3	Individual performance is based on contribution to team's attainment of non-financial targets e.g. customer satisfaction.	1	2	3	4	5
4	The usual basis for awarding reward (e.g. bonus) is flexible; based on the personal assessment of superior.	1	2	3	4	5
5	The usual basis for awarding reward (e.g. bonus) is very objective; based on meeting budget or other quantitative target.	1	2	3	4	5
6	The reward system in my organization encourages team work than individual performance.	1	2	3	4	5
7	The reward system in my organization encourages one to embark on lifelong learning.	1	2	3	4	5

APPENDIX C

Table C1
Reliability And Validity Statistics

MAS characteristics	N	Cronbach alpha	RMSEA	p	CFI	GFI
scope	215	0.8368	0.00	0.75	1.00	1.00
Integration*	218	0.8402				
timeliness	222	0.8639	0.086	0.18	0.99	0.99
Aggregation*	222	0.8141				
Uses of MAS						
Improve understanding	222	0.8374	0.043	0.42	1.00	0.99
Focus attention*	221	0.7591				
Scorekeeping*	221	0.8656				
Improve learning*	221	0.8694				
feedback	219	0.7585	0.063	0.31	0.99	0.99
Reward	221	0.7515	0.081	0.064	0.97	0.96
Organisational Learning						
Knowledge acquisition	220	0.8038	0.067	0.20	0.98	0.96
Information distribution	222	0.7881	0.13	0.05	0.98	0.98
Information interpretation	220	0.7638	0.079	0.17	0.98	0.98
Organization memory	219	0.7949	0.091	0.16	0.99	0.99
Organisational Performance						
Qualitative performance	220	0.7093	0.072	0.26	0.99	0.99
Quantitative performance	221	0.8452	0.068	0.28	1.00	0.99

< 3 questions on the dimension; Confirmatory Factor Analysis is not applicable.
RMSEA = Root Mean Square Error of Approximation
CFI = Comparative Fit Index
GFI = Goodness of Fit Index