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The International Conference on Logistic and Business Innovation (ICLBI) was held on 26–28 September 2018, in Bali, Indonesia. This international conference was a part of CIRAE (International Multi-Conference on Innovative Research and Applied Engineering) and was organized by the Centre for Supply Chain, Centre for Customer Behaviour, and Institute for Community Research & Education and Continuing Education Center, Petra Christian University, Surabaya, Indonesia. The ICLBI conference aimed to bring engineers, economists, business people, academic scientists, and industry researchers to share their research and experience about innovation that are applied in logistics and business. ICLBI 2018 presented three honourable keynote speakers from representative countries: (i) Prof. Béla Pukánszky, Budapest University of Technology and Economics, Budapest, Hungary; (ii) Prof. Sunaryo, University of Indonesia, Jakarta, Indonesia; and (iii) Prof. Walter L. Bradley, Distinguished Professor Emeritus of Mechanical Engineering, Baylor University, Texas, USA (2012) and Professor Emeritus of Mechanical Engineering, Texas A&M University, Texas, USA (2000). After a rigorous selection process, the ICLBI's Scientific & Editorial Board decided to publish 20 selected manuscripts in the KnE Life Sciences Conferences Proceedings. Of the 20 selected manuscripts, nine manuscripts are joint researches between Indonesia and other countries such as Australia, the Republic of China, the Republic of Korea, and Malaysia. These proceedings were edited by professional editors from seven countries (Estonia, India, Indonesia, Latvia, Lithuania, Malaysia, and Sweden). The ICLBI's Scientific & Editorial Boards hope that these proceedings will bring new perspectives to researchers to enhance their research and make fruitful collaborations.

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Conference Paper

The Design and the Use of Management Control System in Developing Organizational Learning

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Abstract

The concept of management control system and organizational learning has drawn the attention of many parties as they began to learn the importance of these tools in organizational sustainability. MCS help to ensure that problem is detected and appropriate decision are made, fundamental changes resulting from correcting the problem will promote organizational learning. The aim of this research is to examine the relationship between the design and the use of management control system in developing organizational learning. More specifically, the study focuses on four elements of organizational learning, namely knowledge acquisition, information distribution, information interpretation, and organizational memory. Two research questions are investigated in this study: i) Does the design of MCS have an impact on the elements of OL? ii) Does the use of MCS influence the elements of OL? The result suggests that there is a positive influence between the design and the use of MCS with Organizational Learning. Use of MCS has more influence on Organizational Learning when compared to the Design of MCS. This is because design will be more meaningful when used and applied.

Keywords: Control framework; information integration; knowledge acquisitom; organizational memory; performance evaluatin.

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1. Introduction

Management control systems (MCS) is a notable function within an organization. The negligence in management control systems will have an impact on the organization that can lead to financial losses and the destruction of market perceived values on the organization [1]. MCS is a compulsory function for an organization in order to gain useful information in applying the management roles, such as decision making, planning and evaluating performance [2]. MCS can change the individuals' perceptions of existing

strategies and structures. Thereby, those individuals, as the members of the organization, can immediately identify new resources to enhance the organization's competitive advantage through organizational learning (OL) [3, 4]. OL enables an organization to adapt to the business environment that has been changing to be more dynamic and competitive by facilitating the creation and retention of knowledge [3, 5--7].

1.1. Problem statement

Research on the relationship between MCS and OL has been done in several previous studies which show significant results in the effect of MCS on OL, in which MCS plays an important role in facilitating OL. However, the discussion of MCS in this study is divided into two aspects, which are the design of MCS and the use of MCS as in the research conducted by Wee et al. [3]. The prior studies often examine these two aspects of MCS on OL separately and show that those two aspects are prominent to OL on their own [8--10]. This study, following Wee et al. [3], investigates both the design and use of MCS on OL in the same framework. In Indonesia, the discussion on MCS is limited to investigating the relationship between MCS and firm performance, not with organizational learning [11, 12]. Therefore, this research will investigate the relationship between design of MCS and use of MCS with OL in Indonesia. This study focuses on qualitative data, and in addition to the previous study, this study examines the effects of design and use of MCS on the four elements of OL, which are knowledge acquisition, information distribution, information interpretation and organizational memory as argued by Kloot [10]. Examining the design and use of MCS simultaneously enables the researchers to improve insights into the relative effects of these two aspects of MCS on the elements of OL.

The remainder of this paper is organized as follows. A review of the literature and the development of hypotheses for this study are presented in the second section. The third section frameworks there search methods adopted in the study. The fourth section presents and discusses the findings of the study. Concluding remarks are then made in the fifth section.

1.2. Research question

1. Does the design of MCS have an impact on the elements of OL?

2. Does the use of MCS influence the elements of OL?

1.3. Purpose of the study

The purpose of this paper is to present the study on relationship between the design and the use of management control system and organizational learning especially in Indonesia.

2. Conceptual model

2.1. Management control system (MCS)

MCS is a process that can convince managers that the resources obtained have been used effectively and efficiently in achieving organizational goals [13]. MCS can be viewed as controlling in organizations, since one of its tools is accounting information system (IAS), performance measurement, reward, and planning or budgetary systems. Instead of focusing on measured performance, some management controls focus on encouraging, enabling, or sometimes forcing employees to act in the organization's best performance [14]. Moreover, some management controls are proactive, they are designed to prevent problems before the organization suffers any adverse effects on [1]. MCS, through the design features, qualifies the organizational learning and has reciprocal impact on the implementation of strategy [15].

MCS can be interpreted as either strategic controls or financial controls [16]. Strategic controls refer to long term objectives which based on information exchange and proper knowledge of markets. In contrast, the financial controls are focusing on short-term financial performance, such as return on investment). MCS has characteristically been designated as tools for implementing the strategy. Coller et al. [17] argues that, in that capacity, MCS has frequently been inspected as ``the use of MCS'' rather than as ``design.'' While, another study reveals that MCS uses should be part of MCS designs [18].

2.2. Design of MCS

The MCS design determines the type of information that the system can provide [3]. An organization must design an MCS while still working to learn faster. The ability to learn faster from competitors in this dynamic and volatile market will be an advantage because who can learn faster will gain a competitive edge [19]. This design can be conceptualized in the form of information character.

Wee et al. [3] cite Chenhall and Morris research in 1986, identifying four characteristics of information that are useful to top management; they are the scope; punctuality; aggregation; and integration. The scope of a broad management control system is that provides information about the external environment, in addition to financial, and future-oriented. Timeliness refers to the speed and frequency of reporting information. Aggregation is a collection of information between periods, and between departments. Integration includes information from certain sub-unit decisions that affect the organization. All these characteristics represent the design of a management control system.

2.3. Use of MCS

Use of MCS is an action or implementation of MCS from a design that has been prepared. MCS is implemented by managers to replace their supervision in performing all control functions ranging from planning, decision making, motivating, coordinating, communicating objectives, providing feedback, and integrating complex activities [10]. Compared with the design of MCS, the use of MCS in previous studies had more influence on organizational learning [3]. There are six major types in the use of MCS: improved understanding, focus of attention, scorekeeping, improvement of learning, performance evaluation, and reward and feedback systems [9, 10, 20--22].

Improved understanding of information in MCS will help management to find weaknesses and dependencies among business units within the organization, evaluate the impact of external events, and examine options. The individual's ability to use the information available in the MCS for decision-making activities depends on the positions in the organizational hierarchy and connections with other members within the organization [3]. The use of MCS by the top management team can act as a precursor to organizational capabilities leading to a strategic choice. The use of MCS supports the implementation of the strategy and implementation of MCS designs actively linked to signals sent across the board to focus organizational attention, stimulate dialogue and support the emergence of new strategies [9]. Concentration includes how the organization highlights the problem area and provides a signal of potential threats to the organization.

Control relates to organizational goals, coordination, and change [10]. Effective control does not only relate to following predetermined procedures and ensuring that individuals have worked productively to achieve the stated goals, but effective control also still provides space for freedom in innovation in achieving goals [23]. Innovation is important in the current business environment which is tightly competitive and full of uncertainty.

Some organizations face that the external environment becomes much more volatile thus have more impact on the organization's performance [24]. In committing to business excellence while dealing with the uncertain environment, an organization must adopt the interactive MCS to manage its business process. The effectiveness of the interactive MCS can be seen from the results which must be monitored regularly. Recording the results of the control includes tracking progress towards the goal, measuring the achievement of the determinants of success, and comparing results with expectations.

Effective MCS can be achieved by improving learning. Learning enhancement is the ability to identify the weaknesses of the strategies used, formulate new strategies, and improve the competitiveness of the products or services produced. MCS can influence the perception that the goals and processes that are being run are no longer meeting external challenges. The use of a broader perspective can provide creative solutions [25]. Information collected by MCS can be used to test whether current strategies and structures are appropriate for use in this dynamic environment.

Achieving the enhanced performance outcomes in the organization is an underlying objective in some management control research. Managers can choose the ways they use control to achieve their goals. Managers can make a decision about their use of control based on expectations (rightly or wrongly) of how their choices affect choices affect future performance [26]. In addition to performance evaluation, MCS can be achieved by implementing a reward system. The reward system states and strengthens the values and norms that cover the organizational culture itself. The design of the reward system can help decision-makers to modify the organizational culture. The reward system is a powerful mechanism that can be used by managers to communicate attitudes and behaviors desired by members of the organization. As time goes on culture can change through clear communication of performance criteria and consistent rewards applications [22].

2.4. Organizational learning (OL)

The phenomenon of organizational learning (OL) in attracting the attention of researchers continues to increase. This has also become a point of controversy regarding learning conducted in or by the organization [27]. There is no single perspective on current learning theory that is right for capturing various relationships and the possibilities that arise from learning and where it is done [28]. Organizational learning is the result of an understanding that arises from the external environment and adaptation of beliefs and behaviors that are compatible with these changes [29].

Organizational learning can be seen in the process of knowledge acquisition, information distribution, information interpretation and organizational memory that can influence organizational behaviors [30--32]. The main focus of organizational learning is a continuous improvement [33, 34]. Through a global economy and dynamic market conditions, companies have realized that continuous improvement in products and processes is needed to create and maintain competitive advantage [35].

To fulfil the information interpretation process, organizations must first determine the nature of learning. In order to determine what learning behavior is needed to develop individual and organizational competencies, some researchers argue that behavioral change must be followed by cognitive change [33, 36]. According to Murray [37], individual competence is very valuable but stored in the human capital of the organization. This competency can be raised through several types of learning systems and organizational learning routines. Individual activities or activities are needed before the implementation of the learning routine. Murray [38] combines individual competencies and organizational competencies to support organizational learning.

2.5. Hypothesis

OL's role is to support sustainable development and to classify organizational traits in a specific organizational learning mechanism in which management views quality programs as successes [39]. In addition, MCS is defined as an organizational control which consists of accounting information systems (including budget and financing systems), performance evaluation systems, planning systems as well as reward systems [39].

Therefore, control can be interpreted as an ongoing process in assessing performance and taking affirmative action as needed; allowing the organization to preserve a high-quality process in addition to control the process hence the development can be carried out [40]. As noted by Simon [41], MCS is very influential in organizational activities. In other words, if MCS is designed to reinforce a learning environment, MCS must be a system that upholds decision-making systems, and assists the progress of effective learning. Moreover, MCS allows acquisition and improvement of information for knowledge creation.

MCS settles the organizations' frameworks to search for information. Accountability and assessments as the evaluation process are formed to certify that MCS well-adopted to dynamic business environment [10, 42]. An MCS of an organization is considered capable of supporting OL through design features and interactively influencing strategy [15].

Based on these matters, this study uses the following hypothesis:

H1: Design of MCS has to influence organizational learning

H2: Use of MCS has to an influence on organizational learning

3. Research methodology

The analysis model used in this study is multiple linear analysis. Figure 1 shows the model used to examine the effect of the relationship between Design of MCS and Use of MCS on OL:

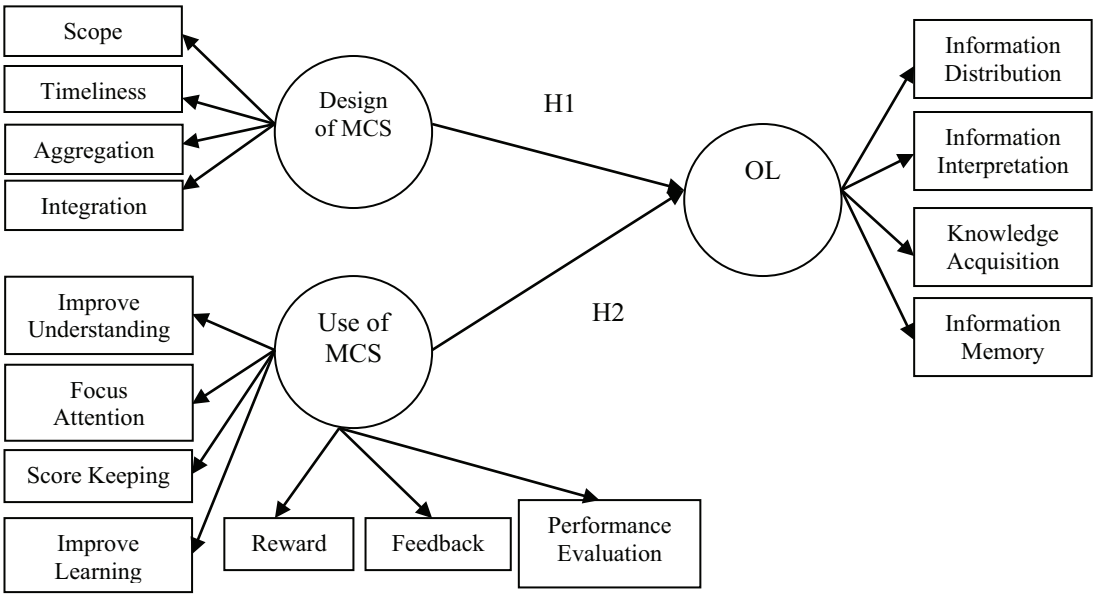

Figure 1: Research framework

The statistical equation shown in Equation 1:

$$OL = \beta_0 + \beta_1 \times DOM + \beta 2 \times UOM + \epsilon \quad (1)$$

Where:

OL = Organizational Learning

DoM = Design of MCS

UoM = Use of MCS

β0 = constant

β1- β2 = coefficients

ε = error

This study uses a Likert scale as the measurement tools in collecting the data. The type of data used is quantitative data (numerical data) which is then analyzed

by statistical methods. Source of data used is primary data collected from respondents, who are managers, through filling out questionnaires. In this study, questionnaires are used to collect data regarding the design of MCS, use of MCS and OL in 30 companies in Indonesia. This questionnaire is adapted from previous research [3].

Data analysis techniques consist of validity, reliability testing and hypothesis testing by WarpPLS. The analysis will be carried out with the help of WarpPLS software. Partial Least Square (PLS) is part of Structural Equation Modeling (SEM). The purpose of using WarpPLS is to predict the impact of the independent variable (X) on the dependent variable (Y) and explain the relationship between these variables. This analytical technique is able to provide accurate results and can be used on a small sample scale. There are two models namely the outer model and the inner model. The outer model consists of testing validity and reliability.

4. Findings

Based on Table 1 it can be concluded that each indicator that is in a latent variable has a difference with indicators in other variables indicated by a higher loading score in its own construct. Thus, the model has good discriminant validity. Based on Table 2, composite reliability and Cronbach's alpha, both have fulfilled the rule of thumb. All composite reliability values are above 0.7 and the value of Cronbach's alpha has been above 0.6 which indicates that this research model has been reliable.

Table 1: The outer model

No.	Variables and Items	Measurements	Loading Factor	Average Descriptive	*P*- value
		DESIGN OF MCS			
1	DESIGN1	Information that relates to projected future financial results under different scenario (e.g. sales under forthcoming new government legislation, competitors' new products).	0.841	3.40	< 0.001
2	DESIGN 2	Non-financial information that measures production efficiency, output rates, employee abs entries m, etc.	0.674	3.77	
3	DESIGN 3	Non-financial information that measures market size, growth share, customer satisfaction.	0.768	3.37	
4	DESIGN 4	Non-financial information that measures innovation and new product/service introduced.	0.787	3.29	
		USE OF MCS			
		IMPROVING UNDERSTANDING			
		How often do you us e accounting information to:			

TABLE 1: Continued

No.	Variables and Items	Measurements	Loading Factor	Average Descriptive	*P*- value
1	USE 1	Identify weakness.	0.622	3.69	< 0.001
2	USE 2	Evaluate impact of external event.	0.799	3.60	
3	USE 3	Explore options	0.845	3.63	
		FOCUSING ATTENTION			
		How often do you us e accounting information to:			
4	USE 4	Highlight problem areas.	0.673	4.09	< 0.001
		SCOREKEEPING			
		How often do you us e accounting information to:			
5	USE 5	track progress towards goals	0.764	4.03	< 0.001
		ORGANIZATIONAL LEARNING			
		KNOWLEDGE ACQUISITION			
1	ACQ 1	Our management proactively addresses problems.	0.658	3.86	< 0.001
2	ACQ 2	Our management monitors important organizational performance indicators.	0.79	4.06	< 0.001
3	ACQ 3	Our management learns from organization's partners (such as customer, suppliers , allies)	0.615	4.17	< 0.001
4	ACQ 4	Our management is interested in the strategies of competitors.	0.564	3.91	< 0.001
5	ACQ 5	Our management learns new things about your organization by direct observation.	0.831	3.91	< 0.001
6	ACQ 6	Our organization collects data on market or consumer-related information, such as customer preferences, employee attitudes of government and consumer bodies, competitive threats, etc.	0.809	3.80	< 0.001
		INFORMATION DISTRIBUTION			
1	DIS 1	Our employees make extensive use of information resources available in the system to support their work	0.654	4.06	< 0.001
2	DIS 2	Our top management integrates information from different organizational areas.	0.807	4.00	< 0.001
3	DIS 3	Our employees share information (such as numbers, plans, idea) with other employees.	0.739	3.91	< 0.001
4	DIS 4	When our employees need specific information, they know who will have it.	0.767	3.97	< 0.001
		INFORMATION INTERPRETATION			
1	INTR 1	Our organization is quick to react to technological change	0.81	4.00	< 0.001
2	INTR 2	Our employee has a large variety of communications tools (telephone, email, internet, and so on) from which to choose.	0.86	4.51	< 0.001

Table 1: Continued

No.	Variables and Items	Measurements	Loading Factor	Average Descriptive	*P*- value
3	INTR 3	Our employees do not res is t changing to new ways of doing things.	0.835	3.83	< 0.001
4	INTR 4	Our employees are encouraged to communicate clearly.	0.826	4.23	< 0.001
5	INTR 5	Our management encourages the use of frameworks and models to assist in decision-making.	0.776	4.00	< 0.001
		ORGANIZATION MEMORY			
1	MEM 1	Our organization stores detailed information for guiding operations.	0.819	4.06	< 0.001
2	MEM 2	Our organization makes extensive use of electronic storage (such as database, data warehousing, scanned documents).	0.835	4.23	< 0.001
3	MEM 3	Our employees us e electronic means to communicate.	0.794	4.49	< 0.001
4	MEM 4	Our employee retrieve achieved information when making decisions.	0.805	4.03	< 0.001

Table 2: Reliability test

	Composite Reliability	Cronbach's Alpha
Design of MCS	0.853	0.768
Us e of MCS	0.86	0.796
Acquisition	0.863	0.806
Distribution	0.831	0.728
Interpretation	0.901	0.853
Memory	0.887	0.829

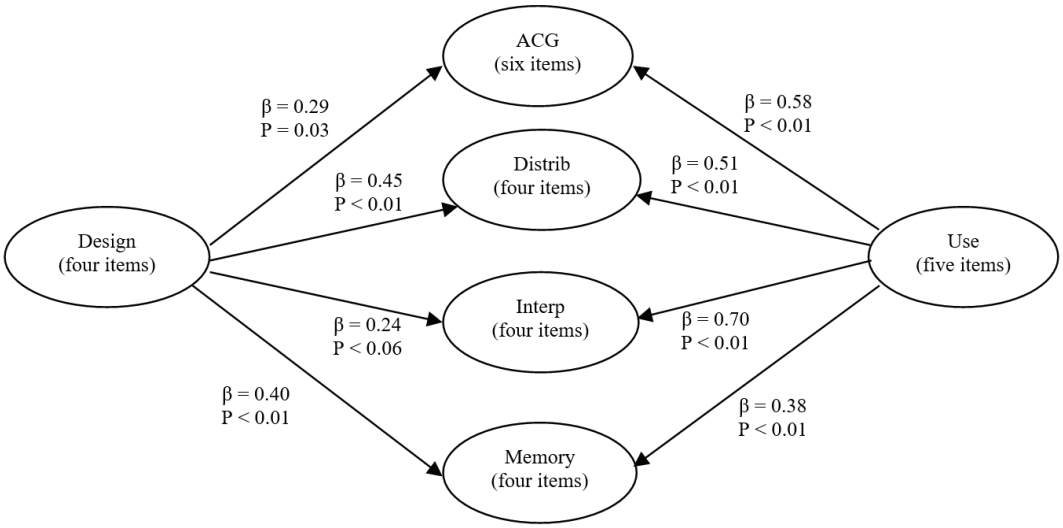

Figure 2: The inner model

The equations resulted from the inner model tests as shown in Figure 2:

$$ACQ = 0.29 \times DESIGN + 0.58 \times USE \qquad R^2 = 0.568 \qquad (2)$$

$$DISTRIB = 0.45 \times DESIGN + 0.51 \times USE \qquad R^2 = 0.661 \qquad (3)$$

$$INTERP = 0.24 \times DESIGN + 0.70 \times USE \qquad R^2 = 0.678 \qquad (4)$$

$$MEMORY = 0.40 \times DESIGN + 0.38 \times USE \qquad R^2 = 0.419 \qquad (5)$$

Variations in the ACQ variable (Equation 2) can be explained by the design variable of MCS and the use of MCS by 56.8 %. Variations in DISTRIB variables (Equation 3) can be explained by the design variables of MCS and Use of MCS by 66.1 %. Variations in the INTERP variables (Equation 4) can be explained by the design variables of MCS and the use of MCS by 67.8 %. Variations in MEMORY variables (Equation 5) can be explained by the design variable of MCS and the use of MCS by 41.9 %.

Overall it can be seen that the design variables of MCS and the use of MCS are positively associated with OL. The use of MCS and the design of MCS simultaneously most strongly influence interpretation, although partially the design significance of MCS is weaker than the use of MCS. The design of MCS most strongly affects distribution. This can be seen from the coefficient (0.45) which is the largest among the other coefficients and also supported by the P-value of less than 0.01. While the use of MCS most strongly influences interpretation (coefficient = 0.70) and is also supported by a P-value of less than 0.01. The P-value limit in this study is 5 %. These criteria are met by all relationships tested except the relationship of the design of MCS to interpretation.

In this study, OL is specifically examined according to its components, which are information acquisition, information distribution, interpretation, and memory. The components of knowledge acquisition are proven to be influenced by the design of MCS by 29 % and the use of MCS by 58 %. This result shows that the use of MCS influences the organization more in gaining new knowledge about the company, both knowledge about competitors' strategies, consumers, and discussing other company issues proactively. Use of MCS facilitates employees in highlighting problem areas, exploring options and evaluating company performance compared to expectations in order to always acquire new knowledge, therefore, the Use of MCS has more influence on information acquisition than the design of MCS.

The information distribution component is proven to be influenced by the design of MCS by 45 % and the use of MCS by 51 %. These results indicate that the Use of MCS

has a little more influence on information distribution within the company, but at the same time, it needs to be seen that the design of MCS has the greatest influence on the information distribution component compared to other components in OL. Design of MCS talks about availability and access to information for companies. While the information distribution speaks of the organization's ability to learn through employees who can use the information available in the company to support work, the integration of information in various areas of the company, employees share information such as ideas and plans and employees know who has the information needed. Therefore, the design of MCS has the greatest correlation with information distribution, but for organizational learning is not enough only supported by the availability of information (Design of MCS) but how information is managed for decision making (Use of MCS), so that the Use of MCS has a little more influence on information distribution component in OL.

The component of information interpretation is proven to be influenced by the design of MCS by 24 % and the use of MCS by 70 %. These results indicate that the use of MCS has more influence on information interpretation. Information interpretation speaks about the organization's readiness to deal with changes around it, such as changes in technology, how employees are encouraged to communicate information clearly and make decisions using models or frameworks. Use of MCS facilitates OL, especially the interpretation of information by encouraging employees to identify weaknesses and potential problems of the company in order to formulate new strategies that are always relevant to change.

In the memory component of the organization, it is proven to be influenced by the design of MCS by 40 % and the use of MCS by 38 %. These results indicate that the Design of MCS has a little more influence on organizational memory than the use of MCS. Organizational memory talks about how companies collect, manage and store information for work guidelines. This component is more associated with the design of MCS because both talk about the availability, access, and storage of information while associated with the Use of MCS through the management of information for decision making. The results of this study are similar to the results of previous studies by Wee, Foong and Tse. [3] which states that both design and use of MCS are both positively associated with OL (knowledge acquisition, information distribution, interpretation of information and organizational memory) in organizations. However, when compared, the Use of MCS has more influence on OL (knowledge acquisition, information distribution, information interpretation) than the Design of MCS on OL (organizational memory). A good design of MCS is needed, but it is not enough to just use the design of MCS so OL can occur. The use of MCS (Use of MCS) by members of the organization both formally

and informally can produce a significant impact on OL activities within the organization. Senior managers must be able to balance the need to manage information flows and the need to facilitate OL to determine the level of MCS usage by subordinates. Lower level managers must recognize the fact that not all relevant information for decision making can be made available through MCS so that the search for information from various sources is still needed.

5. Managerial implication and conclusion

Management Control System (MCS) is an ongoing system in evaluating performance and conducting correction though needed; allowing organizations to provide and control excellent systems so that advancement can be carried out. An MCS is able to support organizational learning as a result of effective design features. The well design features may also interactively influence the organizations' strategy. The design and application of MCS are very influential in organizational activities. In other words, if MCS is designed and used to support Organizational Learning (OL), then MCS must be able to become a system that strengthen decision-making processes, facilitates the effectual learning along with alleviates the acquisition of information in order to organize organizations' knowledge.

There is a positive influence between the Design of MCS and Organizational Learning. A good MCS design can improve OL's ability to obtain information on organizational memory. Thus the first hypothesis is accepted. There is a positive influence between the Use of MCS and Organizational Learning. The use of good MCS can improve OL's ability in knowledge acquisition, information distribution, and information interpretation. Thus the second hypothesis is accepted. Use of MCS has more influence on Organizational Learning when compared to the Design of MCS. This is because design will be more meaningful when used and applied. Similarly, the MCS design will be more influential when used and applied appropriately.

Besides the Use of MCS, the Design of MCS must also be considered. Good design will also produce good use too. For this reason, organizations need to be aware of the importance of designing MCS appropriately to support the use of MCS to support OL. The scope of access to information acquisition must be expanded so that each member of the organization can obtain relevant information easily. Complete and transparent information held by members of the organization can support the smooth running of OL because all the information needed is available and known. The changing times encourage organizations to continue to make changes to adjust to these changes.

Organizations must be more focused on OL and not conservative through the design and use of MCS. Control and learning systems using advanced technology are also recommended so that information can be obtained and managed accurately and credibly.

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