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The Intricate Links Among Culture, Structure And Knowledge Management

Quang Linh Huynh[1], Lisa Soon[2]
[1]*Faculty of Economics Laws, Tra Vinh University, Tra Vinh, Vietnam*
[2]*School of Technology and Engineering, Central Queensland University, Brisbane, Austarlia*

ABSTRACT: *The causal relationships of organizational culture with organizational structure and with the implementation of knowledge management are quite complicated. No prior studies have explored these causal relationships in a joint model. Grounded on the concepts of prior research, this research applies path analysis to simultaneously investigate the causal relationships in a proposed joint research model. It also examines how organizational structure intervenes with the causal relationship between organizational culture and the implementation of knowledge management. The findings report that organizational culture makes statistically significant influences on organizational structure and the implementation of knowledge management that is statistically explained by organizational structure. The effect of the organizational culture on implementation of knowledge management is statistically mediated by organizational structure. This research has some implications on how business managers should adopt knowledge management facing different types of organizational culture and organizational structure.*

KEYWORDS: *Organizational Culture, Organizational Structure, Knowledge management*

I. INTRODUCTION

Organizational culture is a workplace climate that is created from the communication, cooperation, and interaction among the people in an organization. The interaction and behaviors of employees contribute to a unique cultural environment of an organization. The dynamic view proposes that organizational culture plays an important role in helping an organization cope with its business environment. The organizational culture is related to the structure that an organization chooses and will influence the way an organization manages their knowledge in order to achieve their business performance.The effect of organizational culture on the implementation of knowledge management has been empirically investigated in previous studies ([21]; [5]). However, the impact of organizational culture on organizational structure has been scarcely explored. To the best of our knowledge, only a study of [12] examines the influence of organizational culture on organizational structure. Nonetheless, the study measured the dimensions of organizational culture about the organizational employees who are Japanese citizens and American citizens of Japanese descent. These measurements of organizational culture are based on national attributes, while the attributes are referred to as innovative climate and cooperative climate, trust, communication, and coordination among people in an organization ([9]; [18]).

This research adopts this definition of organizational culture to investigate the influence of organizational culture on organizational structure. We concur with [20] on mediating influences and argue that organizational structure mediates the relationship of organizational culture with the implementation of knowledge management. Previous studies have limitations. When they examined how organizational culture impacts on organizational structure and the implementation of knowledge management, they only explored the causal relationships between organizational culture and the other variables, but have not empirically investigated the mediating effect of organizational structure over the causal relationship between organizational culture and the implementation of knowledge management. This research applies path analysis to investigate the casual relationships among organizational culture, organizational structure and the implementation of knowledge management. It then utilizes Sobel's method to explore how organizational structure mediates the casual relationship.To the best of our knowledge, this research is the first to employ the path analysis, which is an extension of the regression model to estimate a set of simultaneous equations and to examine the mediation of one variable on the relationship between other variables to explore the causal associations among organizational culture, organizational structure and the implementation of knowledge management.

It is also the first to utilize Sobel's method to examine the mediation of organizational structure on the relationship of organizational culture with the implementation of knowledge management. The research empirically conducts a data collection in Vietnam as a developing nation where the business environment is considerably changeable. The findings on the mediating role of organizational structure as well as the causal relationships among organizational culture, organizational structure and the implementation of knowledge management will provide researchers and managers with a further understanding of the complicated relationships among organizational culture, organizational structure, and the implementation of knowledge management. Particularly, it will help managers in developing economies make better decisions on the implementation of knowledge management in business, resulting in more attention given to their organizational cultured and structure, in order to achieve better performance. The rest of the research is structured as follows. The next section is a literature review which develops hypotheses. Then, the research methodology is discussed, followed by a section on results. The final section delivers some conclusions.

II. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

This literature review explores how an adopted organizational culture relates to the organizational structure and how it will affect the way an organization manages their knowledge to achieve their business performance. Literature in organizational culture, organizational structure and knowledge management implementation will be reviewed. Schmidt [17] defines organizational culture as values, norms, and behaviors which characterize the organization and its working environment. He also refers to the attributes of organizational culture as innovative and cooperative working environments, trust, communication, and coordination among members, as well as accessibility of leadership and power relationships. It is indicated in previous studies that organizational culture affects the implementation of knowledge management. Organizational culture particularly determines the types of organizational structure. However, the relationship between organizational culture and the implementation of knowledge management is suggested as being moderated by organizational structure. These relationships will be discussed in the following sections.Organizational knowledge creates business success in the dynamically changing environment. The management of knowledge will lead to competitive advantage. Lakshman [10] regards knowledge management as an organizational capability that guides its staff to work together to generate, capture, share, and leverage their collective knowledge to enhance their performance. The previous studies ([7]; [11]) define the implementation of knowledge management as the extent to which organizations are contented with the adoption levels of their knowledge management resulting in different levels of knowledge sharing and knowledge application. Organizational structure plays a vital role in organizations, as it provides an efficient system of work and communication. Like Rogers [16], Chen and Huang [2] define organizational structure as a variable of decentralization (versus centralization), mutual adjustment (versus formalization), and integration. Rogers [16], and Chen and Huang [2] explain the variables as follows. Decentralization refers to the extent to which companies design their organization to authorize decision-making power. Decentralization can differ, from centralizing decision-making power to decentralizing decision-making power. Mutual adjustment refers to the degree the rules and procedures are formalized. Mutual adjustment can varies such as formalized and in-formalized. Integration is defined as the extent to which employees and task assignments are integrated in dealing with work such as making no integration and making integration. This research uses the above definition for organizational structure.

When examining the impact of organizational structure, environment, and the interdependence on the perceived usefulness of management accounting systems, Chenhall and Morris [3] propose that organizational structure affects the adoption of management systems. Firms characterized as decentralized adopt more sophisticated management practices than firms characterized as centralized ([1]). Furthermore, Chen and Huang [2] discover that organizational structure is positively related to the sharing and implementation of knowledge. Yap et al. [21] argue that when knowledge is applied in business, organizational structure should always be taken into account. Hence, organizational structure is considered to impact on the implementation of knowledge management. In addition, the findings of [5] reveal that organizational structure plays an important role in the effectiveness of knowledge management implementation. The above discussions help us posit the hypothesis below.

H1: organizational structure predicts the implementation of knowledge management

Organizational culture refers to innovative cooperative climate ([9]), trust, communication, and coordination among employees ([18]). The effect of organizational culture on firm performance has long been studied by researchers on organizational performance. They often agree with the notion that a "strong" culture will lead to better outcomes, such as greater productivity and profitability. A "strong culture" produces much more consensus among members in an organization. Chen's and Huang's research on "how

organizational climate and structure affect knowledge management" [2] reveals that organizational interaction considered as organizational culture positively impacts on the sharing and application of knowledge. According to [21], organizational culture should be taken into consideration when knowledge management is applied to business. Organizational culture is proposed by [5] to play a vital role in the implementation of knowledge management. Furthermore, Magnier-Watanabe et al. [13] suggest that knowledge management activities need to be tailored to organizational culture; while Erwee et al. [6] find out that organizational culture affects both knowledge management strategies and process. Lincoln et al. [12] attempt to test cultural influence on organizational structure and they affirm that organizational culture is related to the dimensions of organizational structure. They offer strong evidence that specialization is explained by the cultural variable, but provide weak evidence on the association between centralization of decision making, formalization of rules and procedures, and vertical differentiation with organizational culture. It is reckoned that some dimensions of organizational culture are suitable to some organizations with different organizational structures. For example, the cultural variables of communication and coordination may lead to the organizational structures of adjustment and integration. Based on the above arguments, we produce the hypotheses below.

H2: organizational culture predicts the implementation of knowledge management
H3: organizational structure is influenced by organizational culture

Spencer [20] argues that when: (1) an independent variable has significant effect on a dependent variable and also on a third variable, and (2) simultaneously this third variable is significantly associated with the dependent variable, the third variable can be hypothesized to mediate the relationship between the independent variable and the dependent variable. Moreover, Mia [14] argues that if there is a relationship between two variables partly through a third variable, then the third variable can be considered to have a mediating role in the relationship between the two variables. Our hypotheses H1, H2 and H3 along with the arguments of [20] and [14] enable us to conjecture the hypothesis 4 in which organizational structure is regarded as a mechanism to convert the effect of organizational culture into knowledge management implementation.

H4: organizational structure mediates the influence of organizational culture over knowledge management implementation.

The above hypotheses will be used as a foundational knowledge to produce a proposed research model below. Having explained the hypotheses derived from the reviewed literature, we arrive at the model in Figure 1. We would like to discuss the research methodology that we use to guide the data collection and facilitate the data analysis in the following section.

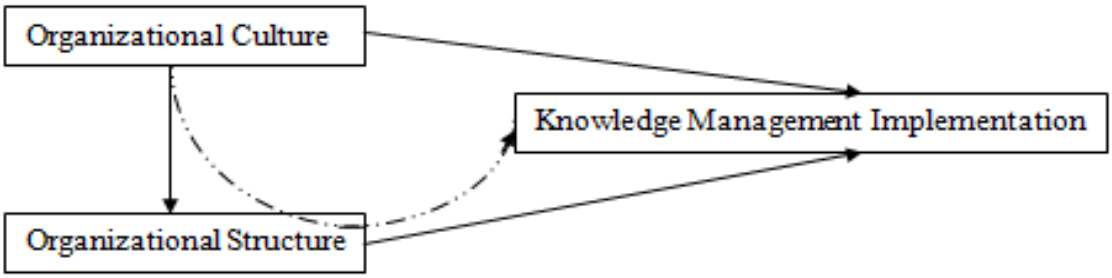

Figure 1**:** Research Model

III. RESEARCH METHODOLOGY

The sample for this research comprises companies that are publicly listed on Ha Noi's and on Ho Chi Minh's Stock Exchanges in Vietnam. Before performing the data collection, we conducted a pilot test for construct measurements with 20 knowledge managers or managers involved in knowledge management to ensure that our construct measurements are valid and appropriate for this study ([4]). Of the sample, only 625 firms went public in or before 2009, which are chosen for this research. Firstly, the initial solicitations were carried out to obtain responses from key informants with experience in knowledge management. For each of these firms, we contacted a knowledge manager or a manager involved in knowledge management to complete a questionnaire by email (395 companies) or in person (230 companies). Of the 230 questionnaires that were scheduled to be performed in person with the respondents, only 181 offered positive outcomes with useful answers. Of 395 questionnaires that were emailed, 294 were returned, in which 57 questionnaires did not provide enough information as required, and only 237 provided complete answers. Finally, we obtained 418 useful replies with sufficiently required information for our research.

The three main variables for this research are constructed as follows. *Implementation of Knowledge Management (IKM)* is evident in an organization when any of the five items below exists: (1) knowledge sharing between supervisors and subordinates- IKM1, (2) knowledge sharing among colleagues- IKM2, (3) knowledge sharing across the units- IKM3, (4) effective management of different types of knowledge sources- IKM4, as well as (5) practical application of knowledge- IKM5. The 5 items above are adapted from [7] and [11]. Measuring IKM, we used a five-point scale as: highly dissatisfied, dissatisfied, a little satisfied, fairly satisfied, and highly satisfied. The five scale points indicate different levels of organizational achievements in each dimension of knowledge management over the last three years. *Organizational Structure (OST)* is of three types: decentralization (OST1), mutual adjustment (OST2), and integration (OST3). A five-point scale is used to assess the three types of organizational structures. (1) Decentralization ranges from 1.centralizing decision-making power to 5.decentralizing decision-making power. (2) Mutual adjustment ranges from 1.formalized to 5.informalized. (3) Integration ranges from 1.no integration to 5.integration. The types and scales are adapted and slightly modified from [16] and [2]. *Organizational Culture (OCU)* is made up of innovative climate (OCU1), cooperative climate (OCU2), trust (OCU3), communication (OCU4), and coordination (OCU5). The 5 OCUs are measured by using a five-point scale ranging from 1.never occurred to 5.always occurred. They are adapted from [9] and [18].

Before testing the causal relationships in the model, we employed a reliability analysis to test the properties of measurement scales and the items that make up the scales. Reliability analysis is used to assess the degree to which multiple measures of the same scale agree with one another ([15]). It offers information about the associations between individual items in the scale. If the relationship is strong, the scale will yield consistent outcomes and so is reliable. To test the items that make up the scales, a factor analysis was conducted to assess the construct validity. Factor analysis is a method used to determine underlying variables (or factors) and identify whether items are linearly correlated to their own underlying factors ([8]). Items should be strongly related to their own factors so as to achieve internal consistency. Next, path analysis was used to explore the casual relationships among organizational culture, organizational structure and the implementation of knowledge management. Path analysis is an extension of the regression model which is used to estimate a set of simultaneous equations and to examine the mediation of one variable on the relation amongst other variables ([8]). Finally, this research uses the technique suggested by [19] to test the significance for the mediating role of organizational structure in the relationship between organizational culture and the implementation of knowledge management in business.

IV. EMPIRICAL RESULTS

The results of the reliability are presented in Table 1. Table 1 is developed to explain how we established reliability of the 3 scales (Organizational culture – OCU; Organizational structure – OST; Implementation of Knowledge management – IKM) that we adopt in this research.

Table 1: Reliability

Scales	No. of items	Item deleted	Item-total correlation deleted	No. of items after deletion	Alphas
Organizational Culture (OCU)	5	OCU5	0.241	4	0.877
Organizational Structure (OST)	3			3	0.868
Implementation of Knowledge Management (IKM)	5	IKM5	0.398	4	0.879

The items OCU5 (coordination) and IKM5 (practical application of knowledge) are removed to improve the reliability, since their item-total correlations are less than 0.5 ([15]). After deletion, for the constructs of organizational culture and knowledge management, each of them only consist of four items, whereas the number of items for organizational structure still remains as three items. The constructs together with retained items achieve the alpha values of above 0.7 as an acceptable limit as [15] recommended. Therefore, all the retained items (11 items) are consistent with the scales (3 scales as OCU, OST and IKM) and will be reliable for use in further analyses. The 11 retained items further went through a factor analysis for construct validity. Table 2 exhibits the results of factor analysis which suppresses coefficients below 0.3. Construct validity is the degree to which a set of observed variables actually reflect their own theoretical latent construct. In order to assess the construct validity, convergent validity and discriminant validity are tested based on the factor loading which is 0.4 or greater, and on the cross-loading which is greater than 0.3 ([15]). Convergent validity reflects the degree to which the items of a specific factor converge or share a high amount of variation in common, while discriminant validity is known as the extent to which a

factor is truly different from other factors ([8]). In addition, the Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO) and Communalities are suggested to be greater than 0.7 and 0.5 respectively, as the smallest acceptable levels recommended by [8]. Table 2 elicits that the factor loadings are well over 0.4. All the cross-loadings exceed 0.3 with KMO of 0.811. In addition, the communalities all surpass the 0.5 level. Hence it is reasonably assured that all our retained items satisfy the construct validity and reliability. This allows us to reasonably retain all these 11 variables for further analyses.

Table 2: Factor Loadings

Item	Factor			Communalities
	1	3	4	
OCU1		0.761		0.617
OCU2		0.865		0.759
OCU3		0.898		0.815
OCU4		0.863		0.770
OST1			0.882	0.792
OST2			0.882	0.788
OST3			0.883	0.796
IKM1	0.804			0.670
IKM2	0.862			0.774
IKM3	0.868			0.755
IKM4	0.885			0.794
KMO	0.811			

Next path analysis is further applied to investigate the casual relationships among organizational culture, organizational structure and the implementation of knowledge management simultaneously. It also explores how organizational structure mediates the relations of organizational culture with the implementation of knowledge management. Before applying path analysis, new composite variables for each factor are created. The 11 retained items produce three new composite variables- namely OCU, OST and IKM, which represent the variables "organizational culture", "organizational structure" and "the implementation of knowledge management". The results of path analysis are demonstrated in Figure 2 as a causal model of organizational performance. The causal model obtained from path analysis suggests organizational culture and organizational structure directly affect the implementation of knowledge management at the 0.001 and 0.05 respectively. The result of path analysis also confirms the statistically significant direct effect of organizational culture on organizational structure with the correlation of 0.211 at the 0.001 level. In addition to the direct impacts, organizational culture still make indirect influence on the implementation of knowledge management through organizational structure, in which the total effect is a sum of the direct and indirect effects. The total effects of organizational culture on the implementation of knowledge management are 0.242 (0.220 + 0.211*0.106 = 0.242). As a consequence, we concur with [20] and [14], and argue that organizational structure may mediate the impact of organizational culture on the implementation of knowledge management. The above findings confirm that our hypothesis H1 for the association between organizational structure and the implementation of knowledge management just achieves statistical significance at the 0.05 level with the estimate of 0.106; while our hypotheses H2 and H3 that organizational culture determines the implementation of knowledge management and organizational structure are statistically supported at the 0.001 significance level, while. We can argue that a company that has a strong culture and a good structure is more likely to apply knowledge management in order to maintain competitive advantages over their rivals. Furthermore, organizational culture is suggested as an important factor determining the types of structure an organization would choose to suit its business activities.

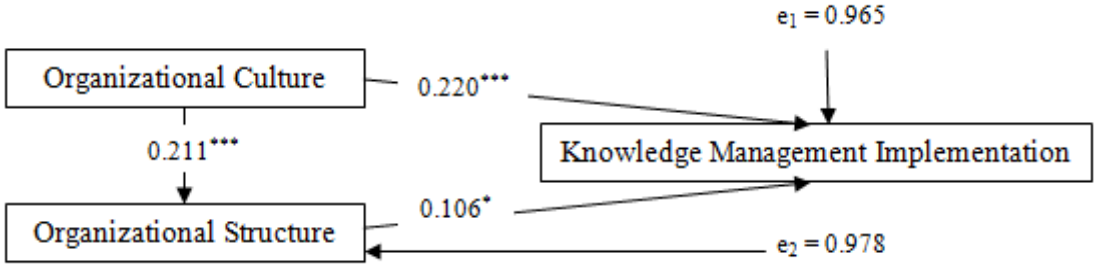

Figure 2**:** Path diagram representing a hypothesized causal model
*(Significance Level: *= 0.05, ***= 0.001)*

The above path analysis proposes the mediating effect of organizational structure; however it does not provide procedures to test the statistical significance for the mediating role. This research uses the

technique by [19] to test the significance for the mediating effect of organizational structure on the relationship between organizational culture and the implementation of knowledge management. Sobel's [19] procedure examines the statistical significance for the indirect effect of the mediating variable by testing the null hypothesis that states no difference between the total effect and the direct effect. Based on Sobel's technique, the mediating influence of organizational structure on the association of organizational culture with the implementation of knowledge management is investigated with the set of two equations as displayed below. A t-test is used to test the indirect effects, with t-statistics as a ratio of the indirect coefficient to its standard error.

For knowledge management implementation: $IKM = a_1 + b_1*OCU + c_1*OST$

$OST = a_2 + b_2*OCU$

Table 3: Indices for Sobel tests

Mediation	Relation	$t_{indirect}$	P_{value}
OST	OCU and IKM	1.9781	0.024

A summary for the Sobel test are exhibited in Table 3. The result for the mediating-test indicates that the effect of organizational culture on the implementation of knowledge management is mediated by organizational structure at the statistical significance level of 0.05 with the $t_{statistics}$ of 1.9781. As a result, our mediating hypothesis H4 is significantly supported. This implies that when organizational structure is included to predict the implementation of knowledge management, it will weaken the direct causal relationship of organizational culture with the implementation of knowledge management.

V. CONCLUSION

Previous studies have explored the effects of organizational culture on organizational structure and the implementation of knowledge management in different research models. In examining the relationship between organizational culture and organizational structure, they only use the proportion of the organization's employees by nationality as a proxy for organizational culture. This research applies the five items (as innovative climate- OCU1, cooperative climate-OCU2, trust- OCU3, communication- OCU4, and coordination-OCU5) to construct organizational culture. It utilizes path analysis to simultaneously investigate the effects of organizational culture on organizational structure and the implementation of knowledge management in a joint research model. Furthermore, it is the first research to investigate how organizational structure mediates the effects of organizational culture on the implementation of knowledge management. The results demonstrate that organizational culture affects the type of organizational structure, and the level of knowledge management implementation. The type of organizational structure that an organization chooses will influence the level of knowledge management that the organization will adopt, and hence will impact differently on the organizational performance. These findings are consistent with prior studies that explored how organizational culture influences organizational structure and the implementation of knowledge management. The results also imply that organizational structure weakens the direct causal relationship of organizational culture with the implementation of knowledge management. The research findings will help managers in developing countries to better understand the complex relationships of organizational culture with: organizational structure and the adoption of knowledge management in a business context. Hence, it helps them make better decisions on implementing the types of culture, structure as well as knowledge management, so that their organization will achieve the best possible performance.

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