Linking Organizational Knowledge Management Drivers to Knowledge management Performance: An Exploratory Study

Sung-Ho Yu
Samsung SDS
Sungho.yu@samsung.com

Young-Gul Kim
Graduate School of Management
domino2@unitel.co.kr

Min-Yong Kim
School of Management
andy@khu.ac.kr

Abstract

Despite the active interest in managing organizational knowledge as a strategic resource, most organizations do not yet understand the challenges involved in implementing knowledge management initiatives. Much of the knowledge management literature has been either conceptual or based on individual implementation cases. This study aimed at identifying the several key drivers for developing organizational knowledge management capability and examining their relationships with knowledge management performance. Using data collected from the 66 Korean firms, the study found that knowledge management drivers such as learning orientation, knowledge sharing intention, knowledge management system quality, reward, and knowledge management team activity were significantly related to the organizational knowledge management performance – knowledge quality and user knowledge satisfaction. The study also found that the knowledge management stage of an organization moderates the relationship between some of the knowledge management drivers and knowledge management performance variables.

1. Introduction

Facing the knowledge-based competition, many organizations have begun to reexamine and rearrange their culture, structures, information technologies, and business processes from a knowledge perspective. By implementing knowledge management initiatives, organizations expect to gain the capability of managing their knowledge and, ultimately, to achieve superior performance [27, 40]. Despite the active commitment toward better knowledge management, however, organizations are struggling with their knowledge management implementations [25]. First, a lack of a proper framework for assessing the current status of knowledge management has cast doubt over the basic concept itself [32]. Second, organizations suffer from difficulties in evaluating performance of their knowledge management initiatives [12].

To address these problems, this study identifies key drivers of organizational capability for knowledge management and investigates their relationships with knowledge management performance in terms of knowledge quality and user knowledge satisfaction. To provide a contingent perspective reflecting the organization-specific knowledge management context, we also examine the moderating effect of knowledge management stage on the relationships between knowledge management drivers and knowledge management performance..

2. Theoretical Background

2.1. Resource-based view and organizational capability

The resource-based view of an organization [3] emphasizes the identification of organizational resources and assessment of capability for utilizing them. Knowledge management is a representative paradigm reflecting this view of the firm [40]. In terms of resources, knowledge is viewed by many as the most valuable resource, inimitable by others and sustainable if once acquired [18, 43]. In knowledge management, a capability is an organizational ability of acquiring, maintaining, and utilizing its knowledge assets in a business for its sustainable competitive advantage [7, 27, 45]. Therefore, an organization should be able to identify strategic knowledge resources and build knowledge-based capability, toward a successful institutionalization of knowledge management [15].

2.2. Social capital and knowledge management enablers

Nahapiet&Ghoshal[33] defined *social capital* as "the sum of actual and potential resources embedded within, available through, and derived from the network of relationships possessed by a social unit". Social capital is believed to be a driving force of collective behavior or social activities of members within one social system [6]. Nahapiet&Ghoshal [33] assert that social capital could facilitate combination and exchange of knowledge, two generic processes for creating intellectual capital, or vice versa. Gold et al. [17] proposed three key infrastructures that were expected to maximize social capital: a structural infrastructure referring to the presence of norms and trust mechanisms, a cultural infrastructure referring to shared contexts about creating and sharing knowledge, and a technological infrastructure addressing technology-enabled ties within an organization. They argue that the infrastructure perspectives provide a useful theoretical foundation for defining important aspects of organizational capability.

2.3. Performance of knowledge management

While the ultimate goal of knowledge management is the improvement of organizational performance, such linkage is obscure and difficult to be empirically validated due to an extremely large number of internal and external factors affecting organizational performance [4, 11, 38]. Therefore, Lee [28] suggested more immediate indicators of knowledge management performance such as knowledge quality and level of knowledge sharing. Fernandez&Sabherwal [14] measured end user satisfaction with knowledge management implementation. These indicators can be considered as immediate outcomes of knowledge management and more direct measures of knowledge management performance.

3. Research model and hypotheses

3.1. Research model

Based on the theoretical discussions on organizational capability, knowledge management enablers, and knowledge management performance, this study developed a research model (cf: Figure 1) with nine knowledge management drivers over three enabler dimensions such as organizational characteristics, IT, and managerial support. Knowledge quality and user knowledge satisfaction were selected as the knowledge management performance variables of interest. We chose the knowledge management stage of individual organization as the contingency factor moderating the base relationship between the knowledge management drivers and knowledge management performance.

3.2 Knowledge quality and user knowledge satisfaction

When your knowledge repository gets filled with irrelevant, inaccurate, and unreliable pile of low quality knowledge, however, it will make your knowledge search more time-consuming and unproductive, ultimately driving away end users from your knowledge management system. Thus, creating and gathering high quality knowledge should be one of the most important objectives of knowledge management and is at the same time certainly related to organizational performance [22, 24].

When satisfied with their organization's knowledge management initiatives, organizational members will voluntarily participate in diverse knowledge management activities such as knowledge creation, sharing, and utilization. In the knowledge management context, we measure user's satisfaction with quality and quantity of knowledge, knowledge search capability, knowledge management system functionalities, incentives for knowledge contribution, and overall organizational management of knowledge.

3.3. Organizational characteristics: Cultural and structural drivers

From the literature, we identified the following factors in organizational culture and structure that are believed to affect the knowledge management performance of an organization:

Learning Orientation

Organizational learning fosters knowledge asymmetries [44], the key to differentiating organizational performance, and provides a platform for knowledge management activities of all organizational levels [10]. Learning orientation exists in all organizations in any form and it is the foundation of fostering organizational learning.

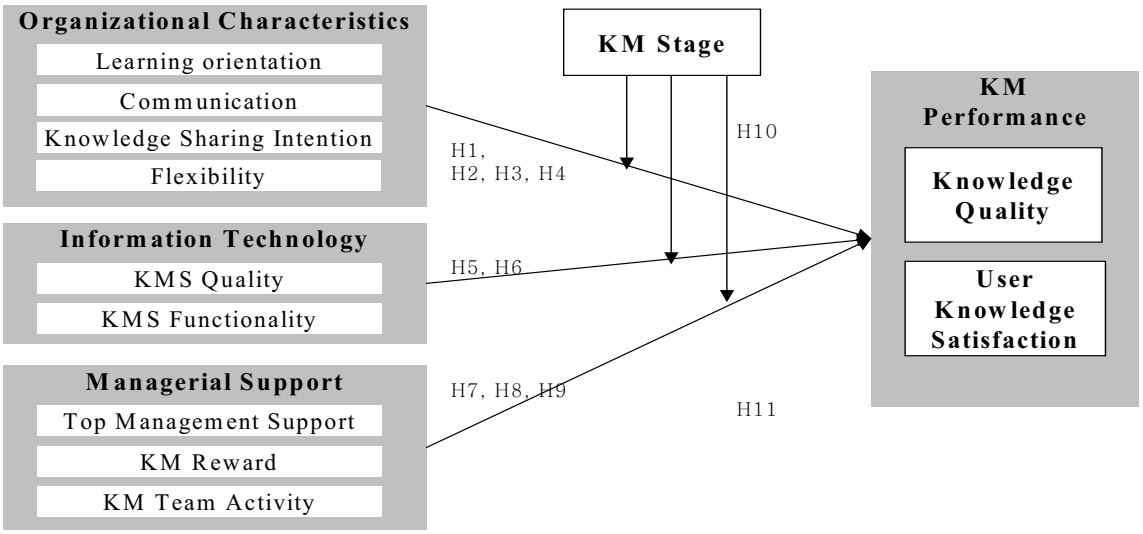

Figure 1. Research model

When organizational members have a strong will to acquire knowledge to solve their problems and innovate to improve their business process, the organization is likely to accumulate high quality knowledge and will find it easier to satisfy its end users since knowledge management tools, methods, and principles will render a good fit with such learning-oriented users.

H1: The level of learning orientation of an organization will have a positive effect on knowledge management performance

Communication

Socialization, one of the major processes for knowledge creation, as defined by Nonaka [34], emphasizes the importance of organizational members' social interaction. These features imply that active communication is important for knowledge creation and transfer. Many studies have emphasized the importance of communication between diverse people or organizational units inside and outside an organization for effective knowledge management [21, 30, 42]. Thus, we expect that:

H2: The level of communication among organizational members will have a positive effect on knowledge management performance

Knowledge Sharing Intention

A positive attitude toward knowledge sharing among members of a given organization is the most basic precondition for knowledge creation. Constant et al. [8] assert that an organization should shape employees' attitudes for information sharing by establishing an organizational norm such that information sharing is socially desirable [5]. This implies that a knowledge sharing mind is not an outcome automatically obtained by implementing knowledge management, but rather a type of capability that should be developed for successful knowledge management.

H3: The level of organizational members' knowledge sharing intention will have a positive effect on knowledge management performance

Flexibility

The hypertext organization suggested by Nonaka&Takeuchi [35] is a flexible structure of an organization that enables knowledge creation to occur naturally within an organization. Its main features are non-hierarchical, self-organizing, and easily reformable properties. By reviewing properties of such structures, we expect that organizational flexibility is the ability to quickly produce and reconfigure its knowledge or knowledge management activities in response to environmental demands.

H4: The level of organizational flexibility will have a positive effect on knowledge management performance

3.4. Information technology: Technical drivers

Information technology is regarded as a critical enabler for knowledge management [1, 13, 46]. Information technology, while not sufficient by itself to guarantee knowledge management success, contributes to supporting or executing knowledge management processes, connecting people regardless of temporal and spatial distance, streamlining information or knowledge flow, and facilitating collaboration among organizational members.

Quality of Knowledge management System

If the quality provided by a knowledge management system does not satisfy the users' expectations, that system will not only be deserted by the users but also fail to improve organizational performance. On the other hand, An easy-to-use, responsive, and reliable knowledge management system will enhance the process and outcomes of end users' knowledge creation, sharing, and utilization.

H5: The quality of a knowledge management system will have a positive effect on knowledge management performance

Functionality of Knowledge management System

A knowledge management system should possess diverse and powerful functions to support or perform various knowledge management activities [1]. Thus, the more functionality a knowledge management system has, the higher utilization and satisfaction we expect, leading to greater knowledge management performance.

H6: The functionality of a knowledge management system will have a positive effect on knowledge management performance

3.5. Managerial support: Managerial drivers

An organization should be able to execute proper managerial actions in a timely fashion as its knowledge management capability evolves [29]. Managerial drivers for knowledge management come from diverse organizational efforts, policies, managerial commitment, and processes to build and maintain organizational knowledge management infrastructures.

Top Management Support

Hambrick&Mason [20] asserted that organizational performance could be predicted by characteristics of a firm's top executives. Accordingly, top management leadership can exert substantive influence on organizational members' knowledge management activities by holding beliefs and values around knowledge [2].

H7: The level of top management support for knowledge management will have a positive effect on knowledge management performance

Reward

An organization's reward and incentive systems can enhance employee efforts and their contribution to organizational performance [47]. A reward and incentive system is considered an effective tool for engaging organizational members' knowledge management activities [31].

H8: The level of reward for knowledge management activities will have a positive effect on knowledge management performance

Knowledge management team activity

To materialize the knowledge management vision of the top into implementable strategies and methods; to coordinate and facilitate knowledge sharing among reluctant organizational units; to motivate and help individuals to turn their experience and knowledge into organizational knowledge, every organization initiating knowledge management needs to create and operate an active knowledge management team [39].

H9: The level of knowledge management team activity will have a positive effect on knowledge management performance

3.6 Moderating effects of knowledge management stage

In the knowledge management stage model suggested by Lee&Kim [29], the goals and managerial actions of each stage reflect which drivers are important in each stage. This implies that the types of drivers more required by a knowledge management initiative at a given time are dependent upon the maturity of knowledge management; that is, the knowledge management stage. Therefore, we expect that:

H10: The knowledge management stage will have a moderating effect on relationships between knowledge management drivers and performance.

4. Research Methodology

4.1. Measurement Development

All perceptual measures used multiple-items with a 7-point Likert scale form '1 = Strongly disagree' to '7 = Strongly agree'. Newly devised measures such as *knowledge management team activity* were developed through field interviews in the preliminary study. *Knowledge management system functionality* was measured by counting the number of functions provided by the knowledge management system. The total number of functions provided in each organization was transformed into a 7-point scale for standardization.

Measures of the stage of knowledge management were developed with a nominal scale determined by objective indicators. For assessing the *knowledge management stage*, we used the checklist developed by Lee&Kim [29]. In their research, they developed 38 typical managerial actions, i.e. checklists, for identifying the four stage of knowledge management: Initiation, Propagation, Integration, and Networking. However, since majority of the firms participating in our study had relatively short knowledge management implementation period, this study classified the knowledge management stage of each organization into two categories, High and Low.

4.2. Administration of Survey

4.2.1. Sample and data collection

Three types of survey questionnaires were mailed to the knowledge management team managers of 220 organizations with a brief description of the survey and a return envelope. Because 10 of the 13 research variables had to be answered by an end user while others (top management support, knowledge management stage, knowledge management system functionality) by the knowledge management team manager or member, data was collected using three types (end user, knowledge management team manager, knowledge management team member) of self-administered questionnaires. For each organization, one questionnaire was provided for a knowledge management team manager, 3~10 for the knowledge management team members, and 10~30 for end users. In addition, we made the follow-up phone calls two weeks after the original mailing.

From April 1, 2002 to May 31, 2002, 74 sets of survey questionnaires were received from 74 organizations, representing a 33.6 percent response rate. Among them, three cases were discarded due to the absence of a knowledge management team manager questionnaire and three cases were eliminated from analysis because the number of completed questionnaires from end users was less than three. Also, two cases were later dropped because of unacceptable inter-rater agreement level among members ($r_{wg}(j) < 0.5$). Finally, 66 completed cases could be used for analysis. On the average, one knowledge management team manager, 3.6 knowledge management team members, and 9.8 end users per organization participated.

5. Results

5.1. Sample characteristics

Table 1 summarizes the respondent characteristics in terms of industry type, period of KM implementation and KMS usage, and the stage of knowledge management.

Table 1. Profile of the respondent organizations

(a) Industry

Industry type	Frequency	Percent (%)
Manufacturing	22	33.3
Banking / Finance / Insurance	10	15.2
Construction	6	9.1
Consulting / SI	6	9.1
Distribution	5	7.6
Transport / Communication	6	9.1
Education / Research	6	9.1
Others	5	7.6
Total	66	100

(b) Period of knowledge management and utilizing a knowledge management system

	Knowledge management		KNOWLEDGE MANAGEMENTS	
Range	Frequency	Percent (%)	Frequency	Percent (%)
<1 y	14	21.2	18	27.3
1y-2y	18	27.3	16	24.2
2y-3y	15	22.7	15	22.3
3y-4y	13	19.7	4	6.1
4y-5y	3	4.5	2	3.0
5 y<	3	4.5	11	16.7
Total	66	100	66	100

(c) Stage of knowledge management

	Stage	
Category	Frequency	Percent (%)
High	23	34.8
Low	43	65.2
Total	66	100

5.2. Reliability and validity test

The content validity of our instruments could be established by adopting the constructs that have already been used and validated in relevant research, or iterative experts' reviews of the instruments [9]. The internal consistency of all variables is higher than a cutoff value of 0.7 [36], ranging from 0.788 (Flexibility) to 0.949 (User Knowledge Satisfaction). Considering the exploratory nature of this study, the relatively high level of the reliability of our instruments seems to be acceptable.

In order to justify the aggregation of individual responses at an organizational level, the level of agreement on each variable among all respondents of each organization was calculated in terms of the index of within-group agreement, $r_{wg(j)}$ suggested by James et al [23]. We calculated $r_{wg(j)}$ of 68 organizations on each research variable after dropping 6 cases due to the absence of a knowledge management team manager questionnaire or lack of completed questionnaires from the end users. As a result, two organizations having a variable whose $r_{wg(j)}$ was less than 0.5 were discarded.

The convergent validity of our instruments was examined by calculating the item-to-total correlations; that is, the correlation of each item to the sum of the remaining items within a variable. All item-to-total correlation scores of all items were greater than 0.4, showing relatively high convergent validity. Discriminant validity was tested by a principal component factor analysis with a VARIMAX rotation to check the unidimensionality of multiple items within each construct [19]. Results of the factor analysis showed two items with factor loading values less than 0.5, one item of Learning orientation and one item of User knowledge satisfaction. After eliminating those two items, we reassessed the reliability and the construct validity of the remaining instruments and their results showed acceptable levels of validity.

5.3. Testing Research Hypotheses

The hypotheses of this research were tested through multiple regression analyses. Before testing the research hypotheses, we tested several assumptions of multivariate analysis. First, the multicollinearity among the independent variables was checked in the correlation matrix between research variables. Since there are relatively high correlations between independent variables, we conducted a hypothetical coefficient variance-decomposition analysis with condition indices. The results showed no potential multicollinearity problem in our data. Second, normality of the variables was tested by calculating the values of skewness, kurtosis, and Kolmogrov-Smirnov's z. The results indicated no significant violation of normality for the multiple regression analysis.

5.2.1. Testing the main effects

The main effects explain 62.5%, 87.0%, and 76.9% of variance in three constituents of knowledge management performance, respectively. All F-statistics of the three regression models (8.168, 32.925, and 16.364 respectively) were statistically significant at the 0.01 levels, indicating acceptable levels of model fit.

Learning orientation was significantly and positively associated with *user knowledge satisfaction* (β=0.196, $p<0.05$). *Knowledge sharing intention* had a significant effect on *knowledge quality* (β=0.301, $p<0.1$). The level of *communication* among organizational members had a significant, but negative, effect (β= -0.296, $p<0.05$) on *knowledge quality*. *Flexibility*, however, had no significant effect on any dependent variable, which fails to support H4. The quality of a knowledge management system (β=0.215, $p<0.01$) in technical drivers had a significant, positive effect on both variables of knowledge management performance, supporting H5. But *knowledge management system functionality* had no significant effect on knowledge management performance, failing to support H6. *Knowledge management reward* is significantly related only to *user knowledge satisfaction* (β=0.413, $p<0.01$), while *knowledge management team activity* positively influenced *knowledge quality* (β=0.365, $p<0.05$) as well as *user knowledge satisfaction* (β=0.358, $p<0.01$). However, *top manage-*

ment support was not associated with any knowledge management performance variable, failing to support H7.

5.2.2. Testing the moderating effects

The interaction term of *flexibility* and *knowledge management st*age is significant in the moderated regression models at the 0.05 level. The interactions term of *knowledge management system quality* and *knowledge management stage* shows a negative, significant effect at the 0.05 level in the two models which regressed *knowledge quality* and *user knowledge satisfaction*.

6. Discussion: Findings and Implications

6.1. Organizational characteristics

Learning orientation had a significant, positive effect on *user knowledge satisfaction* (β= 0.196, $p<0.05$) as we anticipated. However, its effect on *knowledge quality* was not significant. *Learning orientation* seems to be more directly related to knowledge management behaviors, activities, or processes rather than knowledge itself. Therefore, it could positively influence the improvement of business processes, where organizational learning occurs, and users' satisfaction with their learning behavior or its results.

In the case of *communication*, the results do not support our hypotheses. On the contrary, *communication* had a significant negative effect on *knowledge quality* (β= -0.296, $p<0.05$). We presume this is because we measured the quality of knowledge provided only by the knowledge management system. That is, if knowledge could be easily and quickly transferred through active communication with others, organizational members would not need to exert themselves to store critical knowledge in the knowledge management system. Consequently, it is possible for high quality knowledge, especially tacit or implicit knowledge, more likely to be shared in social interaction rather than through a knowledge management system [33].

Knowledge sharing intention had a positive effect on *knowledge quality* (β= 0.301, $p<0.1$) while its effect on *user knowledge satisfaction* was not significant. Compared with *learning orientation*, *knowledge sharing intention* is more directly related to knowledge itself because such intention can be made concrete only by shared knowledge [16].

Even though *flexibility* had no significant relationship with either of the knowledge management performance variables, the relationship between *flexibility* and knowledge management performance variables were found to be moderated positively by *knowledge management stage* (β= 3.907, 1.862, 2.898, $p<0.05$ for KQL, UKS, IMP, respectively). This implies that establishing organizational flexibility may not be urgent in the early stage of knowledge management, but it becomes more essential for improving knowledge management performance as knowledge management becomes more mature. We may argue that the insignificant coefficients of *flexibility* may have resulted from the fact that majority (65.2%) of the respondents was in the low *knowledge management stage*. In addition, the short implementation period (about 2.3 year) of knowledge management by our samples could be another reason for such insignificance. It may be premature for the effects of *flexibility* to be embodied.

6.2. Information technology

Significant effect of the *knowledge management system quality* (KMSQ) on all dependent variables reconfirms the important role of information technologies in knowledge management. However, negative signs of its interaction terms with *knowledge management stage* indicate that the effects of *knowledge management system quality* may diminish as knowledge management becomes mature. Developing technical drivers (e.g. a knowledge management system) can be a good starting point for initiating knowledge management. But, the mere existence of a knowledge management system cannot guarantee the success of knowledge management and its impact would decrease as time goes on [41].

The insignificant effect of the *knowledge management system functionality* (KMSF) on knowledge management performance suggests that a comprehensive set of knowledge management system functionalities may not be necessary for successful knowledge management initiatives. Rather, it will be interesting to examine the fit between the *knowledge management system functionality* and user knowledge requirements.

6.3. Managerial support

Knowledge management team activity, the construct first introduced by this research, was found to be positively associated with *knowledge quality* (β= 0.365, $p<0.01$) and *user knowledge sat-*

isfaction (β= 0.358, $p<0.01$). If developing a knowledge management system is a necessary condition, organizing and operating an active knowledge management team may be deemed as a sufficient condition for a successful knowledge management effort. If organizational members are not willing to share their knowledge or if irrelevant, invalidated, or redundant knowledge floods into the organization's knowledge repository, a knowledge management initiative is doomed at such an organization. A conscientious knowledge management team which seeks to help, not dictate, organizational members in creating, sharing, identifying, and accessing critical knowledge for their problem solving seems essential for securing high quality knowledge and organizational members' satisfaction with the knowledge management initiative.

Knowledge management reward also had a positive effect on *user knowledge satisfaction* (β= 0.413, $p<0.01$). This is interesting since there have been some contradictory arguments over the effects of rewards in knowledge management. O'Dell&Grayson [37], for instance, warned that artificial or extrinsic rewards that are not supported by an organizational culture are likely to be ineffective and may lead to employee cynicism. However, in our study, the reward construct included both extrinsic and intrinsic reward dimensions and the significant correlations between reward and culture-related constructs such as learning orientation or knowledge sharing intentions do not seem to indicate the existence of misfit between reward and organizational culture. Bock&Kim [5] found that expected rewards could have a negative influence on forming a positive attitude for knowledge sharing. This study differs from the Bock&Kim [5] study in that, instead of the "expected" reward, we measured the reward "in place" and, instead of the individual's attitude for knowledge sharing, we measured the organizational members' overall satisfaction with their knowledge management initiatives. Since we used the "knowledge sharing intention", which forms from knowledge sharing attitude, as an organizational driver for knowledge management performance, this study may be seen as an extension of the Bock&Kim [5] study in terms of unit of analysis level (individual=>organizational) and dependent measure (knowledge sharing => knowledge management performance).

The results revealed no significant effect of *top management support* on knowledge management performance. This result was a surprise, considering that *top management support* was the top concern of the knowledge management practitioners [26]. Since initiating the knowledge management team activities, reward systems, and knowledge management system deployment may not have been possible without strong commitment from the top management, we suspect that *top management support* may be an antecedent of some of the knowledge management drivers.

6.4. Knowledge management stage

The knowledge management stage of an organization had shown significant moderating effects on two of the nine knowledge management drivers (flexibility and knowledge management system quality), hinting at the potential need to understand and manage the drivers from a contingency perspective. For instance, as an organization moves to a more mature knowledge management stage, its knowledge management focus may need to shift from a centralized knowledge repository consisting of mostly internal, explicit knowledge to a more flexible organizational structure (e.g. community of practice) amenable to creating and sharing tacit knowledge both inside and outside of the organization.

7. Conclusion

This study identified a set of critical drivers for developing organizational capabilities of knowledge management and then investigated the relationship between those drivers and knowledge management performance in terms of knowledge quality and user knowledge satisfaction. The subsequent results supported our premise that knowledge management should be implemented through an integrated approach comprehending as many aspects of an organization as possible. These findings show that each factor of knowledge management performance is associated with a different set of drivers and some relationships change according to an organization's knowledge management stage.

This research has several limitations in its methodology and interpretation of the results which need to be addressed in the future research. First, the small size of our sample reduces the power of the research model. In addition, the sample consisted of only Korean organizations. This reduces the generalizability of the results obtained. Second, the knowledge management stage of the respondent

organizations was skewed toward the low stage because the knowledge management period of about 75 percents of respondents was less than 3 years. Such skewness made it difficult to classify the knowledge management stage of each organization into the four stages as suggested by Lee&Kim [29]. For this reason, we were limited to use a dichotomous variable to judge the knowledge management stage, potentially losing more in-depth analysis of the moderating effect. Lastly, there is some disagreement about the distinction between knowledge management drivers and their antecedents. Some researchers have dealt with certain drivers as antecedent variables or outcomes of certain drivers. For example, some may argue that top management support is an influencing factor of the drivers rather than a driver itself [28].

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