

USING KNOWLEDGE VALUE CHAIN FOR IMPLEMENTATION OF WORK PERFORMANCE

Yen-Ching OuYang¹, Te-Chun Lee²

¹Dept. of Commerce Automation and Management / National Pingtung University, Taiwan

²Center of General Education / Open University of Kaohsiung, Taiwan

*Corresponding Author: Ou Yang, Yen-Ching¹

Abstract

The best-known framework for analyzing value creation is the value chain, which shows a systematic process to examining the development of competitive advantage. While a few empirical studies have investigated the relationships between knowledge value chain and work performance, this theoretical paper explores the fundamental issue of how knowledge management (KM) capabilities impact work performance. This study explored two major questions: (1) How KM capabilities of knowledge value chain can be defined properly? and, (2) How knowledge value chain positively impacts perceived work performance in value chain way? Drawing on the knowledge-based view of the firm, the paper identifies knowledge value chain according to knowledge management capabilities. The results indicate that KM capabilities for knowledge acquisition, conversion, sharing, and application positively impact work performance as value chain. The results also indicate that KM capabilities may improve performance by a value chain way. In general, the results also help understand the complex role of knowledge value chain have impact on work performance.

Keywords: knowledge management, performance, knowledge value chain, knowledge-based view

Introduction

Introduce the Problem

Value chain oriented Knowledge Management (KM) has been proposed to integrate KM capability and process orientation (King & Ko, 2001). A focus on the importance of creating and using knowledge to achieve work success has encouraged executives to adopt KM with an expectation that KM capability would result in higher competitive advantages and improved performance. As is widely believed, the better use of knowledge has become a progressively more important asset for building competitive advantages (Davenport & Prusak, 1998, Leonard-Barton, 1995, Nonaka, & Takeuchi, 1995). As a result, managers and executives are paying greater attention to the issue of how knowledge can be better managed to optimize their work performance. A growing number of organizations has either adopted or intended to adopt knowledge value chain to assist employees in knowledge creation (Sivakumar, 2018).

Lee and Yang (2000) suggested that competitive advantage grows out of the way corporations organize and perform discrete capabilities in knowledge value chain which should be measured by the core competence of corporation. In sum, knowledge management is the basis for the formalization and development of enterprise integration. Knowledge management enables

superior performance for both solving problems and enhancing motivation. Therefore, a major motivation for organizations to implement knowledge value chain is to enhance their performance. However, most existing research in knowledge management has focused on developing new applications of information technology to support the capture, storage, retrieval and distribution of explicit knowledge (Grover & Davenport, 2001). Despite the fact that many companies recognize the importance of the tie between KM capabilities and work performance, thus far, few research have been able to establish an explicit causal link between them, regardless of how it is measured by direct or indirect effects on work performance as value chain. Especially, few research can defined KM value chain clearly and build a research model to interpret the effect of KM value chain on performance.

Given the above motivations, the purpose of this study is to investigate the following issues. The research questions are:

- 1) How KM capabilities of knowledge value chain can be defined properly? and,
- 2) How knowledge value chain positively impact perceived work performance?

The general purpose of the study is to find more insights into the relationship between KM value chain and performance. With respect to the specified research questions, specific purposes of the research include:

- 1) Identifying KM capabilities of knowledge value chain that may affect work performance. This will be done by extensive literature review and organization to form a helpful knowledge value chain structure.
- 2) Building an integrated research model that includes K value chain, work performance and empirical test the validity of the proposed model. The findings will be able to not only compare to existing literature but also substantially expand our knowledge in the adoption of KM in organizations.

The remainder of the paper is organized as follows: The next section reviews related literature, and describes theoretical development. Section 3 describes research model, methodology, measurement development, reliability, and validity. Section 4 analyses the results of research. Section 5 discusses the research results.

Literature Review

Theoretical Foundation

In this era of a knowledge-based economy, knowledge plays an important role in building sustainable competitive advantages for firms. Knowledge also is a major asset for the success of organizations and economic growth in any country. Enterprises increasingly turn to KM to raise productivity and remain competitive. From a Knowledge-Based View (KBV) of organizations, the focus is on managing knowledge resources, and the associated aspects of human and material resources having capabilities for governing, operating on, and otherwise deploying knowledge (Paradice & Courtney, 1989). To highlight the idea that competitive advantage grows fundamentally out of the value a firm is able to enhance its competitiveness, called the

Knowledge Chain model (Hols apple & Singh, 2000). Shin et al. (2001) integrate different terminologies used by some authors in describing the KM capabilities and aggregate their works as a simple knowledge value chain. Meanwhile, Hols apple and Singh (Hols apple & Singh, 2000) work out a knowledge chain model which is comparable with Porter's value chain (Porter 1985) and is grounded in a descriptive KM framework developed via a Delphi-study involving international KM experts. The knowledge value chain model identifies and characterizes KM capability that an organization can focus on to achieve competitiveness.

Academics and practitioners alike recognize that knowledge capabilities are becoming a prerequisite for organizational success (Davenport & Klahr, 1998, Nonaka, 1991, Porter-Liebskind, 1996, Powell, 1998). Some authors have suggested that organizational ability to generate knowledge is vital (Nonaka & Takeuchi, H., 1995, Powell, 1998, von Krogh, 1998). Meanwhile, others have emphasized the success of an overall knowledge management strategy. For example: Knapp (Knapp, 1998) noted that organizations can benefit from implementing a knowledge management strategy. The benefits include reducing the redundancy of knowledge based processes. The different perspectives improve our understanding of the importance of knowledge value chain for a comprehensive process approach. Thus the alignment of KM capability is a crucial element to knowledge management initiative success (Gold, Malhotra & Segars, 2001).

Shin et al. (2001) identified knowledge management process as a knowledge value chain model, comparable to the value chain of Porter (1985). Meanwhile, Hols apple and Singh (2001) developed a knowledge chain model for identifying and characterizing KM capabilities that an organization can focus on to achieve competitiveness. Shin et al. (2001) integrated different terminologies used by various authors to describe the knowledge management process, and the aggregate of those processes can be described as a simple knowledge value chain. Shin et al. also classified KM capabilities into four categories: knowledge creation, knowledge storage, knowledge distribution, and knowledge application.

An examination of these various capabilities enables them to be grouped four broad dimensions, including: acquisition, conversion, sharing, and application. Nonaka and Takeuchi (1995) provide one process-based argument stated that KM is based on organization ability to create new knowledge through converting tacit to explicit knowledge (Morey, 2001, Skyrme, & Amid on, 1998, Porter-Liebskind, 1996), and eventually transforming it into organizational knowledge. However, some authors describe key capability as being initially based on knowledge acquisition. Therefore, this study aggregates the previous literature in the form of a value chain in research model.

Performance Measurement

Another aspect of research is targeted at measuring the work performance of KM. Non-financial measures should reflect the core competence of an organization. Non-finance-based measurement is more suitable for evaluating intellectual capital (Johnson, Nilsson et al., 1999). The contribution of knowledge management value chain to work performance is difficult to be translated into tangible benefits. The measurement of non-monetary performance is as important as financial performance because the organizational quality would indirectly influence financial

performance serving as a moderating factor (Ahn, & Chang, 2004). This research also adopted self-reported performance assessment as the method for collecting organizational performance data. Therefore, this study expected that effectiveness and efficiency were superior to accounting-based measures of performance.

Methodology and Research Framework

The research model and hypotheses, constructs measurement, development of survey instruments, and data collection strategies are described in the following sections.

Research Model

Only five major constructs are included in the framework (see figure 1). The major independent variable under investigation is the KM capabilities of knowledge value chain, which include knowledge acquisition, conversion, sharing, and application. The dependent variable is perceived work performance.

Knowledge Acquisition Capability: Acquisition-oriented knowledge value chain is those oriented toward obtaining knowledge. Acquisition is the creation of new knowledge based on the application of existing knowledge (Gold, Malhotra, & Segars, 2001). Knowledge acquisition begins from the individual, more and more grows through interaction, and diffuses from the individual to the community, organization even inter-organization. Nonaka and Takeuchi (1995) proposed that knowledge could be created through the interaction between explicit and tacit knowledge. Knowledge acquisition is an activity that produces knowledge through discovering it or deriving it from existing knowledge.

Knowledge acquisition is the nontrivial extraction of implicit, previously unknown, and potentially useful information from data. Knowledge capture/acquisition is employed to identify and extract knowledge from knowledge sources (38), or external sources internal or external knowledge sources (Duffy, 2000, Hols apple, & Singh, 2001). Generally, employees use structural knowledge learning strategies to improve their structural knowledge acquisition. Knowledge discovery/acquisition identifies information from the knowledge-base to make recommendations to different stakeholders in the organization (Balasubramanian, Nochur, Henderson, & Kwan, 1999). Based on the research questions and literature review, the following hypotheses are posited:

H1: Adoption of K. acquisition will have a positive effect on K. conversion, K. sharing, K. application, and work performance.

Knowledge Conversion Capability: Effective storage and retrieval mechanisms of KM capability enable quick and easy access. With the growing body codified knowledge in organizational memories. Knowledge retrieval is a core component to access knowledge items in knowledge repository (Fenstermacher, 2002, Kwan, & Balasubramanian, 2003). The ability to store and retrieve text is an important aspect of a knowledge repository (O'Leary, 1998). A

knowledge repository is a collection of both internal and external knowledge. Tacit knowledge requires a high degree of interpretation (Cliffe, 1998). Davenport et al. (1998) identified three types of knowledge repositories: (1) External knowledge, such as competitive intelligence, (2) Structured internal knowledge, for example research reports, presentations, and marketing materials, and (3) Informal internal knowledge, for example discussion databases, help desk repositories, or shared information databases. Thus, storage/retrieval capabilities are those oriented toward obtaining knowledge in representative form.

Knowledge converts knowledge into and from knowledge base. As a technological example, information technology can help accumulate externally created knowledge content (Kennedy, 1997). The codification strategy aims to promote reuse and involves establishing knowledge repositories to capture knowledge and make it available for workers. Zander and Kogut (1995) believed that prior accumulated knowledge is the critical factor for understanding new knowledge. Employees use the knowledge they acquire to generate other knowledge (Hols apple, & Singh, 2000). Stein (1992) defined organizational memory as the "means by which past knowledge applied to present capabilities, thus resulting in higher or lower levels of organizational effectiveness." Knowledge storage, involving the storage of the large quantities of data required to form a knowledge base, enables firms to increase their overall expertise and efficiency. Consequently, firms with strong conversion capabilities obtain more knowledge sources, affecting KM system use and thus improving performance. Based on the research questions and literature review, the following hypotheses are posited:

H2: Adoption of K. conversion will have a positive effect on K. sharing, K. application, and work performance.

Knowledge Sharing Capability: One of the basic approaches for identifying KM capabilities is personalization (Kankanhalli, Fransiska, Sutanto, & Tan, 2003). The personalization approach concentrates on facilitating the share and transfer of tacit or unstructured knowledge. Various styles of knowledge sharing exist: Knowledge sharing can be either informal or formal, as well as either personal or impersonal (Holtham & Courtney, 1998). Knowledge transfer occurs at various levels: transfer of knowledge between individuals, from individuals to explicit sources, from individuals to groups, between groups, across groups, and from groups to organizations (Alavi & Leidner, 2001).

Wasko and Faraj (2005) conduct knowledge contribution occur without considering expectations of reciprocity from others or high levels of commitment to the communication network. Therefore, individuals connected through a practice network may never meet each other, yet can share considerable knowledge (Brown & Duguid, 2001). The literature demonstrates that knowledge transfer capabilities can bring many advantages to organizations (O'Dell & Grayson, 1998) and knowledge transfer capabilities are now integral to organizational life (Davenport & Prusak, 1998). The effectiveness of knowledge transfer within an organization can significantly affect business performance (Szulanski, 1996). The ability of an organization to create knowledge based on its ability to synthesize and apply its existing knowledge (Kogut & Zander, 1992), or on its ability to value knowledge, and assimilates useful knowledge. To be useful,

knowledge must be distributed, since only in this way can it enhance firm performance (Demarest, 1997). Based on the research questions and literature review, the following hypotheses are posited:

H3: Adoption of K. sharing will have a positive effect on K. application, and work performance.

Knowledge Application Capability: Knowledge application capability is the ability to actually apply knowledge. Notably, the outcomes of the effective application of knowledge have received little attention (Gold, Malhotra, & Segars, 2001). Wong and Radcliffe (2000) proposed a knowledge application model which moves from subconscious awareness to conscious awareness. Previous studies appear to believe that knowledge can be applied effectively after being created (Nonaka & Takeuchi, 1995). Knowledge application-oriented capability indicates those processes that are oriented towards knowledge use. This knowledge then can be applied to adjust strategic direction, solve new problems, and improve efficiency (Gold, Malhotra & Segars, 2001). Based on the research questions and literature review, the following hypotheses are posited:

H4: Adoption of K. application will have a positive effect on work performance.

Knowledge value chain and Work Performance: Although the literature defined KM capabilities are distinct. But some researchers (Hols apple & Joshi, 2003, Hols apple & Singh, 2000, Hols apple & Singh, 2001) argue that KM capabilities should be modelled as a value chain. And they suggested an alternate view that describes KM capabilities and their possible interrelationships. Because the idea of knowledge value chain may help define the concept of knowledge potential. For most of research, KM efforts have focused on developing new applications of information technology to support the capture, storage retrieval and distribution of explicit knowledge (Grover, & Davenport, 2001). Before 2001, most organizations have not taken a conscious process-oriented approach to KM (Grover & Davenport, 2001). After 2001, more literature mentioned process-oriented approach or framework of KM. The limited published research has used multiple competing theoretical frameworks to interpret knowledge value chain. Few of researchers have investigated how KM capabilities sequentially as a value chain to affect organization performance by empirical research.

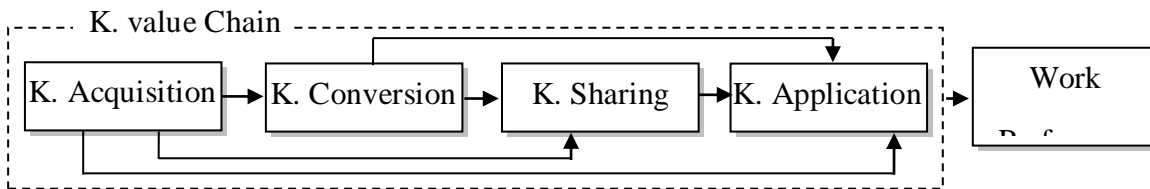


Figure 1. Research model

Measurement of Constructs

Although some survey measures have been developed for the variables and relationships of constructs, the pre-test is still performed to increase content validity. A pool of measurement items was created for the constructs. To the extent possible, previously published items were adopted or adapted. Those constructs can be measured using the following scales. Four knowledge management capabilities were developed by literature (Alavi & Leidner, 2001). The questionnaire included questions on a 7-point scale evaluation. To measure work performance, a five-item instrument developed by Henderson and Lee (1992) was used to measure efficiency and effectiveness, with two items measuring efficiency dimension, with three items measuring effectiveness dimension.

Survey Administration

Prior to the survey administration, a pretest was conducted to ensure reliability, readability, and time requirements. The results of this pretest are incorporated into the development of the final version research questionnaire. The data was collected from the employees (managers, officers or engineers) of 198 firms which are KM adopted. In order to examine the feasibility of the research, a pilot study has been conducted. The pilot survey responses showed that the survey items had reliability scores above 0.60 (as measured by Cronbach's alpha), indicating an acceptable level of internal consistency (Nunn ally, 1978).

Analysis and Results

This section checks statistical assumptions, analyzes the research framework and presents the research results. The test confirmation factor analysis was analyzed using AMOS. The main effect was analyzed using SPSS. The section begins with checks for statistical assumptions of measurement.

Measurement Model

Following Anderson and Gerbing (1988), this research conducted confirmatory factor analysis to assess the reliability and validity of the multi-item measures for the six factors. Given that structural equation modelling has no single statistical test of significance for model fit (Schumacker & Lomax, 1996), several goodness-of-fit measures were used to assess the fit of the model. Due to the sensitivity of the chi-square test to sample size, the relative chi-square was used. Standardized RMR should not be greater than 0.10 and GFI, AGFI, NFI, and CFI should exceed 0.90 to be acceptable (Segars & Grover, 1993). The resulting scales are presented in Table 1 along with goodness-of-fit indices. The measurement model with all six factors was assessed using confirmatory factor analysis (Anderson & Gerbing, 1992). All loadings exceed 0.5 and each indicator is significant at 0.05 levels.

1) Reliability

Reliability of the multi-item scale for each construct was measured using Cronbach's alpha values and composite reliability measures. Both measures of reliability were above the recommended minimum standard of 0.60 (Nunn ally, 1978), the Cronbach's alpha or composite reliability values of all indicators or dimensional scales exceed 0.8 in Table 1. Therefore, the scales used in the study are reliable. The resulting scales are presented in Table 1 along with goodness-of-fit indices. Reliabilities for all eleven constructs are above 0.6. Overall, according to model fit evaluation recommendations, scales for all constructs were deemed acceptable in quality.

Table 1. Reliability of the indicators and model fit measures

Construct/ Indicator	Number of Items	Reliability α / composite reliability	χ^2	df	χ^2 /df	GFI (>0.9)	AGFI (>0.9)	NFI (>0.9)	CFI (>0.9)	RMR (<0.1)
K value chain										
K Acquisition	8	0.89/0.96	454.66	6	75.78	0.99	0.95	0.99	0.99	0.03
K Conversion	4	0.87/0.94								
K Sharing	5	0.86/0.95								
K Application	5	0.90/0.96								
Work Performance										
Efficiency	2	0.96/0.98	247.88	2	123.9	0.92	0.92	0.9	0.97	0.01
Effectiveness	3	0.95/0.95								

Note. Composite reliability= $(\sum \text{standard factor loading})^2 / ((\sum \text{standard factor loading})^2 + \sum \text{error})$

2) Convergent Validity

The properties of the reliability of the constructs (composite reliability), and the average variance extracted were used as the measures for convergent validity (Bagozzi & Yi, 1988, Chau, 1997, Fornell & Larcker, 1981). To be considered adequate, the individual item reliability should be greater than 0.50 and/or a significant t-value should be observed for each indicator (Bollen, 1989, Jöreskog & Sörbom, 1996). The average variance extracted should be at least 0.5 and the composite reliability should be greater than 0.6 (Bagozzi & Yi, 1988). Table 1,2 summarizes the two measures of the convergent validity for the model. Hence, the measurement model seems to possess adequate convergent validity.

3) Discriminate Validity

Discriminate validity was assessed in two ways (Baker, Parasuraman, Grewal, & Voss, 2002). First, the confidence interval for each pair-wise correlation estimate (i.e., \pm two standard errors) should not include 1 (Anderson & Gerbing, 1988). This condition was satisfied for all pair-wise correlations in both measurement models. Second, another approach suggested by Fornell and Larcker (1981) is that discriminate validity is demonstrated when the squared correlation between two constructs is lower than the respective average variance extracted. Table 2 shows

the comparison between squared correlations of two constructs (off-diagonal elements). Overall, all of the six constructs show evidence of discriminate validity, even though the squared correlations between factors were slightly greater than the average variance extracted of factors.

Table 2. Test of discriminate validity

	acquisitio n	conversio n	sharin g	applicatio n	Efficienc y	Effectivenes s
1.K. acquisition	0.777					
2.K. conversion	0.799	0.799				
3.K. sharing	0.762	0.814	0.785			
4.K. application	0.741	0.773	0.778	0.808		
5.Efficiency	0.698	0.693	0.692	0.692	0.969	
6.Effectiveness	0.704	0.701	0.693	0.695	0.923	0.954

Note. Diagonal elements are the average variance extracted for each of the six constructs.

Off-diagonal elements are the squared correlations between constructs.

Overall, a series of statistical tests, including multiple tests of reliability, convergent and discriminate validities, support the overall measurement quality (Anderson & Gerbing, 1992). Therefore, the measurement model exhibited a good level of model fit as well as evidence of convergent validity and discriminate validity. The measures/indicators were then deemed adequate for further analysis of the structural model.

Results of the research Model

Table 3 presents the results of this path analysis which support the proposed hypotheses H1 -H4. However, not all the knowledge value chain has direct, positive effects on performance. As shown in Figure 2, knowledge acquisition has a positive impact on work performance. Knowledge application has a positive impact on work performance. Knowledge acquisition, conversion, and sharing have positive impacts on performance. Knowledge acquisition and conversion have positive impacts on performance. Finally, knowledge acquisition has a positive effect on performance

Table 3. Results of stepwise regression analysis

Dependent Performance	KM value chain

Independent	Work Performance	Application	Sharing	Conversion	Acquisition
Acquisition	0.367***	0.147*	0.222**	0.738***	-
Conversion		0.290**	0.60***	-	-
Sharing		0.379***	-	-	-
Application	0.186*	-	-	-	-
R ²	0.252	0.554	0.605	0.545	
F value	33.68***	82.41***	153.2***	241.05***	

Note. * p≤0.05, ** p≤0.01, *** p≤0.001

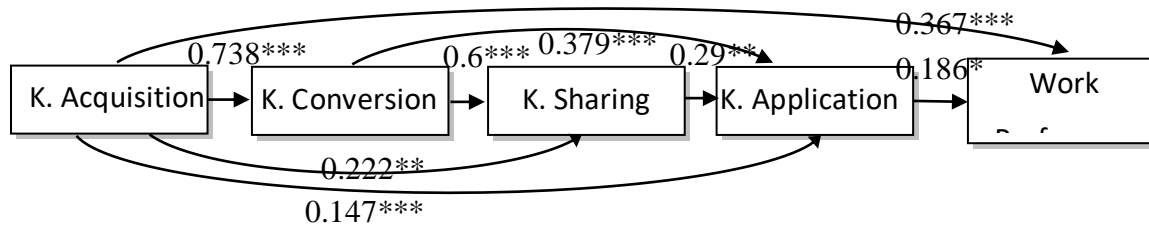


Figure 2. Inter-relationships among KM value chain and performance

Conclusion and Discussion

Results indicate that acquisition and application capabilities have direct positive effects on work performance. Knowledge acquisition, conversion, and sharing have positive impacts on knowledge application. Knowledge acquisition and conversion have positive impacts on knowledge sharing. Finally, knowledge acquisition has a positive effect on knowledge conversion. Therefore, the results show KM capabilities affect work performance just like a value chain. Those four KM capabilities are linked as a value chain sequentially.

Knowledge value chain integrates process management with knowledge management since it embeds KM capabilities in work processes to the corresponding working processes. Although, KM capabilities of knowledge value chain are an important factor, researchers have further argued which KM capability in organization KM should become a focal point of inquiry (Alavi & Leidner, 2001). Due to the link between knowledge value chain and the measures of work performance is not well understood, previous literature seems argued that KM capabilities have a significant/insignificant effect in performance (King & Ko, 2001). This study is an attempt to heed these arguments in the context of multi-business firms. Thus, this study exploit the KM capabilities how to affect the work performance directly/indirectly.

This new KM framework of this research makes a number of key contributions. It integrates concepts from KM, knowledge capabilities and the knowledge-based view of the firm. In doing

so, it places knowledge strategy on a more theoretically sound basis. By looking at KM capability in a new light, we uncover a conceptualization that provides clear linkage between KM capabilities and this value chain way show how KM capabilities and work performance can be related. Finally, we provide a model that demonstrates to managers how KBV within a firm can be coordinated for improved performance.

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