Missing Link Between Knowledge Management and Organizational Performance---Empirical Evidence in Taiwan

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Abstract - **Many study concern that knowledge management (KM) and organizational performance are essential of the success in business. And there are many different results in literatures which declare KM affects organizational performance positively and negatively. We believe that there are still some confusing relations between KM and organizational performance. Accordingly, we propose some hypotheses to verify relationships among them. Base on a sample of Taiwan knowledge-intensive firms engaged in manufacturing, and financial sectors, data are collected using a mail survey, and hypotheses are tested using structural equation modeling. This paper finds organizational learning (OL) as a coordinating mechanism, like black box. Empirical evidence also supports the perspective that KM affects organizational performance through OL. This paper is one of the empirical supports for the role of OL as a mediator between KM and organizational performance. Therefore, the positioning of OL as a mediator is also an important contribution to our thinking.**

Keywords – **Knowledge management, Organizational performance, Organizational learning, Structural equation modeling**

I. INTRODUCTION

According to the resource-based view (RBV), firms gain and sustain competitive advantage by deploying valuable resources [1], [2]. Knowledge management capabilities (i.e., knowledge acquisition, knowledge conversion, and knowledge application) are rooted in the operation of a firm and are derived from configurations of organizational structure and culture [2].

Knowledge management (KM) and organizational performance are essential of the success in business. The different results in literatures that declare KM affects organizational performance positively. In Darroch (2005) research, the results support some KM process positively affects performance. She claims that knowledge acquisition doesn't positively affect performance directly, and knowledge dissemination doesn't positively affect performance, either. Accordingly, the first objective of this paper is to re-examine the relationship between KM and organizational performance.

Even though recent studies have examined the relationship between KM and organizational performance, this research continues to be hampered by the lack of organizational learning. As Tippins and Ravipreet (2003) mention the relationship between IT competency and firm performance is mediated by organizational learning. Also, KM and OL are two similar concepts, and always confuse by managers. Accordingly, the second objective of this paper is to re-examine the relationship between KM and OL, and propose a mediating conceptualization of OL.

The knowledge-intensive sectors are selected because of having large amount of knowledge input, short product life cycles, high demand for customized products, and great quantity of production value [5]. Thus, the results of surveys involving Taiwan knowledge-intensive firms provide a rich data set of information regarding KM behaviors in unstable business environments.

II. LITERATURE REVIEW AND HYPOTHESES

2.1 Knowledge management

Gold, Malhotra, and Segars (2001) examine that the issue of effective knowledge management from the perspective of organizational capabilities. This perspective suggests that a knowledge infrastructure consisting of technology, structure, and culture along with a knowledge process architecture of acquisition, conversion, application, and protection are essential organizational capabilities or "preconditions" for effective knowledge management. Cui et al. (2005) mention that knowledge management capabilities consist of three interrelated processes: knowledge acquisition, knowledge conversion, and knowledge application [6].

With effective and efficient KM process, most companies claims it will be helpful to organizational performance. Accordingly, KM is taken for granted an important antecedent of organization performance or innovation [3]. But there are still some different results in KM sub-processes, or sub-dimensions, and organizational performance.

2.2 Organizational performance

Performance is a recurrent theme in most branches of management, and it is of interest to both academic scholars and practicing managers. Although the importance of the performance concept (and the broader area, organizational effectiveness) is widely recognized, the treatment of performance in research setting is

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perhaps one of the thorniest issues confronting the academic researcher today. With the volume of literature on this topic continually increasing, there appears to be little hope of reaching any agreement on basic terminology and definitions. Some have expressed considerable frustration with this concept. Therefore, financial performance, operational performance, and organizational effectiveness should involve in performance [8].

In Darroch (2005) research, she uses comparative and internally reflective performance measures, for example" Compared with the industry average, our company is more profitable" and internally reflective performance measures, for example, "We are more profitable than we were five years ago". These performance measures capture both financial measures and non-financial measures (e.g. market share and sale growth.)

However, similar to any organizational resource, effective knowledge management through the development of capabilities should contribute to key aspects of organizational performance [6]. Also, when firms develop greater knowledge management capabilities, they can more effectively develop marketing offerings to meet customer needs (Hunt 2000). With greater knowledge management capabilities, firms can obtain and use knowledge more effectively and efficiently, which results in above-normal performance. Thus, this study propose,

H1: Knowledge management affects organizational performance positively.

2.3 Organizational learning

Jerez-Góomez et al.(2005) mention that there are many studies that focus on this construct using a psychological approach, a sociological approach, or from the point of view of Organizational Theory. More recently, organizational learning has been considered, from a strategic perspective, as a source of heterogeneity among organizations, as well as a basis for a possible competitive advantage [2].

Pilar et al. (2005) consider organizational learning to be a latent multidimensional construct including managerial commitment, systems perspective, openness and experimentation, and knowledge transfer and integration. Facing the current uncertainty environment, business must keep learning to maintain its competitiveness. And, organizational learning will develop well base on well structured knowledge in organizations. In other words, business could have organizational learning capabilities underlying well individual learning [10]. Thus, this study propose,

H2: Knowledge management affects organizational learning positively.

Various researches have long acknowledged the importance of organizational learning to overall performance. An organization with a strong organizational learning is not simply a collector or storehouse of knowledge but a processor of it. Feedback from customers, channels, and competitors must be used to develop core competence. The strategic literature suggests that good strategy will allow businesses to earn long-run supernormal profits. Therefore, this study propose,

H3: Organizational learning affects organizational performance positively.

As Tippins and Ravipreet (2003) mentioned, the relationship between IT competency and firm performance is mediated by organizational learning. Therefore, this study propose,

H4: Organizational learning will be a mediator between knowledge management and organizational performance.

According, we draw a framework according to the literatures. This study constructs the research framework which is shown in Figure 1

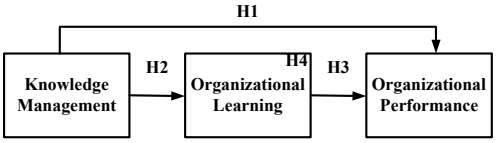

Figure 1 Research Framework

III. METHOD

3.1 Sampling and data collection

This study select for empirical study were chosen from the companies listed in Common Wealth Magazine's Top 1000 manufacturers and Top 100 financial firms in 2007. A total of 327 questionnaires responded to our survey. The final response rate, defined as the number of usable responses received from the final sampling frame, is 54.5% (327/600).

3.2 Measures

To adequately build the constructs for testing our hypotheses, we perform a comprehensive review of the literature. From this review, we borrow and adapt valid multiple-scale items. In this study, 5-point Likert scale (1 totally disagree to 5 totally agree) is used. For knowledge management, we adapt from Gold, Malhotra, and Segars (2001). Organizational learning is from Jerez-Gomez et al. (2003). And organizational performance is defined as the activities which organizations do in transformation of learning capability including individuals and competitors. We adapted the scale for organizational performance from Emden, Yaprak, and Cavusgil (2005). They are

financial, marketing, and partnership performance.

3.3 Analytical approach

This study applies the item-to-total correlation and Cronbach's alpha to establish the adequacy of the measurement model. This study then performs path analysis in LISREL for hypotheses testing [11], [12]. The path analysis procedure is common in studies in which a small sample size restricts the use of full structural equation models [13], [14].

IV. RESULTS

The study adopts a multi-step approach for data analysis. The analyses include testing the measurement model by subjecting our measures to a series of confirmatory factor analyses (CFA) by using SPSS12.0 and LISREL 8.51. LISREL's 8.51 maximum likelihood program [15] is implemented to test the theoretical model proposed.

Table 2 displays the means, standard deviations of variables and their correlations. As can be seen, the following relationships exist between the research variables

Table 2. Table of descriptive statistics

Variables	1	2	3	4	5	6	7	8	9	10
KAC	0.761									
KCO	.730(**)	0.700								
KAP	.689(**)	.760(**)	0.807							
MC	.576(**)	.532(**)	.577(**)	0.676						
SP	.553(**)	.507(**)	.575(**)	.675(**)	0.702					
EX	.599(**)	.569(**)	.639(**)	.732(**)	.605(**)	0.656				
TR	.561(**)	.500(**)	.610(**)	.670(**)	.596(**)	.675(**)	0.536			
FP	.374(**)	.353(**)	.368(**)	.323(**)	.404(**)	.324(**)	.288(**)	0.823		
MP	.398(**)	.353(**)	.429(**)	.346(**)	.425(**)	.326(**)	.335(**)	.829(**)	0.797	
PP	.378(**)	.334(**)	.404(**)	.383(**)	.395(**)	.344(**)	.360(**)	.530(**)	.527(**)	0.733
Mean	3.73	3.68	3.78	3.43	3.48	3.56	3.53	3.44	3.44	3.67
SD	.454	.450	.452	.565	.600	.542	.527	.680	.700	.536

Note1: Diagonal number represents reliabilities alpha.

Note2: **Significant at P<0.01.

Correlations can only reveal the degree of relationship between constructs. To further understand the direct and indirect effects, as well as mediating effects among the constructs, further analysis by structural equation model is required.

4.1 Measure Reliability and Validity

In order to analyze all measures for validity and reliability, we follow the guidelines offered by Anderson and Gerbing (1988), and Bollen (1989). The reliabilities of indicators are assessed through their Cronbach's alpha scores [18] and composite reliability measures [19]. The reliabilities for all the measures are above the recommended limits of .536 and .823. These are displayed in Table 2. And final measurement model shows sufficient fit indices (Table 3) for the interpretation of our findings. Composite reliability is provided as 0.89, 0.884, and 0.838 showing in table 4.

Table 3. Fitting Index of Confirmatory Factor Analysis

Index	KM	OL	PER
GFI	0.86	0.92	0.94
SRMR	0.06	0.049	0.044
RMSEA	0.077	0.063	0.081
NNFI	0.94	0.97	0.97
CFI	0.95	0.97	0.98
$\chi 2$	546.3	225.11	100.7
DF	186	98	32
Normed chi-square	2.94	2.3	3.15

Table 4. Reliability and Convergent validity

Variables	Composite Reliability	λ	ε	T-value
KM	0.890	0.75	0.44	14.69***
		0.73	0.46	14.27***
		0.76	0.42	15.04***
OL	0.884	0.79	0.38	16.09***
		0.71	0.49	14.06***
		0.73	0.46	14.52***
		0.70	0.51	13.60***
PER	0.838	0.82	0.33	16.51***
		0.91	0.17	18.98***
		0.52	0.73	9.57***

Note: $|T| \geqq 3.29$, at p 0.001 level ***

To ensure construct validity, we verify the convergent and discriminate validity of our constructs following the suggestions of Bollen (1989): All of the measurement loadings in the measurement model are significant at the .01 level (convergent validity). Table 3 indicates the fitting index of measurement of each construct. Convergent validity can be judged by considering both the significance of the factor loading and t-values. All the multi-items constructs fit this criterion, and the loading is significantly related to its underlying factor (t-values greater than 1.96) in support of convergent validity (see Table 4).

A series of difference tests on the factor correlations among all the constructs to assess discriminate validity [16]. This is done for one pair of variables at a time by constraining the estimated correlation parameter between

them to 1.0 and then performing a difference test on the values obtained for the constrained and unconstrained models (Anderson and Gerbing, 1988). Therefore, we get the results of convergent validity and discriminate validity. Based on Table 4 and Table 5, all t-values show well convergent validity, and the differences of chi-square ($\Delta\chi2$) are greater than 3.84, where this is a good evidence for the dimensions' discriminate validity.

Table 5. Discriminate validity

Model	$\chi2$	DF	$\Delta\chi2$
---	67.82	32	---
KM - OL	140.00	33	72.18*
KM - PER	306.42	33	238.6*
OL - PER	292.88	33	225.06*
Note: * significant $\Delta\chi2>3.84$			

4.2 Hypothesis testing

To best capture the theoretical interdependencies between KM, organizational performance, and OL, this study analyzes the data using structural equation modeling. We test the full structural equation model using the maximum likelihood method and raw data as input. The fit indices show an adequate fit. All of the hypothesized paths are found to be significant at the $P < 0.05$ level, except for the path between organizational learning and organizational performance.

Table 6 presents the overall model fit and the test of each hypothesis. As shown, the results of path analysis indicate an adequate fit: GFI=0.96, AGFI=0.93, RMSEA=0.059, NFI= 0.97 and CFI=0.99. All four hypotheses are shown in Table 6 for details. The influence of the firm's knowledge management to organizational performance (H1) is significant, as same as we hypothesize in H1 (β=0.34, t-value=2.74). The positive influence of knowledge management to organizational learning (H2) is also supported by our findings (β=0.78, t-value=11.79).

Table 6 Testing results

Causal path	Hypothesis	Path coefficient	t-value	Results
KM - OL	H1	0.34*	2.74	Support
KM - PER	H2	0.78*	11.79	Support
OL - PER	H3	0.23	1.88	Not Support

While we have expected to find a positive relationship between the firm's organizational learning and its organizational performance (H3), our findings yield a non-significant relationship between these two constructs (β=0.23, t-value=1.88). Under this path analysis, we test the mediation effect of OL. The results of path analysis indicate an adequate fit: GFI=0.98, AGFI=0.96, RMSEA=0.017, NFI=0.98 and CFI=0.99. OL plays a complete mediation role between OL and partnership performance in our model. That is the reason why knowledge management won't influence organizational performance. Knowledge management will influence, but it must go via organizational learning.

V. DISCUSSION

After analysis, we got some results different from the past. We hypothesize that OL is a mediator in our research. This study contributes the second finding that we hypothesize that OL mediated the relationship between KM and partnership performance. Therefore, KM will affect partnership performance through OL.

For researchers, we hypothesize that KM is an antecedent affecting OL and organizational performance. This study contributes the finding that KM is an antecedent of OL, and the more KM capability will cause the more OL capability. Accordingly, KM is one of a key fundamental resource of organizations, which is confirmed by RBV.

This study contributes the third finding is knowledge map. Like other maps, it directs this study and provides other research in the future from literature review. We can find the directions precisely and easily from the knowledge map.

For managers, firstly, since KM is an important antecedent, organizations should implement KM thoroughly. In practices, KM implementation almost means the construction KM system. This study suggests that KM implementation is the ability of organization to acquire, converse, and apply their knowledge. After all, system implementation won't equal to the ability to implement. So, managers should consider does one firm set up system only? Or does one firm have the capability to set up and exercise it well?

Secondly, OL mediates the relationship between KM and partnership performance. Managers should take some measures to develop OL in order to link KM and partnership performance, for example: team work, managerial commitment, learning orientation, openness to new ideas…

Thirdly, OL will influence organizational performance under some circumstances. Therefore, managers should not enlarge the perspectives of performance. OL won't influence financial and marketing performance directly. Managers will take other ways to increase them, and this is not the focus of this study.

VII. CONCLUSION

This study provides attention to the relationship among KM, organizational performance, and OL. We hope it intrigues researchers to clarify the important relationship among capability behavior patterns, and measures of organizational performance, and leads to more comprehensive investigations.

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