行政院國家科學委員會專題研究計畫 成果報告

訊息來源，知識分享，與團隊表現
研究成果報告(精簡版)

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計 畫 主 持 人：王耀德

計畫參與人員：博士班研究生-兼任助理人員：謝慧賢
博士班研究生-兼任助理人員：張紹捐
博士班研究生-兼任助理人員：黃宣瑜

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Recent studies in organizational learning have shown that the characteristics of information sources can affect knowledge sharing within organizations. Cross and Sproull (2004) discovered that the perceived expertise of an organizational member who transmitted information to other organizational members had a positive influence on those members' receptiveness of the information. Liu and Liu (2008) found that knowledge from external, non-codified sources was shared more widely within organizations. On the contrary, knowledge from internal, non-codified sources was shared in smaller organizational groups. At the industry level, Appleyard (1996) found that the public nature of information sources was related with inter-firm knowledge sharing. According to knowledge acquisition literature, organizational members use different types of sources to acquire information and knowledge necessary for their work (Bystrom & Jarvelin, 1995; Liu & Liu, 2008; Rulke, Zaheer, & Anderson, 2000). Frequently used sources include core-business sources, science/technology sources, and general-business sources. How these different sources of knowledge are related to knowledge sharing activity in organizations is an issue that remains to be explored. The first purpose of this study is to examine this relationship.

Knowledge sharing was found to be positively related to the performance and innovativeness of organizations. Liao, Fei, and Chen (2007) found that knowledge sharing was associated with product, process, and management innovations in the electronics, medical, and banking industries. van Wijk, et.al. (2008) discovered in their meta-analysis that intra-organizational knowledge sharing was positively related to organizational performance and organizational innovativeness. Through knowledge sharing activities, the knowledge acquired by individual employees gets transferred to other organizational members and then acts as an input for improving product or process technology or creating new product or technology. Whether the positive effect of knowledge sharing on performance found in the literature can be generalized from organizations to work teams is an issue that needs empirical validation.

Studies devoted to exploring the influence of knowledge sharing on knowledge absorptive capacity are scarce in the literature. Cohen and Levinthal (1990) showed that knowledge acquired by an organization in its R&D process served as a foundation for the organization to identify and absorb new knowledge in the future. An organization can acquire new knowledge by either generating the knowledge itself or by importing the knowledge from its members through the act of knowledge sharing. The knowledge acquired from its members can also enhance the organization's knowledge absorptive capacity. The second purpose of this study is to explore the influence of a work team's knowledge sharing activities on its knowledge

absorptive capacity and performance.

To improve knowledge absorptive capacity or organizational performance, the shared knowledge needs to be applied to real world situations. The collective application of knowledge on R&D problem solving leads to higher capabilities for evaluating, assimilating, and applying new knowledge in the future (Cohen & Levinthal, 1990). The application of acquired knowledge (the act of knowing) in solving real world problems makes knowledge meaningful and understandable to its recipient and adds to their potential for performing actions (Cook & Brown, 1999). The effect of knowledge sharing on an organization's knowledge absorptive capacity and performance is mediated through problem solving activities. Whether this mediation effect exists is an issue that deserves researchers' attentions. Thus, the third purpose of this study is to test the effect in empirical settings. The following hypotheses were proposed:

Hypothesis 1. A work team's acquisition of information from general business sources stimulates more knowledge sharing in the work team than acquisition of information from either science-based sources or core business sources.

Hypothesis 2. Knowledge sharing in a work team is positively related to its knowledge absorptive capacity and work performance.

Hypothesis 3. Problem solving activities mediate the effect of knowledge sharing on the knowledge absorptive capacity and the performance of a work team.

METHODS

Sample and Data Collection

The sampled work teams were required to meet these criteria: the team had to be recognized as a work unit in its company; there were at least three persons in the team; the team had common goals that its members worked together to achieve; the team had been in operation for at least 6 months. A set of two or three questionnaires was distributed to each of the 137 work teams in 119 companies in which the managers were acquainted with the researchers. Each questionnaire contained the measures of all variables. One hundred and seven work teams from 90 companies responded to the survey, but 11 of them responded with only one questionnaire. Ten work teams returned three questionnaires and 86 teams returned two questionnaires. Since the majority of the teams responded with only two questionnaires, we decided to use the information from the two respondents in each work team for hypothesis testing. For the ten teams that returned three questionnaires, two out of the three questionnaires were randomly selected for inclusion in the data set. In the 96 teams, 30 of them were from R&D; 16 from marketing/sales; 15 from manufacturing; 17 from finance/personnel/administrative

functions; 9 from information management; and 9 from staff or other functions. Twelve of the teams had been in operation for less than one year; 25 for between one to two years; and 59 for more than two years. Twenty of the teams had 5 or fewer people in the team; 47 had 6 to10 people in the team; 12 had 11-15 people in the team and 17 had more than 15 people in the team. Fifty-one of the teams performed their tasks in a single functional specialty and 45 were cross-functional teams.

To avoid common source bias in our regression analyses for testing Hypothesis 1, we randomly selected one team member's assessment on the team's involvement in acquiring information from the three sources to be used as the measures of independent (cause) variables. The second member's assessment on the team's involvement in knowledge sharing activities was used as a dependent (effect) variable. For testing Hypothesis 2, the first member's measures on the team's involvement in knowledge sharing activities were used as the independent variable and the second member's measures on the team's attained knowledge absorptive capacity and performance were used as dependent variables. For testing Hypothesis 3, the measures used as independent and dependent variables were the same as those used for testing Hypothesis 2. Additionally, the first member's assessment on the team's involvement in problem solving activities was used as the moderating variable while testing Hypothesis 3. By using different sources of measures as independent, dependent, and moderating variables, this study avoided the common source bias that has been common in survey research.

Measures

The scales from Caloghirou, Kastelli, and Tsakanikas (2004), Fosfuri and Tribo (2008), and Zhao, Wong, and Zuh (2005) were adopted as a measure of the team's involvement in acquiring information from the *general business sources*, *science-based sources*, and *core business sources*. The metric for knowledge sharing was derived by combining and adapting scales from De Dreu (2006), Heide and Miner (1992), and McEvil and Marcus (2005). The measure of *Problem solving* was adapted from the works of De Dreu (2006), Heide and Miner (1992), McEvily and Marcus (2005), and Tjosvold, Yu, and Hui (2004). This variable was used as a moderating variable in Hypothesis 3. We used the definition of knowledge absorptive capacity from the literature (Jansen, Bosch, & Volberda, 2005; Lane, Koka, & Pathka, 2006; Zahra & George, 2002) to develop scales to assess a work team's *knowledge absorptive capacity*. The indices from Pina, Martinez, and Martinez (2008) and Senior and Swailes (2004) were used as the measure of *team performance*. The measure of the *size* of a work team, *team conflict*, *task complexity* were used as control variables because they can affect work team's performance.

RESULTS AND CONCLUSION

Table 1 shows the results of testing Hypothesis 1 using hierarchical regression. In Model 1, the control variables accounted for 35% of the variance of knowledge sharing (R^2 = 0.35, p < .001). In Model 2, the inclusion of the additional three sources of information acquisition in the regression analysis increased the explained variance in knowledge sharing to 41 % (ΔR^2 = 0.06, p < .001). Information acquisition from core business sources was negatively related to knowledge sharing (b = -0.22, p < .05). In contrast, information acquisition from general business sources was positively related to knowledge sharing (b = 0.26, p < .01). Information acquisition from science-based sources was unrelated to knowledge sharing. On the basis of these results, we conclude that Hypothesis 1 is supported. Only the acquisition of information from general business sources had a positive effect on knowledge sharing in work teams.

Model 1 and Model 2 in Tables 2, 3, and 4 were used to test Hypothesis 2. In Model 1 of Table 2, the control variables explained 24% of the variance in the potential absorptive capacity (R^2 = 0.24, p < .001). In Model 2 the inclusion of knowledge sharing contributed an additional 6% of the explained variance in the potential absorptive capacity (ΔR^2 = 0.06, p < .001; b = 0.27, p < .01). In Model 1 of Table 3, the control variables accounted for 13% of the variance in the realized absorptive capacity (R^2 = 0.13, p < .05), and the addition of knowledge sharing increased the explained variance to 20% (ΔR^2 = 0.07, p < .01; b = 0.30, p < .01). The control variables in Model 1 of Table 4 accounted for 14% of the variance in team performance (R^2 = 0.14, p < .05) and the addition of knowledge sharing increased the explained variance to 20% (ΔR^2 = 0.06, p < .01; b = 0.26, p < .05). According to these results, knowledge sharing positively affects the two knowledge absorptive capacities and team performance. Hence, hypothesis 2 is supported.

In testing Hypothesis 2, we found that knowledge sharing positively affected the potential and realized knowledge absorptive capacities and team performance (see Table 1). Correlation analysis showed that problem solving was positively correlate with knowledge sharing (r = 0.69, p < .001). Model 3 in Tables 1, 2, and 3 shows that problem solving had a positive effect on the potential knowledge absorptive capacity, realized knowledge absorptive capacity, and team performance (b = 0.38, p < .001; b = 0.41, p < .001; b = 0.37, p < .001). Compared with the results in Model 2 of these tables, Model 4 further shows that the effects of knowledge sharing on both types of knowledge absorptive capacities and team performance disappeared when

problem solving was entered into the regression analysis (b = -0.04, p > 0.1; b = -0.02, > 0.1; b = -0.05, > 0.1). Hypothesis 3 is supported according to these results.

This study contributes to the literature by showing that acquiring information from different sources may evoke different knowledge management behaviors in organizations. This study contributes to the literature by reaffirming the importance of knowledge sharing on organizational learning in a real world context.

EFERENCES

Appleyard, M.M. (1996). How does knowledge flow? Interfirm patterns in the semiconductor industry. ***Strategic Management Journal***, 17, 137-154.

Bystrom, K. & Jarvelin, K. (1995). Task complexity affects information seeking and use. ***Information Processing & Management***, 31(2), 191-213.

Caloghirou, Y., Kastelli, I., & Taskanikas, A. (2004). Internal capabilities and external knowledge sources: complements or substitutes for innovative performance? ***Technovation***, 24(1), 29-39.

Cohen, W.M., & Levinthal, D.A. (1990). Absorptive capacity: A new perspective on learning and innovation. ***Administrative Science Quarterly,*** 35, 128-152.

Cook, S.D.N., & Brown, J.S. (1999). Bridging epistemologies: The generative dance between organizational knowledge and organizational knowing. ***Organization Science,*** 10, 381-400.

Cross, R., & Sproull, L. (2004). More than an answer: Information relationships for actionable knowledge. ***Organization Science,*** 15, 446-462.

De Dreu, C. K. W. (2006). When too little or too much hurts: evidence for a curvilinear relationship between task conflict and innovation in teams. ***Journal of Management,*** 32, 83-107.

Fosfuri, A. & Tribo, J.A. (2008). Exploring the antecedents of potential absorptive capacity and its impact on innovation performance, ***Omega***, 36(2), 173-187.

Heide, J.B. & Miner, A.S. (1992). The shadow of the futures: Effects of anticipated interaction and frequency of contact on buyer-seller cooperation. ***Academy of Management Journal***, 35, 265-291.

Jansen, J.J.P., Van Den Bosch, F.A.J., & Volberda, H.W. (2005). Managing potential and realized absorptive capacity: How do organizational antecedents matter? ***Academy of Management Journal,*** 48, 999-1015.

Lane, P.J., Koka, B.R., Pathak. S. (2006). The reification of absorptive capacity: A critical review and rejuvenation of the construct. ***Academy of Management Review***, 31, 833-863.

Liao, S-h, Fei, W-C, & Chen, C-C. (2007). Knowledge sharing, absorptive capacity, and innovation capability: an empirical study of Taiwan's knowledge-intensive industries. ***Journal of Information Science***, 33(3), 340-359.

Liu, M-S & Liu, N-C. (2008). Sources of knowledge acquisition and patterns of knowledge sharing behaviors—An empirical study of Taiwanese high-tech firms. ***International Journal of Information Management***, 28, 423-432.

McEvily, B., & Marcus, A. (2005). Embedded ties and the acquisition of competitive capabilities. ***Strategic Management Journal,*** 26, 1033-1055.

Pina, M.I.D., Martinez, A.M.R., & Martinez, L.G. (2008). Teams in organizations: a review on team effectiveness. ***Team Performance Management***, 14(1/2), 7-21.

Rulke, D.L., Zaheer, S., & Andersone, M.H. (2000). Sources of managers' knowledge of organizational capabilities. ***Organizational Behavior and Human Decision Processes***, 82(1), 134-149.

Senior, B. & Swailes, S. (2004). The dimensions of management team performance: A repertory grid study. ***International Journal of Productivity and Performance Management***, 53(3/4), 317-333.

Tjosvold, D., Yu, Z.Y., & Hui, C. (2004). Team learning from mistakes: the contribution of cooperative goals and problem-solving. ***The Journal of Management Studies,*** 41, 1223-1245.

van Wijk, R., Jansen, J.J.P., & Lyles, M.A. (2008). Inter- and intra-organizational knowledge transfer: A meta-analytic review and assessment of its antecedents and consequences. ***Journal of Management Studies***, 45(4), 830-853.

Zahra, S.A., & George, G. (2002). Absorptive capacity: A review, reconceptualization, and extension. ***Academy of Management Review,*** 27, 185-203.

TABLE 1

Regression Analysis of the Effect of Knowledge Sharing on Information Sources

	Knowledge Sharing			
	Model 1		Model 2	
	β	*t*	β	*t*
Control				
Size	-0.11	-1.20	-0.06	-0.61
Task Difficulty	0.47***	5.09	0.49***	5.32
Task Variety	0.15	1.64	0.16^{+}	1.75
Relationship Conflict	-0.25**	-2.70	-0.21*	-2.28
Task Conflict	0.18^{+}	1.83	0.15	1.59
Independent				
Core Business Sources			-0.22*	-2.13
General Business Sources			0.26**	2.68
Science-based Sources			0.02	0.16
R^2	0.35		0.41	
$\triangle R^2$			0.06	
F	9.71***		7.56***	

$^{+}$p＜0.1

*p＜0.05

**p＜0.01

***p＜0.001

TABLE 2

Regression Analysis of the Effect of Potential Absorptive Capacity on Knowledge Sharing and Problem Solving

	Potential Absorptive Capacity							
	Model 1		Model 2		Model 3		Model 4	
	β	*t*	β	*t*	β	*t*	β	*t*
Control								
Size	-0.22*	-2.28	-0.23*	-2.48	-0.25**	-2.87	-0.25**	-2.87
Task Difficulty	0.27**	2.70	0.20^{+}	1.94	0.17*	1.79	0.17^{+}	1.80
Task Variety	0.03	0.27	0.04	0.43	0.04	0.39	0.03	0.38
Relationship Conflict	-0.22^{+}	-1.84	-0.18	-1.58	-0.15	-1.36	-0.15	-1.36
Task Conflict	0.28*	2.53	0.30**	2.86	0.27**	2.69	0.27*	2.61
Independent								
Knowledge Sharing			0.27**	2.82**			-0.04	-0.27
Problem Solving					0.38***	4.20	0.41**	2.98
R^2	0.24		0.30		0.37		0.37	
$\triangle R^2$			0.06		0.13		0.13	
F	5.69***		6.43***		8.55***		7.26***	

$^{+}$p＜0.1

*p＜0.05

**p＜0.01

***p＜0.001

TABLE 3

Regression Analysis of the Effect of Realized Absorptive Capacity on Knowledge Sharing and Problem Solving

	Realized Absorptive Capacity							
	Model 1		Model 2		Model 3		Model 4	
	β	*t*	β	*t*	β	*t*	β	*t*
Control								
Size	-0.18^{+}	-1.74	-0.19^{+}	-1.93	-0.21*	-2.28	-0.21*	-2.27
Task Difficulty	0.19^{+}	1.72	0.10	0.93	0.08	0.75	0.08	0.76
Task Variety	-0.01	-0.13	0.00	0.03	0.00	-0.04	0.00	-0.04
Relationship Conflict	-0.18	-1.41	-1.14	-1.13	-0.11	-0.91	-0.11	-0.90
Task Conflict	0.15	1.28	1.18	1.58	0.15	1.33	0.14	1.29
Independent								
Knowledge Sharing			0.30**	2.92			-0.02	-0.12
Problem Solving					0.41***	4.21	0.42**	2.88
R^2	0.13		0.20		0.27		0.27	
$\triangle R^2$			0.07		0.14		0.14	
F	2.59*		3.76**		5.51***		4.67***	

$^{+}$p＜0.1

*p＜0.05

**p＜0.01

***p＜0.001

TABLE 4

Regression Analysis of the Effect of Team Performance on Knowledge Sharing and Problem Solving

	Team Performance							
	Model 1		Model 2		Model 3		Model 4	
	β	*t*	β	*t*	β	*t*	β	*t*
Control								
Size	-0.06	-0.57	-0.07	-0.69	-0.09	-0.97	-0.09	-0.98
Task Difficulty	0.14	1.25	0.06	0.56	0.04	0.34	0.04	0.38
Task Variety	-0.03	-0.32	-0.02	-0.19	-0.02	-0.25	-0.03	0.27
Relationship Conflict	-0.33**	-2.66	-0.30*	-2.44	-0.27*	-2.27	-0.27*	-2.26
Task Conflict	0.26*	2.25	0.29*	2.53	0.26*	2.37	0.25*	2.28
Independent								
Knowledge Sharing			0.26*	2.53			-0.05	-0.34
Problem Solving					0.37***	3.84	0.41**	2.80
R^2	0.14		0.20		0.26		0.26	
$\triangle R^2$			0.06		0.12		0.12	
F	2.88*		3.61**		5.23***		4.45***	

$^{+}p<0.1$

$*p<0.05$

$**p<0.01$

$***p<0.001$

無衍生研發成果推廣資料

98 年度專題研究計畫研究成果彙整表

計畫主持人：王耀德	計畫編號：98-2410-H-009-025-
計畫名稱：訊息來源，知識分享，與團隊表現	

成果項目			量化			單位	備註（質化說明：如數個計畫共同成果、成果列為該期刊之封面故事...等）
			實際已達成數（被接受或已發表）	預期總達成數(含實際已達成數)	本計畫實際貢獻百分比		
國內	論文著作	期刊論文	0	0	100%	篇	
		研究報告/技術報告	0	0	100%		
		研討會論文	0	0	100%		
		專書	0	0	100%		
	專利	申請中件數	0	0	100%	件	
		已獲得件數	0	0	100%		
	技術移轉	件數	0	0	100%	件	
		權利金	0	0	100%	千元	
	參與計畫人力（本國籍）	碩士生	0	0	100%	人次	
		博士生	3	0	100%		
		博士後研究員	0	0	100%		
		專任助理	0	0	100%		
國外	論文著作	期刊論文	0	1	100%	篇	正撰寫論文，預備投稿國外管理期刊中.
		研究報告/技術報告	0	0	100%		
		研討會論文	0	0	100%		
		專書	0	0	100%	章/本	
	專利	申請中件數	0	0	100%	件	
		已獲得件數	0	0	100%		
	技術移轉	件數	0	0	100%	件	
		權利金	0	0	100%	千元	
	參與計畫人力（外國籍）	碩士生	0	0	100%	人次	
		博士生	0	0	100%		
		博士後研究員	0	0	100%		
		專任助理	0	0	100%		

其他成果 (無法以量化表達之成果如辦理學術活動、獲得獎項、重要國際合作、研究成果國際影響力及其他協助產業技術發展之具體效益事項等，請以文字敘述填列。)	無

	成果項目	量化	名稱或內容性質簡述
科教處計畫加填項目	測驗工具(含質性與量性)	0	
	課程/模組	0	
	電腦及網路系統或工具	0	
	教材	0	
	舉辦之活動/競賽	0	
	研討會/工作坊	0	
	電子報、網站	0	
	計畫成果推廣之參與（閱聽）人數	0	

國科會補助專題研究計畫成果報告自評表

請就研究內容與原計畫相符程度、達成預期目標情況、研究成果之學術或應用價值（簡要敘述成果所代表之意義、價值、影響或進一步發展之可能性）、是否適合在學術期刊發表或申請專利、主要發現或其他有關價值等，作一綜合評估。

1. 請就研究內容與原計畫相符程度、達成預期目標情況作一綜合評估

■達成目標

□未達成目標（請說明，以 100 字為限）

□實驗失敗

□因故實驗中斷

□其他原因

說明：

2. 研究成果在學術期刊發表或申請專利等情形：

論文：□已發表 □未發表之文稿 ■撰寫中 □無

專利：□已獲得 □申請中 ■無

技轉：□已技轉 □洽談中 ■無

其他：(以 100 字為限)

3. 請依學術成就、技術創新、社會影響等方面，評估研究成果之學術或應用價值（簡要敘述成果所代表之意義、價值、影響或進一步發展之可能性）(以 500 字為限)

本研究的主要結果之一是發現知識分享活動對工作團隊(或部門)的績效與知識吸納能力的促進作用，是透過團隊問題解決活動而產生。知識分享會促進問題解決活動的發生，因此導致較高的工作團隊績效，也導致較多知識吸納能力的提升。這一結果顯示知識分享對組織績效的影響並不是因為純粹靠累積知識而產生，是因為分享的知識導致較多的問題察覺和問題解決活動而產生。這一結果也顯示知識吸納能力的增加，不是因為知識的累積，而是因為增加的新知識促進了問題的察覺和解決活動而造成。此二結果對組織學習領域的研究文獻具有啟示作用，在學理上證明了知識分享是透過何種歷程在影響組織。本研究的另一結果說明了企業一般性資訊的收集，而非科學技術資訊或企業核心活動資訊的收集，導致較多的工作團隊資訊分享與問題解決活動，最後造成較高的團隊績效與團隊的知識吸納能力。此一結果對組織學習領域的研究文獻具有另一啟示作用，在學理上證明了企業一般性資訊的收集對組織績效與組織的學習(知識吸納)能力有較大影響。本研究結果對管理實務亦有啟示作用，管理者除了藉研發投資外，亦可透過企業一般性資訊收集機制的投資與建置，來增強員工的一般性企業資訊收集活動，以提升組織的績效和學習能力。