行政院國家科學委員會補助專題研究計畫成果報告

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※　網路成員地位，網路成員互信度和網路學習　※

※　專有性對網路結盟績效的影響　※

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□出席國際學術會議心得報告及發表之論文各一份

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EXPLOITATION AND EXPLORATION:

ACHIEVING LEARNING BENEFITS THROUGH INTERNAL NETWORK AND EXTERNAL NETWORK

Preparation of NSC Project Reports

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ABSTRATCT

This study collects 98 survey responses from a group of Taiwanese firms to test the main proposition that both internal network and external network will influence firms' knowledge management. The results show that while knowledge transfer, buyer relations, and transnational strategy are all positively related to the learning benefit of exploitation. On the other hand, only buyer relations and transnational strategy are positively related to exploration.

1. INTRODUCTION

Firms in Taiwan have been pursuing the path of low cost for decades with impressive results. However, developments in recent years have cast doubts on this singular effort on costs only. For instance, the trend of shifting production bases away from Taiwan to mainland China has further intensified on the eve of China and Taiwan's entry to WTO. Deciding what crucial components of the value chain to retain in Taiwan and what to shift out to mainland China will have profound impact not only on Taiwanese firms' global competitiveness but also on the island's future economic vitality. Furthermore, firms will need plenty of partners to help them move up the value chain scale in search of differentiation rather than just low cost (Porter, 1980). These partners will provide the much needed knowledge for Taiwanese firms to tap into. It is within this broad context of learning with partners to innovate that motivates this current study. Specifically, this research invokes the dichotomy of exploitation and exploration to examine the various factors that may contribute to these two contrasting learning benefits. These independent variables include knowledge transfer / knowledge creation, buyer relations, and transnational strategy. Transnational strategy refers to the focal firm's own strategy of coordinating a global network of subsidiaries to achieve economies of scale and local responsiveness simultaneously (Bartlett & Ghoshal, 1989). On the other hand, buyer relations depicts whether the focal firm and its key corporate customer have a close relationship or not (Dyer & Nobeoka, 2000). Lastly, knowledge

transfer / knowledge creation addresses the nature of knowledge flow between the focal firm and its key buyer (Gupta & Govindarajan, 2000). When the flow is from the buyer to the focal firm, it is labeled as knowledge transfer. However, a more active learning occurs when the flow is interactive and reciprocal. If the focal firm is able to contribute to new knowledge as an equal partner to its buyer, knowledge creation takes over knowledge transfer.

2.THEORY DEVELOPMENT

2.1Exploitation and Exploration

The sudden boom in knowledge management echoes the rise of the New Economy. Low inflation coupled with low unemployment rate seemed to confirm the invincibility of high-tech investment for a while. However, the march was interrupted by the global economic slowdown at the beginning of the new millennium. While elsewhere second thoughts about the optimism of high-tech investment and the associated knowledge management have been aired, the euphoria of knowledge management seems only to intensify in Taiwan. This may reflects the fact that the island's core industries are high-tech. It may also match the island's ambition to climb up the value chain soon. Nevertheless, a valid concern is that this overwhelming interest in knowledge management may equally be just another management fad, not unlike reengineering, TQM, or corporate culture that preceded it (Staw & Epstein, 2000). To break out the cycle of fad, researchers therefore need to pinpoint the specific and substantial benefits of knowledge management. This study selects March's (1991) dichotomy of exploitation and exploration to carry out this task. Basically, exploitation hops back to the bounded rationality view (Cyert & March, 1963; March & Simmon, 1958) that firms are trapped by their own very strengths (Leonard-Barton, 1992). They tend to look for solutions in areas close to their expertise, regardless of the possibility that an old asset may be transformed into a new liability by the mercilessly changing environment. Low cost, efficiency, standardization and economies of scale may enable the firm to offer a low price, but they may also result in a product that the market no longer wants, regardless of prices. On the other end of the spectrum is exploration. This option calls for a spirit of open experimentation, risk-taking, playfulness, and the willingness to walk into the unknown. Its chaotic pace is set to obtain the ultimate fruit of ground-breaking innovation. Although Taiwanese take pride in their ability to excel in speed and flexibility, their national culture and education have been slow to adopt a value system that emphasizes innovation over standardization. Obviously, firms need to heed to both innovation and standardization to thrive in the long term. The major objective of this study is to flesh out the factors that contribute to each of them. The following section addresses the first group of independent variables of knowledge transfer and knowledge creation.

2.2 Knowledge Transfer and Knowledge Creation

The literature in knowledge management is mostly preoccupied with one-way knowledge transfer, with various labels such as knowledge acquisition (Yli-Renko, Autio & Supienza, 2001), knowledge outflow and inflow (Gupta & Govindarajan, 2000), knowledge transfer (Simonin, 1999), knowledge diffusion (Young, Charns & Shortell 2001), and absorptive capacity (Cohen & Levinthal,

1990). This phenomenon is particularly conspicuous in light of the fact that Thompson's (1967) seminal work on three types of interorganizational relationships places sequential relationship as the second type. The last type of reciprocal relationship can achieve a greater amount of coordination, and presumably offers a greater potential for creating new knowledge. Similar bias toward this linear thinking also exists in the international business literature. For instance, Chung (2001) cited that Caves (1996) offers two reasons that foreign direct investment (FDI) may increase host industry productivity. First, FDI intensifies and disciplines local competition, and then FDI can also transfers technology to local firms. Both reasons skip over the possibility of cooperating with local firms as a team to create new technology. Given that the mainstream journals are predominantly of Anglo-Saxon origin with its cultural trait of high individualism, this one-way knowledge transfer mentality may be another instance of research as cultural byproduct (Mizruchi & Fein, 1999).

As compared to the one-way learning nature of knowledge transfer, knowledge creation goes one step further to examine how the focal Taiwanese firm can take on a more active role and create knowledge jointly with its key buyer. By studying the issue of knowledge creation, this study aims to update the view that corporations from non-Western countries are students of their Western counterparts. The literature of the multinational corporation's subsidiaries network has shown that foreign subsidiaries are capable of being knowledge creator (Frost, 2001; Gupta & Govindarajan, 2000; O'Donnell, 2000; Rugman & Verbeke, 2001). Similarly, there is no reason to preclude the possibility that for a namebrand U.S. or European buyer, its foreign supplier can actively create knowledge for it. Although this possibility may bring in the thorny issues of knowledge protection and potential future competitors (Hamel, 1991; Hennart, Roehl & Zietlow, 1999), utilizing this active learning may provide key competitive resources for the Western firm, not just for the knowledge-creating supplier. The passive tone of one-way knowledge transfer matches that of the routine-maintaining exploitation. On the other hand, the proactive stance of two-way knowledge creation is natural to firms searching for free-spirited exploration. This study therefore presents its first set of hypothesis as below.

H1a: Knowledge transfer is positively related to exploitation.

H1b: Knowledge creation is positively related to exploration.

2.3 Buyer Relations

One possible knowledge source for the Taiwanese firms is their foreign corporate buyers, who often are more established firms. The literature is filled with studies documenting the positive performance consequences of supplier-buyer alliances (Dyer & Nobeoka, 2000; Kaufman, Wood & Theyel, 2000; Nordberg, Campbell & Verbeke, 1996; Uzzi, 1997). As such, they echo the claims of the broader network literature that network provides an unique source of competitive advantage (Ahuja, 2000; Carpenter & Westphal, 2001; Young, Charns & Shortell, 2001). One way to differentiate the supplier-buyer context from the general network framework may be to follow the distinction between scale alliances and link alliances (Dussauge, Garrette & Mitchell, 2000). Scale alliances refer to alliances where partners contribute similar knowledge, while link alliances apply to alliances where partners

combine asymmetric knowledge. This contrast is similar to that of cost sharing alliances vs. skill sharing alliances (Sakakibara, 1997). Sakakibara found that the former tends to involve partners with homogeneous capabilities, while the latter with heterogeneous capabilities. Similarly, Dussauge, Garrette and Mitchell (2000) found that link alliances lead to greater level of learning. These two studies suggest that supplier-buyer alliances resemble skill sharing and link alliances. As such, the potential for alliance learning should be great. It is this potential that motivates this study's selection of the supplier-buyer context.

The above phenomenon of cooperation and learning in the supplier-buyer context has been the research focus in some recent studies. For instance, Dyer and Nobeoka (2000) provided a detailed account of how Toyota's production network encourage more network knowledge sharing than other competing automaker network. Specifically, Toyota's network motivates members to participate and openly share valuable knowledge, prevents free riders, and reduces the costs of searching and applying various types of knowledge. While Toyota may be an exceptional case of a close supplier-buyer relationship network, Kaufman, Wood and Theyel (2000) offered a strategic supplier typology to cover a wide spectrum of possible supplier-buyer arrangement. By devising a two-by-two figure with collaboration and technology as its two dimensions, Kaufman Wood and Theyel presented four types of supplier. Starting from low to high working relationship with the buyer, these include commodity supplier, technology specialist, collaborative specialist and problem-solving supplier. Just as Dyer and Nobeoka (2000) attributed Toyota's competitive edge to Toyota's supplier network, Kaufman and his colleagues found that the firms in the problem-solving quadrant have the largest number of employees, have the highest percentage of export sales, pay the highest wages and have the highest relative gross margins. All the above studies seem to suggest that a close buyer relations can bring in the learning benefits of both exploitation and exploration. This study therefore presents its second set of hypothesis as below.

H2a: Buyer relations is positively related to exploitation.

H2b: Buyer relations is positively related to exploration.

2.4 Transnational Strategy

Transnational strategy refers to practicing a mixture of efficiency-oriented global strategy and adaptation-oriented multi-domestic strategy in conducting business worldwide. This particular type of strategy has been touted as the final stage of the evolution of international strategy (Bartlett & Ghoshal, 1989). Its having the best of both worlds closely matches that of analyzer (Miles & Snow, 1978), as well as that of combining low cost and differentiation (Porter, 1980). In addition to the above business strategy analogy, transnational strategy is also associated with mentality. It reflects the underlying worldview of the focal firm's top managers (Murtha, Lenway & Bagozzi, 1998). As such, transnational strategy is more than just a strategy. It may be closely linked to the concept of absorptive capacity (Cohen & Levinthal, 1990) which in turn has been proved to play a crucial role in learning. More specifically, one component of absorptive capacity is the internal value system of the focal firm. As the most liberal form of the value system, transnational strategy aims to break down boundaries and discard ethnocentrism.

While headquarters maintain the crucial task of coordination, subsidiaries are encouraged to participate in coordination as well. The overall structure resembles more like a web than a pyramid. Information flows in and out of every node in this web, not just the center. The experience in cultivating this internal web of learning will prepare the focal to learn from its outside partners. This web gives the firm a larger base of basic knowledge to comprehend, relate to, and put to use its partner's knowledge. As a result, the learning benefits of either exploitation or exploration will be enhanced. Therefore, this study presents its last set of hypothesis as below.

H3a: Transnational strategy is positively related to exploitation.

H3b: Transnational strategy is positively related to exploration.

3. METHODOLOGY

In May, 2001, this study selected the 620 firms in the seven industries on the list of Common Wealth 1000 and sent out the questionnaire to the top executive representing each firm. A total of 98 responses were received, resulting in a 15% response rate. Two sets of regression analyses were performed for each of the two dependent variables of exploitation and exploration. To avoid the confounding effects of variables not specified in the original models, this study also contained eight control variables. These include: explicit knowledge, social status, R&D%, age, number of overseas subsidiaries, export%, industry, and nationality. Table 1 contains the two full models for the final results.

4.RESULTS AND CONCLUSION

Model 1 has an adjusted r-square value of .530, and it is significant at $p<.0001$. Furthermore, all three independent variables are positively and significantly related to exploitation. Knowledge transfer has a coefficient of .280 ($p<.01$), supporting H1a. Buyer relations has a coefficient of .430 ($p<.001$), supporting H2a. Lastly, transnational strategy has a coefficient of .414 ($p<.0001$), supporting H3a. Two control variables also show positive and significant relationship with exploitation: explicit knowledge ($b=.15$, $p<.05$) and R&D% ($b=5.36$, $p<.01$). Overall, the results support all the three hypothesis relating to exploitation. In addition, the control variable of the focal firm's own R&D% has the largest coefficient, indicating that R&D% indeed may serve as a proxy of absorptive capacity facilitating learning from partners.

Model 2 has an adjusted r-square value of .439, and it is significant at $p<.0001$. Two of the three independent variables are positively and significantly related to exploration. Knowledge creation has a coefficient of .211 ($p>.1$), failing to support H1b. Buyer relations has a coefficient of .290 ($p<.05$), supporting H2b. Lastly, transnational strategy has a coefficient of .425 ($p<.0001$), supporting H3b. Of the eight control variables, only R&D% and nationality approach marginal significance level and are both in the positive direction. Overall, the results show that transnational strategy has the largest impact on the deeper learning benefits of exploration, much more so than buyer relations (.425 : .290). Coupled with results from model 1, they seem to suggest that to go beyond exploitation, firms will need to rely on their own internal subsidiaries network than external partners.

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Table1			
Exploitation and Exploration			
		Exploitation	Exploration
Intercept		-2.461 (1.044)	-0.229 (1.043)
1.	Knowledge transfer	0.280** (0.095)	-
	Knowledge creation	-	0.211 (0.145)
2	Buyer relations	0.430*** (0.123)	0.290* (0.124)
3	Transnational strategy	0.414*** (0.093)	0.425*** (0.100)
4	Explicit Knowledge	0.154* (0.075)	0.076 (0.081)
5	Social status	-0.009 (0.077)	-0.099 (0.077)
6	R&D %	5.364** (1.986)	3.736+ (2.005)
7	Age	0.018+ (0.009)	0.014 (0.009)
8	Number of oversea subsidiaries	-0.015 (0.017)	-0.027 (0.018)
9	Export %	0.228 (0.370)	0.042 (0.373)
10	Industry	0.419+ (0.234)	0.373 (0.235)
11	Nation	0.444+ (0.236)	0.409+ (0.234)
F-Equation		8.284***	5.972***
R^2		0.603	0.527
Adjusted R^2		0.530	0.439
N		72	71