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Innovation and Performance in Multinational Subsidiaries: The Role of Headquarters-Initiated Knowledge and Subsidiary Strategic Choices

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Abstract

This paper investigates knowledge flows between headquarters and subsidiary and the role of such linkages as conduits for subsidiary innovation as well as channels for performance. On the basis of data from 195 subsidiaries in Taiwan, we analyze the knowledge scale, quality, transfer time and subsidiary strategic choices. Our theoretical development and the results from the analysis document a complex relationship between headquarters and subsidiary in knowledge intensive activities. We find a positive relationship between the extent of knowledge quality, transfer time, strategic choices and innovation confirming our argument of knowledge flow affecting subsidiary activity and performance. However knowledge scale has no curvilinear correlation to subsidiary innovation.

Keywords: *HQ-subsidiary relationship, knowledge flow, innovation, subsidiary*

1. Introduction

Strategically speaking, multinational corporations aim at coordinating and employing organizational structures of different types of knowledge (Ghoshal & Bartlett, 1990; Kogut & Zander, 1992). The headquarters of such a structure plays the role of knowledge coordination, deployment, as well as maintaining the knowledge transfer in the corporation (Ciabuschi et al., 2010). Multinational corporations especially have many overseas subsidiaries scattered in the global market. Besides building business relationships in the host country (Holm et al., 2005; O'Donnell, 2000), the knowledge transfer from headquarters can facilitate the development in the host country (Gupta & Govindarajan, 2000; Kogut & Zander, 1992) and headquarters can thus acquire new knowledge of overseas market (Ambos et al., 2006) or create a whole new competitive strength (Ambos & Schlegelmilch, 2005; Frost et al., 2002; Giroud & Scott-Kennel, 2009). All the theories implied the importance of the synergy creating by the knowledge sharing within MNC. Therefore, there are many studies focusing on how an MNC sharing knowledge and create business growth by employing the economies in different regions (Holm et al., 2005; Minbaeva, 2007). This study discusses headquarters' role in knowledge transfer and the growth of subsidiary performance and analyzes with the three qualities of knowledge transfer: knowledge scale, knowledge quality, and knowledge transfer timing.

Different corporate event participants hold different opinions towards the directions of business performance development. The coordinating relationship among headquarters and the subsidiaries is not easy to explain with business strategies and structures (Ambos et al., 2010; Simonin, 2004). The main reason is that a MNC may operate differently according to the difference of strategy viewpoints and headquarters and the subsidiaries often come up with different strategies and behaviors (Bartlett & Ghoshal, 1998; Birkinshaw & Hood, 1998). From headquarters' point of view, it can support subsidiary's local activities through experience and knowledge transfer, as well as gaining its control over subsidiary or restraining certain activities not in accordance with corporate objectives. From subsidiary's point of view, it expects to gain headquarters' attention, resources, autonomy, corporate influence, bargaining power, and avoid excessive management restrictions. Therefore, it is worth discussing the source of subsidiary's business strength of different motivations.

In addition, because there are different roles and positions for subsidiary (Birkinshaw & Hood, 1998; Frost et al., 2002), these roles and positions stem from different explanatory variables, such as initiatives (Ambos et al., 2010; Birkinshaw & Hood, 1998) or corporate power (Mudambi & Navarra, 2004; Pfeffer & Salancik, 2003).

Generally speaking, subsidiary would strive for its corporate role of positioning, such as gaining the influence within the corporation, giving out the best business performance, and

becoming the benchmarking within the corporation (Ambos et al., 2010; Birkinshaw & Hood, 1998). Such strategic behaviors can let us know if subsidiary has complete access to the resources and subsidiary's decision making can also bring influence to the base of subsidiary competence. Therefore, this study explores the source of subsidiary's innovative knowledge and intends to know headquarters' role of the knowledge development during the knowledge transfer process. The analytical perspectives of this study aim at how an MNC creates the competitive strength with headquarters' knowledge and subsidiary's decision in adopting the knowledge. Also, the contribution of this study is to apply the structure of parent-subsidiary relationship to discussing the influences of the three main attributes of knowledge on subsidiary's knowledge innovation. After integrating headquarters' values and subsidiary's attributes, six hypotheses are proposed to elaborating subsidiary development.

2. Theories and Hypotheses

2.1 Headquarters' Knowledge Scale and Subsidiary's Innovation

Headquarters' knowledge is a valuable source for subsidiary's knowledge. The knowledge flow within the corporation has certain effects on the knowledge integration and performance (Grant, 1996; Gupta & Govindarajan, 2000). Tsai (2001) believes the higher the integration level within the corporation is, the more it helps the corporation innovate. At the same time, as the bonding fastens, the frequency of knowledge exchange grows, which helps improve the level of innovation. In addition, the efficiency and effectiveness also depends on the parent-subsidiary relationship (Ciabuschi et al., 2010). Because headquarters hodls the power to allocate resources, it has a certain outlook of the resource allocation. Also, as environmental uncertainty is considered, headquarters tend to integrate many activities for the global outlook, which emphasizes the headquarters' importance in global activities and knowledge transfer (Hedlund, 1986). From this viewpoint, the parent-subsidiary interaction is then the important factor for subsidiary's knowledge innovation (Bartlett & Ghoshal, 1998). The higher level the integration is, the higher is the frequency of communication and interaction. This will then have a more significant influence on subsidiary's innovative activities. The knowledge transfer would therefore have significant influence on innovation (Foss & Pedersen, 2002; Tsai, 2001). The empirical research of Phene & Almeida (2008) points out that subsidiary's innovation and knowledge accumulation are resulted from massive knowledge transfer. The more knowledge subsidiary acquires the more positive assistance it gets for knowledge development. The headquarters can analyze the value of every resource by establishing performance indicators, approving the budget plans or related promotion events, which allows the subsidiary to provide different opinions during conducting related innovative behaviors. This would provide the subsidiary a knowledge learning guideline (Ambos et al., 2010). The argument indicates that headquarters can help

the developing subsidiary accumulate competitive strength. In addition, the frequenter the communication of knowledge and opinion is, the larger the knowledge exchange scale is (Foss & Pedersen, 2002; Tsai, 2001), which narrows the knowledge gap and reaches the fit of innovation system and knowledge (Ambos et al., 2006; Grant, 1996; Szulanski, 1996).

However, the larger the scale and volume of the knowledge is, the more redundant is the tacit knowledge. Mahnke et al. (2009) have found out that the level of knowledge sharing and the business strength shows an inverted U-shaped curve. When the knowledge sharing behaviors and procedures increase, as it breaks through a critical point, the performance and the advantage of the knowledge receiver would instead start to get lower. The main reason is that if subsidiary possesses the position of all the knowledge sharing, it tends to absorb knowledge from the same knowledge source and such a habit would eventually diminish the benefit from knowledge sharing, as well as increases the burden and opportunity cost of knowledge sharing (Johnston, 2005). This will in the end affect the benefit of knowledge transfer and other corporate units which long for headquarters' attention. Therefore, as the knowledge volume transferred from headquarters to the subsidiary has exceeded a certain threshold, it will then inhibit the subsidiary's innovation.

In conclusion, a hypothesis is proposed as follows;

H_1：A curvilinear correlation (inverted U curve) shows when subsidiary has acquired larger knowledge scale from headquarters.

2.2 Headquarters' Knowledge Quality and Subsidiary's Innovation

Knowledge transfer shows a significant effect on subsidiary's innovation. Because knowledge has an indescribable attribute, some errors or omissions might occur in the knowledge transfer process (Mahnke et al., 2009; Szulanski, 1996). Moreover, the intention and capability to share of the knowledge transfer, the absorptive capacity of the knowledge recipient and attitudes would then affect the quality of knowledge transfer (Lane et al., 2001). As knowledge flows, due to information stickiness, knowledge boundary, and selfseeking with guiles, the loss from knowledge base, strategic objectives and coordination during the knowledge transfer among two different units must be considered (Buckley & Carter, 2004). In order to reduce the loss of knowledge benefit during the transfer, an appropriate structure must then be chosen in the process of knowledge integration and exchange.

Ambos *et al.* (2006) claimed that knowledge quality is the most critical element for a corporate's ultimate performance. The study revealed that if the parent-subsidiary relationship expects to benefit from knowledge transfer, such knowledge would count on output of large scale or interaction of high frequency, but to acquire the most important and the most stable knowledge resource from the knowledge source, which can thus help the business performance. High quality knowledge resource usually indicates innovative ideas, which

provide subsidiary the ideas for business operation in the future, the ways to establish the structure for strategic development, and allow subsidiary to make the best decisions and business activities that bring in the most benefits. In other words, if the knowledge transfer has a lower quality, knowledge ambiguity will then affect the overall business objectives. When the recipient acquires related resources, some key clues maybe left out (Simonin, 1999). Thus, knowledge quality has a certain influence on innovation.

In conclusion, a hypothesis is proposed as follows;

H_2：It shows a significant and positive influence of the knowledge quality from headquarters to subsidiary.

2.3 Headquarters' Knowledge Transfer and Subsidiary's Innovation

Due to the competitive market, uncertain environment, and changing consumer markets, the timing of knowledge acquiring shows significant influence on the level of innovation (Jiang et al., 2009; Kogut & Kulatilaka, 2001).

For example, the umbrella manufacturer Fu-tai Umbrella Works has transferred the know-how to other factories around the world as the domestic market started to decline. The company has also applied diversification to other unrelated business fields. As the headquarters of the Fu-tai company then transferred immediately the know-how to other factories around the world, which has allowed the subsidiaries to develop in the specialized filed, but also allowed the whole Fu-tai group to keep growing. When the environment is competitive, the subsidiary in the host country should integrate and employ the resources and knowledge as fast as possible. If the headquarters fail to transfer related knowledge in time, the subsidiary's local strategy must then be adjusted, which could damage subsidiary's innovation (Kogut & Kulatilaka, 2001; Tran et al., 2010).

If a subsidiary can receive knowledge from headquarters in time, it will then help the subsidiary make the decision immediately (Jiang et al., 2009; Kogut & Kulatilaka, 2001).

Both too earlier and too late can affect the value of knowledge. In general, when subsidiary receives too early the knowledge, the knowledge would then be temporally kept in the company, possibly be forgotten, even reckoned as excessive interference from headquarters. When subsidiary receive too late the knowledge, subsidiary may consider such knowledge trivial and has less opportunity to employ the knowledge, even may directly ignore it. Therefore, the timing of parent-subsidiary knowledge transfer should not be too early or too late. If the adopted knowledge content shows significant correlation with the transfer timing, it is plausible to assume the timing of headquarters' knowledge transfer has influence on subsidiary's innovation. If the transfer timing is premature, the market in the host country may not accept the acquired knowledge, thus the value to be produced is then limited. If the transfer timing is too late, the market demand can be already dominated by

competitors. In addition, due to the knowledge ambiguity and the indescribable attribute, if the recipient has not sufficient time to comprehend the content, it cannot be easily applied to any business strategy (Grant, 1996; Szulanski, 1996). As the knowledge is not immediately employed by subsidiary, it will then lose the expected value (Tran et al., 2010). The timing of knowledge transfer is like options. For subsidiary, specialized advantages would be developed when the headquarters' knowledge comes in time. On the other hand, subsidiary's innovation and performance would then be inhibited (Tran et al., 2010).

Therefore, a hypothesis is proposed as follows;

H_3：The timing of headquarters' knowledge transfer shows a significant and positive influence on subsidiary's knowledge innovation.

2.4 Subsidiary Strategy and Subsidiary's Innovation

Subsidiary holds a different professional role (Bartlett & Ghoshal, 1998; Gupta & Govindarajan, 2000). From this viewpoint, the influence of subsidiary's strategy on innovation is discussed in this study, which is the influence brought by subsidiary initiatives. Because subsidiaries locate in overseas markets, facing the uncertain and changing market, besides depending on headquarters' support, subsidiaries can look for external knowledge resources to expand competitive advantages.

2.5 Initiatives

Subsidiary initiatives can be defined as a different and proactive behavior employed by subsidiary. Such behavior is an innovative and unique approach in resource application and expanding (Birkinshaw & Hood, 1998). Subsidiary with initiatives can not only create business value, but also corporate advantage (Frost et al., 2002; Johnston, 2005). Subsidiary can thus with initiatives expand knowledge category and accumulate innovation ability, as well as transfers the special strength to other units and acquires the synergy of global advantage for the whole corporation (Ambos et al., 2010; Rugman & Verbeke, 2001).

A subsidiary with initiatives can develop demanded strengths by itself for any inferior aspects. For example, subsidiary can build up its own business relationship network in the host country and look for the most complimentary counterpart to establish a certain business relationship. As the cooperation between complimentary corporations intensifies, subsidiary can thus improve business efficiency and acquire information, as well as getting critical know-how and exchange market experiences with its partners, which can bring in more related knowledge and know-how to create the unique and ultimate skills and strength (Holm et al., 2005; Lane et al., 2001). Because innovation stems from merging knowledge or external input, it is revealed in the research of Phene & Almeida (2004) that subsidiary can through talent search and merging strength to increase its innovation strength or increase the capacity of knowledge base. With technology alliance or merging any business with valuable

technology can help subsidiary create innovation strength (Kale et al., 2002; Phene & Almeida, 2008). With learning, management experiences and communication systems, as well as integrating and developing both new knowledge and old knowledge can also increase subsidiary's innovation performance (Lane et al., 2001; Mudambi & Navarra, 2004).

Therefore, a hypothesis is proposed as follows;

H_4：Subsidiary's initiatives have a significant and positive influence on subsidiary's knowledge innovation.

2.6 Subsidiary's Influence

As subsidiary can influence the decision-making of other units in the company, it means it plays a certain critical role within the MNC. Speaking from the viewpoint of resource dependence theory, if subsidiary is dependable, it means the subsidiary is entitled to conduct exclusive strategy planning or through negotiation to demand others to comply with its own demands (Mudambi & Navarra, 2004). Moreover, horizontal connection is a crucial attribute of subsidiary. When a subsidiary has certain power, the subsidiary can thus possess confidence and sense of stability in business performance and doesn't need to join other subsidiaries to consume corporate resources. Such a subsidiary receives less administrative interference from other subsidiaries. In other words, a more influential subsidiary possesses more irreplaceable structural influence in the corporate network (Foss & Pedersen, 2002; Ghoshal & Bartlett, 1990; Johnston, 2005).

However, subsidiary's influence results from headquarters' directions of globalization and strategic positioning. If headquarters reckon subsidiary's host country as a critical potential market, even subsidiary does not hold an important role, headquarters would consider such subsidiary as future opportunity and render strategy autonomy to the subsidiary, which allows subsidiary to focus on developing related strengths and innovations (Bartlett & Ghoshal, 1998; O'Donnell, 2000). For instance, the role of black hole presented by Bartlett & Ghoshal (1998) indicates such concept. Even headquarters do not pay much immediate attention to the subsidiary, such subsidiary of the kind will eventually become the critical strategy leader in the corporation with its growth or market importance, which means the subsidiary will then acquire the legitimacy and independence from the headquarters and focus on developing competitive advantages and innovation (Frost et al., 2002).

Therefore, a hypothesis is proposed as follows;

H_5：Subsidiary's influence within the corporation has a significant, positive influence on subsidiary's knowledge innovation.

2.7 Subsidiary's Knowledge Innovation and Subsidiary's Performance

Innovation indicates the output of new product, new technology, and new services (Jindra

et al., 2009; Phene & Almeida, 2008), which is the crucial factor for business competitive advantage and performance (Foss & Pedersen, 2002; Frost et al., 2002). Coroporation is the knowledge storage, through knowledge acquisition, absroption, creation and application can produce positive effects to innovation (Grant, 1996). In the process of knowledge integration and devleopment, besides bringing knowledge benefits to the most with proper mechanism, it can at the time bring benefits to the corporate output (Buckley & Carter, 2004). Therefore, when a subsidiary possesses innovation strength, it will have its own competitive advantage and maintain outstanding comepetitiveness in the market, as well as better business performance. Even the changing business environment brings uncertainty to the business development, innovation helps improve the existing market force and brings business performance and market development potential to the corporation (Holm et al., 2005; Phene & Almeida, 2008). This allows other units to lean and be reckoned by the headquarters and let the subsidiary become the example of other subsidiaries (Ambos et al., 2010; Birkinshaw & Hood, 1998).

Therefore, the following hypothesis has been formulated;

H_6：Subsidiary's knowledge innovation has a significant and positive influence on subsidiary's business performance.

As a result, the theory model of this research is shown as Figure 1.

3. Research Method

3.1 Data Collection and Sampling

The main research object in this study is subsidiaries in Taiwan. The research samples are collected from the "Foreign Investment Directory" published by the investment commission of Ministry of Economic Affairs and systematic sampling is applied to acquire related samples. With systematic sampling, 1,200 copies of questionnaire were sent out and 207 of them were returned. After ruling out invalid questionnaires, there are 195 valid questionnaires in return and the response rate is 16.2%, which is acceptable in the field of international business study. Non-response error analysis is further conducted to see if the collected samples are representative. It shows no significant difference among the samples from the results, which indicates the samples are representative.

In addition, as the subsidiaries are the major objective of the research, in order to reduce the common method variance, some objective variables are added to the operational definition. As for subjective variables, with factor analysis it shows the explanation of variance of the first principle component not significantly larger than other components. It is concluded that common method variance does not generate any significant influence.

3.2 Operational Definition

3.2.1 Dependent Variables

a. Subsidiary's Innovation

The measure of subsidiary's innovation is compared the innovative changes with other counterparts in the same business in four aspects in the past three years, which are administrative management, manufacturing technology, sales and marketing, and research and development. The factor loadings of the factor analysis all comply with the standard of measurement (0.61、0.49、0.83、0.68) and Cronbach's alpha is more than 0.7 (0.85).

b. Performance

The measure of performance is evaluated by the financial indicators. The respondents answer the company's performance in comparison with other counterparts in ROI (return of investment), profitability, productivity, and cash flow. The factor loadings of the factor analysis all comply with the standard of measurement (0.86、0.82、0.87、0.78) and Cronbach's alpha is more than 0.7 (0.92).

3.2.2 Independent Variables

Knowledge Scale, Knowledge Quality, and knowledge transfer timing

The five most important corporate knowledge categories are employed in this research, which are sales guideline, total product category, advertising and promotion, display and exhibition, and updated seasonal best product information. Then we measure the knowledge quality, knowledge reception scale, and knowledge reception time of each of the five knowledge categories.

Knowledge scale is objectively measured by answering questions, which the respondents answer the level of reception of knowledge. The collected data will then be summed up.

The bigger the sum is, the bigger is the scale of the knowledge. Three dummy variables are employed to measure the knowledge transfer timing. "0" indicates premature transfer timing, "1" indicates proper transfer timing, and "2" indicates late transfer timing. As the numbers are added up, the overall condition of transfer timing are presented. As knowledge quality is a subjective indicator, the factor loadings of the factor analysis all comply with the standard of measurement (0.94、0.90、0.64、0.89、0.88) and Cronbach's alpha is more than 0.7 (0.95).

3.3 Subsidiary's Strategy Selection

3.3.1 Initiatives

Subsidiary's initiatives are measured with the level of preparatory operation in the past five years in product developments, product sales, new business activities, and investment on research and development. The factor loadings of the factor analysis all comply with the standard of measurement (0.89、0.89、0.89) and Cronbach's alpha is more than 0.7 (0.98).

3.3.2 Impact

As for subsidiary's impact, all the respondents would answer all the questions with Likert scale. The questions are; (a) the level of the subsidiary's impact on other subsidiaries' business performance, (b) the level of the job content relevance between the subsidiary and other subsidiaries, (c) the level of impact brought by other subsidiaries' activities, (d) the level of the subsidiary's dependence on other subsidiaries support to accomplish business objectives. The indicator of the impact would be calculated with the following formula.

$$\text{Impact} = \frac{\text{Indicator A}}{\text{Average of (Indicator B , Indicator C , Indicator D)}}$$

3.4 Control Variables

Four control variables are employed in this research. First of all, as subsidiary is the research objective in this study, the business environment of the host country would bring influence to subsidiary's knowledge creation and business performance (Foss & Pedersen, 2002; Frost et al., 2002). The business environment is then considered as a control variable. Secondly, the longer a subsidiary operates, the more it comprehends the host country market and possesses more specialized business knowledge (Rugman & Verbeke, 2001). Thirdly, the larger scale a subsidiary is, the more resources it has, as well as the possibility for innovation (Lane et al., 2001). Business scale is then considered as a control variable. Lastly, subsidiary's nationality varies. The level and demand of innovation would also vary. Western MNCs embrace a higher level of entrepreneurship, which have a higher level of innovation then MNCs in eastern countries (Johnston, 2005). Subsidiary's nationality is then considered as a control variable.

4. Research Result

The multiple regression analysis is applied in this study to analyze the influence of knowledge scale, knowledge quality, knowledge transfer timing, initiatives and impact on subsidiary's innovation. The equation of the analysis is shown as Model 1. As subsidiary's innovation strength and performance can influence each other, it is analyzed in this study with Model 2.

OLS method is applied in this study for data analysis. Before we verify the hypotheses, Table 1 shows the correlation matrix. From the Table 1 we know that the correlation among the independent variables tends to be low. In addition, with collinarity diagnosis, the VIF and TOL values among the variables complied with the standard (Bagozzi & Yi, 1988), which means the problem of collinearity should not produce any bias for the analysis. Moreover, we

know from the table of correlation coefficient that a significant correlation exists between the coefficients among dependent variables and independent variables. OLS method is then further applied for analysis.

The result of OLS analysis is revealed in Table 2. Model 1-4 takes innovation as the dependent variable and Model 5-6 takes performance as the dependent variable. Model 1 is the basic model with only control variables. Model 2 consists of knowledge scale, knowledge quality, and knowledge transfer timing, which analyzes all the knowledge related variables. Model 3 takes in initiatives and impact as variables, which analyzes subsidiary's strategy selection. Model 4 includes all the independent variables. As for Model 5, it analyzes the correlation among control variables and performance. Model 6 analyzes the influence on performance brought by innovation. We can see from the overall analysis results that goodness of fit increases after adjustment and shows significant *explanatory power*, which indicates all the variables included in this study are statistically significant.

Analytical results are shown in Table 2. As for the control variables, except the *length* of the *company's operation* shows a significant influence on innovation, all the rest control variables have no significant affect. We learn from the result that the shorter the length of the subsidiary's operation, it tends to be more innovative. However, with a shorter length of operation, such a subsidiary does not have significant impact. The result indicates that younger subsidiary tends to be more innovative, but the performance is not thus promising.

As for H_1, it is assumed in this research that an inverted U curve correlation exist between knowledge scale and innovation, thus knowledge scale was taken as a variable and generates a positive correlation. The *quadratic component* of knowledge scale is then added and it shows a negative *correlation coefficient, which results in* an *inverted U*-shaped relation.

However, the *inverted U*-shaped relation is not statistically *significant, thus* H_1 *does not sustain. As for* H_2*, knowledge is reckoned to have a positive correlation with innovation. We learned from the result that the coefficient is positive and significant, which support the* H_2 *hypothesis. As for* H_3*, knowledge transfer timing is assumed to help subsidiary's innovation and the coefficient is positive but not significant, which means headquarters' knowledge transfer timing cannot have a significant influence on innovation, though it meet the need of innovation. Thus it doesn't support the hypothesis. Moreover, as all the results are simultaneously added to complete model, the significance of coefficients does not change, which indicates a stable analysis conclusion.*

As for the innovation influence of subsidiary's strategy selection, it is assumed that a subsidiary with initiatives can have positive influence on innovation. We can learn from the coefficient that it shows a positive and significant correlation, which sustains H_4. As for H_5, it is assumed that the more influential a subsidiary is, it helps more in innovation. The

coefficient shows a positive and significant result, which supports H_5. In addition, all the independent variables are included in Model 4 and we learned from the complete model analysis that the research results of H_1-H_5 have no significant difference both in individual analysis or complete model analysis, which means the analysis result of the research stable. As for performance, it is assumed in H_6 that the more innovative a subsidiary, the better performance it has. We can learn from the analysis in Table 2 that the coefficient is positive and significant, which supports H_6.

5. Research Conclusion

If subsidiary intends to improve its competitiveness with developing innovative knowledge, the headquarters' knowledge flow is reckoned as an existing strategic behavior. Moreover, besides depending on headquarters, subsidiary's own strategy selection is also a crucial source of innovation.

With empirical analysis, the theoretical contributions of the research are elaborated as follows; first of all, the knowledge flow within a MNC can develop subsidiary's innovation strength, which means the innovation strength can be improved with better knowledge scale, knowledge quality, and transfer timing. However, it is revealed in the analytical results of the research that subsidiary's innovation strength can have positive influence only with better quality of transferred knowledge. The better the knowledge quality, the more certain the knowledge and the easier it can be absorbed by and transferred to the subsidiary, as well as avoiding less omissions during the transfer. When a subsidiary receives knowledge of more complete and better quality, it tends to be more innovative. In addition, it is found in the research that larger scale of knowledge only show effects in the beginning. As the scale extends to a certain degree, it tends to drop due to knowledge redundancy and overloading. Though it shows no significance in analysis, such a result is important because it is consistent with the theory of Tran et al. (2010). It is expected that the induction or operation of knowledge scale can be more delicate in the future. This is supposed to improve the theoretical contributions of subsidiary's innovation strength. It shows a positive influence on innovation when the knowledge transfer timing is appropriate, though the result is not statistically significant. Such a result complies with the theory of Jiang et al. (2009) and the reason of non-significance might be the knowledge transfer timing does not meet subsidiary's expectation. From the standpoint of headquarters, if a subsidiary can run the business in the host country, the headquarters tend to provide knowledge transfer anytime to maintain subsidiary's competitiveness (Jindra et al., 2009). Therefore, even the knowledge can be employed in the future, it still shows no statistical significance in this research. The transfer timing can be further discussed in the furture.

As for subsidiary's strategy selection, the more initiatives a subsidiary has, the more it

helps in innovation. Initiatives shape up subsidiary's role, especially when a subsidiary has business visions and integrate corporate objectives in the business behaviors. Such a subsidiary would look for all the resources and supports in demand and expand the innovation filed of knowledge. In addition, subsidiary's influence and importance in the corporation also shows a positive significance to knowledge innovation. Subsidiary's impact in the corporation can result from its importance in the host country (Ghoshal & Bartlett, 1988) and headquarters' recognition (Mudambi & Navarra, 2004). Thus, when a subsidiary shows impact, it is easier for the subsidiary to access key information or the influential corporate global strategy, which helps accumulate the drive of innovative knowledge. Therefore, with selection and adjustment of business strategy, subsidiary can increase the degree of knowledge innovation and the growth of business performance. As for practical contribution, all MNCs strive for new resources and develop new innovation strengths to successfully execute global strategies. Thus, many MNCs would outsource product development and product design and reserve key know-hows or marketing skills (Kale et al., 2002). However, only few corporations will actively look for other approaches for knowledge resources. Some corporations would rely on authorization, some would employ approach of mergers and acquisitions, and some would go through internal research and development to acquire knowledge resources. It is indicated that the survival rate of business would increase if one has more channels to acquiring resources. MNCs can improve its core business competitiveness with the external resources and the direct or indirect interferences of headquarters can help subsidiary create knowledge and improve performance. Therefore, if the existing resources can sustain the development demand, internal research and development can be the choice. Otherwise it should outsource and exchange resources with external businesses. The most important attribute of MNC is the compatibility with external resources, which helps subsidiary create the best competitive strength in host country. For example, NHN Corporation, the headquarters of Line Application, besides the acquisition the Taiwan-based startup Gogolook, it has established its Taiwan subsidiary "Camp Mobile" in 2014 to join the market of smartphone application. NHN Corporation has not only appointed all the smartphone application engineers to support the subsidiary, but also intends to design the best communication applications by comprehending the market needs in Taiwan. The performance of subsidiaries and MNCs does not just depend on globalization. A business of the best adaptability, *contingency* management, and timing control can thus create the best business flexibility, which shows the corporate's efforts in globalization is not just dispersion of business activities, but a series of movement to success and accomplish the best business performance with innovative knowledge.

A few directions for future research are then proposed. First of all, it is found in this

research that knowledge scale and innovation strength shows an inverted U curve but not significant correlation. Knowledge scale is expected to be measured in a more delicate method in the future. Secondly, it is revealed in this research that subsidiary's internal impact can directly influence the possibility of knowledge innovation, but there are also subsidiaries which develop their own knowledge strengths before acquiring headquarters' attention, then increase the impact. Therefore, other different theoretical derivation methods can be considered in the future. Finally, the research model is based on theory and employed cross-section analysis. Longitudinal data can be employed to confirm the consequence among the assumptions, as well as timing difference to confirm the influence on performance and knowledge strength generated by variables like transfer timing…etc.

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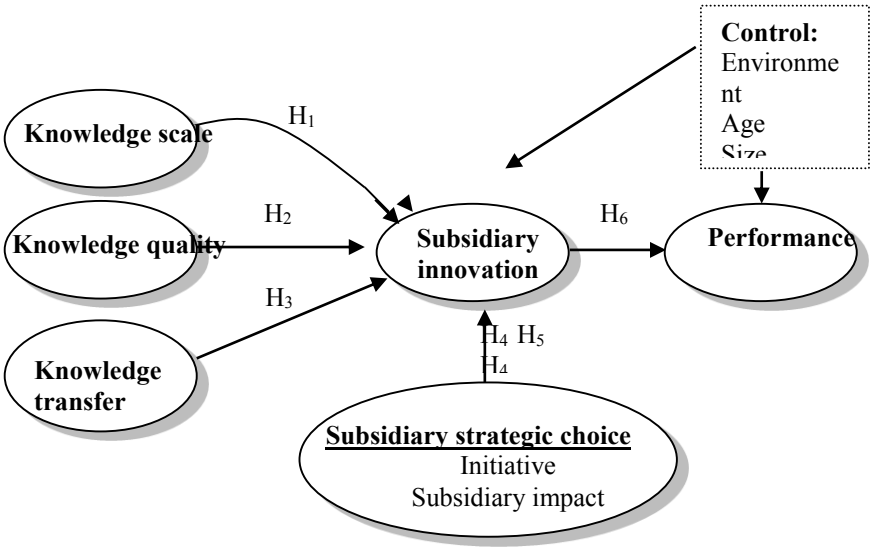

Figure 1: Theoretical framework

Table 1: descriptive statistics and correlation matrix

Varibles	Average	S.E	1	2	3	4	5	6	7	8	9	10	11
1. Environment	2.38	1.10	1										
2. Age	2.70	1.32	0.007	1									
3. Size	2.30	1.05	0.016	0.680*	1								
4. Nationality	2.01	0.77	-0.073	-0.006	0.002	1							
5. Knowledge scale	17.84	5.43	0.036	0.619*	0.614*	-0.085	1						
6. Knowledge Quality	25.96	5.16	0.052	0.935*	0.899*	0.036	0.578*	1					
7. Knowledge transfer time	5.13	1.80	-0.028	0.019	0.001	0.064	0.047	0.016	1				
8. Subsidiary knowledge innovation	20.07	4.44	-0.020	0.444*	0.425*	0.015	0.232*	0.566*	0.035	1			
9. Initiatives	14.86	5.18	-0.022	0.410*	0.353*	0.006	0.171*	0.493*	-0.017	0.681*	1		
10. Subsidiary Impact	1.23	0.18	-0.042	0.256	0.243*	-0.133	0.065	0.285*	-0.096	0.453*	0.280*	1	

11. performance	23.37	4.82	0.042	0.449*	0.457*	0.022	0.220*	0.536*	0.034	0.672*	0.548*	0.311*	1

*p-value<0.05

Table 2: regression analysis and results

DV : Innovation	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**DV : Performance**	Model
Constants	15.974(1.242)	1.388(3.166)	2.619(1.802)	-5.399(2.886)		17.830(1.33
Environment	-0.023(0.263)	-0.084(0.236)	0.004(0.195)	-0.033(0.188)		0.038(0.264
Age	0.388(0.639)*	-0.613(0.739)*	-0.051(0.489)	-0.572(0.587)*		0.199(0.641
Size	0.060(0.807)	-0.100(0.745)	0.214(0.602)	0.087(0.600)		0.266(0.809
Nationality	0.016(0.377)	-0.045(0.337)	0.047(0.282)	0.014(0.272)		0.026(0.379
K.S		-0.261(0.259)		-0.074(0.206)		
$K.S^2$		0.198(0.007)		0.103(0.006)		
K.Q		1.275(0.143)**		0.710(0.124)**		
K.T.T		0.030(0.142)		0.063(0.113)		
Initiatives			0.552(0.046)**	0.460(0.047)**		
Impact Innovation			0.266(1.281)**	0.252(1.229)**		
R^2	0.199	0.393	0.565	0.621		0.213
Adj R^2	0.182	0.367	0.551	0.600		0.196
R^2 change		0.185 *(Compare with Model1)*	0.369 *(Compare with model 1)*	0.418 *(Compare with model 1)*		
F-value	11.777**	15.067**	40.714**	30.142**		12.824**

N=195, *p-value<0.05、 **p-value<0.01
K.S: Knowledge scale
K.Q: Knowledge quality
K.T.T: Knowledge transfer time