

Reverse Knowledge Transfer within the Intra-firm Networks: The Role of Subsidiaries' Knowledge Transfer Capacity

내부 기업 네트워크 내 역지식이전: 자회사의 지식이전능력의 역할*

오 금 식** Kum-Sik Oh
조 민 수*** Min-Soo Joh
박 병 일**** Byung-Il Park

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Abstract

Research on reverse knowledge transfer from subsidiaries to headquarters is

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** 제주한라대학교 호텔경영학과 조교수, 제1저자

*** 한국외국어대학교 경영학과 박사과정, 교신저자

**** 한국외국어대학교 경영학과 교수, 공동저자

recently gaining prominence. The debate regarding the precedents affecting the phenomenon has yet to reach a consensus. Therefore, this paper attempts to identify the effects of an organization's subsidiaries' knowledge transfer capacity (KTC) on reversely transferred local market information (LMI) to headquarters. The present study also examines the moderating effect of intrinsic KTC on the relationship between extrinsic KTC and RKT in an effort to gain better insights into KTC. Through sample data gathered from South Korea, knowledge development capability and subsidiary willingness were found to be vital precedents for successful reverse transferring of LMI to headquarters. Furthermore, we also found that subsidiary willingness functions as an interfering moderator between the relationship of knowledge development capability and RKT. Theoretical contributions and practical implications of these findings are discussed.

〈Key Words〉 Reverse Knowledge Transfer, Knowledge Transfer Capacity, Local Market Information, South Korea

I. Introduction

Various researchers have reached a consensus that knowledge transfer between organizational subunits will eventually build knowledge based competitive advantages for multinational enterprises (MNEs) (e.g., Argote & Ingram, 2000; Asmussen et al., 2013; Reagans & McEvily, 2003). Given the importance of knowledge sharing within organizations, scholars have paid much attention to relevant topics (e.g., knowledge transfer, knowledge acquisition, and/or reverse knowledge transfer) for the past several decades (e.g., Gupta and Govindarajan, 2000; Minbaeva et al., 2003; Simonin, 1999; Szulanski, 1996; Tsai, 2001). Conventional knowledge transfer literature assumes that the headquarter (HQ) is the provider of tacit and firm specific knowledge and a subsidiary is the receiver of that knowledge. However, as competitions have intensified in the global arena and as the number of overseas subsidiaries of MNEs grew exponentially, scholars soon noticed that knowledge transfer could take place in multiple directions (McGuinness et al., 2013), and given their access to the knowledge pool in the local

environment (Frost, 1998), subsidiaries played a pivotal role in sustaining an MNE's competitive advantage as well as innovation process through reverse knowledge transfer (i.e., knowledge transfer from subsidiaries to MNE HQs) (e.g., Ambos et al., 2006; Bartlett and Ghoshal, 1989; Cantwell, 1995; Rabbiosi, 2011; Subramaniam and Venkatraman, 2001; Venaik et al., 2005; Yamin and Forsgren, 2006). As a result, reverse knowledge transfer (RKT) began to receive attention from diverse international business (IB) researchers (Frost and Zhou, 2005; Gupta and Govindarajan, 2000; Håkanson and Nobel, 2001; Jeong et al., 2016; Song, 2014; Yang et al., 2008).

Previous studies regarding RKT began seeking empirical evidence of the RKT phenomenon. Some of these earlier works pursued the evidence of RKT by tracking patent data within MNEs (e.g., Almeida 1996; Granstrand et al. 1997), or investigated the overseas subsidiary manager's perception on knowledge transfer (e.g., Gupta and Govindarajan 2000; Harzing and Noorderhaven 2006). More recent studies on RKT have paid attention to the HQ's absorptive capacity (e.g., Murray and Chao, 2005), desirable knowledge transfer environments and conditions within MNEs such as social capital (e.g., Bjorkman et al., 2007; Noorderhaven and Harzing 2009), and knowledge management process (e.g., Jeong, Chae, and Park, in press). Despite the fact that a number of studies contribute to the understanding of RKT, in terms of its process, there is an important issue that such earlier studies have yet to cover. Apart from the content issue of the knowledge and how subsidiaries acquire valuable local market information (LMI), in terms of constructs comprising RKT from transferor (i.e., subsidiary) to receiver (i.e., HQ), there are three core concepts to be considered. First, as a majority of researchers would agree, the absorptive capacity of a receiver plays a crucial role for the learning organization to leapfrog into becoming high knowledge acquirers (e.g., Cohen and Levinthal, 1990). Absorptive capacity acts as a foundation for organizational learning, and it refers to a firm's ability to understand, assimilate new knowledge and apply it to commercial ends. Thus, in the context of RKT, the absorptive capacity of the HQ is surely of great importance. Second, socio-environmental conditions, such as trust, cultural distance, and mutual active communication between the two entities also plays an equally critical role. The social construct can be components deciding the level of RKT in that it functions as a favorable or sometimes a poor learning environment in determining the knowledge receiver's extent to which it learns new information from the

knowledge transferor (Junni and Sarala, 2013). Third, although, in a logical sense, it is quite obvious that the transferor's knowledge transfer capacity (KTC) is equally important as other previously proposed elements, conventional knowledge transfer literature in IB academia has demonstrated surprisingly little interest to this theoretical concept with three notable exceptions by Garud and Nayyar (1994), Martin and Salomon (2003) and Park (2011). In regards to this issue, Park's research in 2011 on KTC of MNEs' international joint venture, contends that "...Although it (knowledge transfer capacity) is a strategically important notion that is worth examining, extant literature currently sheds light on only student's absorptive capacity and neglects teacher's fundamental ability by attributing knowledge acquirers' failure to their own lack of learning capability (2011, p.76)." Similarly, Garud and Nayyar (1994) and Martin and Salomon (2003) clearly indicate that compared to the unidirectional (conventional) knowledge transfer process, subsidiaries act as a knowledge transferor rather than HQs in the case of RKT discussions. They also point out that the HQ's absorptive capacity has been empirically examined in various RKT experiments, which inversely informs us that it is worth examining the subsidiary's KTC by that same logic though the topic is often overlooked. In addition, it is common sense that a subsidiary is at the receiving end of the conventional knowledge transfer process, and thus its KTC is rather questionable than its counterpart HQ, which is quite experienced.

In an attempt to fill this gap, the main objective of this study is to introduce the concept of KTC in the context of RKT literature. Moreover, this study is different from those three formative studies illustrated above because we investigate whether factors comprising a subsidiary's KTC affect RKT to HQ and by classifying it (i.e., KTC) into intrinsic and extrinsic dimensions. Whilst doing so, the paper will attempt to identify what key factors affect RKT and further minutely examine whether an intrinsic element successfully moderates the impacts of the extrinsic factors on RKT. This study contributes to the academy of IB and knowledge transfer literature by adopting a rather unexplored construct and by delivering a more complete framework of the RKT process, which aims to bring better understanding of KTC. This paper is organized as follows: It starts with a brief review of the concepts, which constitute the research model of RKT. Then, a theoretical framework is proposed and hypotheses are specified. This is followed by a description of the research method utilized and empirical results drawn

from a series of regressions are presented. Lastly, discussion of findings, theoretical and managerial implications, and limitations as well as future research venues will be provided.

II. Literature review and theoretical backgrounds: RKT from the Subsidiary to the Headquarter

Setting aside the issue of knowledge content, there are three elements which past studies point to as key determinants of successful RKT : absorptive capacity, social capital and knowledge transfer capacity. As numerous scholars indicate, the presence of RKT is minimal if the knowledge receiver does not possess the sufficient competence needed to digest the transferred knowledge properly; thus, the absorptive capacity becomes vital to enlarge the effect of knowledge flow between HQs and subsidiaries (Lyles & Salk, 1996; Murray and Chao, 2005). Social capital is also important since knowledge exchange depends upon the interaction between the subsidiary and HQ; naturally, promoting a favorable environment for the transfer process will aid in the successful knowledge transfer/acquisition within MNE networks (Norman, 2004). As much as the knowledge receiver's absorptive capacity is important, we think knowledge transferor's KTC is critical in order to boost learning effects. In particular, in the case of RKT, a knowledge transferor is a subsidiary whose capacity of transferring knowledge is highly questionable in that it is conventionally used to receive new information from its HQ. The following section explains how these elements impact successful RKT through a brief review of extant literature.

1. Absorptive capacity

Cohen and Levinthal (1990), who coined the term absorptive capacity, refer to the concept as a firm's ability to recognize the value of new external knowledge, assimilate it, and apply it to enhance organizational performance. Since then, absorptive capacity

has been recognized as one of the most influential concepts especially in the literature of organizational learning (e.g., Lane et al., 2006; Volberda et al., 2010; Zahra and George, 2002). Kim (1998) suggested that absorptive capacity depends on a firm's intent to learn and endeavor to acquire new information. Authors in the same school (e.g., Park, 2010) also argued that as knowledge builds over time, the abilities to accumulate and recall international experience and implement it increase the absorbing capability. Other scholars (e.g., Minbaeva, 2007; Minbaeva, et al., 2003; Zhao and Anand, 2009) further developed this notion and documented that the concept encompasses the quality of employees in learning organizations (i.e., human capital), and stated that a series of components are required to facilitate knowledge flow from transferors to acquirers (McGuinness et al., 2013). When conventional understanding of absorptive capacity as stated above is applied to the context of RKT, it can be translated into headquarters' ability to recognize the value of new information transmitted from their subsidiaries, which is beyond our research scope. We believe that through the absorptive process, the HQs will be able to link the information that has not been available internally to new commercial ends. In sum, the higher the absorptive capacity, the more knowledge HQs can acquire from their subsidiaries.

2. Social (relational) Capitals

Along with the absorptive capacity of the knowledge receiver, previous literatures empirically examined the influence of various social capital constructs over knowledge transfer (e.g., Inkpen and Tsang, 2005; Lane and Lubatkin, 1998; Park et al., 2008; Yli-Renko, Autio, and Sapienza, 2000; Zahra, Ireland, and Hitt, 2000). They emphasized that social capital could hinder or nurture knowledge transfer by creating favorable or hostile conditions between the transferor and receiver. Among various social constructs, interorganizational trust, cultural distance and mutual communication were often considered as components of social capital. Interorganizational trust is a crucial factor for knowledge transfer since it refers to the confidence in the counterparts' fulfilling their obligations and reliability. Thus, once trust develops, it promotes the willingness to share information and communicate frequently (Norman, 2004). Conversely, when the relationship lacks trust, it will create suspicion, which in turn, leads to opportunism

(Inkpen and Tsang, 2005). Cultural difference is also an essential element which should not be forgotten. Simonin's (1999) research on the transfer of marketing know-how confirmed its detrimental effects on knowledge transfer within the strategic alliance. Empirical studies experimented by Gulati (1996), Lyles and Salk (1996) as well as Mowery, Oxley and Silverman (1996) also confirmed its strong influence over knowledge transfer within various different contexts. In the case of MNEs, cultural differences between HQs and subsidiaries create unforeseen problems since the incongruence may trigger a situation where they are unaccustomed to each other's social norms. For this reason, both the organizational and national cultures are often discussed as a hurdle, which could negatively impact cooperative tasks (Simonin, 1999). Mutual communication between the HQ and its subsidiaries is another factor influencing knowledge transfer/RKT. Social interactions such as face-to face communication are not only particularly beneficial to the transfer of tacit and sticky knowledge, but also provide chances for social construction of knowledge (Noorderhaven and Harzing, 2009). For instance, social learning theory suggests, through communication, social cohesion around a relationship affects the willingness and motivation to invest time and energy in sharing knowledge (Reagans & McEvily, 2003). Moreover, because tacit knowledge is difficult to transfer, it needs to be translated and interpreted in order for learning to occur, and communication functions as a vehicle to facilitate translation and interpretation (Becker-Ritterspach, 2006). In other words, open, frequent, and mutual communication is necessary for effective knowledge transfer. This view is consistent with Ghoshal and Bartlett (1988), stating that inter-unit communication density enhanced the movement of knowledge. Similarly, Gupta and Govindarajan (1994) discovered that the intensity of both HQ -subsidiary and inter-subsidiary communication are key predictors of knowledge flow. Hansen, Mors, and Løvas (2005) also suggested that frequent and intense communications increased the exposure to the counterparts, thereby, reducing negative perception.

3. Knowledge Transfer Capacity

As stated above, when examining knowledge transfer between HQs and overseas subsidiaries, it is necessary to explore the teaching capacity of the knowledge transferor as much as the receiver's absorptive capacity and learning environment. When trans-

ferring knowledge, due to the embedded tacit nature of the knowledge, information often entails stickiness, which makes it difficult for learning organizations to acquire new skills (Anh et al., 2006). In the context of RKT, LMI residing in overseas countries, also possess locally embedded characteristics which logically functions as a hindrance for HQs to absorb it. A subsidiary's ability to effectively and efficiently transfer new local market knowledge is thus a vital prerequisite to enhance HQ's knowledge acquisition. Though, the earlier literature shows strong empirical understanding on absorptive capacity and documents social capital as a detonator occurring organizational learning, in comparison, we would argue that KTC of knowledge transferors is another pivot functioning as a facilitator to enlarge the extent to which a learning organization can be a high knowledge acquirer (Martin and Salomon, 2003; Park, 2011).

There have been several occasions to define knowledge transfer capacity in previous literatures. On one hand, Martin and Salomon (2003) argued that knowledge transfer capacity can be divided into two separate dimensions : Source transfer capacity and recipient transfer capacity. They define source transfer capacity (STC) as "the ability of a firm (or the relevant business unit within it) to articulate uses of its own knowledge, assess the needs and capabilities of the potential recipient thereof, and transmit knowledge so that it can be put to use in another location (p. 363)." Also, authors defined recipient transfer capacity (RTC) as "a transferee's ability to assimilate and retain knowledge from a willing source (p. 363)." Martin and Salomon's (2003) conceptualization of KTC covered the capacity of both the transferor and receiver. The research focused on proposing a model of interaction between newly defined concepts and their model captured the context of an entry mode rather than learning in organizations. On the other hand, Park (2010), in researching technology acquisition in international joint ventures, defined knowledge transfer capacity as a capability of parent firms to assist subsidiary learning. The author further illustrated that the concept (i.e., KTC) has two sub-dimensions: innate internal capability (i.e., intrinsic KTC) and a capability that is developed by own efforts (i.e., extrinsic KTC). Park (2010) suggested that the transferor's level of innate internal capability is the context in which knowledge is acquired by the receiver, as it affects the knowledge transferor's transformative capacity. He further sheds light on the role of extrinsic KTC and pinpoints that a receiver is able to acquire new knowledge from a transferor more easily when the transferor compiles and develops adequate

teaching capability (p. 79). Each dimension captures several factors. The former (intrinsic) dimension typically pertains to the teaching organization's intent to share (i.e., willingness to teach) whereas the latter (extrinsic) one includes knowledge development capability and possession of prior relevant knowledge (Oh & Anchor, in press; Park, 2011).

III. Hypotheses development

To reiterate, based on the discussions above, this study uses a chronically overlooked theoretical concept, knowledge transfer capacity as the theoretical lens in order to cement extant research gaps. In particular, we attempt to categorize the concept into two different dimensions: one is extrinsic KTC, which is not innate but acquired, and the other is intrinsic KTC, which is not acquired but innate. By doing this, this study will be able to better look into the insights of the theoretical concept.

1. Extrinsic knowledge transfer capacity

Knowledge development capability. RKT from subsidiaries to their HQs occur when the subsidiaries generate knowledge that are firm specific yet are potentially valuable to their parent firms (Mudambi, Piscitello & Rabbiosi, 2014). Hence, it is reasonable to state that developing and stockpiling knowledge and stockpiling is a prerequisite for RKT to take place (Martins, 2012). Knowledge development of a subsidiary has a close connection to its absorptive capacity since it requires both an ability to recognize the value of new local market knowledge and the ability to assimilate it with the prior knowledge in hand in order to set the initial stage of embarking on knowledge development. Thus, as the absorptive capacity of firms varies from one to another; knowledge development capability, also, could differ from one subsidiary to another. Some subsidiaries could better enhance the value of their own knowledge by learning new and adequate LMI and blending it with prior knowledge while others might lack those capabilities. These subsidiaries with superior knowledge development capability could utilize that knowledge for its own local operations; hence, they could achieve su-

perior performance and competitive advantage over other subsidiaries within its parent firm. When a HQ finds a subsidiary with higher creative performance in comparison to its peers, the HQ may be inclined to acquire the subsidiary's competitive advantage by learning from them (Davenport & Prusak, 1998). Consequently, HQs have a motivation to support subsidiaries with high knowledge development capability in order to pursue an opportunity to absorb valuable LMI via RKT (Rugman & Verbeke, 2001). Consistent with this statement, Gupta and Govindarajan (2000) as well as Bjorkman, Barner-Rasmussen and Li (2004) claimed that when a subsidiary's knowledge development is higher than others, its capability to reversely transfer the knowledge to HQ will logically increase and, in return, HQ will try to provide more training occasions to the subsidiary so that they could further cultivate unique and firm specific LMI for the HQ. Thus, the following hypothesis is proposed.

H1 : Subsidiaries' knowledge development capability will increase their RKT to HQs.

Possession of prior related knowledge. The knowledge based view (KBV) has stretched resource based theory by proposing that knowledge is the fundamental resource of new value creation and competitive advantage (Barney, 1991; Grant, 1996; Kogut & Zander, 1992). The view posits that the size of the knowledge pool is vital to its operation and often determines its sustainable existence. Likewise, transferred knowledge from subsidiaries to HQs may not only help firms to maintain their competitive advantage but also aid in further improving firms' status in the global arena. However, RKT from subsidiaries to HQs may be difficult due to the stickiness of tacit local knowledge which acts as a hurdle (Gupta and Govindarajan, 2000). Luo and Peng (1999) argued that the pool of relevant knowledge helps a firm to decrease operational uncertainties and improve performance by effectively transferring knowledge in foreign markets. That is, subsidiaries' possession of prior related knowledge is vital to successful acquirement of new knowledge by HQs (Simonin, 1999). In line with the previous statement, Cohen and Levinthal (1990) posit that when organizations retain prior related knowledge, they could better accomplish challenging organizational goals. Park (2011) further developed the above argument by illustrating that the knowledge transferor's possession of prior relevant knowledge aids the receiver's efficient learning. Likewise, Ghauri and Park

(2012) implied that the subsidiaries' capability to transfer LMI to HQs on the basis of prior related knowledge is one of the key competitive advantages of MNEs. Hence, the following hypothesis is proposed.

H2 : Subsidiaries' possession of prior related knowledge will increase their RKT to HQs.

2. Intrinsic knowledge transfer capacity

Subsidiary willingness. When knowledge transfer occurs between two entities, the knowledge transferor needs to devote time and resources to the transfer of knowledge even though it could allocate those resources to other domains such as regular business operations. Hence, when transferring knowledge, the receiver of the information should anticipate the knowledge transferor's willingness to share its knowledge with them. In other words, HQs have to rely on the willingness of the subsidiaries during RKT. Not only does the transferring of knowledge itself require the subsidiary's resources, but also, the tacitness of LMI makes the transferring of knowledge even more difficult, which leads to the additional spending of time and resources. These issues could produce a passive reaction from subsidiaries toward RKT to HQs (Najafi-Tavani, Giroud and Sinkovics, 2012). In addition, the willingness to transfer knowledge implies the knowledge transferor's consent to losing of its sole ownership, status and/or superiority regarding that knowledge (Szulanski, 1996). Consistently, Husted and Michailova (2002) also discussed numerous factors for the knowledge transferor's fear of sharing its knowledge. Above mentioned factors include issues such as potential loss of market value, bargaining power, and sustaining competitive advantage; reluctance to spend time and resources on knowledge sharing; protecting against external assessment of the quality of the knowledge possessed; and uncertainty of the knowledge recipients' interpretation and perception about the shared information. These factors, inversely point to the fact that the willingness to share knowledge by subsidiaries is a crucial element of RKT to the HQs (Najafi-Tavani et al., 2012). Furthermore, some firms could be more susceptible to sharing knowledge than other firms for different reasons and such openness could predict the success of RKT (Park, 2011). In line with this view, Inkpen and Dinur (1998) explained that when a subsidiary's organizational structure is built conducive to knowledge sharing

from its inception, its KTC should be more effective. In this regard, the following hypothesis is proposed.

H3 : Subsidiaries' willingness to share its knowledge will increase their RKT to HQs.

3. The moderating effect of intrinsic KTC on the relationship between extrinsic KTC and RKT

The present paper not only investigates the direct relationship between the KTC and RKT, but also, investigates the interactions between the intrinsic and extrinsic KTC towards the former's influence over the relationship between the latter and RKT as well. As previously stated, intrinsic dimension typically focuses on the teaching organization's intent to share, while extrinsic dimension includes acquired abilities such as knowledge development capability and possession of prior relevant knowledge. Behavioral science researchers often suggest that employees' ability and motivation both act as critical predictors for organizational behavior. Ability and motivation are equally required in order to achieve high levels of efficiency and effectiveness (Baldwin, 1959). Various empirical results support an interactive effect between ability and motivation over organizational performance including learning (e.g., Fleishman, 1958; Heider, 1958; O'Reilly and Chatman, 1994). When the above relationship is translated in the context of RKT, interaction between the extrinsic and intrinsic dimensions of KTC should interface to develop synergy for the RKT.

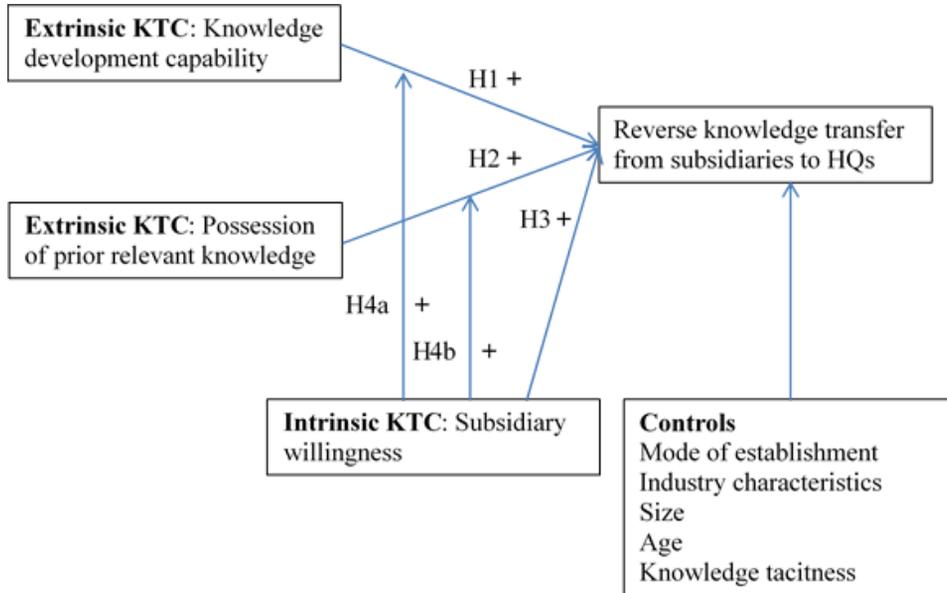
To date, there has not been any prior research to investigate the moderating role of a component to the relationship between the sub-dimensions of KTC and its effects on RKT. However, there were a few research studies which investigated such effects between ability and motivation in the discussions on conventional knowledge sharing. Minbaeva, Pedersen, Bjorkman, Fey and Park (2003) applied the above concept of an interaction effect of ability and motivation on the issue of knowledge transfer and hypothesized that the interplay between employees' ability and motivation will increase the level of knowledge transfer to the subsidiary (2003, p.589). Through empirical investigation, the authors confirmed the existence of the moderation effect of motivation

in the association between ability and knowledge transfer, although their individual and independent effects were not significant. Consistent with Minbaeva et al. (2003), Reinholt, Pedersen and Foss (2011) also empirically confirmed the interaction between the employee's knowledge sharing ability and their autonomous motivation over knowledge acquisition and knowledge provision. The authors further developed their model on the moderating relationship of motivation with prior understanding of ability and argued that "there is a three-way interaction between the centrality of an employee's network position, autonomous motivation for knowledge sharing, and knowledge-sharing ability (2011, p.1282)." In sum, these studies clearly point out that it could be plausible that intrinsic KTC (i.e., motivation : subsidiary willingness) will moderate and resize the extent to which extrinsic KTC influences the level of RKT. Furthermore, albeit, the present paper acknowledges that the moderating effect of an element (i.e., subsidiaries' willingness to share, which is intrinsic KTC) on extrinsic KTC comprising of two variables (i.e., knowledge development capability and possession of prior related knowledge) needs to be considered separately. Consequently, this research investigates two different moderation effects : (i) the interaction between subsidiaries' willingness to share and the knowledge development capability on RKT, (ii) the interaction between subsidiaries' willingness to share and the possession of prior related knowledge on RKT. Accordingly, these discussions lead to the following hypotheses.

H4a : Subsidiaries' willingness to share will strongly moderate the effect of knowledge development capability on RKT to HQs.

H4b : Subsidiaries' willingness to share will strongly moderate the effect of the possession of prior related knowledge on RKT to HQs.

The conceptual framework is presented in Figure 1.



〈Figure 1〉 Research Framework

IV. Research Methods

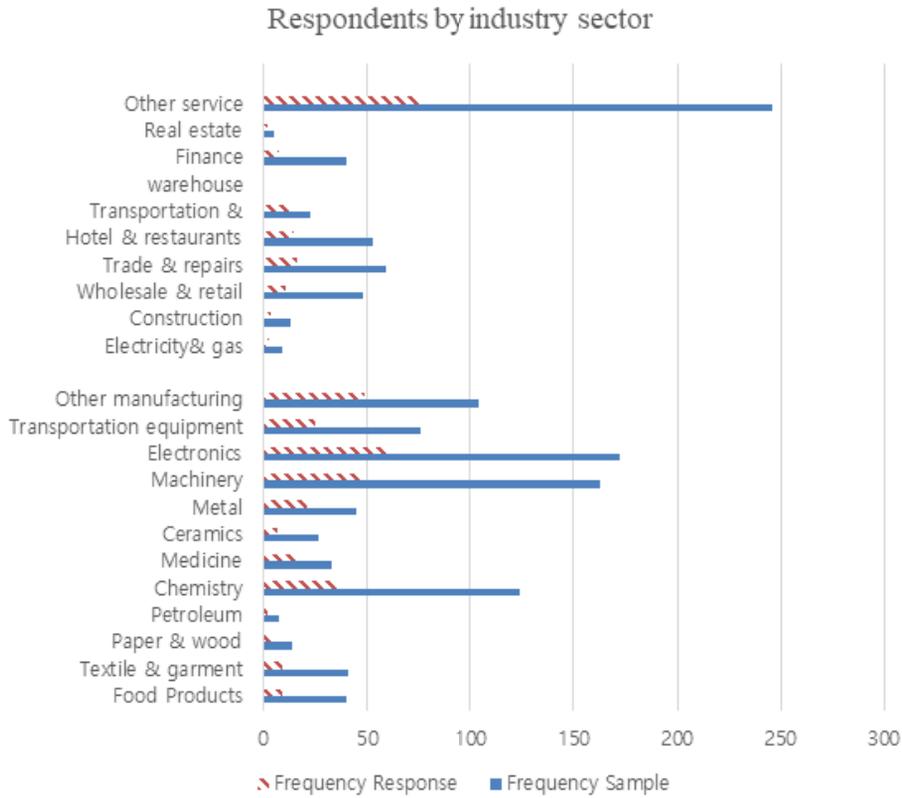
1. Sample design and research method

Data was collected from subsidiaries established by MNCs in order to study the subsidiaries' RKT to their HQs in South Korea (hereafter Korea). The initial population was gathered from Foreign Direct Investment (2014) published by the Korean Ministry of Trade, Industry and Energy. Foreign Direct Investment (2014) comprises of information on all types of foreign investments from various business types in Korea. As a periodic government publication that lists 15,566 foreign investments, the Foreign Direct Investment is a reliable source of data. As stated above, the present study attempts to identify key elements influencing RKT from the subsidiaries' perspective. Thus, the subjects for this study consist of Korean subsidiaries of foreign MNEs. The following sampling criterion was adopted to reduce the sample to a manageable size

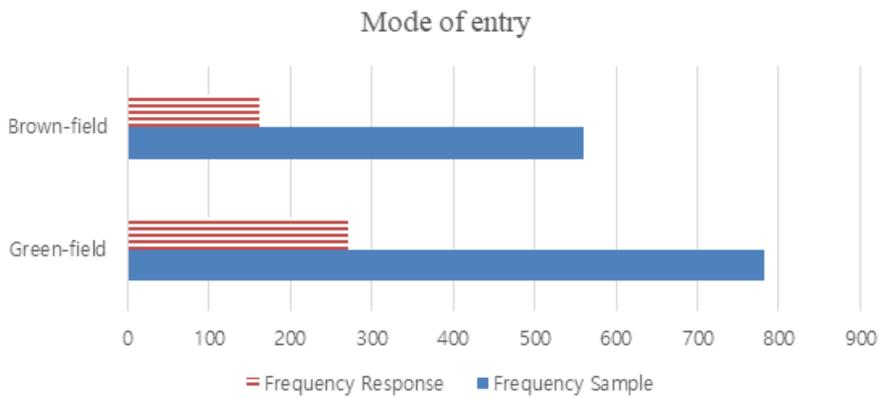
for purposes of empirical examination : (1) Subsidiaries of 50 or more employees (small subsidiaries may not have enough resources to be involved in knowledge transfer to HQs); (2) Subsidiaries with two or more years of operational experience by 2013 (according to Rowley et al. (2013), subsidiaries with short operational experience may not have accumulated sufficient LMI); (3) Subsidiaries with 50% or more foreign owned equity ownership. (in the case where foreign investors have dominance over their subsidiaries' operations, potentially, subsidiaries' RKT could be mandatory)

After the sampling processes, sample subsidiaries' information was validated through web-based data 'Data Analysis, Retrieval and Transfer (DART) (<http://dart.fss.or.kr/>),' which is a system authorized by the Financial Supervisory Service of Korea. While data is accumulated and refreshed every year, there is a possibility that some samples may no longer operate for some reasons. Moreover, since the DART system does not provide age of a subsidiary, we confirmed the business status and age of the subsidiary by visiting the corporate homepages. As a result of this process, the total number of identified firms was 1,343. To achieve higher response rates, questionnaires were sent to executives in both English and Korean to allow the respondents to choose the questionnaire according to their native language. This study focuses on foreign subsidiaries in Korea, and the data for this research were collected from March 2015 to June 2015 (four months). A total of 432 responses were returned, giving a response rate of 32.2%. Furthermore, the minimum presence of non-response bias was confirmed by using three key parameters (i.e., industry characteristics, the mode of entry and a comparison between subsidiaries established before the Asia crisis vs. after the event). However, there were no significant differences with regard to those tested parameters, which indicated that the non-response bias is negligible (Ambos & Birkinshaw, 2010; Chung, 2014). Respondents were asked to report the main industry sector in which they operate, mode of entry and firm age etc. The figures below display the information.

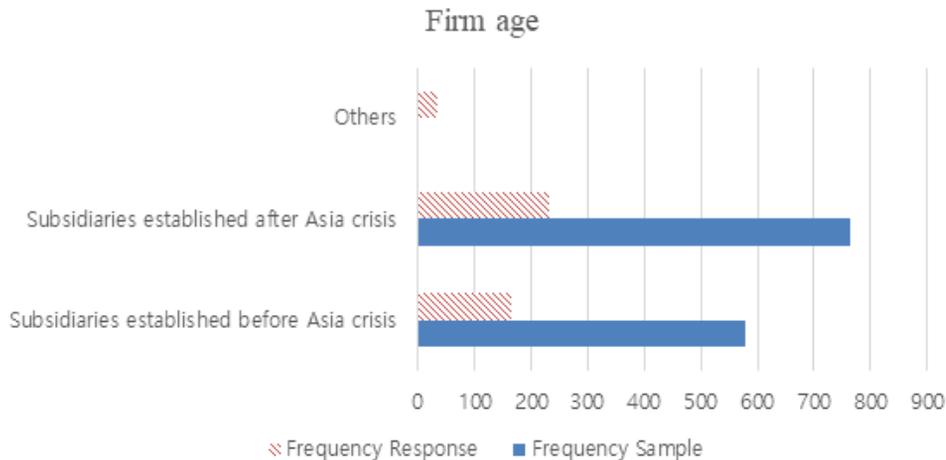
〈Figure 2〉 Respondents by industry sector



〈Figure 3〉 Mode of entry



〈Figure 4〉 Firm age



2. Variable measurements

Dependent variable, RKT from subsidiaries to HQs was measured by asking respondents the following questions : “To what extent has this firm successfully transferred market data about (1) customers, (2) competitors, (3) marketing know-how, (4) distribution know-how, (5) market-specific technological know-how, (6) purchasing know-how, and (7) overall LMK to headquarters (Gupta & Govindarajan, 1994; Najafi-Tavani et al., 2012; alpha = 0.93)?”

Independent variables, Knowledge development capability was measured by asking respondents the following questions : (1) “Our employees in the firm have adequate academic background to understand and use local market knowledge very well;” “We commit significant resources to educating and training (2) non-managerial and (3) managerial employees to master local market knowledge (Andersson, Forsgren, & Holm, 2002; Wang, Tong, & Koh, 2004; alpha = 0.73).” Possession of prior related knowledge was evaluated by inquiring “compared to headquarters, how similar are (is) (1) the products, (2) the service, (3) the customers, (4) the basic technology, and (5) the basic skills which are (is) produced (or provided and shared) by this firm (Park, 2011; alpha = 0.91).” Subsidiary willingness was gauged by inquiring respondents to answer the levels of (1) its motivation to transfer knowledge to headquarters, (2) organizational commitment to

knowledge transfer within MNC networks, (3) relations with its main establishment purpose with knowledge transfer, and (4) relations between subsidiary knowledge transfer and appraisal by headquarters (Najafi-Tavani et al., 2012; $\alpha = 0.56$) (according to Kang and Kim (2002), Cronbach's alpha value exceeding 0.5 is acceptable).

Control variables. In order to better illustrate focal variables, other factors' potential influences should be controlled. Hence, five variables were employed in the framework: (1) Mode of establishment. According to Mudambi et al. (2014), the level of RKT could be influenced by the entry mode of a MNE's overseas subsidiary establishment, thus, a dummy variable was created for control (1 for greenfield strategy, 0 for otherwise); (2) Industry characteristics. A firm's industry characteristics may influence knowledge transfer within MNCs due to the fact that the level of knowledge sharing could differ from service industry to manufacturing (Minbaeva et al., 2003). Therefore, industry characteristics were controlled as a dummy variable (1 for service sector, 0 for otherwise); (3) Size. A firm's number of employees was measured in order to indicate its size. Numerous previous studies have controlled size of MNEs, when investigating knowledge exchange (Minbaeva et al., 2003; Tsai, 2001); (4) Age. In line with Anh, Baughn, Hang, and Neupert (2006), the age of a subsidiary was measured by the number of years since its creation; (5) Knowledge tacitness. Rabbiosi and Santangelo (2013) explained that it is more difficult to transfer information when its tacit characteristics are high, thus it was controlled by measuring the average of the following six items on the difficulties of market data verbal transfers and the difficulties of encoding data for purposes of knowledge transfer : (a) customers, (b) competitors, (c) marketing know-how, (d) distribution know-how, (e) market-specific technological know-how, (f) purchasing know-how to headquarters.

In addition to the reliability test, we further ran a confirmatory factor analysis as a validation test, and we found that all variables have convergent validity (details can be provided upon request).

3. Common method variance

For the present survey, the same respondents were asked to perceptually judge both independent and dependent variables. Therefore, a test for the presence of common

method variance (CMV) is needed to confirm low variance between the variables. Consistent with Podsakoff, MacKenzie, Lee, and Podsakoff (2003) and Podsakoff and Organ, (1986) we used Harman's one factor analysis to solve this issue. Based on previous studies, all the variables assessed by the respondents' subjective measurement were put into the analysis. The proportion of variance criterion show three factors : knowledge development capability, subsidiary willingness and RKT have high loadings on the first factor (30.6%); possession of prior related knowledge has high loadings on the second factor (21.0%); knowledge tacitness has high loadings on the third factor (20.4%); representing 72.0% of total variance. This result clearly confirms that the data used in this paper does not suffer from this problem. In order to further verify this issue, 10 respondents were interviewed to check their responses were consistent to that of the survey. There were no significant differences between the interview and the survey responses. Also, questionnaires were re-sent to 50 firms, and different respondents (e.g., general managers and directors) have answered the survey. There were not any considerable inconsistencies between the two surveys from each firm. The above series of results verified the minimal presence of CMV within our model (Luo, 2006).

V. Data analysis

1. Results

Prior conducting hierarchical regression analyses, we needed to confirm the non-existence of multicollinearity between the variables. When there are high correlations between the independent variables, multicollinearity occurs and becomes a serious problem when two or more independent variables show high correlations. In order to verify that multicollinearity is not an issue, Table 1 is presented. It is comprised of the means, standard deviations, and correlations among the five control variables, three independent variables and a dependent variable. The table shows that the problem of multicollinearity is negligible, in that all of the correlations between the variables are below .4 (Hair, Anderson, Tatham and Black, 2005).

〈Table 1〉 Correlation matrix

	Mean	S.D	1	2	3	4	5	6	7	8	9
1. Mode of establishment	0.37	0.48	1.00								
2. Industry characteristics	0.34	0.47	0.10*	1.00							
3. Size	258.82	951.73	0.04	0.02	1.00						
4. Age	17.65	12.47	-0.02	0.14**	0.27**	1.00					
5. Knowledge tacitness	3.60	0.44	0.03	0.05	-0.01	0.01	1.00				
6. Knowledge development capability	3.30	0.77	-0.16**	0.00	0.09	-0.10	-0.06	1.00			
7. Possession of prior related knowledge	2.55	1.09	0.13**	-0.13**	-0.03	0.02	-0.01	-0.06	1.00		
8. Subsidiary willingness	3.49	0.61	0.05	0.05	0.05	0.05	-0.03	0.19**	0.09	1.00	
9. Reverse knowledge transfer	2.69	0.75	-0.08	-0.02	0.02	-0.09	0.04	0.22**	0.10*	0.36**	1.00

The present study investigated the KTC of a subsidiary and its diverse effects on RKT to HQ's. Furthermore, by exploring the presence of interactions between the sub-dimensions of KTC over RKT, the research attempted to discover a clearer relationship between KTC and RKT. In this sense, we adopted a hierarchical regression analysis to investigate the direct effects of the sub-dimensions of KTC to RKT as well as their interaction effects to RKT (Hair, Anderson and Tatham, 1987). Table 2 illustrates the result of the hierarchical regression analysis on the subsidiaries' RKT. Model 1 is the result for just the five control variables. Models 2 through 4 are the outcomes of the direct effect of knowledge development capability (KDC), the direct combined effects of KDC and subsidiary willingness (SW), and the interaction of KDC and SW,

respectively. Models 5 through 7 are the outcomes for the direct effect of possession of prior related knowledge (PRK), the direct combined effects of PRK and SW, and the interaction effect of PRK and SW correspondingly. While model 8 depicts the overall combined direct effects of KDC, PRK and SW, model 9 is a complete analysis of entire variables including the overall combined direct effects as well as the interactions (i.e. KDC and SW, PRK and SW). Some results of tested models showed high significance ($p < .001$) whereas some revealed merely a marginal effect ($p < .1$). With respect to control variables, organizational size and age turned out to be significant in all models except model 5. The fact that the size of firms has positive significance tells us that the larger the subsidiary, the more propensity for RKT to HQs. On one hand, this could mean that the larger subsidiaries are more strategically important to HQs, thus, more resources are invested in order to encourage them to transfer more valuable LMI. But on the other hand, there could also be the possibility that larger subsidiaries have better bargaining power in local markets, which triggers situations where they may cooperate with local firms possessing good quality of local information. These explanations clearly document that there is no doubt that the size of the subsidiary is vital to RKT. In contrast to size, age of subsidiaries is negatively significant to RKT. It means that as subsidiaries age, they lose their tendency to transfer LMI back to HQ. In regards to this issue, Ghauri and Park (2012) proposed that due to the age-long operations with its parent, HQ, which is a source of firm-specific capabilities, it is expected that older firms have a better knowledge pool and information management capability. But the authors add that another recent phenomenon seen nowadays is that juvenile organizations tend to endeavor to learn new information in order to speedily catch up with other competitors in the global markets.

(Table 2) Results of hierarchical regression analysis

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	VIF
Control variable										
Mode of entry	-0.058	-0.018	-0.039	-0.042	-0.070	-0.077	-0.076	-0.048	-0.047	1.077
Industry characteristics	-0.012	-0.020	-0.030	-0.036	0.001	-0.016	-0.021	-0.020	-0.031	1.080
Size	0.153**	0.125*	0.112*	0.115*	0.149	0.124**	0.124**	0.109*	0.111*	1.103
Age	-0.132*	-0.100*	-0.119*	-0.122*	-0.134	-0.143**	-0.144**	-0.120*	-0.122*	1.122
Knowledge tacitness	0.065	0.076	0.075	0.076 [†]	0.064	0.066	0.068	0.075	0.078*	1.009
Main effect										
Knowledge development capability(KDC)		0.237***	0.168***	0.161***				0.170***	0.171***	1.122
Possession of prior relevant knowledge(PRK)					0.082	0.057	0.053	0.063	0.052	1.060
Subsidiary willingness (SW)			0.338***	0.332***		0.367***	0.360***	0.333***	0.319***	1.082
Moderating effect										
KDC X SW				-0.090 [†]					-0.077 [†]	1.043
PRK X SW							0.054		0.062	1.061
Model Summary										
R ²	0.037	0.091	0.199	0.207	0.044	0.177	0.179	0.203	0.214	
Adjusted R ²	0.025	0.076	0.185	0.191	0.029	0.162	0.162	0.186	0.193	
F	3.021**	6.439***	13.750***	12.598***	2.962**	11.856***	10.555***	12.289***	10.434***	

Notes : Coefficients are standardized, [†] p < 0.10; *p < 0.05; **p < 0.01; ***p < 0.001

For the direct effects of sub-dimensions of KTC on RKT, two of the proposed variables included in the framework are confirmed to be positively significant. KDC showed very strong positive association with RKT throughout the models which included the variable (Models 2 -4, 8, 9; $p < .001$), and in turn, hypothesis 1 was supported. The direct effect of SW also turned out to show high positive association with RKT in all of the models which encompassed the variable (Models 3, 4, 6 -9; $p < .001$), and thus, hypothesis 3 was also supported. Yet, as an exception, PRK did not show any statistical significance on RKT in all the models which examined the variable, although, the variable consistently displayed positive association with the dependent variable (Models 5 -9). Therefore, hypothesis 2 has been rejected.

For the moderating effects of intrinsic KTC on the relationship between extrinsic dimension of KTC and RKT, mixed results were discovered. First, interaction between KDC and SW exhibited a strong association with respect to RKT throughout the models which tested the variable (Models 4, 9; $p < .10$). Hence, hypothesis 4a was supported. Second, interaction between PRK and SW did not present any association with RKT throughout the models which calculated the variable, although, the variable constantly showed positive association with respect to the dependent variable (Models 7, 9). Consequently, hypothesis 4b was rejected. A summary of the hypothesis testing results is organized in table 3.

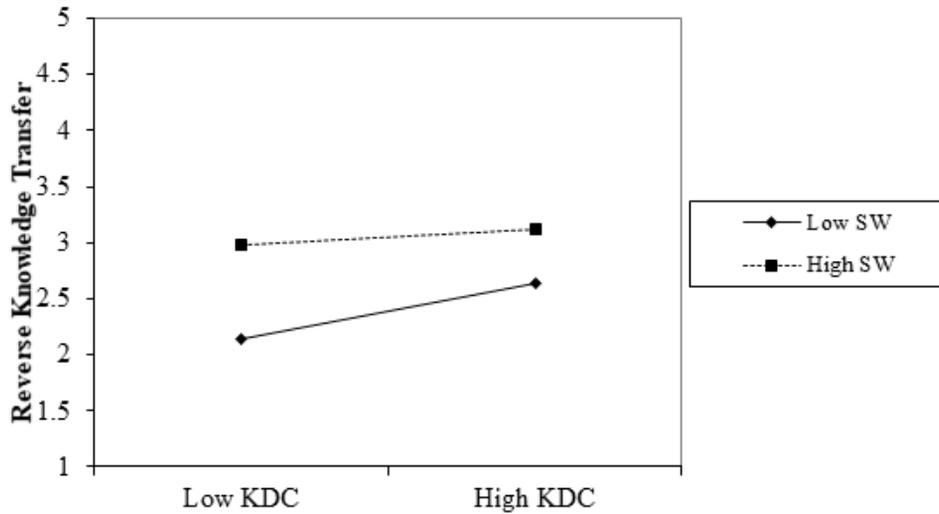
<Table 3> Summary of hypothesis testing

#	Hypothesis	Result
H1	Subsidiaries' knowledge development capability will increase their RKT to HQs.	Supported
H2	Subsidiaries' possession of prior related knowledge will increase their RKT to HQs.	Rejected
H3	Subsidiaries' willingness to share its knowledge will increase their RKT to HQs.	Supported
H4a	Subsidiaries' willingness to share will strongly moderate the effect of knowledge development capability on RKT to HQs.	Supported
H4b	Subsidiaries' willingness to share will strongly moderate the effect of the possession of prior related knowledge on RKT to HQs.	Rejected

2. Discussions

There are several notable findings of this research paper that are in need of discussion. First, although most of the sub-dimensions of subsidiaries' KTC are confirmed to play a vital part in reversely transferring LMI to their HQs, unexpectedly, accumulated PRK of subsidiaries demonstrated non-significant relationship with RKT to HQs. This is a surprising outcome in that most previous studies empirically documented that the possession of relevant knowledge influences the skill possessor's information sharing and exchange with acquirers (e.g., Minbaeva et al., 2003; Park, 2011; Reinholt et al., 2011). For example, Park (2011) stated that "pre-ownership of appropriate information is not only an important precondition for knowledge acquirers but is also a key requirement for foreign firms (i.e. knowledge transferors) to transfer proprietary organizational knowledge efficiently (2011, p.82)." Despite the theoretical illustrations and empirical results of dominant literature, several studies suggest an alternative explanation as a means of changing our way of thinking (Asmussen, Foss, and Pedersen, 2013; Oh and Anchor, in press). These scholars posit that because in general, the prior knowledge of subsidiaries is closely related to HQs' knowledge in hand, and since a large part of their prior knowledge came from the HQ's, it is possible that such HQs might perceive the information rooted in their prior knowledge reservoir as not being valuable and/or unique enough. Another probable reason may be considerably associated with the characteristics of the knowledge. In particular, LMI cultivated in local markets logically has cultural-specific characteristics and tacit attributes, and thus it is highly influenced by the context of knowledge formation. For example, technological knowledge can be easily learnt by codifiable means, such as manuals, guides and instructions, which are based on prior experience. However, environmental incongruence exists between the HQ's home country and local markets where the subsidiaries are operating. Therefore, LMI can be viewed differently since the sharing of common perception between the knowledge transferor and the receiver is rare (Oh and Anchor, in press).

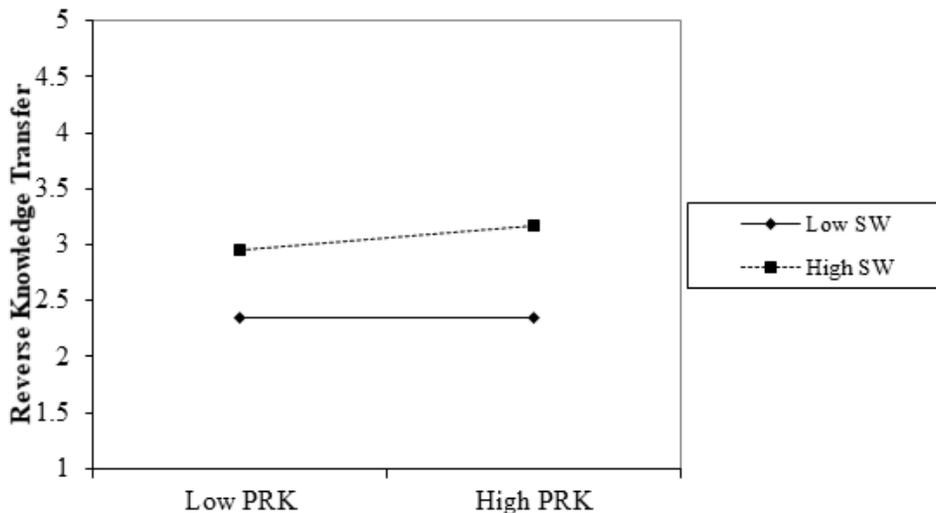
〈Figure 5〉 Subsidiary willingness(SW) as a moderator of the relationship between Knowledge development capability(KDC) and Reverse knowledge transfer(RKT)



Second, the moderating effects of the intrinsic KTC on the association between extrinsic KTC and RKT drew quite an interesting result. Although there were not many studies researching the interaction between the ability and the motivation to transfer knowledge, our research is based on explanations given by a few extant studies (e.g., Minbaeva et al., 2003; Reinholt et al., 2011) stating that their interplay will result in one's moderating effect to another's influence on knowledge exchange. As expected, our empirical analysis discovered that the impact of knowledge development capability on RKT is considerably moderated by the presence of the subsidiaries' intent to share (i.e., willingness), and as the subsidiaries' willingness to transfer LMI to the HQs increases, it gradually substitutes the role of KDC (see Figure 5). Meanwhile, we need to pay attention to the fact that the moderation effect is based on substitution rather than synergy. When defining the relationship between HQs and their subsidiaries, some scholars posit that the association could be characterized as a principal-agent relationship (Mudambi and Navarra, 2004; Nohria and Ghoshal, 1994). In this view, it is acknowledged that the subsidiaries may pursue their own interests and perhaps are reluctant to merely adopt headquarters' will. More importantly, subsidiaries' local market

interests may not always align with those of the headquarters (Nohria and Ghoshal, 1994, 492). Alongside this view, Gupta and Govindarajan (2000) indicate that knowledge flows from the subsidiaries depend significantly on the motivation of the subsidiaries to acquire knowledge and then to share it. They further point out that due to this, the incentive structure of subsidiaries' managers needs to be carefully designed. According to this perspective, 'the ability to develop new knowledge for the agents (i.e., subsidiaries) to achieve strong positions and obtain competitive advantages within local market' and 'their responsibility to obey and share knowledge to the principals (i.e, HQs)' can potentially conflict with each other.

〈Figure 6〉 Subsidiary willingness(SW) as a moderator of the relationship between Possession of prior relevant knowledge(PRK) and Reverse knowledge transfer(RKT)



Third, in contrast to the moderating effect of SW on the relationship between KDC and RKT, the hypothesis on the interaction effect between PRK and SW is rejected (Figure 6 also displays that there is no moderating effect). It is perhaps logical to assume that the characteristics of PRK affected this phenomenon since our results clearly lend support to hypothesis 3 (i.e., the results confirmed that SW has strong positive influence over RKT). No one may deny that relevant knowledge to LMI, which is a focal knowledge for RKT, should be embedded to the local context of the subsidiaries' geo-

graphical location. Nevertheless, it is also true that some parts of the subsidiaries' prior relevant knowledge stems from the knowledge pool of HQs. The data in this study are based on subsidiaries operating in Korea, and the substantial portion of their ownerships is held by MNEs rooted in Western countries (e.g., the United States and European countries). Therefore, there is a high probability that the local context (i.e., national culture, power distance, etc.) of the subsidiaries and the context of their parents are somewhat dissimilar. On one hand, as an East Asian market, Korea is well-known for her collectivist culture. Scholars point out that Koreans are often referred to as people functioning interdependently with others within their community and searching for contextual signs in information (Kagitcibasi, 1997; Markus and Kitayama, 1991; Triandis, 1998), which indicates that they are much more sensitive to comprehending context-specific information (Bhawuk, 2001; Triandis, 1998), and emphasize historical and contextual knowledge than individualist countries (Kagitcibasi, 1997; Triandis, 1998). On the other hand, to reiterate, subsidiaries' parent firms are often located in the western developed countries, where individualism is commonly valued to a greater extent than in Asian countries. In other words, the subsidiaries' PRK, which have become strongly embedded in local context, may possess tacit characteristics, and thus, it perhaps inhibits reciprocal mutual interactions between vital components affecting RKT (Bhagat, Kedia, Harveston and Triandis 2002). In line with this view, scholars have also confirmed that cultural distance could be a factor which could hinder knowledge flows between transferors and acquirers (see also Ambos et al., 2006; Martins, 2012; Oh and Anchor, in press). In conclusion, even though a subsidiary has willingness for RKT, some inherent cultural stickiness and context-specific natures of PRK seem to delay the changes in a certain factor's (e.g., SW) influential power over the occurrence of RKT.

VI. Conclusion

This study examines RKT from subsidiaries and the role of the latter's KTC for organizational learning of HQs. A series of hierarchical regression analyses were performed in order to achieve the research objectives : (1) to identify critical components

consisting of KTC of subsidiaries which may affect RKT to HQs, and (2) to verify the moderating effects of intrinsic KTC (i.e., SW) on the roles of extrinsic KTC (i.e., KDC and PRK). To sum up, the original value of the present research lies with our findings. In particular, the research findings confirmed that a subsidiary's KTC acts as an igniting fuse and amplifies HQ's substantial learning and suggested some factors in helping subsidiaries get on the right track for knowledge transfer. According to the findings, KDC and SW play a pivotal role in promoting RKT to HQs. In contrast, although we were not able to uncover any effect of PRK, we provided several convincing explanations on the plausible reasons for this result. More importantly, we discovered the moderating effect of SW on the relationship between KDC and KTC. However, we failed to confirm the impact of SW on the association between PRK and SW.

From a theoretical point of view, the key contribution of this research is in further extending our understanding on RKT. Given the importance of the issue, more researchers are eager to identify critical factors affecting the RKT from subsidiaries. Though empirical studies on RKT have garnered a great deal of interest recently, to date work on RKT is limited in range and volume with an emphasis on subjects such as technology and innovation, or the mechanisms of knowledge flow (McGuinness et al., 2013). In comparison, this research argues that RKT from the subsidiaries to HQs is not only affected by the KTC of the subsidiary but also significantly influenced by the interaction between the subsidiaries' intrinsic (SW) and extrinsic KTC (KDC). Moreover, by empirically confirming the interplay between the sub-dimensions of KTC, which have been unnoticed by previous literature, this research attempted to elaborate on the concept as well as draw a more sophisticated framework between KTC and RKT.

The present study delivers several practical implications for the executives of MNEs. First, we found that e KDC; as an extrinsic KTC, and SW; as an intrinsic KTC, are the prerequisite factors in order to have RKT take place. This suggests that executives of MNEs should develop a mechanism that could advance subsidiaries' ability to create new knowledge by assimilating prior knowledge with LMI and improve subsidiaries' motivation to transfer newly developed knowledge to the HQs. Second, the result confirmed that subsidiaries' willingness is not only a vital predictor for RKT to the HQ but could also moderate the relationship between KDC and RKT by substituting the influence of KDC. This phenomenon demands MNE managers to be more sensitive and at-

tentive to the subsidiaries' situation. When the subsidiaries' interest on local operation conflicts with their motivation to reversely transfer LMI to HQs, the subsidiaries' RKT may become inefficient. In addition, the result further illustrates a strong positive relationship between the size, in terms of employees, of the subsidiary and the RKT to the HQ, while age of the subsidiary and its RKT to the HQ shows strong negative relationship. This implies that the executives, when establishing a new subsidiary, should consider certain degree of investments which guarantee adequate size. The result also suggests that executives keep in mind that older subsidiaries tend to lose their interest in transferring knowledge back to the HQs, and as such, need proper restructuring or training to prevent the phenomenon from occurring.

While this paper contributes to the current understanding of RKT and its related theoretical domains, and provides numerous practical implications to executives of the MNEs, we recognize that it is not without several limitations. First, the data source of this study's empirical examination is geographically restricted to Korea. As is the case with many regional studies of this kind, the results of this study could differ from that of another nation, culture, and context. In this vein, the results from this study need to be verified and compared with empirical evidence collected from other situational settings. We believe that future empirical studies applying our research framework to different geographical contexts will help to generalize the findings of this paper. Second, LMI consists of diverse context specific knowledge, which could be divided into various dimensions (e.g., cultural specific local information, information on local institutions and regulations etc.), but it is rather unexplored. This implies that future studies should delve deeper into examining the nature of context specific knowledge and HQ-subsiary knowledge exchange within MNE networks. Finally, as we discovered a moderation effect of SW on the relationship of KDC and RKT, there may be more existence of interaction between RKT and its relevant constructs such as an interaction between KTC and relational capital or within the various constructs of social capital (i.e., Oh and Anchor, in press). In this sense, future studies should attempt to search for these relationships by employing more comprehensive approaches by using, for instance, structural equation modeling.

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내부 기업 네트워크 내 역지식이전: 자회사의 지식이전능력의 역할

오 금 식

조 민 수

박 병 일

국문초록

최근 해외자회사로부터 본사로 행해지는 역지식이전에 대한 실증적 관심이 크게 증가하였다. 하지만 동 현상에 영향을 미치는 주요 요소들에 대한 논쟁은 아직 일반적인 합의를 이루지 못했다. 이에 따라 본 연구는 현지 시장 정보를 본사에 역지식이전 하는데 있어 자회사가 보유하고 있는 지식이전능력이 갖는 효과에 대해 알아보려고 하였다. 그렇게 하는 과정 속에서, 또한 외재적 지식이전능력과 역지식이전 간 관계에 시현하는 내재적(즉, 본질적인) 지식이전능력의 조절효과를 살펴보고자 시도하였다. 한국에서 수집된 데이터를 통해, 본 연구는 지식개발능력과 자회사 의(지식이전) 의지가 본사로의 성공적인 역지식이전에 결정적인 역할을 수행함을 발견하였다. 더욱이 자회사의 의지는 지식개발능력과 역지식이전의 관계에 중요한 조절효과를 가짐을 실증하였다. 이러한 결과들을 바탕으로, 본 연구는 이론적 기여 및 실용적 시사점을 제공하고자 노력하였다.

〈주제어〉 역지식이전, 지식이전능력, 현지 시장 정보, 한국