The Mediating Role of Creativity on Knowledge Management in Multinational Firms[1]

다국적기업의 지식경영에 대한 창의성의 매개효과

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ABSTRACT

This study focuses on the mediating role of creativity on the knowledge management process. To confirm focal hypotheses, we conducted survey on 538 employees of foreign subsidiaries of global enterprises. Main findings are: first, creativity turned out to positively mediate the effect of knowledge transfer on the firm's performance; second, the mediating role of creativity differs depending on the domain of acquiring knowledge such as exploitation and exploration. This research found that the influence of exploitative knowledge on knowledge creation and innovative performance was stronger. As such, among tension view and foundational view, which are two competing views on the relationship between knowledge and creativity, the latter is more soundly supported.

Keywords: *knowledge transfer, knowledge creation, creativity, explorative knowledge, exploitative knowledge*

1. Introduction

Knowledge is a vastly dynamic resource; its content, novelty, and economic value differ greatly, and it can be either implicit or explicit depending on how it is acquired. Not only can the knowledge itself be stored to be utilized directly, it can also be integrated to create additional knowledge, generate innovation, or even bring financial profit to firms.

This dynamic feature of knowledge allows creativity to play a part in knowledge management, and with creativity, firms can create internal knowledge that is better suited to

firms. Because this intangible capability is highly inimitable and therefore highly sustainable (Zander and Kogut 1995), creativity can be considered very important for firms.

The dynamic features of knowledge are also reflected in how firms acquire and manage it. Firms gather knowledge through either exploitation or exploration depending on the knowledge needed, after which they attempt to create new knowledge and, ultimately, achieve profits. Although discussions are ongoing regarding the optimal balance of the two knowledge acquisition methods are still (Ebben and Johnson 2005; He and Wong 2004), most scholars agree that acquiring knowledge and managing it is a highly promising strategy (Birkinshaw 2001).

Multinational firms have the most opportunities to acquire knowledge. Not only can they acquire deep knowledge through large-scale research in host countries, but they can also gain knowledge through their foreign subsidiaries (Rugman and Verbeke 2001). As such, there is a demand for multinational firms to develop knowledge management process.

In this paper, we analyze the validity and effectiveness of knowledge management processes of multinational firms. Specifically, we thoroughly examine the role of creativity in knowledge management. This research attempts to not only validate the value of firms' creativity in generating new knowledge but also prove that the effect of knowledge creation differs depending on how the knowledge is acquired, whether by exploitation or exploration.

2. Theoretical Background

In this paper, transfer of exploitative and explorative knowledge between multinational firm and its foreign subsidiaries are analyzed as input, while creativity, or creation of exploitative and explorative knowledge is analyzed as process. These two stages generate innovative performance and financial performance as output.

2.1 Resource-based View in Knowledge Management

The resource-based view focuses on a firm's to understand and utilize its distinctive resources and capabilities to gain distinctive competencies (Barney 1991; Costa et al. 2013; Kogut and Zander 1993; Teece et al. 1997; Wernerfelt 1984). That is, research suggests and resources and capabilities are tangible or intangible assets that firms use to implement strategy (Ray et al. 2004). The resource-based view emphasizes that resources should be difficult to duplicate in order to generate sustainable competitive advantage (Mahoney and Pandian 1992; Peteraf 1993).

Among a firm's necessary capabilities, the ability to access, integrate, and utilize knowledge is reported to be an important source of competitive advantage (Grant 1996). This process, also known as knowledge management, is composed of four main processes: knowledge transfer, combination, sharing, and creation (Teece 2000). Among these, knowledge sharing and creation are emphasized as core processes (Kogut and Zander 1993; Krogh et al. 2000; McElroy 2003). Here, knowledge

creation refers to an organization's capability to generate useful and novel ideas by integrating existing knowledge through different interactions (Ganesh 2001; Marakas 1999).

The same can be applied to multinational firms. It can be suggested that a firm's ability to share and create new knowledge with its subsidiaries is a main source of distinctive competencies. Foreign subsidiaries acquire and create knowledge through two-way knowledge management, which includes knowledge transfer and reverse knowledge transfer (Björkman et al. 2004; Noorderhaven and Harzing 2009; Ambos et al. 2006; Yang et al. 2008). In knowledge transfer process, exploitation happens when foreign subsidiaries utilize global knowledge which is one of multinational firm's resource for monopolistic superiority (Björkman et al. 2004; Noorderhaven and Harzing 2009). In reverse knowledge transfer process, exploration happens when newly acquired foreign knowledge is transferred to other subsidiaries or to multinational firm (Ambos et al. 2006; Yang et al. 2008).

Knowledge transfer and reverse knowledge transfer are both suggested to enhance performance (Ambos et al. 2006; Björkman et al. 2004; Noorderhaven and Harzing 2009; Yang et al. 2008). In particular, much research examines knowledge sharing between firms and their subsidiaries as a starting point of knowledge creation, suggesting that competent firms often share knowledge to create new knowledge (Inkpen and Dinur 1998; Larsson et al. 1998; Ko et al. 2018; Koo et al. 2017). Furthermore, firms' recognition of

all their extant knowledge within their networks is critical in creating and sustaining subsidiary-specific advantages (Rugman and Verbeke 2001). Recognizing the potential sources of distinctive competencies, multinational firms are increasingly putting more effort into integrating and developing knowledge management skills and managing interactive knowledge sharing with their subsidiaries (Fang et al. 2010; Foss and Pederson 2002; Mudambi 2002).

Exploitation and exploration focuses on input stage of knowledge management, where transfer of knowledge between firm and subsidiaries are emphasized in resource-based view. Knowledge shared at this stage are input for gaining competitive advantage. In knowledge creation process, creativity which is capability to integrate ideas, plays its role in generating new ideas (Amabile 1988). Knowledge creation process progresses into innovation process in which firms select creative ideas and develop those into useful product, service or process (Amabile 1988). During these processes, innovation requires combining multiple capacities such as selecting and promoting ideas that have economic value (Sternberg 1997; Sternberg and O'Hara 1999) or developing novel ideas. Thus, innovation is actually putting creative outputs into practice (Oldham and Cummings 1996).

2.2 Knowledge-based View in Creativity

In resource-based view, creativity is considered as capacity to create knowledge and seek various solutions for upcoming problems (Staw 1990).

Firms integrate or relate ideas in unique ways in variation stage and transform the generated ideas into product, service or process in selective retention stage where innovations happen (Staw 1990). In this process of organizational innovation, creativity in conceptualized as prerequisite stage of innovation. Also, strategy for competitive advantage evolves from resource-based view into knowledge-based view. Global firms are active in not only acquiring new knowledge but also integrating their resource with the knowledge, utilizing their organizational learning capacity (Baldwin and Gu 2004; Alegre and Chiva 2013).

Creativity is among the most important of a firm's capabilities because it is the origin of all subsequent innovation processes. Creativity has been emphasized as the main factor responsible for innovative performance, which generates strong competitive advantage (Kanter 2000; Sternberg and O'Hara 1999). In particular, the ability to combine different types of knowledge is suggested to be especially important in generating innovation (Galunic and Rodan 1998).

Little research has been conducted on the effects of creativity on firms' performance (Sung and Choi 2012) because most research focuses on how to generate more creativity rather than on the consequences of having creativity (Shalley et al. 2004). Generally, there are two views on the effects of creativity on a firm's financial performance. Many scholars suggest that the novelty of an idea, which is greatly determined by creativity, is greatly related to its economic value (Phene et al. 2006; Singh and Fleming 2010), but

some scholars argue that this novelty may not be directly related to a firm's financial performance (Sternberg and O'Hara 1999). Nevertheless, although no evidence has been found on the role of creativity in firms, specifically multinational firms, the importance of knowledge creation in these firms' performance indirectly implies that creativity will have a positive influence on firm performance. Research also suggests that a firm's innovativeness, as indicated by its R&D efforts (Hitt et al. 1997), has a positive moderating effect between the degree of multi-nationality and firm performance (Kotabe et al. 2002).

There are two main views on the relationship between knowledge and creativity in a firm. The first is the tension view, which many researchers support either implicitly or explicitly (Weisberg 1999). According to the tension view, deep knowledge in limited areas can cause myopia, and hence, integrating more diverse knowledge is required to generate novel ideas (Kaplan and Vakili 2015). In other words, creativity decreases when deep knowledge comes from only a few domains.

The other view is the foundational view, which asserts that deep knowledge gained through local research is likely to generate innovative performance (Taylor and Greve 2006; Weisberg 1999). It is also suggested that concentrating on local research in limited domains is expected to generate more novel ideas than attempting to combine distant knowledge (Kaplan and Vakili 2015).

The relationship between the tension and foundational views resembles the coexistence

between exploitation and exploration within firms. Exploitation is defined as "refinement, choice, production, efficiency, selection, implementation and execution," whereas exploration is defined as "search, variation, risk-taking, experimentation, play, flexibility, discovery, and innovation" (March 1991). A similar tension exists between the influences of exploration and exploitation on firm performance. Some scholars suggest that choosing only one of the two strategies is better than combining the two (Ebben and Johnson 2005), but others suggest that pursuing both simultaneously improves performance (He and Wong 2004). There is a significant difference, however, in that the discussion about exploration and exploitation examines the effects of individual activities on performance but not on creativity itself. Because research suggests that creativity is important, each activity's influence on creativity should be separately analyzed to verify whether the tension or the foundational view is more justifiable.

In the case of multinational firms, gathering local knowledge from subsidiaries can be more or less effective in increasing creativity depending on which view we choose. In multinational firms that pool distant knowledge from local subsidiaries or institutes (Foss and Pederson 2002), the tension view is expected to be more effective because these firms enjoy great advantage from the diverse knowledge they gather. The positive influence on creativity of diverse knowledge is expected to outweigh the benefits of deep knowledge in limited areas, and in fact, the role of local knowledge in knowledge creation is very important.

3. Developing Hypotheses

Knowledge transfer, i.e. exploitative knowledge transfer from parent companies to foreign subsidiaries, is a type of organizational learning that entails sharing knowledge across different organizational units in a network (Tsai 2001). These units are coordinated through resource and knowledge sharing (Gresov and Stephens 1993), and the networks are crucial because the organizations gain new knowledge by interacting with one another (Tsai 2001).

Knowledge transfer is expected to have a positive relationship with financial performance. Knowledge transfer from firms to subsidiaries is expected to enhance the performance of subsidiaries through sharing of exclusive knowledge or know-how (Björkman et al. 2004; Noorderhaven and Harzing 2009). Furthermore, reverse knowledge transfer from subsidiaries to firms, i.e. explorative knowledge transfer can also improve a firm's performance (Ambos et al. 2006; Yang et al. 2008). In addition, it is suggested that social networks within a firm foster the creation of new knowledge within the firm (Kogut and Zander 1992; Tsai 2000).

Thus, we can hypothesize that the degree of knowledge transfer within a firm will have a positive relationship with the firm's performance.

H 1: Knowledge transfer (both exploitative and explorative knowledge transfer) will have a positive (+) relationship with financial performance.

The effect of knowledge transfer on financial performance can be moderated by many factors. Among them, creativity is one of the most important because it directly determines the degree of knowledge creation and innovation.

Creativity is defined as the ability to combine ideas in a distinctive way (Amabile 1988). It is different from innovation in that innovation refers to the process of selecting ideas and successfully turning them into actual products or services (Amabile 1988; Oldman and Cummings 1996). In short, creativity includes the process of combining existing knowledge, creating new knowledge, and developing it, innovation refers to the next step, which is putting the idea into actual practice.

The main area in which a firm utilizes creativity is knowledge creation, which we can assume is the degree of utilization. Knowledge creation is defined as combining different sets of knowledge to generate new creative insights and ideas. From this definition, we can infer that active knowledge transfer will encourage active knowledge creation, thus improving the creativity in a firm. With more information available, combining the information to create new knowledge will be easier. It is suggested that more knowledge resources within networks provides firms with access to a greater variety of knowledge (Gulati 1999) and thus innovate by combining their own knowledge with newly gained knowledge (Tseng 2009). Particularly in the case of technological knowledge creation, it is said that a firm's innovativeness is driven by combining existing technologies (Carnabuci and Operti 2013).

H 2: Knowledge transfer (both exploitative and explorative knowledge transfer) will have a positive relationship with creativity.

Creativity is expected to have a positive influence on innovation. Innovation is the process of selecting and promoting certain new ideas generated by creativity in firms (Amabile 1988; Oldman and Cummings 1996). Thus, increased creativity means that there are more ideas provided for selection and promotion. In addition, Galunic and Rodan (1998) propose that combining knowledge from different sources is essential in deriving firm innovation, indicating the importance of creativity in innovation.

Knowledge creation, the most important function of creativity, is suggested to have a positive influence on innovation. It is also suggested that integrating knowledge to produce novel ideas with economic value is very important in a firm's innovation process (Ahuja and Lampert 2001; Phene et al. 2006). Kogut and Zander (1992) also assert that one fundamental function of multinational firms is to combine knowledge from different sources to facilitate technological or managerial innovation. The ability to combine knowledge to create novel ideas, which is commonly emphasized in many studies, is in essence creativity. Thus, we can expect creativity to play a positive mediating role in the relationship between knowledge transfer and innovative performance. In other words, the positive effect of knowledge transfer on innovation will be greatly strengthened through knowledge creation.

Furthermore, knowledge creation is expected to enhance firms' financial performance. It can encourage many innovative activities that generate economic value, such as new product development or improving overall management skills (Andersson et al. 2005; Smith et al. 2005). Thus, we can hypothesize that knowledge creation will positively mediate the relationship between knowledge transfer and financial performance.

The reason knowledge creation is not expected to be a moderating factor is that factors other than knowledge creation influence this relationship, such that knowledge creation does not appear to be influential. For instance, even though some innovation studies have proposed the that novelty and value of ideas are positively related (Phene et al. 2006; Singh and Fleming 2010;), many scholars assert that skills for producing cognitively novel ideas are weakly related to skills for selecting and promoting ideas that can generate economic value, further weakening the effect of creativity on financial performance (Sternberg and O'Hara 1999).

Meanwhile, we can raise questions on whether the type of knowledge shared will influence its effectiveness. This research distinguishes between explorative and exploitative knowledge. Marketing and R&D reflect the explorative knowledge that is regarded to increase competency in multinational firms (Hsu et al. 2013; Lu and Beamish 2004). They are greatly explored by subsidiaries and are shared within multinational firms' networks. The other type of knowledge is exploitative, which is normally developed by firms themselves and then transferred to subsidiaries.

According to the tension view, explorative knowledge is expected to more positively influence firm creativity and innovative performance. This is because through exploration, firms can gain a wide variety of knowledge, whereas they can only gain deep knowledge in limited domains through exploitation, which is assumed to cause myopia. Thus, sharing explorative knowledge to improve innovative performance by increasing creativity can be hypothesized to be effective than sharing exploitative knowledge.

H 3a: Creativity will have a positive mediating effect on the relationship between knowledge transfer and innovative performance.

H 3b: Creativity will have a positive mediating effect on the relationship between knowledge transfer and financial performance.

H 4: The positive mediating effect of creativity on the relationship between knowledge transfer and innovative performance will be stronger with explorative knowledge than with exploitative knowledge.

Some scholars propose that the novelty of ideas is not strongly related to firm performance. To actually generate profit, not only does novelty of the idea matter but also the potential to generate profit, and in fact, many creativity scholars have asserted that skills for producing cognitively novel ideas are weakly related to skills for selecting and promoting ideas that can generate economic

value (Sternberg and O'Hara 1999). Some extreme views even suggest that patents that possess both novelty and economic value are rare (Kaplan and Vakili 2015).

Many innovation studies, however, have shown that the novelty and economic value of ideas are positively related (Phene et al. 2006; Singh and Fleming 2010). Even though selection skills are shown to have a weak relationship with idea novelty, we cannot conclude that the novelty itself has a weak relationship with economic value. In fact, it is undeniable that the most valuable ideas will simultaneously display novelty. Thus, we can hypothesize that creativity will have a positive relationship with financial performance.

Innovative performance will have a positive relationship with financial performance. Whereas creativity only refers to generating ideas, innovation involves selecting and promoting ideas that have economic value. Thus, unlike creativity, innovation has a stronger causal relationship with economic profit. In fact, this positive relationship between innovation and performance has already been well established (Avlonitis and Gounaris 1999; Li and Calantone 1998; Va'zquez et al. 2001). Lastly, we will attempt to verify whether innovation generated from creativity has a positive effect on firm performance.

H 5: Innovative performance will have a positive relationship with financial performance.

4. Research Method

4.1 Data and Sample

For this research, we surveyed 538 employees of foreign subsidiaries of global enterprises that entered the Chinese market from June to August 2016. In order to conduct research on firm-level, this research surveyed one respondent from each firm. Among the types of subsidiaries surveyed, Table1 shows that most (82%) were wholly owned subsidiaries and most subsidiaries' primary firms are located in the United States (36.4%). In addition to the United States, subsidiaries of firms from Australia, Germany, the UK, France, Korea, and Japan participated in the survey. By size, most subsidiaries had approximately 1500 employees (67.1%), followed by 1000–5000 employees (19.3%) and 500–1000 employees (9.5%). The respondents worked in a variety of departments such as R&D and sales. The subsidiaries belonged to a wide range of industries, with 23.6% in industry machinery, 12.1% in business service, and 11.3% in telecommunication equipment. This researched controlled rank of all respondents to assure that only respondents in adequate rank that are expect to know overall knowledge management process of the firm respond.

As suggested by Armstrong and Overton (1977), we conducted t tests in this research on major variables from 25% of each of the first- and second-half responses to verify if there was a non-response bias. The result showed no significant differences between the averages of variables in each group. Thus, we can conclude that there is no non-response bias.

<Table 1> Demographics of survey respondents

Question	Types	Frequency	Percentage	Accumulative Percentage
Entry mode of foreign subsidiary	Wholly owned subsidiary	444	82.5	82.5
	Joint venture	17	3.2	85.7
	M&A	40	7.4	93.1
	Strategic alliance	37	6.9	100
Industry type of foreign subsidiary	Household electric appliances	34	6.3	6.3
	Rubber & plastic products	18	3.3	9.7
	Others	44	8.2	17.8
	Business service	65	12.1	29.9
	Insurance	5	0.9	30.9
	Industrial machinery	127	23.6	54.5
	Food & beverages	42	7.8	62.3
	Bank	10	1.9	64.1
	Cars & parts	46	8.6	72.7
	Pharmaceutical	25	4.6	77.3
	Paper products	7	1.3	78.6
	Measurement & analysis tool	7	1.3	79.9
	Telecommunication equipment	61	11.3	91.3
	Chemical and related products	47	8.7	100
Size of foreign subsidiary (number of employee)	1-500	361	67.1	67.1
	500-1000	51	9.5	76.6
	1000-5000	104	19.3	95.9
	5000-10000	19	3.5	99.4
	>10000	3	0.6	100
Department of respondents	Others	20	3.7	3.7
	Service	81	15.1	18.8
	R&D	170	31.6	50.4
	Sales/Marketing	158	29.4	79.7
	Logistics/ Distribution	24	4.5	84.2
	Manufacturing	85	15.8	100

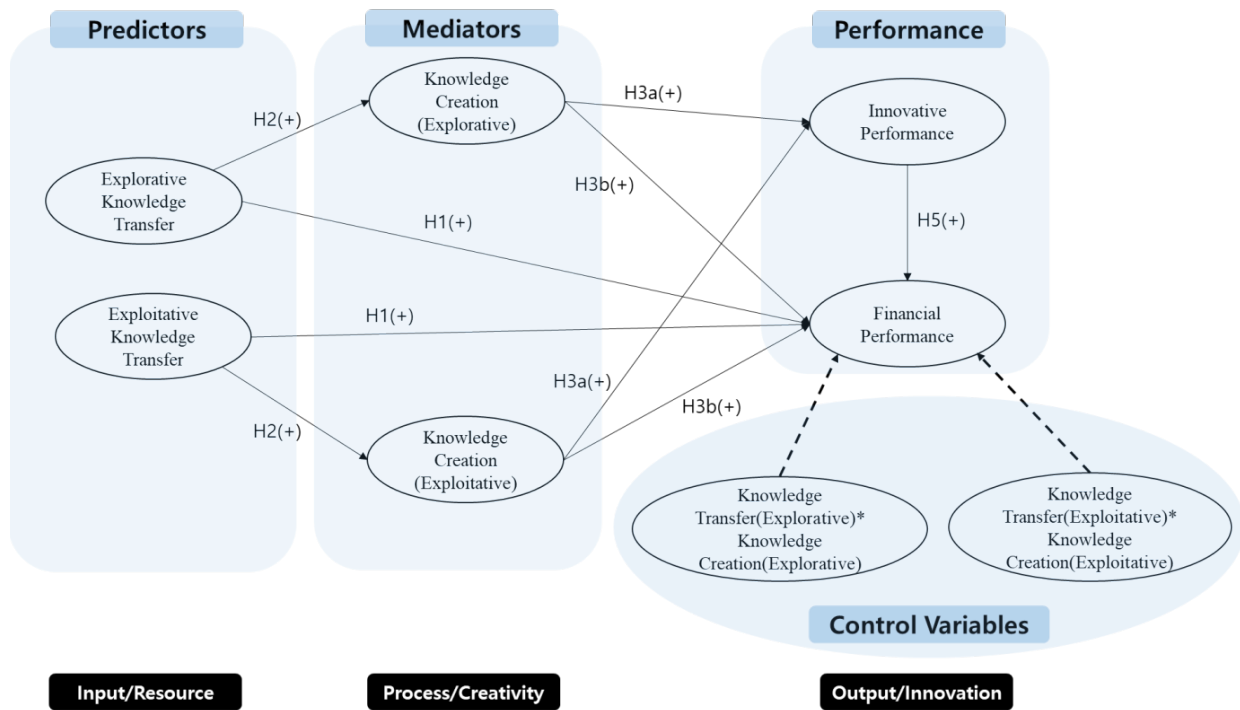|	Albania	2	0.4	0.4
	Australia	54	10	10.4
	Belgium	14	2.6	13
	Canada	9	1.7	14.7
	Denmark	12	2.2	16.9
	UK	25	4.6	21.6
	France	26	4.8	26.4
	Germany	33	6.1	32.5
	Hong Kong	10	1.9	34.4
Nationality of Firm	Italy	3	0.6	34.9
(Home Country)	Jamaica	1	0.2	35.1
	Japan	54	10	45.2
	Kenya	4	0.7	45.9
	Korea	26	4.8	50.7
	Malaysia	1	0.2	50.9
	The Philippines	1	0.2	51.1
	Switzerland	3	0.6	51.7
	Singapore	51	9.5	61.2
	Thailand	13	2.4	63.6
	United States	196	36.4	100

4.2 Model Specification

To verify the hypotheses we drew from preceding research, we proposed the model shown in Figure 1. We examined the moderating effect of knowledge creation on the relationships between knowledge transfer, innovation, and firm performance and compared how the effect changes depending on whether the knowledge is gained through exploration or exploitation. The hypotheses are written on each of the relevant links in Figure 1.

4.3 Measures

The questionnaire consisted of questions about knowledge transfer of foreign subsidiaries, firm knowledge creation, innovation, and performance, and other demographic factors. Specific measures on each construct are as follows.

On the other hand, when unit of measure of independent variable and predictor is same with that of dependent variable, common method bias can exist. To confirm the existence of the common method bias , following the approach in Podsakoff

<Figure 1> Research Model

Notes: 1) A solid line indicates the direct effect of one variable to another; + or– in parentheses indicates positive or negative relationships; 2) A dashed line indicates interactive term representing moderating effects.

et al. (2003), when designing the questionnaire, we employed the different format of wording for the scale and response anchors. In addition, in terms of technique, we tested our confirmatory factor analysis, correlated uniqueness and Harman's (1976) single factor test and found no evidence for the common-method bias.

4.3.1 Operational Definition of Knowledge Transfer

In research conducted by Björkman et al. (2004) on the relationship between knowledge transfer and firm performance, the authors measured degree of knowledge transfer by how much R&D, manufacturing, marketing/sales, customer service, and general management knowledge had been transferred to local firms from external firms. In addition, Reiche et al. (2015) conducted a study on knowledge transfer and reverse-knowledge transfer and analyzed how much knowledge is transferred to and from firms to foreign subsidiaries in sectors such as R&D, manufacturing, logistics/distribution, sales/marketing, human resources, and service delivery, based on research on the role of language in knowledge flow. Because this research focused on knowledge transfer in global enterprises, we adopted the method of Reiche et al. (2015) for measuring degree of knowledge transfer

from firms to subsidiaries in each sector. We generated six survey questions to measure the degree of knowledge transferred from firms to subsidiaries in each of the R&D, manufacturing, logistics/distribution, sales/marketing, human resources, and service delivery sectors. Following factor analysis of each indicator, we excluded factors that lacked convergent validity; the Cronbach's alpha coefficient of the construct composed of only indicators with convergent validity was shown to be 0.7341, exceeding the standard value.

4.3.2 Operational Definition of Knowledge Creation

Zhang et al. (2010) examined the relationship between knowledge creation and competitive advantage. They measured the degree of knowledge creation by how many new operational ideas, new ways to perform tasks, new manufacturing processes, or new product-specific technologies were created while performing tasks. The current study integrated the survey methodology of Reiche et al. (2015) to measure the degree of knowledge creation in each sector in addition to measuring knowledge transfer, reverse-knowledge transfer, and knowledge sharing. We then included six survey questions on how much transferred knowledge is utilized in knowledge creation in each of the respective departments. Through factor analysis of each indicator, we excluded those that lacked convergent validity, and the Cronbach's alpha of the construct that was composed of only those

indicators with convergent validity was 0.8045, exceeding the standard value.

4.3.3 Operational Definition of Firm Performance

Delaney and Huselid (1996) and Youndt et al. (1996) determined firm performance by measuring organizational performance (improved products or services, development of new markets and new products) and financial/marketing performance (business growth, increase in profit, improved financial performance). In contrast, Lee (2001) and Zhang et al. (2010) measured firm performance based on firm market performance (market satisfaction, profit growth, goal achievement). By considering the various effects of knowledge transfer and creation on firm performance, we considered firm short- and long-term financial performance measures proposed by Simonin (1999). Following factor analysis of each indicator, we excluded those that lacked convergent validity, and found that the Cronbach's alpha of the construct composed of only those indicators with convergent validity was 0.8732, exceeding the standard value.

5. Results

For this research, we used SPSS for the demographic analyses and SmartPLS for the factor and link analyses. Many researchers now use PLS in their analyses (Fey et al. 2009; Lam et al. 2012; Vaara et al. 2014). PLS is a new

<Table 2> Measurement Indicators

Construct	Measurement Indicators
(reverse) Knowledge transfer	**Degree of knowledge transfer from headquarter to foreign subsidiaries in each sector** *Indicate to what extent knowledge in the following field in your company is transferred from headquarter to foreign subsidiaries (from foreign subsidiaries to headquarter)* ➢ R&D, manufacturing, distribution/logistics, sales/marketing, human resource, service delivery ※ R&D, sales/marketing (explorative knowledge transfer) ※ Other value chain activities (exploitative knowledge transfer)
Knowledge creation	**Degree of transferred knowledge utilized in creating new knowledge** *Indicate to what extent transferred knowledge in the following field in your company is utilized in creating new knowledge* ➢ R&D, manufacturing, distribution/logistics, sales/marketing, human resource, service delivery ※ R&D, sales/marketing (explorative knowledge creation) ※ Other value chain activities (exploitative knowledge creation)
Firm performance	*Indicate innovative and financial performance of foreign subsidiary and headquarter in the following areas relative to competitors?* ➢ Innovative performance (developing new products or new technology, efficient decrease in R&D costs, applying for and registering patents) ➢ Financial performance (percentage of operating profits, sales growth rate)

generation structural equation that has less rigidity than covariance structural equations from a factor analysis perspective (Chin et al. 1995) but that is highly applicable with small samples or complex modeling (Willaby et al. 2015).

5.1 Model Evaluation

We evaluated the research model for reliability and construct validity (convergent validity), multicollinearity between indicators, and discriminant validity.

<Table 3> Factor Analysis

Construct	Knowledge creation A	Knowledge creation B	Knowledge transfer A	Knowledge transfer B	Innovative performance	Financial performance	AVE (0.5)	C.R. (0.7)	Cronbach's Alpha(0.7)
KC1	0.8726						0.7598	0.8635	0.7838
KC4	0.8706								
KC2		0.7815					0.5967	0.8551	0.7737
KC3		0.7942							
KC5		0.7076							
KC6		0.8028							
KT1			0.8416				0.6933	0.8189	0.7579
KT4			0.8236						
KT2				0.7579			0.5379	0.8227	0.7164
KT3				0.7850					
KT5				0.6709					
KT6				0.7148					
IP1					0.8432		0.6729	0.8602	0.7550
IP2					0.8590				
IP3					0.7549				
FP1						0.8805	0.7056	0.9053	0.8599
FP2						0.8602			
FP3						0.8433			
FP4						0.7718			

Notes: 1) C.B. (Composite Reliability); 2) KC1, KC4 are indicators for each construct: KC1~6 (Knowledge creation), KT1~6 (Knowledge transfer), FP1~4 (Financial performance), IP1~3 (Innovative performance); 3) Bold indicates a significant relationship present

5.1.1 Reliability and Construct Validity

We selected 22 questions for the factor analysis, excluding those with factor loading values lower than 0.7. Table 3 shows that the loading values between each variable were over 0.7 and that the average variances extracted (AVE) of the latent variables were over 0.5 (Chin 1998; Fornell and Larcker 1981). In addition, the Cronbach's alphas and composite reliability also exceeded 0.7 (Nunally and Bernstein 1994). Thus, we confirmed the convergent validity—the reliability—of the model is proven.

5.1.2 Multicollinearity

Multicollinearity between the indicators of a construct distorts results by increasing the standard deviations. Thus, we tested for multicollinearity using tolerance and variance inflation factor (VIF). An indicator is independent when its variance is not explained by another indicator. Meanwhile, tolerance is calculated by 1-R2, whereas the VIF is calculated by 1/tolerance. The cut-off for each indicator is 0.2 or higher but less than 5 (Hair et al. 2011). Measures are correlated, which enables identifying multicollinearity using only the VIF.

In the model that has knowledge creation (KC) and financial performance (FP) as sequential dependent variables (knowledge transfer and knowledge creation based on financial performance), the VIFs for knowledge creation A and B and financial performance were 1.323, 1.508, and 1.438, respectively. The VIFs for KC (A, B) and innovative performance in the model that had KC and innovative performance (IP) as sequential dependent variables were 1.324, 1.508, and 1.468, respectively.

In the model that had KP-IP-performance-financial-performance as sequential dependent variables, the VIFs for KC (A, B), IP, and financial performance were 1.323, 1.506, 1.462, and 1.517, respectively. Because the VIFs for all construct variables were lower than 5, we concluded that there was no multicollinearity.

Other than the finding that a VIF larger than 5 indicates potential multicollinearity (Hair et al. 2011), there is a more conservative claim that multicollinearity exists when the mean VIF for each indicator is over 3.3 (Diamantopoulos and Siguaw 2006; Petter et al. 2007). In this research, we verified that there was no multicollinearity because not only were the VIFs for each indicator lower than the general cut-off of 5 but the mean VIF was also lower than 3.3, the conservative standard for mean VIF.

5.1.3 Discriminant Validity

For this research, we tested discriminant validity to verify the independence of each construct. Discriminant validity is verified in two conditions. Under the first, the outer loading variable of each indicator relative to its construct should be larger than the cross-loading value it has with all other constructs. Under the second, a more conservative method uses the Fornell-Larcker standard, which requires that the square root of the AVE of each construct be larger than the correlations between variables (Fornell and Lacker 1981). As shown in Table 4, if the Fornell-Larcker method is applied, the correlations between variables will be lower than the square root of AVE (in bold in Table 4). Thus, we confirmed the discriminant validity of the constructs in the research model based on the above conditions.

5.2 SEM Results

Complete mediation refers to when the direct links from predictor variables to dependent variables is not statistically significant but only the indirect links between the predictor-variable-parameter-dependent variables are significant

(Baron and Kenny 1986). When the direct links between predictor and dependent variables and the indirect links between predictor-parameter-dependent variables are both statistically significant, it is referred to as partial mediation (Judd and Kenny 1981). As shown in Table 5, knowledge transfer A (explorative) and knowledge transfer B (exploitative) both do not significantly affect financial performance, indicating that the link between knowledge transfer and financial performance was statistically insignificant. In contrast, both types of knowledge transfer showed significantly positive relationships with knowledge transfer (A, B), and knowledge creation (A, B) showed significantly positive relationships with financial performance. Thus, we verified complete mediation between knowledge-transfer, knowledge creation, and financial-performance. In addition, knowledge-creation, innovative, performance, and financial-performance showed partial mediation because the relationship between knowledge creation (A, B)-innovative performance and innovative performance-financial performance were both significantly positive. In addition, the moderating effect of knowledge creation on the relationship between knowledge transfer and financial performance was shown to be insignificant.

In conclusion, hypothesis 1, stating the direct relationship between knowledge transfer and financial performance is rejected for both exploration and exploitation, whereas hypothesis 2, stating a direct relationship between knowledge transfer and knowledge creation, is supported.

Hypothesis 3a, which states that the mediated effect between knowledge creation and innovative performance, as well as hypothesis 3b on the mediated effect between knowledge creation and financial performance, are supported. Lastly, hypothesis 5, stating the direct relationship between innovative performance and financial performance, is also supported.

5.3 Robustness Test

To verify the consistency of the research, we conducted the Sobel's (1982) test to evaluate the robustness of the parameters and the common method bias test regarding overestimating the correlations between variables.

5.3.1 Sobel Test

To verify the mediated effect of knowledge transfer and knowledge creation, we used the multivariate delta formula, for the dual-method effects in the Sobel's (1982) test. Here, a and b are path coefficients, and are the standard errors of the relevant paths. As shown in Table 6, the mediated effect of knowledge creation (A, B) was significant in the relationship between knowledge transfer (A, B) and financial performance (Z=2.12, p<0.005, Z=2.59, p<0.01). Thus, we confirmed that the structural model with mediating parameters was more effective than models without mediating parameters (Helm et al. 2010). In addition, in the structural model of knowledge-creation, innovative-performance, and financial-performance, the model with a mediating variable was superior to the model without one. As a

<Table 4> Multicollinearity and discriminant validity at the construct level (whole sample)

Variables		(1)	(2)	(3)	(4)	(5)	(6)
(1)Financial performance		0.8400					
(2)Knowledge transfer A		0.3845	0.8327				
(3)Knowledge transfer B		0.3916	0.6277	0.7334			
(4)Knowledge creation A		0.4829	0.4939	0.4906	0.8717		
(5)Knowledge creation B		0.5001	0.4438	0.5801	0.7041	0.7725	
(6)Innovative performance		0.4768	0.4025	0.4768	0.4798	0.5459	0.8203
DV	Mean VIF	Tolerance=1-R2 VIF=1/Tolerance					
KC-FP	1.4233	0.695(0.305)			0.756(0.244)	0.663(0.337)	
KC-IP	1.4338				0.755(0.245)	0.663(0.337)	0.681(0.319)
KC-IP-FP	1.4521	0.659(0.341)			0.756(0.244)	0.664(0.336)	0.684(0.316)

Notes: 1) Knowledge transfer A=explorative, Knowledge transfer B=exploitative, Knowledge creation A=explorative, Knowledge creation B=exploitative; 2) Bolded value on downward slope is the square root value of AVE; 3) DV (Dependent variable), KT (Knowledge transfer), KC (Knowledge creation), IP (Innovative performance), FP (Financial performance); 3) Tolerance, VIF, Value in ( ) is R2 value.

<Table 5> Brief summary of results

Hypothesis(effect)	Path	t-value	Result
H1 (direct)	Knowledge transfer A→ Financial performance	0.109 (1.645)	**Reject**
H1 (direct)	Knowledge transfer B→ Financial performance	0.013 (0.208)	**Reject**
H2 (direct)	Knowledge transfer A→Knowledge creation A	0.494† (10.628)	Support
H2 (direct)	Knowledge transfer B→Knowledge creation B	0.580† (12.949)	Support
H3a (direct) *Tension View*	Knowledge creation A→ Innovative performance	0.189*** (3.243)	Support
H3a (direct) *Foundation View*	Knowledge creation B→ Innovative performance	0.413† (7.749)	Support
H3b (mediating) *Tension View*	Knowledge creation A→ Financial performance	0.174** (2.158)	Support
H3b (mediating) *Foundation View*	Knowledge creation B→ Financial performance	0.196*** (2.976)	Support
H5 (direct)	Innovative performance→ Financial performance	0.240† (3.824)	Support
(Moderating)	Knowledge transfer A*Knowledge creation A→ Financial performance	-0.000 (0.005)	Not sig-nificant
(Moderating)	Knowledge transfer B*Knowledge creation B→ Financial performance	0.012 (0.132)	Not sig-nificant

Notes: 1) Knowledge transfer A=explorative, Knowledge transfer B=exploitative, Knowledge creation A=explorative, Knowledge creation B=exploitative; 2) Figure in ( ) is t-value; 3) †P<0.001, ***P<0.01, **P<0.05, *P<0.1.

supplementary method, we also used the Aroian test and the Goodman test, and the results of both agreed with the Sobel test results.

5.3.2 Common Method Bias

It was possible that our survey contained the common method bias of overestimating the correlations between the variables because the survey was a self-report instrument with to questions regarding independent and dependent variables. Common method bias refers to the systemic errors that can occur when data for

independent and dependent variables are gained through the same method or via the same respondents. Usually when respondents answer questions for both independent and dependent variables, the probability of common method bias is high. Common method bias can manipulate insignificant relationships to make them appear to be significant by overestimating the coefficients of the correlations (Billings and Wroten 1978; Lindell and Whitney 2001). It can also decrease the correlations and cause Type II error (Cote and Buckley 1988).

<Table 6> Test results of Mediating Effects

Path	Sobel test(Z)	Aroian test(Z)	Goodman test(Z)
KT(A) → KC(A) → FP	2.122** (0.033)	2.112** (0.034)	2.133** (0.032)
KT(B) → KC(B) → FP	2.590*** (0.009)	2.582*** (0.009)	2.598*** (0.009)
KC(A) → IP → FP	2.649*** (0.008)	2.607*** (0.009)	2.694*** (0.007)
KC(B) → IP → FP	3.803† (0.0001)	3.777† (0.0001)	3.829† (0.0001)

Notes: Figure in ( ) is p-value; †P<0.001,***P<0.01,**P<0.05,*P<0.1

If common method bias is present, all indicators can be grouped with only one construct, or a particularly dominant construct can explain most of the total variance (Andersson and Bateman 1997; Aulakh and Gencturk 2000; Greene and Organ 1973; Krishnan et al. 2006; Podsakoff et

al. 2003; Podsakoff and Organ 1986; Podsakoff et al. 1984; Schriesheim 1979; Schriesheim 1980; Steensma et al. 2005). Thus, we conducted the most widely used test, Harman's single factor test, to test for common method bias (Podsakoff et al. 2003).

<Table 7> Explained Total Variance

Component	Initial eigenvalue			Loading of extracted sum of squares		
	Total	% of variance	Accumulative rate (%)	Total	% of variance	Accumulative rate (%)
1	7.220	42.470	42.470	64.822	42.470	42.470
2	1.625	9.557	52.027	1.625	9.557	52.027
3	1.178	6.927	58.954	1.178	6.927	58.954
4	.998	5.869	64.822	.998	5.869	

Table 7 shows the results of our factor analysis using varimax. We extracted four components in factor analysis without rotation, and the eigenvalues for three of them were over 1. Because there were four components in the research, if we rotate, as in loading the sum of the squares, all four had eigenvalues over 1 and the variance explanatory power decreased by approximately half compared with before it was rotated. Thus, we showed that we had controlled common method bias, improving the structural model.

On the other hand, this research conducted additional robust test on common method bias by using Marker Variable, which was proposed by Lindell and Whitney (2001). Specific marker variables (job commitment, organizational commitment) were used to analyze correlation with the latent variables of existing research model. Correlation coefficient was lower than 0.7, showing that there was no common method bias.

6. Discussion

6.1 Theoretical Implication

This research showed that creativity in a firm is important because it can enhance performance. The positive effects of knowledge sharing between firms and their subsidiaries on both innovative and financial performance are greatly strengthened through knowledge creation. To be precise, in contrast to the fact that knowledge transfer does not influence financial performance without knowledge creation, we showed that knowledge transfer can positively influence performance through knowledge creation. In accordance with the resource-based view and the knowledge-based view, with its strong emphasis on a firm's inimitable capacity to generate innovation and improve firm performance, creativity is one of the most effective capabilities.

Furthermore, this research investigated the effects of two different types of knowledge on every knowledge management process and examined the legitimacy of the tension view in multinational firms. Although we showed that both explorative and exploitative knowledge positively influenced knowledge creation, we found that the influence of exploitative knowledge on knowledge creation and innovative performance was stronger.

Even though we can assume that the foundational view is more valid due to the rejection of the hypothesis 4, the conclusion is not absolutely correct because we showed that acquiring both diverse knowledge (exploration) across the network and in-depth knowledge within a limited domain (exploitation) had a substantial influence on knowledge creation. This result does not deny either the tension or foundational views. Rather, it is more plausible to conclude that it is important to utilize both approaches in creating knowledge and linking it actual financial performance. As long as explorative knowledge has a positive influence on knowledge creation and performance, there is no reason to abandon the strategy.

Further research about the optimal combination of the two approaches is recommended. Although

authors have studied combining exploration and exploitation to enhance firm performance has (March 1996; Gupta et al. 2006; Tushman and Romanelli 1985), the optimal combination of exploration and exploitation to maximize both creativity and performance needs to be thoroughly examined.

6.2 Managerial Implication

Based on this study, firms are highly recommended to enhance overall creativity. Firm creativity is determined at both the individual (MacKinnon 1978; Parnes 1993) and organizational (Sternberg and Lubart 1991; Woodman et al. 1993) levels. By improving individual and organizational creativity, managers can improve both innovative and financial performance.

We also recommend that supervisors manage the types and mechanisms of knowledge shared because the effects of exploitative and explorative knowledge sharing are different. Depending on whether knowledge creation or improvement in actual performance is the priority, managers should determine the types of knowledge to be shared. For firms that can afford more long-term investment, we suggest balancing between exploration and exploitation to improve creativity as well as increase performance. However, if immediate performance improvement is needed, we recommend focusing on sharing exploitative knowledge.

Overall, this research also showed that knowledge from subsidiaries can play a positive role in improving firm performance as long as supervisors can adequately manage the knowledge. This shows that subsidiaries are no longer merely subordinate burdens for firms but are important strategic partners for future performance. We suggest that managers encourage investment in subsidiaries, so that firms can enjoy the advantages of knowledge sharing between firms and subsidiaries.

7. Conclusion

Our primary objective was to verify the role of creativity in multinational firms' knowledge management. We examined how knowledge creation actually affects a firm's innovation and financial performance. We showed that creativity is crucial in multinational firms because the knowledge shared within firms improves firm performance much more substantially following knowledge creation. In other words, a firm's creativity in combining knowledge shared between the firm and its subsidiaries to generate novel knowledge is very important in generating both more innovation and better financial performance in a firm. In addition, this research verified that the type of knowledge influences the effects of knowledge sharing on knowledge creation and firm performance.

This research has the limitation that we did not the characteristics of organizations. In reality, organizational characteristics will greatly affect the role of creativity within the organizations. We recommend that future research that more

sensitively reflects organizational characteristics to offer more detailed analysis of the role of creativity in different types of organizations.

Furthermore, we recommend research on whether the locations of subsidiaries affect the role of creativity in knowledge creation. The countries where subsidiaries are located at can be characterized by country-specific characteristics such as degree of development and distance from the primary firm's location. More sophisticated research on the influence of subsidiary countries' characteristics on creativity will allow managers to establish more detailed strategies.

In addition, more research on how different combinations of exploration and exploitation affect the degree of creativity should be conducted. Although we showed the effects of exploration and exploitation after distinguishing the two by the contents of knowledge, research will show how the two approaches' effects on creativity will differ if the two are implemented simultaneously in one type of knowledge area such as marketing or R&D. The optimal combination will provide managers with reliable guidelines for knowledge management.

Similarly, we recommend research on firms that changed their knowledge management strategy. This study also has the limitation that it did not cover the dynamic changes in firm strategy, but differences are expected between firms that use exploitation strategy from the beginning and those that implement first exploitation but adopt exploration strategy soon after. We recommend research with more dynamic perspectives to analyze these effects.

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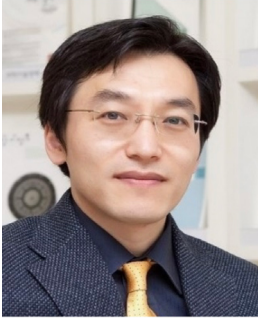80. Schriesheim, J. F. 1980. "The social context of leader–subordinate relations: An investigation

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현재 강원대학교 경영대학 경영회계학부 교수로 재직 중이다. 서울대학교에서 경영학 박사 학위를 취득하였고, 삼성경제연구소 수석연구원 및 고려대학교 연구교수를 역임하였다. 주요 관심 분야는 지식이전, 지식공유 및 지식경영전략, 은행의 국제화 전략, 글로벌기업의 조직양면성, 신흥시장출신 글로벌기업 등이다. 지금까지 Argumenta Oeconomica, Int. J. Business Information Systems 등 주요 학술지에 논문을 발표하였다.

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현재 서울대학교 경영대학에서 재학 중이다. 민족사관고등학교를 졸업하였고, (사)한국국제경영관리학회 주관 2017 춘계학술대회에서 최우수논문상을 수상한 바 있다. 주요 관심 분야는 경영전략, 국제경영, 마케팅 등이다.