Print ISSN: 1738-3110 / Online ISSN 2093-7717
doi: 10.13106/jds.2014.vol12.no1.35.

A Study on the Factors that Affect the Negotiation of Technology Trading for Promotion of Technology Transfer Commercialization*

Wanki Kim**

Received: October 10, 2013. Revised: January 16, 2014. Accepted: January 16, 2014.

Abstract

Purpose – This Study aims to promote technology transfer commercialization and ultimately make contribution towards enhancement of the success rate of commercialization of technology transfer at national level by deducing the factors that impart influence on the negotiation at the time of technology trading between the seller and buyer of technology of public research institutions subjected to transfer and sales.

Research design, data and methodology - This Study deduced 5 research hypotheses through preceding researches related to technology transfer commercialization related technology marketing for technology trading negotiation. This Study was conducted by verifying the hypotheses through multiple regression analysis.

Results - As the result of the Study, the research hypothesis H1, 'Promotion of commercialization of technology transfer trading will be affected in accordance with the innate characteristic factors of the technology', and H5, 'Promotion of commercialization of technology transfer trading will be affected in accordance with the mutual factors of the parties of the technology trading', among the 5 research hypotheses were chosen.

Conclusions - It was found that the technology seller must be able to demonstrate technological value of the technology being sold in order to successfully conclude technology transfer trading negotiation and mutual understanding and harmonious communication between the parties.

Keywords: Technology Transfer Trading, Negotiation, Promotion of Technology Transfer Commercialization.

JEL Classifications: C83, L81, M31, O33.

* This work was announced by "The 5th International conference 2013 of the Korean Science Association and Shandong University of Political Science and Law" and thanks to debated by anonymity judge.

** Ph.D Professor in Graduate School of Management of Technology, Sogang University, KOREA Tel: +82-2-705-4780. E-Mail : wkkim@sogang.ac.kr.

1. Introduction

The accelerated fusion among industries in an age of global keen competition has been causing a great influence on the trading, distribution, relevant laws, etc, of technological assets, where academic as well as business interests keep increasing together. The general distribution is referred to as a producer's selling of a product to a consumer, but the technology trading takes the form of an auction. For reference, technological assets mean those of intangible assets created in the forms of R&D-resulted patents, know-how, business models, etc. Technology trading is characterized by the fact that trading is achieved by mutual negotiation between technology seller and technology buyer. In case of ordinary commodity, trading is concluded by supply and demand in the market, but technology trading take a unique form of distribution that the selling price is determined by a negotiation between both parties. Table 1 shows the kinds of typical domestic trading markets by type of business:

<Table 1> Various Markets Type by Business Aspects

Category	Off-line	On-line	Author
Market for Commodity	Supercenter, Department Store, Outlet, Traditional market, CVS, etc.	Various online shopping malls, home shopping channels like Amazon, Inter-park, 11 St. etc.	Moon, et al. (2012)
Market for Technologies	59 institutions designated nationally for technology trading including TLO (Technology Licensing Office), Korea Technology Transfer Center, Private trading organizations of U.S. Wells, Coresys, etc.	A number of public and private designated institutions like Yet2.com, National Technology Bank(NTB), Deltatech, Techran, Markpro, etc.	Lim (2008)

Suh (2011) has once said that in a broad sense of marketing, a technology may be regarded also as a product, thus allowing the application of the general marketing principles and

techniques. Gee (1974) has defined that technology transfer trading is a concept in which technologies are traded for direct using of any technologies together with newly developed usage and transfer selling, etc. Advance global enterprises have recently shown their keen interests not only in the types of production, distribution and sale of commodity, but also in technology trading/sale, licensing, etc. On the other hand, in case of our country, small and medium industries as well as those of middle standing are experiencing difficulties in terms of lack of R&D professional manpower, funds for development and production, etc. This is because technology commercialization of their own R&D cannot help being restricted by their internal financial limitations (Chesbrough, 2003; Kil, 2009; Bok, et al., 2008).

With the enactment of the Fundamental Law for Intellectual Properties in 2011 regarding technology trading as focused on technology assets together with the existing Technology Development Promotion Law, a full-fledged technology trading market is beginning to be formed in our country (2012 White Paper, 2012). However, in view of our country's current status of R&D investment <Table 2>, the success rate of technology transfer and commercialization is relatively low with technology transfer ratio of 23% on an average, which is the ratio of technology transfer trading to the total of national R&D investment. See <Table 3>.

<Table 2> Current Status of R&D Investment in Korea (Jung, 2008)

Category	2009	2010	2011	Total
`Technologies Owned (No.of Cases)	15,247	18,439	19,995	53,681
Technologies Transferred(No. of Cases)	3,468	4,259	5,193	12,920
Ratio of Technology Transfer (%)	22.7	23.1	26.0	23.3

<Table 3> Current Status of Technology Transfer By Public R&D Institutions (2012 White Paper, 2012)

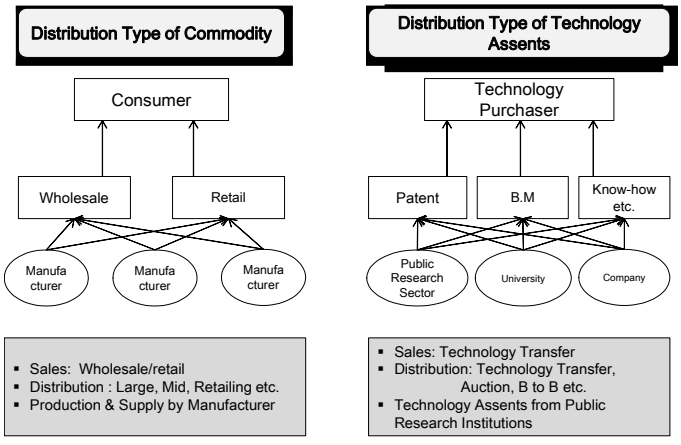
Category		Current Status
R&D Size	Nat'l R&D Size	Weight of R&D to Nat'l GDP: 3.23 (5thGlobally)
	Weight to GDP	Japan(3.30%),Korea(3.23%),U.S.(2.62%), Germany(2.51%), France(2.12%)

As viewed in <Table 3>, the low technology transfer ratio is mostly due to the gap in mutual awareness of trading parties (seller and buyer of technology). This is affected by diverse decision-making variables of technology completeness, selling price, term of licensing patents, capacity for technology absorption, managerial capabilities of the management, expected time of commercialization, etc. Regarding the phenomenon that the gap in awareness arises when making a technology trading, Paik (2008) has insisted that conflicts will take place as the awareness gap exists between sellers and buyers of technologies at all times, thus causing both of them to make a loss as a hindrance to the promotion of technology trading (marketing). Kim and Hong (2013) has insisted that technology trading negotiations are difficult to reach a conclusion due to the technology-related awareness gap between both parties, even though is recommending the methods of either technology inducement transfer or conducting joint researches.

Therefore, the low ratio of technology transfer trading is judged to be caused by the fact that the awareness gap of both the trading parties is acting as a hindrance to the promotion of technology transfer commercialization.

2. Theoretical Background

2.1. Technology Distribution and Technology Transfer Commercialization



<Figure 1> Structures of Commodity Distribution trading and Technology Assets Distribution trading

Kim et al. (2011) have insisted that, as a definition for market, it is a space where products or services are sold to consumers, and that the role of market as complete activities is to be a space that links sellers and buyers together. The general, market-centered distribution trading takes the form of the distribution trading in which products made by multiple manufacturers are sold to consumers, the distribution trading of technologies in the form of technology assets like patents, know-how, etc. is being operated differently from the general distribution trading. <Figure 1> shows that trading is made according to negotiation results between the technology provider (selling) and the technology purchase (buying) at the time of any technology distribution trading.

Meanwhile, Technology transfer commercialization means to be the commercialization that is practiced by enterprises or other private self-owners aiming at the technologies that were created through R&D activities of public research institutions as their technological properties and then sold and transferred to those enterprises or private self-owners The Korea. Technology Transfer Center (2008) has defined that the technology transfer and commercialization activities are to commercialize tech-

nologies (or knowledge) for utilization or to develop, produce and sell products by utilizing developed technologies or to enhance the relevant technologies involved in the process (The Korean Law of Technology Transfer and Commercialization Promotion, 2012).

On the other hand, as for the definition of successful commercialization, there are a variety of interpretations depending upon the main agent. First, Sonet et al. (2009) was of the opinion that the transfer of a technology itself is a success (creation of new value added through diffusion and utilization of developed technology), and the Korea. Technology Transfer Center (KTTC) is defining the criteria for successful commercialization to be the time when the accrued earnings from the commercialization activities exceed the total cost involved in R&D, production, investment and selling beyond the break-even point. However, whether or not a technology transfer is achieved is affected by both the possessed patents and R&D capabilities of the corresponding transfer organization. Therefore, Kim et al. (2006) has insisted that an enterprise-customized technology transfer will be necessary only through an organization for dedicated to technology transfer.

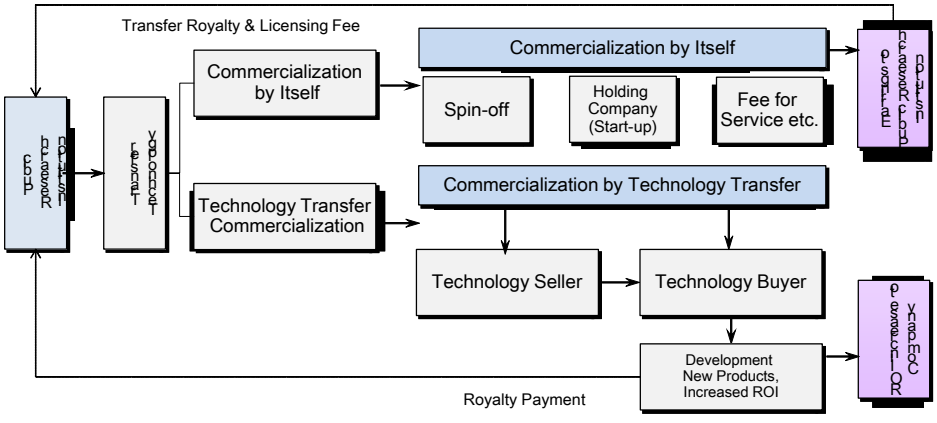
For reference, the income creation structure of technology distribution trading of public research institutions (universities, R&D institutions) is as shown in <Figure 2>. In particular, while the main target of an enterprise is said to be profit-making by product selling, profit-making by public research institutions may be said to be the royalty income as resulted from the success of technology transfer commercialization. For reference, preceding studies on the success of technology transfer and commercia-lization are given in < Table 4>.

<Table 4> Preceding Studies on Influence Factors of Success in Technology Transfer Commercialization

	Contents	Authors
Domestic	Target: Endowment (Res. Inst.), University-centered - Majority for case studies rather than empirical ones, empirical ones are increasing - Technology transfer success factors of technology seller-centered R&D achievements, etc.	Kim et al.(2006) Son et al. (2009), Hwang et al(2010), Hyun & Yoo (2008),etc.
Overseas	Target: Universities, enterprises - Technology transfer success factors in aspects of sellers and buyers of technologies, etc.	Bozman(2000), Brown et al. (1991), Daghfous (2004), Erlich & Gutterman (2003); Fredland (2000),Greiner & Franza (2003), Kremic (2003), Rogers et al. (1998); Schmiemann & Durvy(2003),etc.

2.2. Negotiation and Bargain Power

Normally, for trading technology assets, technology transfer trading negotiations are performed between the parties based on selling prices, licensing period, review results on technological aspects, etc. Kim (2002) has defined negotiation as a process of identifying a solution alternative which will be beneficial for both parties through mutual debates and exchange of opinions, and Park (2004) has presented that negotiation is a process of strategic encountering against the conflicting interests by two or more decision-making subjects, while



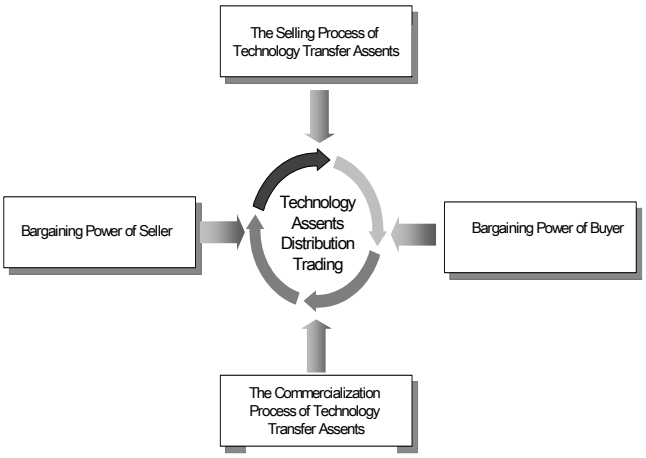
<Figure 2> Income Creation Structure of Technology Trading of Public Research Institutions

As noted particularly, the majority of domestic preceding studies are mostly those on the factors of success in technology transfer of R&D achievements as focused on technology sellers, whereas in case of overseas countries, diverse case studies have been presented regarding the influence factors of the success of technology transfer commercialization in the aspects of both the technology trading parties.

Pruitt and Carnevaie (1993) have defined to be debating of two or more groups for avoiding social conflicts.

Also, Chang (1988) has once insisted that the concept of negotiation is a public selecting process of mediating conflicting parties' interests or to derive an agreement between the parties. Hence, the success or failure of a negotiation will be determined depending upon the negotiation and bargaining p

ower of each party for trading conditions. Therefore, it may b e said as for an advantageous negotiation that negotiation re sults can be varied depending upon who will have the predo minant negotiation superiority. For describing the negotiation between trading parties at the time of negotiating technology transfer trading, the Porter's industrial competitiveness model (1985) is given below in <Figure 3>.



<Figure 3> Technology Assents Distribution Trading Between Bargaining Power and Negotiation

As in the studies quoted as examples, depending upon the process held by a technology to sell, i.e. depending upon the characteristics of the transfer-aimed technology or development capabilities of the developer, etc., the technology seller's bargaining power can be strengthened. On the other hand, technologies transferred from a technology seller will be affected by technological maturity, absorbing capacity and time to market. Hence, technology transfer trading is concluded at a crossing point at which mutual opinions are in agreement with each other. However, in reality, deriving a conclusion from negotiations of technology trading is still a difficult matter mixed with issues on conditions of transferred technology between sellers and buyers, all the additional costs for commercialization and the marketability of technology, etc.

3. Influence Variable of Negotiation on Technology Transfer

3.1. Negotiation Influence Variable

In order to draw the negotiation influence variables of technology transfer trading, the important factors of technology distribution decision-making are utilized in this study as present by Kim (2008).

According to Kim (2008), technology transfer distribution with public research institutions goes through, by and large, 3 decision-making steps (① Exploration → ② Negotiation/ Agreement → ③ Post-Management), which was presented with 32 important factors. In this study, utilizing the Porter's Five Forces Model (1985) as above <Figure 3>, the important factors for enhancing the success rate of technology transfer commercialization are to be reorganized as in <Table 5> and negotiation influence variables are to be drawn.

4. Study Model and Methodology

4.1. Study Model

This study is to be carried out in two steps as in <Figur e 4>. In the first step, important factors for decision-making on technology transfer trading are to be drawn. In the secon d step, through a study hypothesis verification on influence v ariables affecting technology transfer trading aiming at techno logy sellers and technology buyers, their cause-and-effect rel ationship will be verified and then implications will be present ed. This suggested model's goal is increased technology tran sfer commercialization via promotion the technology transfer c ontract.

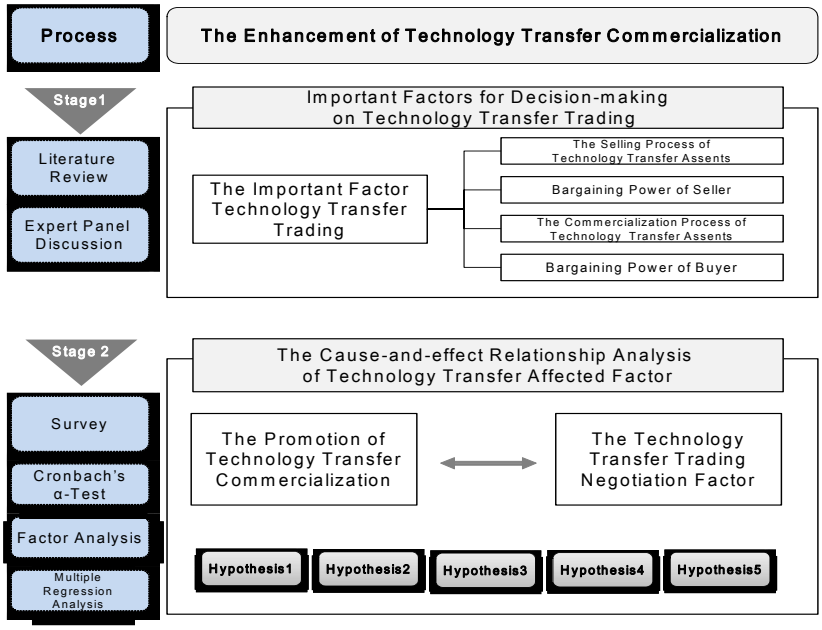
4.2. Study Methodology

4.2.1. Data Collection and Analysis Method

Using the influence variables in <Table 5>, a questionnair e survey is to be carried our aiming at the departments or u nits in charge of technology transfer of domestic universities, government-sponsored research institutes, public research inst itutions, etc. or persons in working level of the industry-acad emic cooperation groups. For empirical analysis, a study hyp othesis verification will be performed after first, carrying out t he technology statistical analysis using PASW 20.0, and the reliability verification of measurement variables, and second, f inally drawing out the influence variables of technology tradin g negotiation through reliability analysis and factor analysis fo r variables, and then carrying out both analysis correlation an alysis and multiple regression analysis.

4.2.2. Measuring Method and Establishment of Study Hypotheses

In order to verify the study hypothesis model, questionnaire items structured with 5-point scale will be made for all the variables and the reliability and validity will be measured. Study hypotheses to be used for the study hypothesis verification, are given as follows:



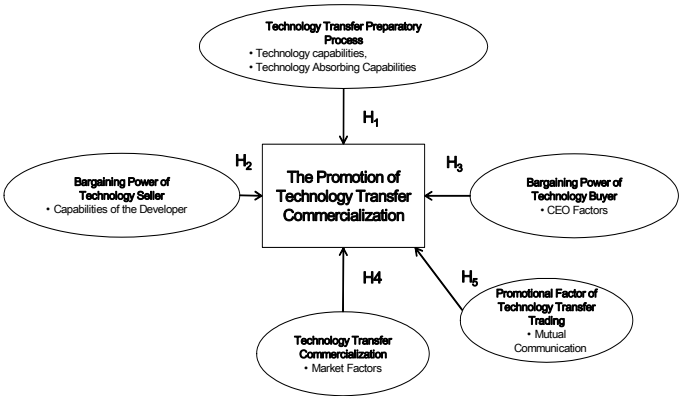
<Figure 4> Proposed Model

<Table 5> Decision-Making Factors of Successful Technology Transfer Commercialization (Kim, 2008; Porter, 1985)

Negotiating Process	Variable		Operant Definition
Technology Transfer trading Process	Technological Characteristics	Differentiation	Technology differentiation's from present competitiveness technologies in other to Commercialization
		Innovativeness	Technology innovation level comparing to commercialized technologies for commercialization
		Risk	Technology risk's is various Influence factor technology level for commercialization such as technology own's level, R&D failure probabilities, competitive power from other similar technology, market entry circumstances etc.
	Technology Absorbing Capabilities	Technology Evaluation Capabilities	Influence on commercialization of own technology evaluation capabilities before technology commercialization
		Technology Modification Capabilities	Influence on commercialization of technology modification capabilities at technology commercialization
Bargaining Power of Technology Seller	Developer Factor	Experience of Technology Transfer	Influence on commercialization of experience before technology transfer
		Technological Capabilities	Influence on commercialization of technology capabilities of R&D capabilities, etc.
		Brand of Institution	Influence on commercialization of technology seller's brand
		Supporting After Service	Influence on commercialization of technology seller's supporting after service
Bargaining Power of Technology Buyer	Manager Factor	Business Mind	Influence on commercialization of CEO's business mind
		Commercialization Experience	Influence on commercialization of CEO's commercialization experiences
		Interest and Will	Influence on commercialization of CEO's interest and will
Process of Transfer and Commercializati on	Market Factor	Marketing Support Capabilities	Influence on commercialization of technology buyer's marketing supporting capabilities in markets
		Financial Support Capabilities	Influence on commercialization of R&D buyer's financial support capabilities
		Technology Price	Technology price of trading in markets
Promotion of Commercializ-a tion of Technology Transfer Distribution	Brand Factor	Communication	Influence on commercialization of communication between parties after technology trading
		Understanding of Technology	Degree of understanding on technology to be transferred for commercialization

4.2.3. Establishment of Study Hypotheses

In this study, study hypotheses are to be established for the influence variables affecting the negotiations for promoting the technology transfer trading and commercialization, and the significance is to be verified. Variables for the hypothesis verification have been set to be analysis total 5 groups as in <Figure 5>, and each study hypothesis is intended to use the important variables that have been drawn from <Table 5>.



<Figure 5> Theoretical Model of Study Hypotheses

4.2.3.1. Technology Transfer Preparatory Process

As a preparatory process for judging either the technological characteristics of a technology that has been created by a technology seller and is currently to be transferred, or whether a technology buyer is in possession of sufficient technology absorbing capabilities, the degree of completeness of a technology affects technology transfer trading, where a higher degree of completeness enhances technology buyer's intention to buy. In the preparatory process for technology transfer and selling, the characteristics of a technology itself (such as innovativeness of technology to be transferred, differentiation, risk) together with technology absorbing capabilities (such as technology evaluation capabilities, technology modification capabilities) can be judged to be exerting a great influence on negotiations for technology transfer trading (Lim, 2004; Baer, 1976; Lee, 2003; Thurs by et al., 2001; Cohen et al., 1998).

H1: The technology transfer preparatory process (technology capabilities, technology absorbing capabilities) will affect the promotion of technology transfer trading and commercialization.

4.2.3.2. Bargaining Power of Technology Seller

A technology seller should have the technological competitiveness within its own technology to be transferred. Technological competitiveness comprises not only the technological characteristic, but also technology developer's experience on technology transfer, capabilities for developing technologies, brands of technology sales organizations and additional technical assistance of the developer, even after the transfer/selling. Therefore, technology sellers will have a superior bargaining power to those potential buyers wishing to buy technologies, and in reality, the negotiation power for technology transfer trading can be varied depending on the capabilities of the developer and the applicable organization (Lee, 2003; Kim et al., 2006; Kim, 2005; Seo, 2006; Cohen et al., 1998).

H2: The bargaining power of a technology seller (developer factor) will influence the promotion of technology transfer trading and commercialization.

4.2.3.3. Bargaining Power of Technology Buyer

A technology buyer wishes to buy a technology at a lowest possible price in consideration of the technology seller's capabilities as well as the superiority of an offered technology. In such a case, a superior negotiation power can be secured depending upon the degree of technology buyer CEO's experience in general and in commercialization. Therefore, the capabilities (business mind, experience in commercialization, interest and will for technology commercialization, etc.) of a CEO who wishes to buy a technology will act as an important bargaining power in negotiations for technology trading (Zahoand Reddy, 1993; Bozeman, 2000)

H3: The bargaining power of technology buyer (manager factor) will influence the promotion of technology transfer trading and commercialization.

4.2.3.4. Process of Technology Transfer Commercialization

A technology buyer is required to have abilities for diverse activities needed for commercialization of transferred technologies. Therefore, in a technology seller's position, it may well be much interested in the technology buyer's degree of capabilities for technology commercialization in addition to its capabilities for absorbing the transferred technology (Cohen et al., 1998; Daghfous, 2004; Bozeman, 2000). For successful commercialization, the higher the completeness of transferred technology is as well as the sooner the transferred technology is being absorbed, the faster the successful commercialization and the time to market can be achieved, while being affected also by the capabilities for developing additional technologies. In other words, an organization to which any technologies are to be transferred is required to have the capabilities for technology commercialization in the process of technology transfer and commercialization.

H4: The process of technology transfer and commercialization (market factor) will influence the promotion of technology transfer trading and commercialization.

4.2.3.5. Promotional Factor of Technology Transfer trading

As for the promotional activities of technology transfer trading, the higher the number of technology trading cases is, the higher

the success rate of technology commercialization will be. Even though technology commercialization may be promoted in the form of a spin-off away from an internal unit of technology selling, most technologies are usually sold and transferred to enterprises and individuals and then commercialized by them. Therefore, the success rate of technology commercialization will be higher as the number of technology transfer trading cases (successful ones) increases, where an increase in number of such cases will be greatly helpful to the promotion of technology transfer and commercialization. Hence, in order to promote technology transfer trading, all the parties of technology transfer trading should have full understanding about those technologies to be transferred and even after any technology transfer trading has been achieved, a joint effort should be accompanied so as to make the technology commercialization successful through smooth and continuous mutual communication (Ahn, 2004; Lee, 2003; Sim, 2004; Grinner & Franza, 2003)

H5: The degree of promotion (Brand factor) of technology transfer trading will influence the promotion of technology transfer trading and commercialization.

5. Empirical Analysis

5.1 Technology Statistics Analysis

First of all, a total of 107 persons of technology sellers and buyers with their experience in technology commercialization have been targeted for a questionnaire survey. The number of the questionnaire respondents was 80 persons, of which 73 persons were valid ones consisting 43 of technology sellers and 30 of technology buyers. Revealed in the questionnaire survey results, as for the purpose of purchasing a technology, the pioneering of a new business area through technology transfer (77.8%) was the most selected one, while as for the core technology area, 49.3% of all the respondents responded positively as their most interested and important technology area. In addition, as shown in <Table 6>, as for the time required for commercialization of a transferred technology, 12 months' selection was the highest followed by 24 months, 36 months and so on, while most the technologies transferred were found out to have been commercialized within 3 years. On the other hand, the competitiveness of a typical transferred technolo-gy was maintained for a period of around 60 months, thus explaining the survey result that a new technonogy transfer trading takes place over a period of 5 years or so. See <Table 7>.

<Table 6> Technology Statistics of Questionnaire Respondents – Interested Technology Area, Technology Purchasing Purpose and Awareness on Commercialization

Interested Technology Area		Respondent	Percentage (%)
Type of Technology	Basic Technology	8	11
	Core Technology	36	**49.3**
	Leading Technology	18	24.7
	New Technology	11	15.1
Purpose of Technology Transfer	Pioneering of New Business Area	56	**77.8**
	Enhancement of Existing Technology	16	22.2
Business Area	Instruments and Systems	39	**53.4**
	Parts and Materials	33	45.2
Patents Owned	5 or below	21	**29.2**
	5 to 10	12	16.7
	10 to 20	18	25
	Over 20	21	**29.2**
Role of Commercialization	Technology Buyer	30	41.1
	Technology Seller	43	**58.9**

<Table 7> Technology Statistics of Questionnaire Respondents– Average Period Required for Technology Transfer Commercialization and Period of Maintaining Technology Competitiveness

Average Period Required for Technology Transfer Commercialization			Technological Competitiveness		
Category	Respondent	%	Category	Respondent	%
6Month	5	6.9	12Month	3	4.2
12Month	22	**30.6**	24Month	6	8..3
18Month	8	11.1	36Month	16	**22.2**
20Month	2	2.8	48Month	6	8.3
24Month	16	**22.2**	50Month	1	1.4
36Month	15	**20.8**	60Month	22	**30.6**
48Month	2	2.8	72Month	2	2.8
60Month	1	1.4	84Month	6	8.3
120Months	1	1.4	100Month	5	6.9
			120Month	5	6.9
			140Month	1	1.4

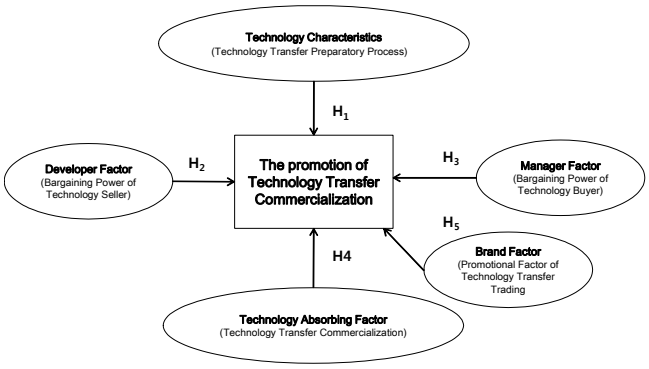
5.2. Evaluation of Reliability and Validity

5.2.1. Reliability Verification

Previously, using diverse variables of <Table 5>, a theoretical

model as in <Figure 5> was established and an analysis of reliability has been carried out for the diverse variables. In case of an exploratory study hypothesis verification, depending upon the verification results of the reliability between each questionnaire item and variables, if the Cronbach's α coefficient is 0.5 or over, the reliability is acknowledged (Nunnally, 1978). Therefore, the remaining 5 variables excluding the 'Market Factor' whose Cronbach's α coefficient is below 0.5, i.e. Technological Characteristics Factor, Manager Factor, Brand Factor, Developer Factor and Technology Absorbing Capabilities Factor have finally been adopted <Table 8>.

Next, as a result of the verification of Convergent Validity of measurement variables excluding the variable of 'Technology Absorbing Capabilities' variable which is of low reliability through the factor analysis, the final grouping has been made been made to be as shown in <Table 9> and viewing that the KMO (Kaiser-Meyer-Olkin) value, which indicates whether or not the correlation matrix is adequate for factor analysis, has been found out to be .645, which value is well over .50, it may be safely that the Convergent Validity of both the measurement questions and relevant variables has been secure(Kang, 2000).



<Figure 6> Revised Study Hypotheses Through Reliability Verification

<Table 8> Analysis on Reliability of Questionnaires

Category		Variable				
		1	2	3	4	5
Technology Characteristics Factor	Differentiation	.813	-.071	.124	-.057	-.096
	Risk	.794	.099	-.081	.115	.324
	Innovativeness	.704	.239	.290	.227	-.125
Developer Factor	Technological Capabilities	.160	.819	-.060	-.109	.153
	Commercialization Experience	.087	.768	.123	.257	-.128
	Support Service	-.100	.675	.092	.021	.416
	Brand	-.101	.212	.351	.448	-.536
Manager Factor	Business Mind	-.028	.006	.839	-.005	.234
	CEO's Interest and Will	.331	.010	.716	-.181	-.140
	CEO's Experience	.303	.256	.417	.091	.320
Brand Factor	Communication	.093	-.128	-.073	.843	.083
	Technology Understanding	.077	.208	-.063	.792	.012
Technology Absorbing Capabilities Factor	Technology Evaluation	-.040	.094	.416	-.066	.739
	Technology Modification	.046	.300	.003	.296	.611

<Table 9> Factor Analysis of Measurement Variables

Measurement Variable	No. of Items	Cronbach's α Coefficient
Technological Characteristics Factor	3	0.725
Manager Factor	3	0.603
Brand Factor	2	0.676
Developer Factor	3	0.693
Market Factor	2	0.493
Technology Absorbing Capabilities Factor	2	0.554

Therefore, on the basis of the verification analysis results, the study hypothesis model has been reestablished as shown in <Figure 6>, and hypothesis verification has been carried out on this.

5.2.2. Correlation Analysis

A correlation analysis has been carried out to see the relationship between variables selected from the revised study hypotheses of <Figure 6>. As a result of the experiment, it was revealed that the 'Technology Differentiation' was in a significantly positive relationship with the 'Communication.' Therefore, it was verified that H1 and H5 were in a highly correlated relationship in Table 10.

<Table 10> Correlation Analysis of Technology Transfer Trading Variables

Factor	Innov.	Diff.	Risk	Comm.	Tech. Und.	Tech Eval.	Tech Modi.	Comm Exp.	Tech. Capa.	Supt. Serv.	Busin. Mind	CEO's Int/Will	Tech. Comp.
Innovativeness	1												
Differentiation	.491**	1											
Risk	.492**	.458**	1										
Communication	.193	.047	.131	1									
Technology Understanding	.209	-.044	.194	.518**	1								
Technology Evaluation	.036	.019	.157	-.024	-.097	1							
Technology Modification	.110	-.029	.282*	.153	.163	.385**	1						
Commercialization Experience	.304**	-.007	.180	.074	.326**	.052	.260*	1					
Technology Capabilities	.224	.072	.201	-.017	.091	.175	.235*	.447**	1				
Support Service	.104	-.072	.100	-.003	.191	.369**	.337**	.314**	.528**	1			
Business Mind	.205	.068	.030	-.028	-.031	.416**	.089	.081	.048	.190	1		
CEO's Interest/Will	.343**	.267**	.185	-.146	-.071	.141	-.081	.086	.032	.007	.448**	1	
Technology Competitiveness	.146	.340**	.135	.354**	.135	-.036	-.082	.003	.004	-.026	.002	-.162	1

5.3. Verification of Study Hypothesis

For the verification of revised study hypotheses, correlations between variables were first analyzed as in <Figure 6>, and then the multiple regression analysis method was used for the analysis in order to predict dependent variables from independent variables. As a result of the regression analysis, the regression model was found out to be relatively appropriate with R-Square value of .063 and F-value of 1.959 (p-value = .096) as shown in <Table 11>.

<Table 11> Multiple Regression Analysis

Independent Variable	Un-standardized Coefficient		Standardized Coefficient	t-Value	P-Value (Significant Level)
	B	Standard Error	Beta		
Constant	57.807	3.154	-	18.327	.000
Technology Characteristics Factor	6.616	3.163	.240	2.092	.040
Developer Factor	-2.317	3.153	-.085	-.738	.463
Brand Factor	6.554	3.162	.238	2.073	.042
Technology Absorbing Capabilities Factor	-.523	3.200	-.019	-.163	.871
Manager Factor	-2.235	3.155	-.081	-.709	.481
R Square = .129, Adjusted R Square = .063 F = 1.959, p=.096					

Summarizing the results of the verification of revised study hypotheses, the technology characteristics factor of t=2.097 (p-value = .040) and the brand factor of t=2.073 (p-value = .042) were significant to the positive(+) direction which means to influence the technology transfer trading, while on the other hand, other factors were found out to be of low explanation power explanation power. Hence, only the two study hypotheses H1 and H5 have been adopted and all the other have been rejected.

With such a result, it was possible to identify that the technology's own characteristics factors of technology differentiation, innovativeness, risk, etc. will exert a positive influence upon technology transfer trading, while the technological characteristics of subject technology will exert a crucial influence upon technology transfer trading. Also, it was found out that the more often the communication between technology transfer trading parties was made and the higher the degree of the parties' understanding was, the more of influence was exerted on negotiations for technology transfer trading, from which the need for con-

tinued communication between parties in the process of technology transfer trading negotiation could be perceived. In addition, the product completeness obtained from full understanding about the technology involved was found out to exert a positive influence upon both parties' decision making on technologies to be transferred. Hence, it was possible to predict that, with such improved understanding, the success rate of technology commercialization could be enhanced gradually. In other hand, H2, H3, H4 are insufficient for increased technology transfer trading possibilities because of negotiations aspect. See <Table 12>.

<Table 12> Summary of Verification Results of Revised Study Hypotheses

H.	Contents	Result
H1	Technology (own) characteristics factor will influence the promotion of technology transfer trading and commercialization	Adopted(+)
H2	Technology seller's characteristics factor will influence the promotion of technology transfer trading and commercialization	Rejected
H3	Technology buyer's manager factor will influence the promotion of technology transfer trading and commercialization	Rejected
H4	Technology buyer's technology absorbing capabilities will influence the promotion of technology transfer trading and commercialization	Rejected
H5	Depending on the brand factor between technology trading parties, it will influence the promotion of technology transfer trading and commercialization	Adopted(+)

6. Conclusion and Implications

This study was carried out for the purpose of promoting the technology transfer commercialization with regard to the technology assets created by public research institutions of the national dimension. However, in the case of our country, the transfer rate of the technologies from public research institutions is relatively low in reality. Therefore, it is quite necessary to make multilateral efforts to enhance the efficiency of national R&D resources as well as to strengthen the nation's technological competitiveness.

In these days, in accordance with the newly enacted law of 'The Law for the Promotion of Technology Transfer and Commercialization' (Ministry of Trade, Industry&Energy, 2012), lots of activities are being unfolded for promoting the technology transfer commercialization. However, despite the fact that the technology transfer rate should be enhanced for promoting technology commercialization through technology transfer trading, difficulties are being experienced in reality caused by the awareness gap existing between technology trading parties. This study has been attempting to identify the crucial factors in an effort to minimize the awareness gap existing between trading parties when negotiations are being made for technology transfer trading, so that minimizing the awareness gap could eventually help promote the technology transfer commercial-ization. As a result of this study, first, as the most influencing factors when making negotiations of technology transfer trading, the technological completeness with regard to the technology's own characteristics factors (risk, differentiation, innovativeness) should be enhanced by technology sellers. This accords with the theory insisted by Jee (2013) that it would be difficult to achieve customer satisfaction without taking strategies for market segmentation and differentiation where customers' needs are getting more and more diversified. Therefore, technology buyers also should improve their communication with technology sellers and enhance the degree of their understanding upon technologies to be purchased.

Second, it seems necessary for the public research institutions (universities, research institutes, etc.) to make efforts to develop R&BD-type technologies focused on technology buyers' wishes from the technological planning stage. In other words, technology transfer is not an easy matter if the completeness of technology is not high enough even with superior technology characteristics. On the other hand, in the standpoint of technology buyers, they have their advantageous bargaining power in the respect that they can select technology sellers. However, it is to be noted that the success rate of technology transfer trading will vary in accordance with the degree of mutual understanding between trading parties even for a superior technology. Therefore, as it will take a lot of time also for technology buyers to commercialize purchased technologies, it is thought that the success rate of commercialization could be somehow enhanced more by obtaining innovative and differentiated technologies and materializing them rather than by focusing only on the short-term business performance.

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