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Studies of Actors in Cross-Cultural Management —For Effective Knowledge Transfer and Knowledge Creation in Product Development

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Under the globalization of economies, the importance of cross-cultural management and knowledge creation increases. The capability of offshore development becomes the key success factor, and companies are required to face diversity and open innovation.

This study investigates the actor's role in cross-cultural communication and knowledge creation. Firstly, a literature survey was conducted with respect to the following: 1. means of communication and management of projects, 2. role of actors in cross-cultural knowledge transfer and the knowledge creation in projects.

Secondly, 52 projects in multinational environment are investigated. From the survey, the model of "duel core" actors is proposed and verified. The duel core actors are people who communicate on both the sender side and the receiver side. From this study, the model of "duel core" actors is verified. The dual core actor is one of a pair of actors, who exist on both sides, functioning as both a sender and a receiver. The necessity of core actors is discussed in many examples of previous research, sometimes identified as a "gatekeeper" or a "transformer". However, there is no research which points out that such core actors need to exist on both sides, communicators functioning as dual core actors. Therefore, the theoretical contribution this study identified is that dual core actors are necessary in remote cross-cultural communication.

For product development, smooth, and appropriate communication and knowledge transfer becomes important, and the actor's role in combining internal and external ideas is indispensable. In this sense, the dual core actor is the innovator and the driving force for cross-cultural communication and management. The business and operational implication of this study is that it is necessary to locate and appoint duel core actors on both the sender side and the receiver side in order to create new knowledge by fusion of different cultures.

Keyword : knowledge transfer, knowledge creation, open innovation, cross-cultural communication, cross-cultural management

1. Introduction

Under globalization, the necessity of open innovation is increasing for new product development. This is because new economies such as the BRICs (Brazil, Russia, India, and China) show a remarkable growth. According to IMF (2007) the BRICs countries

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greatly according to variables of the country level.

(2) Types of Cultures and Communication

There are many studies which discuss different aspects in types of cultures and communications. Hall (1976) divides cultures into the high context and low context. A high context culture is a culture that emphasizes tacit consent and atmosphere. A low context culture is a culture that communicates by the actual language expression of text messages. High context cultures include Japan, Arabic countries and a part of the Russian Federation. Germany or Switzerland is regarded to be a typical low context culture.

Trompenaars and Woolliam (2005) analyze cultures based on "the merit system" vs. "the attribute system". The merit system is based on personal achievement, while the attribute system is based on the principle of age, sex, social rank, and educational background. According to Trompenaars and Woolliam, a typical culture based on the merit system is America. The attribute based cultures include the Confucian countries such as Japan or the Republic of Korea. Countries of the Middle East are considered to be attribute based cultures.

Samovar et al. (1981) point out that cross-cultural communication occurs when the sender and receiver belong to different cultures. Here culture affects both the content of the message for both the sender and receiver.

(3) Characteristics of National Cultures

Michailova (2004) compares Chinese culture with Russian culture and points out commonalities. They have the tendency to emphasize personal connections. Michailova also stresses that in Russia and China the power that is achieved by personal connections in knowledge transfer is strong.

Hakamada (2002) describes the characteristics of Russia compared with Germany, Japan, Britain, America, France, Italy, and China. According to him, it is assumed that an authoritarian system such as modern Russia as well as modern China is due to the political system.

Michailova (2004) and Hofstede and Bond (1984) point out that Russians receive strict education about handling secrecy. Elenkov (1998) studies effective management methods of Russians working in American companies. He points out that compared with an American, Russians have high power orientation, and furthermore, Russians are risk averse and intolerant of political fallout.

Engelhard and Nagele (2003) conducted research on 22 MNC (multi-national companies) in Moscow. According to the investigation, neither of management system based on an European value system nor American culture is hard to be understood or implemented in Russia.

2-2 Knowledge Transfer in Cross-Cultural Communication and Management

(1) Technology Transfer and Cross-Cultural Communication

Technology transfer is indispensable for the inter-firm cooperation in R&D and prod-

mark the growth which exceeds other advanced industrial countries as the economic power. New economies are becoming more important as trade partners and resource providers since they have ample population and natural resources.

With the globalization of economies, the importance of cross-cultural communication and management increases. Companies are facing the challenge of surviving while coping with the fast growth of new economy. To be able to utilize a wealth of resources in the BRICs, effective cross-cultural communication and management are required. For product development, smooth and appropriate communication and knowledge transfer becomes important. The capability of offshore development becomes the key success factor. As Drucker (1993) predicted, a new economic situation will increase the intellectual importance and ability of utilizing the knowledge assets regardless of culture, nationality, or region.

In Japan, fundamental research expenses are being reduced, according to the Statistics Bureau of General Affairs Ministry (2004), and Yamaguchi (2000). They indicate that Research and Development in central laboratories was reduced in many companies in Japan during the 1990's. In order to make up for the fundamental research, the necessity of the open innovation is proposed (Chesbrough, 2003). It means that links to outside organizations are required. This is the reason that the capability of offshore development such as with Russia becomes one of the factors for success. Companies are required to face diversity and open innovation. Therefore, it is important to develop effective methods for collaboration and for working with the BRICs.

2. Research Review

In this section, previous research is reviewed considering inter-firm cooperation in R&D in a multinational environment. Firstly, research on cross-cultural management is investigated, then research on knowledge transfer and knowledge creation in cross-cultural management is reviewed.

2-1 Cross-Cultural Management

(1) Factors of Cross-Cultural Management

In cross-cultural management there are multiple factors to be considered. Harris and Moran (1979) divide the consisting elements of cross-cultural management into ten factors ; 1. Language, 2. Clothing, 3. Food, 4. Time dimensions, 5. Honoring system, 6. Human relations, 7. Value and model, 8. Distance between self and other people, 9. Learning process, and 10. Religion and faith.

Hofstede and Bond (1984) classify the administrative culture in four axes ; power distance, uncertainty acceptance vs. avoidance, individualism vs. collectivism and masculinity vs. femininity. The research is driven by results of an investigation of offices of IBM in 70 countries. Holden and Tansley (2007) point out that management is influenced

uct development such as open innovation. According to Tech-Encyclopedia (2009), technology transfer is one form of cross-cultural communication and the definition of technology transfer is: 1. Applying the results of research to a practical application, and 2. Sharing technical information by means of education and training.

With globalization of technology, international technology transfer is promoted. From the viewpoint of the international technology transfer, Saito (1979) investigates the technology trade between advanced industrial countries and developing countries. He insists that utilization of technology contributes to the global economy, political stability, and nurturing culture. He mentions that it can be the base of sustainable international development or, more over, world peace.

Schumacher (1973) points out the fact that the efficiency of technology transfer is controlled by the peripheral environment. He places "an intermediate technology" located in the middle of the transitional technology to make technology transfer more effective. Thus, Kobayashi (2005) indicates that the technology from western countries was modified and transferred successfully in Japan, and modified western technology still holds an important position.

Zander and Kogut (1995) analyze a case of organizational technology transfer, and prove that morality, the value system, and local culture, including human relations, play important roles. In the technology transfer, various conditions such as technology standards, resources, scale of the market, and the social culture environment of a country transferred to have to be considered.

(2) Difference of Technology Transfer and Knowledge Transfer

As for the definition of the technology transfer, Goc (2002) mentions that the technology transfer means an exchange and transfer of technical resources. In a narrow sense, it is accompanied by techniques such as patents, licenses, royalties, and joint management enterprises. Gopalakrishnan and Santoro (2004) compare knowledge transfer with technology transfer and conclude that technology transfer is narrowly defined, and knowledge transfer broadly defined.

Technology transfer uses tools such as manuals, experiments, simulations, and pilot tests. Knowledge transfer uses tacit or implicit methods. Here, logistical elements in the background such as corporate culture, the technology background or organizational relationships are important.

According to Goc (2002), knowledge transfer is done before and after technology transfer. Furthermore, knowledge transfer occurs after the technology transfer is completed, and when the project shifts to the next stage.

In summary, knowledge transfer is considered to be technology transfer on a wider scale. Knowledge transfer is more difficult than technology transfer. Knowledge is transferred usually by means such as trial and error, and through OJT (On-the-Job Training). Technology is not transferred just as a single element but is transferred as knowledge as a whole.

2-3 Knowledge Creation in Cross-Cultural Communication and Management

(1) Cross-Cultural Management and Knowledge Creation

Holden (2002) introduces a new viewpoint regarding new knowledge creation in cross-cultural management. Holden obtains his idea from the way Japanese companies create the innovation dynamics through collaboration among different types of organizational cultures (Nonaka & Takeuchi, 1995). Prior to Holden's research, the traditional approach was to focus on cross-cultural differences and similarities. However, Holden insists that there is the potential of bring-in innovations in cross-culturally diverse projects.

Porter (1985) develops Holden's idea into the idea of cross-cultural diversities as intangible assets. He introduces a competitive strategy theory. Barney (1991) placed knowledge as one of the competitive assets of corporations and made a base of his "resource based view". For a company to maintain competitiveness, it needs to have resources which others cannot imitate (Hamel and Prahalad, 1990). Holden advances Nonaka's (1995) theory, focusing on the heterogeneity of a combination of cross-cultural management theories.

(2) Actors in Cross-Cultural Knowledge Creation

As a transmitter or medium of communication of a knowledge, the existence of "a gatekeeper" or "a boundary spanner" (a border connecting person) is studied. Allen (1979) examines a communication network used by an engineer. He found the existence of a central person in knowledge transfer, labeling the person "a gatekeeper." The "Gatekeeper" takes the role of promoting knowledge transition and he or she eliminates semantic noise. Such noise occurs due to lack of common understanding between the people concerned in communication.

In addition, there is "a boundary spanner" who is another medium of communication. The boundary spanner collects necessary information for an organization from the outside. Then, he or she analyzes it, and disseminates it within an organization (Tushman, 1977, Adams et al., 1980).

3. Survey

Based on the previous research, fifty-two cases of cross-cultural projects between Russia and Japan are analyzed. Russia is one of the BRICs countries, showing a steady economic growth. Among the BRICs, Russia exceeds India, China, and Brazil on GDP per person. It has strong technological potential for offshore development, resource diversity and further innovation.

3-1 Overview of Survey

As for Russian economy, it was once depressed after the collapse of the Soviet Union in 1991, but nowadays it shows remarkable growth. Compared to other countries in the

BRICs, the standard of living and education in Russia are very high. Russia keeps the highest number of research and development personnel in the world in terms of population (BowWave Technologies, 2002). Russia exceeds India and China in higher education (International Bank for Reconstruction and Development (2006)). Russia has strong potential for fundamental research.

(1) Break-down of Survey

The classification of 52 product development projects is shown in the Table 1. Projects are classified by fields, industries, types of business, and the monetary size. The number of projects in the public welfare sector are 35, the basic level product development are 29, the application level product development are 23, and the military affairs / national defense area are 17. In terms of the amount, 50% came from IT and electronics projects, and 21% from biotechnology, 10% from aviation / space, and 19% from nano-technology.

Table 1 Classification of 52 Cases

Field	No.	Type	No.	Industry	No.	Amount%
Military affairs/ national defense	17	Basic level	29	IT・Electronics	40	50
Public	35	Application level	23	Blotechnology	2	21
Total	52	Total	52	Aviation/space	5	10
				Nano technology	5	19
				Total	52	100

(2) Definition of the Degree of Success

The degree of success for each project is measured by the impact of contributions, which are roughly divided into three categories :

- ① the monetary size of a project
- ② the number of repetitions of a project
- ③ satisfaction level of participants after the project

As for ① the monetary size of a project, the project size is divided by large (over one million US dollars, medium (more than 30K and less than one million US dollars), and small (less than 30K US dollars). As for ② the number of repetitions of a project, the actual number is counted. As for ③ satisfaction level of participants after the project, project participants were asked to respond to a questionnaire after the project completion. They were asked to rate items very satisfactory, not satisfactory, or neither of the above. For each of the three kinds of contributions, ①, ② and ③ the full score is 100% and the three are totaled to be weighted equally. Thus the maximum value of the degree of success is 3.0.

Figure 1 shows the correlation of the degree of success (Y) and the duration (X) of

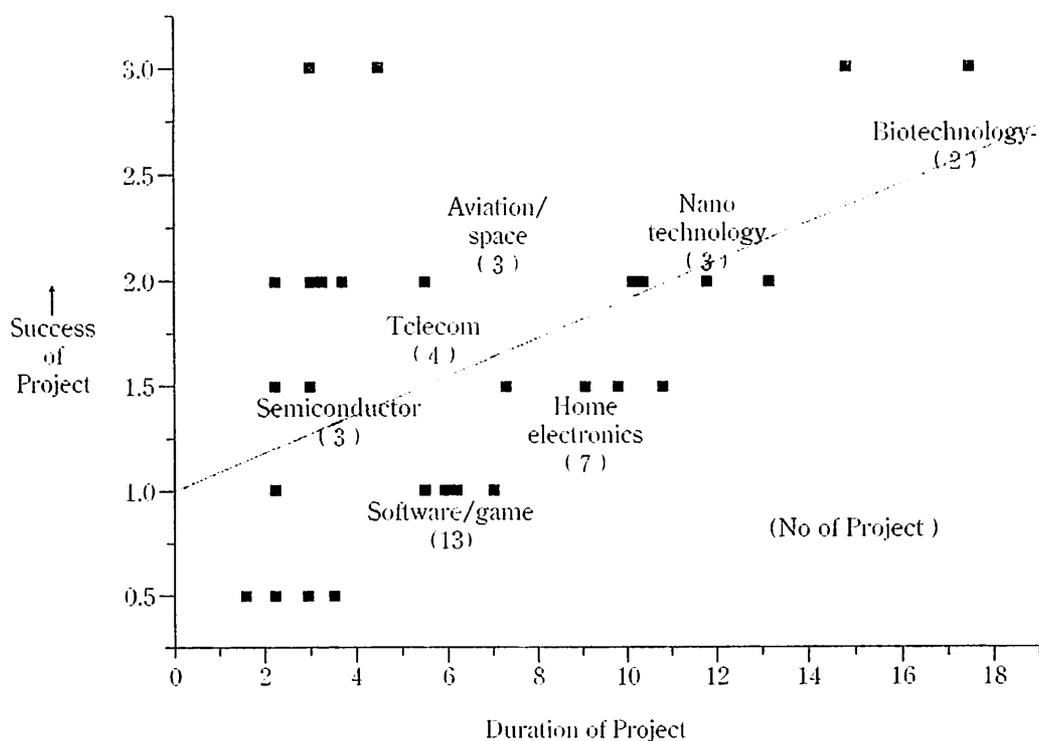


Figure 1 Correlation of Success Degree (Y) and Duration of project (X)

each project, where linear regression equation is $Y=1.03112+0.08939X$ and correlation coefficient is $R=0.4813$. Among 52 projects, biotechnology projects show the highest degree of success, and the next is aviation / space. Nanotechnology projects are the third. The results show, the degree of success and duration (X) of each project has a strong correlation. Projects such as biotechnology, nanotechnology, and aviation space show above average rates of success. Some IT and electronics projects show above average rates of success, but some are significantly below average.

3-2 Analyses of Actors

Among the 52 cases, all cases had either one or two actors in existence. In 95% of the cases, that actor is an engineer. Many actors are executives and also experts in advanced areas, especially in fields such as nanotechnology, biotechnology and aviation space.

The results below are considered with respect to personnel type. The categories used for classification are the number and type of actors, cross-cultural communication level and overseas experience of actors, presence of offline communication, frequency of offline communication, period of communication, and level and strength of motivation by actors.

(1) Numbers and Types of Actors

As for the types of actors, 95% of actors have a high level of technical background. Also it is a necessary condition that such actors have an influential position in the organization.

Figure 2 shows a correlation of communication proficiency and overseas experiences of an actor (X) and the success of a project (Y).

Regarding the success rate, there is a weak positive correlation ($r=0.33$,

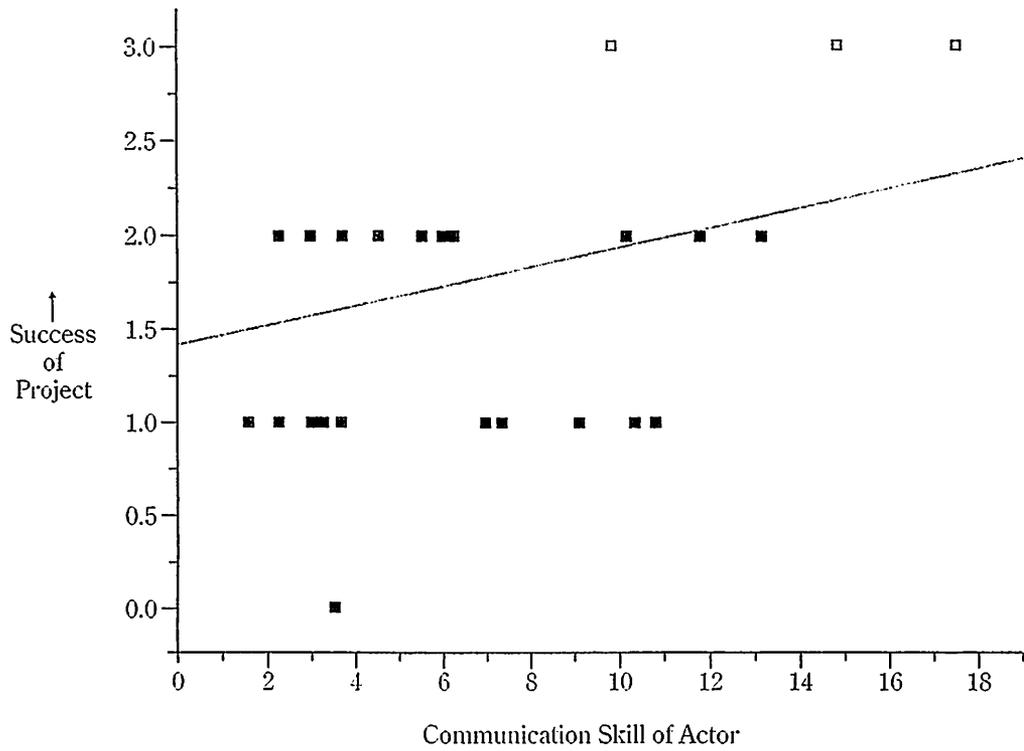


Figure 2 Correlation of Success Degree (Y) and Communication Skill of Actor (X)

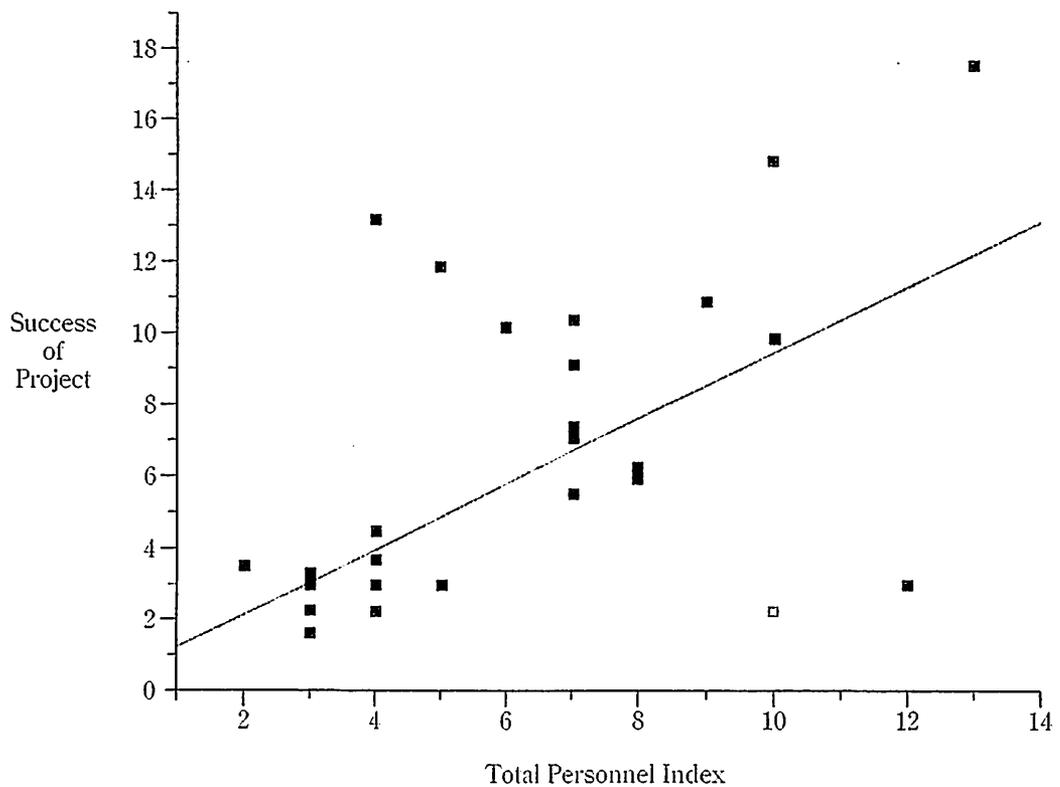


Figure 3 Correlation of Success Degree (Y) and Total Personnel Index (X)

$y=1.41+0.05x$) between the communication skill of the actor and success of the project. The communication skill of the actor is measured by the English proficiency and overseas business experience of the actor, and is measured by the 0~20 scale.

The total personnel index includes elements such as the presence of offline communication, the frequency of the offline communication, and duration of communication (Figure 3). The personnel index has a stronger correlation ($r=0.61$, $y=0.31+0.91x$: Figure 2) with success than the correlation of the communication skill of the actor. This means that the presence of offline communication and the frequency of the offline communication contribute to the project success. The offline communication means the communication that does not rely on an electronic medium, such as an email and fax. It includes unofficial eating and drinking. Other than the official face-to-face communication in meetings, the unofficial communication is effective when people are reluctant to express opinions openly. Actors can facilitate communication in unofficial communication situations by understanding each other's intention, which is not expressed usually in official meetings.

(2) Network of Actors

Among the 52 cases, the average number of actors was 1.36 / case. It is the necessary condition for success that at least an actor exists. In case of group communication, Leavitt (1951) indicates four types : "the circle type", "the chain type", "the Y character type", and "the wheel hub type". Each type has various functions in communication, i.e., regarding efficiency, and the morale of project members. Based on this survey, Furuta, et al. (1996) point out that the typical communication style of the Japanese is the circle type, and the typical European and American communication is the wheel hub type.

When successful cases are analyzed among the 52 surveys, it is found that the Japanese side actor is the circle type, and the Russian side is the wheel hub type (Figure 4). All successful cases have actors existing in a pair, on both the sender / receiver sides.

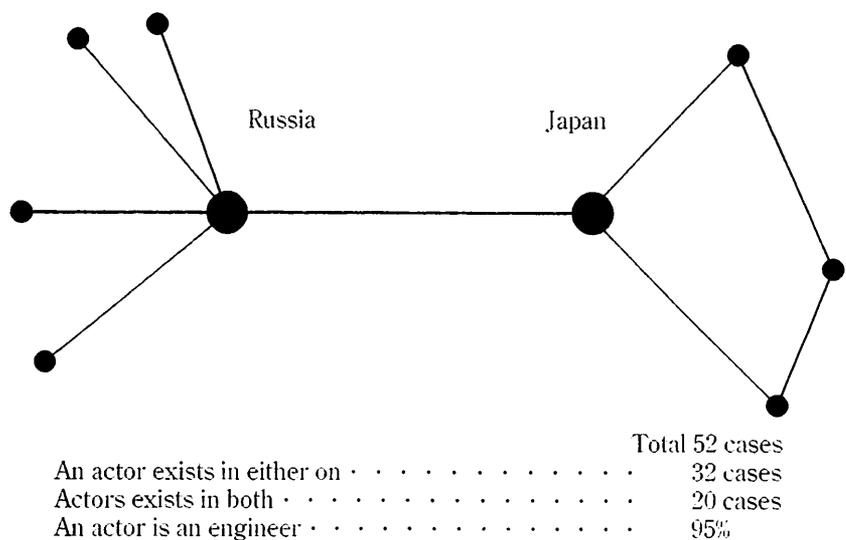


Figure 4 Networks of Actors

Having actors on both the Russian side and the Japanese side raises the success rate. Twenty cases among the 52 cases have actors on both the Russian side and the Japanese side. Actors act as “dual core” communicators in both sides of the project.

Powell and Grodal (2005) mention that the establishment of relationship between the sender and receiver is important even before the knowledge transfer. With a tighter relationship between the sender and the receiver, a more complicated level of knowledge transfer becomes possible. For the cross-cultural knowledge transfer, it is necessary that the dual core actors function as key men.

(3) Knowledge Transfer to Create New Products

A role of an actor is to mediate between the basic research and the product development. Russia is superior in basic sciences such as nuclear physics, which can be connected to the new product development by means of Japanese company’s knowledge. The effective knowledge transfer from Russian science to Japanese companies can create new products which have never existed.

In the 52 cases, many show valuable outcomes in new product development. Some introduce innovational products in the nanotechnology, biotechnology, and aerospace fields. Such results come from effective collaboration on basic science and product development.

(4) Knowledge Creation Model of “Dual Core” Actors

Actors work as the medium. They strengthen communication and cooperation within both parties. When an actor understands and communicates new knowledge, he or she can learn faster from a partner. He or she can also acquire the tacit knowledge such as the experience or the sense of judgment. It leads to a new knowledge creation. In this way, an actor becomes effective mediator and the acquisition of the knowledge will be activated effectively.

In the following cases, actors knew both the fundamental research and development. As discussed in the research review above, such an actor is “bilingual”, and a talented person. He or she collects necessary information for the organization from outside the organization and analyzes it. In addition, he or she spreads it within the organization, playing the role of “boundary spanner (border connection personnel)”. In successful cases of the knowledge transfer, such an actor exists in both sides as a “dual core” actor.

4. Discussion

This section discusses, analyzes and verifies the model of the dual core actors, which is proposed in the previous section.

4-1 “Dual Core” Actors as Knowledge Transformers

As discussed in the previous section, actors transmit and enhance cross cultural communication. There has been some discussion about the roles and definitions of such ac-

tors.

Allen (1979) points out that the existence of the knowledge mediator is effective, and he names the mediator as "a gatekeeper". Harada (1999) proposes the concept of "the knowledge transformer", and Numagami (1999) introduces "the bilingual mediator" in the technology transfer. Such transformers or mediators understand both research and development. More specifically, Suenaga (2003) calls such person "the knowledge interpreter", who translates not only the explicit knowledge but also the tacit knowledge not expressed by the language. Tushman and Scanlan (1981) define the existence of "a boundary spanner". All these personnel act as knowledge brokers who transmit knowledge. For the cross-cultural knowledge transfer, such a brokerage agent is necessary. As the necessary condition of such person's capability, Aonuma (1982) points out the factors below : 1. Understanding the characteristics of one's own country culture objectively, 2. Knowledge of the culture of a partner, and a positive attitude toward cross-cultural understanding, and 3. Knowledge and skill related to the business of the cross-cultural interchange.

However, there are few studies about the mechanism of such actors in organization. Krogh, Ichijo, and Nonaka (2000) insist on the formation of a "micro-community of knowledge" to increase the productivity of knowledge creation, and call actors within that microcommunity) "knowledge enablers". Carlile (2004) investigates how mismatched relations between actors arise that lead to negative outcomes and insists on the necessity of "boundary object" as a mediator. Bathelt, Malmberg and Maskell (2004) investigate the effective process of the cross-cultural knowledge creation. According to them, it is necessary to build the network including both sender and receiver, which is called "a pipeline" between the knowledge mediation personnel. The "Dual Core" Actors Model supports the idea of Bathelt, Malmberg and Maskell (2004) and advances its mechanism.

4-2 Roles of "Dual Core" Actors

In the product development, one of the difficulties of the knowledge transfer is that there are communication gaps between the basic science and business activities. While the basic science studies a natural phenomenon, the business is focusing on a market and a customer. In addition, there are cross-cultural obstruction factors such as language differences or translation mistakes. Besides, there is the tacit knowledge that is hard to communicate.

As Polanyi (1966) points out, there are two types of the knowledge, i.e., "tacit knowledge" and "explicit knowledge". Explicit knowledge is common, self-evident knowledge. Tacit knowledge is the knowledge that cannot be coded or formatted. Tacit knowledge is not expressed by the language, and is hard to convey, transfer, or communicate. However, this tacit knowledge plays critical roles in communication, especially when it is related to insight, culture, value, and decision-making perspectives. This is one of the rea-

sons that translation or interpretation of knowledge becomes difficult. This tacit cultural difference is not translated by the language. Therefore, translating is one role of an actor who successfully achieves knowledge communication. Actors on both sides make efforts to communicate tacit knowledge which is indispensable for the success of project. Tacit knowledge must be accounted for when transmitting knowledge between different cultures and languages. The cross-cultural communication of tacit knowledge becomes more difficult in international communication. This is the reason that we need actors such as the dual core actors.

4-3 Driving Force of Cross-Cultural Communication and Management

The dual core actor should be one of a pair of actors, who exist on both sides as both senders and receivers. The dual core actor is a talented person with understanding of the technology and the products as well as market needs. He or she plays a role of “gate-keeper” and “transformer” as well as “bilingual” that understands cross-cultures. The dual core actor is the innovator and the driving force of the cross-cultural communication and management.

Figure 5 shows the knowledge creation model of the dual core actor. Dual core actors exist on both sides of the Russian fundamental research and the Japanese product development. A dual core actor externalizes the tacit knowledge in his or her organization to be understood and utilized by the partner organization. At the same time the dual core actor internalizes explicit knowledge that is obtained from the partner organization for the usage and creation of new knowledge. Dual core actors work in pairs, and mediate the knowledge for externalization and internalization on both sides. The dual core actor acts as a catalyst or a mediator, and the knowledge can be externalized by the dual core actor for better understanding of the receiver. Once the knowledge is externalized, the knowledge is accumulated and internalized by the receivers so that they can use it free-

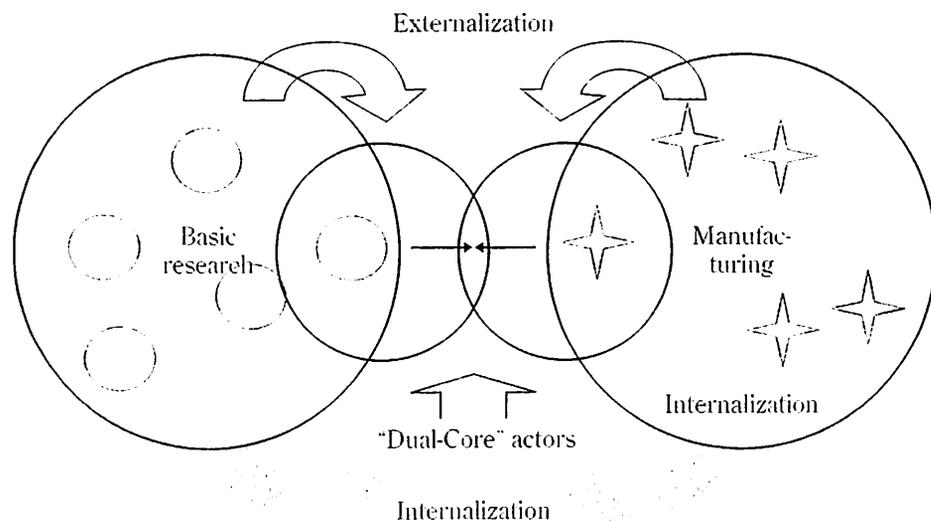


Figure 5 Knowledge Creation Model of “Dual Core” Actors

ly. Then, the receiver becomes the sender and externalizes and sends feedbacks of the accumulated knowledge. The relationships among other senders and receivers develop effectively, through the help of the dual core actors.

The dual core actor becomes "a knowledge transformer" and a leader to coordinate and accomplish business. He or she gathers up a team to acquire new technology and products. This requires both the cross-cultural communication skill and the cross-cultural management skill. Dual core actors play the role of a catalyst for the cross-cultural connection and become intermediaries.

5. Conclusion and Recommendation

5-1 Conclusion

In this study, the model of dual core actors is proposed. The dual core actors are people who transmit communication on both the sender side and the receiver side. They are mediators of cross-cultural communication and they fill a gap between different cultures. To verify this model, analysis of case studies of the cross cultural knowledge transfer between Japan and Russia is presented. Then, the model is tested by the survey regarding 52 cases of knowledge transfer from Russian fundamental research to Japanese manufacturers.

The theoretical contribution of this study is the identification of the dual core actors. The importance of the dual core actors is not indicated in prior research by predecessors. This study has shown that dual core actors are definitely necessary. It is especially true in remote cross-cultural communication such as that between Japan and Russia as well as between the fundamental research and product development. Thus, it is indispensable to have dual core actors who understand needs on both sides of a project.

5-2 Recommendation

The further agenda is to investigate the features and characteristics of such dual core actors, as well as the combination of what kind of actors are most desirable internationally. In addition, it is necessary to bring up and train dual core actors as human resources in the organization. To be able to do so, it is indispensable to provide organizational support for the activity of the dual core actors. To promote motivation of core actors, it is necessary to regard the task as the duty and mission of an entire company. The task of dual core actors has to be promoted as being of critical importance for the survival of companies. The support and consciousness of the top management is required in order for a company to have such understanding.

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