

# **Repatriate Knowledge Transfer in Multi-National R&D Companies: A Comparison Based on Demographics, Type of Knowledge, and the Knowledge Exchange Network**

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Over the last two decades, practitioners and researchers have increasingly recognized that repatriate knowledge transfer is a crucial organizational resource for global businesses to gain a competitive advantage. In an attempt to prevent the spread of COVID-19, multi-national companies (MNCs) have not been able to dispatch employees to foreign countries as frequently as before. MNCs may have to seek other methods to activate repatriate knowledge transfer (RKT), as the existing repatriates now have a higher scarcity value.

This research attempts to identify the differences between repatriates and their colleagues at the home unit in transferring knowledge. It focuses on the types of knowledge transferred by repatriates by comparing it with the knowledge of their colleagues at the home workplace. First, there is limited research on the type of knowledge among R&D repatriates; therefore, identifying the knowledge transferring behavior would assist in gaining an understanding of the same. Second, few RKT studies have compared the knowledge sharing behavior of repatriates and that of their colleagues at the home offices. A comparison would assist in identifying whether differences exist in the knowledge transferring characteristics between the two. This would also promote an understanding of the knowledge transferring behavior of R&D repatriates in the workplace.

## **Repatriates' demographics and overseas experience**

Repatriates have more experience from overseas than the other employees at the home office. Expatriation and repatriation can take a few years. Thus, it could be assumed that repatriates are older than the other employees of the company. The turnover rate of large R&D companies in Japan is relatively low, and the correlation between the age of employees and duration of working in a company is high

(Yoshimura, 2007). This could be used to predict that the repatriate's duration of working in a company is longer than that of non-repatriates.

Hypothesis 1-1 Repatriates are older than non-repatriates.

Hypothesis 1-2 Repatriates have worked in the present company longer than non-repatriates.

Hypothesis 1-3 Repatriates have the same demographic characteristics as non-repatriates other than the age and duration of working in the present company.

### **Repatriate's knowledge**

Repatriates bring back varied knowledge (Antal ,2000; Fink & Meierewert, 2005). The transfer of knowledge also varies from conceptual to contextual knowledge. Antal (2000) pointed out that "since the knowledge abroad is contextual, its usefulness in the new context requires processes of adaption, in other words, knowledge creation" (p.37).

R&D repatriates bring a variety of knowledge that they have gained while working abroad back to the home workplace. Repatriates might exchange and/or transfer knowledge more actively than non-repatriates in the home office. Therefore, this study proposes Hypotheses 2-1 to 2-4.

Hypothesis 2-1 Repatriates exchange or share different types of knowledge more frequently than no repatriates with other employees at the workplace.

Hypothesis 2-2 Repatriates transfer different types of knowledge that they have acquired from outside the workplace to other employees at the workplace more frequently than non-repatriates.

Hypothesis 2-3 Repatriates exchange knowledge using all channels more than non-repatriates.

Hypothesis 2-4 Repatriates exchange knowledge more frequently through all channels than non-repatriates.

This study also assumes that the size of the network for repatriates differs from that for non-repatriates. Repatriates have numerous opportunities to communicate with people from various backgrounds. In line with this view of their overseas experience, the author hypothesizes the following:

Hypothesis 3-1 Repatriates exchange more knowledge with various personnel from varied backgrounds than non-repatriates.

## **METHODS**

### **Procedure**

Data for this research are a part of larger data that were collated in 2015. The research team contacted a number of R&D companies, and ten companies agreed to participate in the research project. A total of 751 participants completed the online or paper questionnaire, and the completion percentage is 44.1%. From these, the author selected seven MNCs that have overseas R&D units or departments with headquarters in Japan. A total of 643 participants were selected, and the available data percentage is 42.2%. Data from 632 participants, who answered the main measures as required, have been analyzed.

Japan has been selected as a context for this study because it has a long history of expatriation. Research on expatriates and repatriates in Japan began in the 1980 (Japan Institute of Labour, 2001) and has been compiled for more than three decades. To address concerns about the possible misuse of data, the instructions with the online and paper questionnaires stated that the data would be treated as confidential and would be accessed only by the research team members.

### **Participants**

A total of 632 R&D workers from the MNEs met the type of knowledge measure required for this study. Based on the accepted definition of repatriates, which implies staff that have been dispatched overseas at least once in the past, 105 (16.6% of the total 632 R&D workers) employees were identified as repatriates for this research. The remaining 527 are referred to as non-repatriate R&D workers (or non-repatriates) in this study.

### **Measurement**

#### **Demographics**

The author uses gender, age, duration of service in the present company, possession of doctorate, the industry in which the employee works, scope of current work, and managerial status as demographics of the participants. Scope of current work also includes research, which implies basic or applied research, and development, which implies development or design.

### **Knowledge-exchanging persons**

#### Knowledge transferring behavior

R&D workers transfer different types of knowledge daily at the workplace. The research team developed an R&D worker's knowledge transferring behavior measurement scale in the context of interview research<sup>1</sup>. The R&D worker's knowledge transferring behavior is measured by how often they transfer the following five types of knowledge to their colleagues at the workplace: cutting-edge knowledge, seeds for research and technology trends, knowledge of science and technology for problem solving, knowledge and information on business, or knowledge and information regarding the company's products. Participants rated the frequency of knowledge transferring behavior on a five-point scale, which ranged from *frequently* to *very seldom*. Participants could also mark "none" if a certain type of knowledge was not applicable to their jobs.

#### Knowledge-exchanging persons

Repatriates may exchange their knowledge regularly with a certain person. The participants were asked to identify one person in each given category, such as "non-R&D personnel within your company" or "R&D personnel at other companies, universities, or research institutions outside the country," with whom they exchanged knowledge and information most frequently over the last year. If they could not think of anyone, they were asked to write "x" in the column.

#### Frequency of knowledge exchange

On a scale of 1 to 5, participants were asked how often they exchanged knowledge and information with the person, with 1 indicating *rarely (once or less than once a year)* and 5 indicating *frequently (once or more than once a week)*.

#### Knowledge-exchanging network size

The knowledge exchanging network size was measured by the total number of categories for which the participants did not mark "x". As the study has five categories, the knowledge exchanging network size could range from 0 to 5.

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<sup>1</sup> We interviewed 27 employees at 11 R&D MNCs, including the headquarters in Japan and 5 of the overseas research offices. The interviewees were HR or R&D managers.

## ANALYSIS

Repatriates were compared to non-repatriates based on demographics and knowledge-related variables using a *t*-test.

## RESULTS

Table 1 provides a *t*-test on the demographics of repatriates and non-repatriates. The mean age of repatriates is 42.2 years old. The female repatriates constitute only 2% of the total, which is significantly lower than among non-repatriates. The mean years of service with the current company for the repatriates is 16.5, which is also significantly longer than that of non-repatriates. The participants worked in the following industries, manufacturing of transportation equipment (repatriates: 31.4%; non-repatriates: 7.8%), pharmacy (repatriates: 29.5%; non-repatriates: 40.2 %), and manufacture of electrical machinery, information, and communication electronics equipment (repatriates: 39.1%; non-repatriates: 52.0%).

On average, the repatriates are 42.4 years old and have worked at the company for 16.5 years, and females constitute only 1.9% of the total. On the other hand, the non-repatriates are 39.1 years old on average, have worked at the present company for 13.5 years, and 17.1% of them are females.

In terms of responsibilities, 54.3% of the repatriates are in charge of research and 61.9% are in charge of development, while 62.6% of non-repatriates are in charge of research and 59.8% are in charge of development<sup>2</sup>.

The first set of hypotheses examines the demographic characteristics of repatriates. Table 1 presents the results of Hypothesis 1-1, indicating that repatriates are older and have worked with the present company for a longer period than non-repatriates, thereby supporting the hypothesis. Table 1 also presents the results of Hypothesis 1-2, indicating that the percentage of female repatriates is lower, and a larger percentage are in managerial positions. Moreover, a larger ratio of personnel work in the transportation industry; therefore, Hypothesis 1-2 is not supported.

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<sup>2</sup> Multiple choices can be made on the scope of participants' current work. Therefore, the total of these percentages could exceed 100.

**Table 1. Demographics**

Demographics	R	NR	<i>t</i> value
Age	42.4	39.1	4.14***
Female (%)	1.9	17.1	-7.16***
Length of service (years)	16.5	13.5	3.34**
Doctorate(%)	18.3	24.0	-1.34
Industry(%): pharmacy	29.5	40.2	-2.16*
: electrical	39.1	52.0	-2.46*
: transportation	31.4	7.8	5.03***
Job %: Research	54.3	62.6	-1.57
: Development	61.9	59.8	0.41
Managerial status %	29.5	11.4	3.87***

R=Repatriates, NR= non-repatriates

\*  $p < .05$     \*\*  $p < .01$     \*\*\*  $p < .001$

The second set of hypotheses considers the repatriates' knowledge-transferring behavior. Specifically, Hypothesis 2-1 predicts that repatriates exchange or share each type of knowledge more than non-repatriates at the workplace. Table 2 presents the results of Hypothesis 2-1, which indicates that the knowledge associated with science and technology for problem solving ( $p < .10$ ), knowledge and information on business ( $p < .01$ ), and knowledge and information regarding the company's products ( $p < .01$ ) are transferred most frequently. These results partially support Hypothesis 2-1.

Table 2 demonstrates that repatriates transfer knowledge more actively than non-

**Table 2. Knowledge transferring behavior of R&D workers within the workplace**

Type of Knowledge	R(%)	NR(%)	<i>t</i> -value
① Cutting-edge knowledge	65.4	71.7	-1.237
② Seeds for research and technology trends	85.6	82.5	0.799
③ Knowledge on science and technology for problem solving	87.5	81.4	1.668 <sup>+</sup>
④ Knowledge and information on business	66.3	48.5	3.475**
⑤ Knowledge and information regarding the company's products	80.8	65.6	3.448**

R=Repatriates, NR=non-repatriates, multiple answers

<sup>+</sup>  $p < .10$     \*\*  $p < .01$

repatriates in terms of each of the five types of knowledge.

Hypothesis 2-2 states that repatriates transfer each type of knowledge more frequently than non-repatriates within the workplace. Table 3 presents the results of Hypothesis 2-2, showing that the knowledge associated with science and technology for problem solving ( $p<.05$ ), knowledge and information on business ( $p<.01$ ), and knowledge and information regarding the company's products ( $p<.01$ ) are transferred more frequently. These results partially support Hypothesis 2-2.

**Table 3. Frequency of knowledge transferring behavior among R&D workers by type of knowledge from outside the workplace**

Type of Knowledge	Frequency		
	R	NR	<i>t</i> -value
①Cutting-edge knowledge	3.42	3.47	-0.389
②Seeds for research and technology trends	3.70	3.67	0.317
③Knowledge on science and technology for problem solving	3.80	3.57	2.082*
④Knowledge and information on business	3.17	2.72	3.222**
⑤Knowledge and information regarding the company's products	3.46	3.05	3.134**

R=Repatriates, NR= non-repatriates.

\*  $p<.05$  \*\*  $p<.01$

Hypothesis 2-3 predicts that repatriates exchange knowledge using all channels more than non-repatriates. Table 4 presents the results of this hypothesis, indicating that repatriates exchange knowledge more often than non-repatriates through non-R&D personnel at other workplaces within the company ( $p<.01$ ), R&D personnel at the company's overseas subsidiaries or affiliates ( $p<.001$ ), and R&D personnel at other companies, universities, or research institutions outside the country ( $p<.01$ ), partially supporting hypothesis 2-3.

**Table 4. Knowledge exchanging channels**

Channel	R(%)	NR	t-value
①R&D personnel at other workplaces within the company	84.8	79.7	1.287
②Non-R&D personnel at other workplaces within the company	64.8	50.1	2.875**
③R&D personnel at other companies, universities, or research institutions within the country	55.2	58.1	-0.53
④R&D personnel at the company's overseas subsidiaries or affiliates	64.8	34.5	5.901***
⑤R&D personnel at other companies, universities, or research institutions outside the country	41.9	24.1	3.434**

R=Repatriates, NR=non-repatriates

\*\*  $p < .01$  \*\*\*  $p < .001$

Hypothesis 2-4 predicts that repatriates exchange knowledge more frequently through all channels than non-repatriates. Table 5 presents the results of this hypothesis, indicating that repatriates exchange knowledge more frequently than non-repatriates through R&D personnel at other workplaces within the company ( $p < .10$ ), non-R&D personnel at other workplaces within the company ( $p < .01$ ), R&D personnel at the company's overseas subsidiaries or affiliates ( $p < .001$ ), and R&D personnel at other companies, universities, or research institutions outside the country ( $p < .01$ ), partially supporting hypothesis 2-4.

The third set of hypotheses looks at the knowledge exchange network. Specifically,

**Table 5. Frequency of knowledge exchanging channels**

Channel	R	NR	t-value
①R&D personnel at other workplaces within the company	3.24	2.87	1.961 <sup>+</sup>
②Non-R&D personnel at other workplaces within the company	2.25	1.56	3.385**
③R&D personnel at other companies/ universities/ research institutions within the country	1.33	1.50	1.108
④R&D personnel at the company's overseas subsidiaries or affiliates	2.11	1.01	5.742***
⑤R&D personnel at other companies, universities, or research institutions outside the country	1.09	0.56	3.236**

R=Repatriates, NR=non-repatriates

\*\*  $p < .01$  \*\*\*  $p < .001$



Hypothesis 3-1 predicts that repatriates exchange more knowledge with various personnel than non-repatriates. Table 6 presents the results of this hypothesis, indicating that there are fewer repatriates who have no network channels than non-repatriates (2.9%, 7.4%), and that there are more repatriates who have five network channels than non-repatriates (26.7%, 10.6%), thus supporting Hypothesis 3-1.

**Table 6. Knowledge exchange network size**

Network size	R		NR	
	Cases	%	Cases	%
0	3	2.9	39	7.4
1	19	18.1	126	23.9
2	15	14.3	108	20.5
3	22	21.0	116	22.0
4	18	17.1	82	15.6
5	28	26.7	56	10.6
Total	105	100.0	527	100.0

R=Repatriates, NR=non-repatriates

Table 7 also presents the results of hypothesis 3-1, showing that on an average, repatriates have significantly more knowledge exchange channels than non-repatriates ( $p < .001$ ), supporting Hypothesis 3-1.

**Table 7. Number of knowledge exchanging channels**

Channels	R	NR	<i>t</i> -value
①Mean of knowledge exchanging channels	3.11	2.46	3.992***

R=Repatriates, NR=non-repatriates

\*\*\*  $p < .001$

## DISCUSSION

This study attempts to clarify a relatively unexplored aspect of repatriates knowledge transferring behavior by comparing them with non-repatriates. To describe the characteristics of repatriates knowledge transferring behavior, the hypotheses for this study are based on demographics, type of knowledge transferred, and the knowledge exchange networks. First, repatriates were predicted to be older and to have worked with

their company for longer periods than non-repatriates. The results support this hypothesis. Additionally, it was found that the number of female repatriates is much lower, repatriates mostly occupy managerial positions, and an equal number of them work in the field of pharmacy, electrical, machinery, and transportation.

Second, this study predicts that repatriates exchange or transfer each type of knowledge more frequently than non-repatriates. The results support this hypothesis for certain types of knowledge, including, knowledge of science and technology for problem solving, knowledge and information regarding business, and knowledge and information regarding the company's products.

Third, this study predicts that repatriates exchange knowledge more actively through all channels. The results support this hypothesis, except through the channel of R&D personnel at other companies, universities, and research knowledge and information on business institutions within the country. Fourth, this study proposes the hypothesis that repatriates have a larger network size for exchanging knowledge, and this is supported by the results.

### Implications

This study provides a new perspective for understand the knowledge transferring behavior of repatriates. Although a few studies have elaborated on the fact that non-repatriates play an important role as a knowledge receivers or knowledge appreciators during the process of knowledge exchange or transfer within the organization (Oddou, Osland, and Blakeney,2009), few studies have compared the characteristics of the knowledge transferring behavior of repatriates with those of non-repatriates. This comparative analyses could identify basic differences and common points between R&D repatriates and R&D non-repatriates based on individual characteristics and knowledge transferring behaviors.

The three findings of this study have practical implications. Repatriates exchange or transfer innovations, such as knowledge and information regarding the business or the company's products, more frequently than non-repatriates. Repatriates actively exchange knowledge and information with R&D personnel or overseas personnel. Moreover, repatriates' network size of exchanging knowledge is larger than that of non-repatriates, although neither of them shows significant differences in the scope of the current job. These findings indicate that repatriates exchange or transfer knowledge in a way that is

beneficial to their present company.

#### Limitations and directions for future research

The simple analysis method based on raw data performed to explore the characteristics of the knowledge transferring behavior of repatriates used in this study is a limitation. In future research, first, the key variables such as R&D knowledge transferring behavior, should be used as factors through confirmatory factor analysis. Second, R&D outcomes should be incorporated into the R&D repatriate knowledge transferring model. Third, some mediators between R&D repatriate knowledge transferring behaviors and R&D performance should be included to enrich the content of the knowledge transferring model and to enable testing the same.

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