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THE IMPACT OF WORKPLACE DIVERSITY ON INNOVATION: THE MODERATING EFFECTS OF TRANSACTIVE MEMORYAND INCLUSION CLIMATE

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Abstract

With the progress of globalization, diversity management, such as how to manage employees with different genders, races, languages, values, etc., has become an important issue even in Japanese companies, which have traditionally been dominated by male regular employees. This study examined the effects of bio-demographic diversity and task-related diversity on innovation in the workplace, and the moderating effects of inclusion climate and transactive memory. Four hypotheses were proposed and the questionnaire surveys from 173 Japanese employees in various companies were statistically analyzed. The results showed that task-related diversity, which is an internal characteristic of human attributes such as work experience, educational experience, and values, was a factor that promoted innovation. In addition, transactive memory, which is a memory system of knowledge about who knows what in the workplace, was found to strengthen the positive relationship between task-related diversity and innovation as the higher it was. In addition, although inclusion climate had no moderating effect between diversity and innovation, it had a significantly positive direct impact on innovation. It was suggested that creating a climate of inclusion, independent of increasing the degree of diversity, is important for innovation in the workplace.

Keywords: *bio-demographic diversity, task-related diversity, inclusion climate, transactive memory, innovation.*

INTRODUCTION

The research aims to examine the impact of bio-demographic diversity and task-related diversity in the workplace on innovation and the moderating effect of inclusion climate and transactive memory on the influence process.

As the globalization progresses, diversity management, such as how to manage employees with different genders, races, languages, values, and so on, is becoming an issue even in Japanese companies, which have traditionally been dominated by male regular employees (Japan Cabinet Office, 2019). Many studies have been accumulated on the effects of diversity on the performance of organizations and workplaces, including the clarification and promotion of positive factors and the clarification and suppression of negative factors. In particular, research on innovation is considered to be a central issue (Shin et al., 2012). The inclusion climate examined in this study is supposed to reduce the cognitive bias caused by diversity. In addition, transactive memory is reported to promote positive organizational learning generated by diversity. Therefore, the research proposes four hypotheses from previous

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studies and statistically test the results of a questionnaire survey obtained from 173 Japanese employees working in diverse companies.

LITERATURE REVIEW

Among Joshi and Roh (2009) and Horwiz and Horwitz (2007) analyzed empirical research on the relationship between human resource diversity and the performance of corporate organizations and their workplaces (hereinafter referred to as "performance") using the meta-analysis method. According to these two studies, there is no consistent relationship between diversity and performance. As a reason for this, they point out that many studies mix "bio-demographic diversity" and "task-related diversity". Bio-demographic diversity refers to the superficial characteristics of human attributes such as gender, race, and age. The task-related diversity refers to the internal, deeper characteristics of human attributes such as work experience, educational experience, values and beliefs. Their research shows that bio-demographic traits have no negative or negative effect on performance, while task-related traits have a positive effect.

As explanatory theories for these results, van Knippenberg et al. (2004), based on Williams and O'Reilly (1998), proposed two theories: social categorization theory and information decision making theory. Then, they proposed a categorization-elaboration model that integrates these two theories.

The social categorization theory was proposed by Turner (1987, 1999). The theory states that people categorize people with similar attributes to themselves as in-groups while categorizing people with different attributes as out-groups, thereby creating a cognitive bias to overestimate in-groups over out-groups. This cognitive bias causes conflicts between groups and negatively affects performance. Bio-demographic diversity, in particular, is easy to discriminate, and thus is likely to cause categorization, which has a negative impact on performance.

Information decision making theory states that when task diversity increases, the quality of decision making improves due to the increase in the variety and quantity of knowledge and information, resulting in positive performance (Webber & Donahue, 2001). Bio-demographic diversity is unrelated to an increase in the variety and quantity of job-related knowledge and information, and thus has no effect on performance.

H_1: Bio-demographic diversity will have a negative impact on innovation in the workplace.

H_2: Task-related diversity will have a positive impact on innovation in the workplace

van Knippenberg et al. (2004) proposed the categorization-elaboration model, which integrates social categorization theory and information decision making theory .According to this model, bio-demographic diversity has a negative impact on performance, task-related diversity has a positive impact on performance, and the relationship between task-related diversity and performance is moderated by bio-demographic diversity. This categorization-elaboration model indicates that reducing the categorization and cognitive biases created by demographic-type diversity is important for performance. Inclusion climate, which is examined in this study, can be an important factor in reducing cognitive bias.

Inclusion climate refers to employees' perceptions of whether the workplace treats employees fairly, respects individual differences, and actively involves employees in workplace decision-making (Nishii, 2013).

Ely and Thomas (2001) state that in workplaces with a high inclusion climate, "learning and integration" is achieved. This means that organizational learning is promoted by the acceptance of various opinions, and group integration is achieved by respecting differences to achieve a balance between group assimilation and self-identity. Such an inclusion climate is expected to have a moderating effect on the negative relationship between bio-demographic diversity and

corporate performance as indicated in Hypothesis 1. In case the degree of inclusion climate is high, there may be no tendency for performance to become more negative as the degree of bio-demographic diversity increases.

H_3: Inclusion climate will mitigate the negative impact of bio-demographic diversity on innovation in workplace.

In order for task-related diversity to have a positive impact on corporate performance, it is necessary for organizational learning to be effective (Van der Vegt & Janssen, 2003). The transactive memory system examined in this study can be pointed to as an important factor that enhances the effectiveness of organizational learning. Transactive memory refers to members' knowledge about who knows what expertise in the workplace (Wenger, 1987; Wegner et al., 1991). A transactive memory system is a system that makes transactive memory effective. Even in a situation where there is a high degree of task-related diversity due to the diversity of expertise and thinking of members in the workplace, it will not lead to organizational learning if each member does not know it well from each other (Ren & Argote, 2011). Lewis (2003) describes transactive memory systems as consisting of three sub-concepts: specialization, credibility, and coordination. Specialization refers to transactive memory itself. Credibility refers to the credibility among members as a mechanism for effectively regulating transactive memory. Coordination refers to cooperation among members. Transactive memory generates a high degree of innovation to facilitate organizational learning. Since task-related diversity has a positive impact on innovation as presented in Hypothesis 2, transactive memory may make the positive impact of task diversity stronger.

H_4: Transactive memory will amplify the positive relationship between task-related diversity and innovation.

MATERIALS AND METHODS

Research Setting and Participants

The data analyzed are the results of a questionnaire survey obtained from 173 respondents. The questionnaires were collected by snowball sampling method via e-mail for one month from August to September 2020. Respondents were Japanese.

The size of the companies they belonged to was as follows: 1-100 employees (30 respondents), 101-500 employees (35 respondents), 500-1000 employees (32 respondents), more than 5000 employees (41 respondents), and 16 respondents did not answer. The majority of respondents were in their 20s, 119 (68,8%), 30 were in their 30s (7,3%), 15 were in their 40s (8,7%), 6 were in their 50s (3,5%), and 3 were over 60 (1,7%). The mean length of tenure was 6,15 years (SD = 8,00). Gender was 90 males, 82 females, and 1 non-response. The last educational background was high school graduate (7), university graduate (139), master's degree (26), and doctorate (1). The job titles were 120 general employees, 26 equivalents to a foreman, 15 equivalents to a section chief, 10 equivalents to a general manager, and 2 did not respond. In terms of employment status, 159 were regular employees and 14 were non-regular employees.

Measurement Scale and Operationalization

Diversity

There are two types of measurement scales for diversity: objective scales and subjective scales. In this study, subjective scale is used except for gender. The subjective scale was chosen because it is known that subjective diversity intervenes between objective diversity and performance. Gender is selected as an objective measure because objective and subjective evaluations are nearly identical (Hentschel et al., 2013). For the subjective measurement scale, van Dick et al. (1998) was used, modified for Japanese. It measures both bio-demographic and task-related diversity and consists of eight items. The scale is a Likert 5-point scale, with 1 being disagree to 5 being agree.

Of the eight items in the measurement scale, the bio-demographic diversity items (age, and nationality/race/religion) excluding gender, and the task-related diversity items (employment status, school, education, work experience, expertise, and values), two items (nationality/race/religion, and school) showed ceiling effects. Therefore, these two items were deleted from the analysis.

Exploratory factor analysis was conducted on the remaining six items. The analysis was repeated until the factor loadings became above 0,5. As a result, one factor consisting of four items was finally extracted (Eigenvalue = 2,10). These were: "I think my educational background (college, graduate school, etc.) varies," "I think my work experience is diverse," "I think my expertise is diverse," "I think there is a diversity of values and ways of thinking," All of them belonged to the task-related diversity. In this study, the total score of these four items is used as the representative value for task-related diversity (α= 0,669, total score range: 4 to 20). The higher it is, the more diverse it is. For bio-demographic diversity, on the other hand, we used the Blau Index, which is based on the gender ratio, an objective measure (Blau, 1977). A score approaching 0,5 indicates diversity (gender equal ratio), while a score approaching 0 indicates a skew towards one gender or the other.

Inclusion Climate and Transactive Memory System

For the inclusion climate, we used a 15-item measurement scale developed by Nishii (2013). It was modified for use with Japanese. These consisted of three sub-concepts: foundation of equitable employment practices, integration of differences, and inclusion in decision making. However, because a ceiling effect was found for one item, this item was excluded and 14 items were used. The scale is a Likert 5-point scale, with 1 being "disagree" to 5 being "agree".

For the transactive memory system, we used a 15-item measurement scale developed by Lewis (2003). It was modified for use with Japanese. These consisted of three sub-concepts: specialization, credibility, and coordination. However, a ceiling effect was observed for one item, so this item was excluded and 14 items were used. The scale is a Likert 5-point scale, with 1 being "disagree" to 5 being "agree".

Although inclusion climate and transactive memory system are different concepts, there are many similarities in their measurement scales. Therefore, an exploratory factor analysis was conducted on the integrated version of both scales. The analysis was repeated until the factor loadings of all the questionnaire items became above 0,5. As a result, two factors were extracted. The first factor consisted of four items: "I think that promotion and advancement are fair," "I think that the performance evaluation method is fair," "I can freely voice my complaints and dissatisfaction," and "It is an open work environment where everyone can express themselves as they are" (Eigenvalue = 2,081). These were defined as the "inclusion climate". The total score was used as the representative value (α= 0,783, total score range: 4 to 10). The higher the score, the more inclusive the climate is. The second two factors consisted of two items: "Members of the workplace have expertise that they do not know from each other" and "Members of the workplace know what expertise they have from each other" (Eigenvalue = 1,403). These were designated as "transactive memory". The total score was used as the representative value (α= 0,790, total score range: 2 to 10). The factor correlation between the two factors was 0,357.

Innovation

Using Bear (2012) as a reference, we developed our own scale for non-technical office workers in Japan. It consists of four items with creativity and its commercialization as sub-concepts. In developing the questions, we obtained advice from three experts. As a result of exploratory factor analysis, one factor was extracted from which all four items had factor loadings above 0,5 (Eigenvalue = 2,796). The total score of these factors was used as the

"innovation" (α = 0,856, total score range: 4 to 20).

Control Variables

The number of workers and the gender of the supervisor (male = 1, female = 0) are set as control variables. It is possible that the larger the number of workers, the lower the transactive memory. It is also possible that the more male the supervisor, the more difficult it is to create a climate of inclusion.

Common Method Bias

Since the analysis in this study is about human cognitive processes, it is susceptible to common method bias. A typical method to eliminate bias is to conduct separate surveys at different times for the same sample. However, when the situation is such that this method is difficult, there is Harman's single factor test (Podsakoff & Organ, 1986). In this study, a single factor test was attempted for the questionnaire items since the sample collection method was the snowball sampling method as mentioned above. As a result, the contribution of the first factor was 29,489%, which was so low that the percentage of variance of all observed variables was less than 50%. Based on the above, it can be concluded that common method bias does not occur.

RESULTS AND DISCUSSIONS

Descriptive statistics and correlation coefficients for each variable are listed in Table 1.

Table 1. *Descriptive Statistics and Correlations*

No.	Variable	1	2	3	4	5	6	7
1	Number of employees in workplace	1,000						
2	Gender of supervisor	-0,087	1,000					
3	Bio-demographic diversity	0,111	0,215**	1,000				
4	Task -relate diversity	0,045	-0,089	-0,039	1,000			
5	Inclusion climate	0,027	0,018	-0,066	0,309**	1,000		
6	Transactive memory	0,088	0,052	0,102	0,351**	0,298**	1,000	
7	Innovation	0,049	-0,022	-0,005	0,290**	0,373**	0,277**	1,000
*** p < 0,01; * p < 0,05; * p < 0,10*								

In order to test the hypotheses, hierarchical multiple regression analysis was conducted. As objective variables, we used innovation; as explanatory variables, we used bio-demographic diversity, task diversity, inclusion climate, transactive memory, the interaction term between bio-demographic diversity and inclusion climate, the interaction term between task diversity and transactive memory and as control variables, the number of employees in the workplace and the gender of the supervisor. The results are shown in Table 2 and Figure 1.

Table 2. *Results of Hierarchical Multiple Regression Analysis*

Variables	Model1				Model2				Model3				VIF
	b	SE	β		b	SE	β		b	SE	β		
Constant	13,715	0,342		**	13,814	0,323		**	13,607	0,333		**	
Control													
Number of employees in workplace	0,000	0,005	-0,002		0,000	0,005	-0,006		0,000	0,005	0,006		1,040
Gender of supervisor	0,107	0,697	0,012		-0,159	0,659	-0,018		-0,115	0,652	-0,014		1,063
Explanatory													
Bio-demographic diversity	-0,171	2,257	-0,006		0,308	2,148	0,011		0,253	2,136	0,009		1,092
Task-related diversity	0,299	0,083	0,279	**	0,148	0,085	0,138	+	0,152	0,085	0,142	+	1,218
Inclusion climate					0,316	0,082	0,303	**	0,333	0,082	0,319	**	1,198
Transactive memory					0,238	0,146	0,132		0,282	0,146	0,156	+	1,273
Bio-demographic diversity x Inclusion climate									-0,861	0,602	-0,104		1,026
Task-related diversity x Transactive memory									0,062	0,033	0,136	+	1,044
R^2	0,078			*	0,191			**	0,219			**	
*** p < 0,01; * p < 0,05; + p < 0,10*													

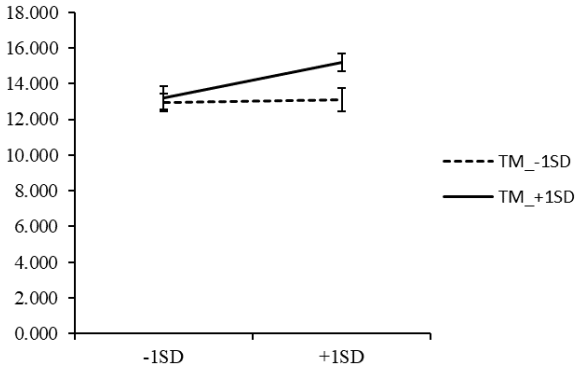

Figure 1. Innovation by Task-Related Diversity and Transactive Memory

Model 1 is the baseline model. Innovation was used as the objective variable, and bio-demographic diversity and task-related diversity were used as explanatory variables. Model 2 is Model 1 with the addition of inclusion climate and transactive memory as explanatory variables. In Model 3, bio-demographic diversity and inclusion climate as well as task diversity and transactive memory are added as interaction terms to Model 2. As for multicollinearity, the VIF (Variance Inflation Factor) of Model 3 are all less than 10 (1,026-1,273), so multicollinearity is not occurring.

The partial regression coefficients for bio-demographic diversity in models 1 through 3 were all non-significant (Model 1: b = -0,171, SE = 2,257, β = -0,006, t[156] = -0,076, p = 0,940; Model 2: b = 0,308, SE = 2,148, β = 0,011, t[154] = 0,143, p = 0,886; Model 3: b = 0,253, SE = 2,136, β = 0,009, t [152] = 0,118, p = 0,906). Therefore, Hypothesis 1, "Bio-demographic diversity will have a negative impact on innovation in the workplace," is not supported.

The partial regression coefficients for task-related diversity in Models 1 through 3 show that it has a significantly positive impact on innovation in all models (Model 1: b = 0,299, SE = 0,083, β = 0,279, t[156] = 3,624, p = 0,000; Model 2: b = 0,148, SE = 0,085, β = 0,138, t[154] = 1,727, p = 0,086; Model 3: b = 0,152, SE = 0,085, β = 0,142, t[152] = 1,792, p = 0,075). Thus, Hypothesis 2 "Task-related diversity will have a positive impact on innovation in the workplace," was supported.

The interaction term of bio-demographic diversity and inclusion climate in Model 3 showed no significant impact on innovation (b = -0,861, SE = 0,602, β = -0,104, t[152] = -1,431, p = 0,154). Hypothesis 3, "Inclusion climate will mitigate the negative impact of bio-demographic diversity on innovation in workplace," was not supported.

However, inclusion climate had a significantly positive impact on innovation directly in both Model 2 and Model 3(Model 2: b = 0,316, SE = 0,082, β = 0,303, t[154] = 3,831, p = 0,000; Model 3: b = 0,333, SE = 0,082, β = 0,319, t[152] = 4,069, p = 0,000).

The interaction term between task-related diversity and transactive memory in Model 3 had a significantly positive impact on innovation at the 10% level (b = 0,062, SE = 0,033, β = 0,136, t[152] = 1,853, p = 0,066).

For this reason, a simple slope test was conducted (Figure 1). In the group with low transactive memory (-1 SD), there was no effect of task-related diversity (b = 0,023, SE = 0,107, β = 0,021, t[152] = 0,215, p = 0,830), but in the group with high transactive memory (+1 SD), task-related diversity enhanced innovation significantly (b = 0,280, SE = 0,082, β = 0,276, t[160] = 2,503, p = 0,013). Figure 1 illustrates the relationship between task-related diversity and transactive memory on innovation, with moderating effects.

Thus, Hypothesis 4 "Transactive memory will amplify the positive relationship between task-related diversity and innovation. is supported.

As a result of the analysis, Hypothesis 2: “Task-related diversity will have a positive impact on innovation in the workplace.” and Hypothesis 4: “Transactive memory will amplify the positive relationship between task-related diversity and innovation.” were statistically supported. Task-related diversity, which is the internal characteristics of human attributes such as work experience, educational experience, and values, was a factor in promoting innovation. Transactive memory, which is the memory of knowledge about who

knows what in the workplace, was a factor in promoting innovation. The higher the level of transactive memory, the stronger the positive relationship between task-related diversity and innovation. Figure 2 illustrates the effect of task-related diversity and transactive memory on innovation.

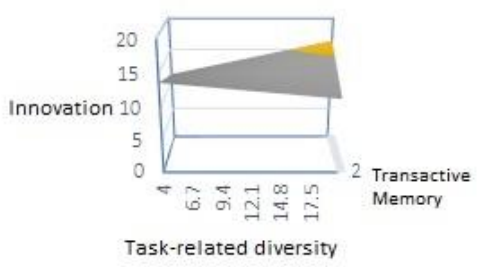

Figure 2. The Effect of Task-related Diversity and Transactive Memory on Innovation.

On the other hand, Hypothesis 1, "Bio-demographic diversity will have a negative effect on innovation in the workplace." was not supported. The reason for this may be related to the age of the respondents. Only gender diversity was used as the measurement scale for bio-demographic diversity. The majority of respondents in this study were in their twenties, accounting for 68,8% of the respondents. Since this generation is not at an age where they feel significant gender differences, social categorization may not be apparent.

Hypothesis 3, "Inclusion climate will mitigate the negative impact of bio-demographic diversity on innovation." was also not supported. The reason for this is the same as the reason for Hypothesis 1: the cognitive bias caused by diversity is low in the 20s, which is the main group of respondents, so the inclusion climate may not be effective.

However, although the inclusion climate did not have a moderating effect between bio-demographic diversity and innovation, it did have a significantly positive direct impact on innovation. This may indicate that increasing the inclusion climate is important for increasing to enhance innovation in the workplace, independently of increasing the degree of diversity.

CONCLUSIONS

First, it is important to increase the degree of task-related diversity in terms of education, work experience, expertise, and values, rather than demographic diversity in terms of gender, age, nationality, race, and religion, in order to increase innovation in the workplace. Second, it is necessary to form a transactive memory, which is an organizational memory of who knows what, and third, fostering inclusion climate that reduces cognitive bias in the workplace is essential for innovation, regardless of the degree of task-related diversity.

The theoretical contribution of this study is that it pointed out the moderating effect of transactive memory on the relationship between task-related diversity and innovation. The previous studies assumed that the information and knowledge produced by task-related diversity directly lead to innovation and so on. This study showed that the effectiveness of task-related diversity in promoting innovation can be strengthened by enhancing transactive memory and demonstrated the importance of the moderating effect of transactive memory.

The practical contribution of this study is that it pointed out the importance of inclusion climate in innovation. The fact that inclusion climate had a positive impact on innovation regardless of the degree of diversity indicates that practices such as fair treatment, recognition of individual differences, and respect for diverse opinions are important even in homogeneous workplaces with a low degree of diversity. This can be seen as an indication that inclusion is a universal management variable. As a company, building inclusion culture is a very important management issue.

We can point out the following new research issues as a result of this study. The first is to further the study of transactive memory systems. The results of the exploratory factor analysis of the questionnaire

revealed that the concept of transactive memory system consists of both transactive memory and inclusion climate. Although the focus of diversity research has shifted to inclusion research, in the future, transactive memory, as a more comprehensive concept, is likely to become the focus of research on the relationship between diversity and innovation.

Another way to study diversity is from the faultline perspective (Lau and Murninghamm 1998). Faultlines are a multilayered understanding of diversity in terms of types and levels. Kumada and Kurahashi (2020) looked at diversity from the perspective of fault lines and used the results of an actual survey of Japanese companies to analyze the relationship between diversity and performance using an agent-based model. As a result, it was clarified that the outcomes of diversity differ depending on the strength of the fault line and the number of subgroups, and that it is important to understand the structure of diversity in the organization, clarify organizational goals, and design communication. Although the fault line theory was not examined in this study, analysis using this theory can be pointed out as a future challenge in order to enrich our understanding of diversity.

The limitations of this study are, first of all, the small sample size and the age bias of the respondents. It is necessary to make it more general by enriching the sample. It can also be pointed out that as a result of the manipulation of the measurement scale, the measurement variable of bio-demographic diversity was singled out as gender, which prevented a deeper analysis of bio-demographic diversity.

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