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The Effects of Diversity in Innovation: The moderating role of universal-diverse leaders

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The Effects of Diversity in Innovation: The moderating role of universal-diverse leaders*

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Abstract

Past research has shown mixed results for the effect of diversity toward innovation. We hypothesize that leadership is a key in its success. In particular, we focus on the leader's universal-diverse orientation. Team diversity could lead to low social integration which affects team creativity; however, leaders with a high universal-diverse orientation ("universal-diverse" leaders) moderate this relationship between social integration and creativity.

The conceptual model is assessed using survey data of 41 teams from mid- and large-sized Japanese companies. The results show that diversity is negatively associated with a group's social integration, and that social integration has a positive effect on creativity. The results also indicate that the universal-diverse leader mitigates the negative relationship between diversity and creativity through decreased social integration.

This research contributes to diversity and group performance literature in two ways. First, it identifies a new moderator in the relationship between diversity and group performance. Second, it connects two research streams: diversity and group performance literature and leadership literature.

The findings of the study also provide implications for policy makers and managers. Today, in Japan, diversity is considered as a key for economic growth. Thus, Japanese government is enforcing policies that support Japanese firms to diversify, and the latter are increasing their efforts to diversify. However, in order to obtain positive effects of diversity on firm performance, it is not enough simply to diversify their organizations. It is also important to have the universal-diverse leaders manage the diversified groups. Hence, it is important for the government and companies to also increase efforts in educating leaders. Leaders need to have universal-diverse orientation, and they need to be able to understand people's similarities and differences and effectively manage the diverse groups.

Keywords: Diversity, Innovation, Team creativity, Leadership, Social integration, Universal-diverse
JEL classification: L25, M100

*This study is conducted as a part of the Project "The Effect of Diversity on Economic Growth and Business Competitiveness" undertaken at Research Institute of Economy, Trade and Industry (RIETI). This study utilizes the micro data of the questionnaire information based on "the Survey on the New Product Development Project Team's Condition and Diversity" which is conducted by the Research Institute of Economy, Trade and Industry (RIETI). The author is grateful for helpful comments and suggestions by Discussion Paper seminar participants at RIETI.

Diversity is an important keyword for the growth of Japanese economy and companies. Under Abe Cabinet, since 2013, Japan has launched initiatives to accelerate diversity management at workplaces. Diversity means “the inclusion of different types of people in a group or organization” (Merriam-Webster, 2016). In other words, the promotion of diversity management leads to the workforce becoming increasingly diverse on a number of dimensions including gender and nationality. As diversity increases, the diverse views and backgrounds members bring with them to the organization (i.e., diversity in group values, namely “value diversity”) must be successfully managed.

Diversity affects economic growth and business competitiveness (Research Institute of Economy, Trade and Industry). For example, Edamura and Inui (2016) show that diversity in researcher groups increases patent application behaviors. This research focuses on innovation, given that innovation have a vital impact on business performance (e.g., Ahlstrom 2010). Past researchers have studied this question in depth; however, there have been equivocal findings, and the issues concerning the effects of diversity on innovation remain unsettled (Stahl et al. 2010; Zhan, Bendapudi, and Hong 2015). Some studies have shown the positive effect of diversity toward innovation (e.g., Earley and Mosakowski 2000; Niebuhr 2010; Tadmor et al. 2012); whereas others have found a negative or null relationship (e.g., Bell et al. 2011; Harvey 2013; Østergaard, Timmermans, and Kristinsson 2011). Edamura and Inui (2016) also finds reverse U relationship between the number of females or phD holders

and patent application behaviors. The findings show that both positive and negative effects of diversity toward innovation exist in practice. To further understand the conditions where diversity have positive effect on innovation, it is important to examine how moderators influence the effects of diversity on innovation. However, there is yet little systematic research on moderators in diversity and innovation, and this research aims to fill such research gap.

Innovation is a very abstract construct when conducting research (Im and Workman 2004; Wind and Mahajan, 1997). Thus, we focus on creativity, a construct that precedes innovation. In fact, Amabile et al. (1996) state, “all innovation begins with creative ideas… [C]reativity by individuals and teams is a starting point for innovation” (p. 1154). In addition, we focus on creativity in a specified context, namely a new product development (NPD).

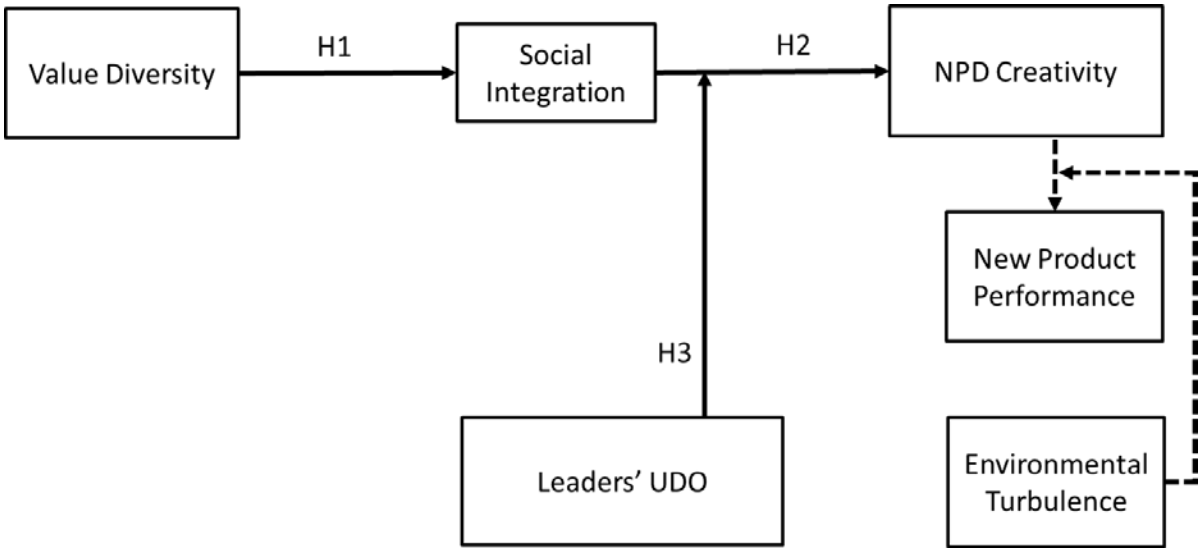
This paper focuses on a “universal-diverse” leader as the moderating variable for the effect of diversity on creativity. The universal-diverse leaders are those who are high in universal-diverse orientation (UDO; Fuertes et al. 2000). UDO is defined as “an awareness and potential acceptance of both similarities and differences in others that is characterized by interrelated cognitive, behavioral, and affective components” (p. 158). An awareness of how people are alike and different is important for the effective social interactions (Vontress 1979, 1988, 1996). For example, in counseling, an awareness and acceptance of a person’s similarities and differences from oneself are important for counselors who work with clients

from a variety of cultural backgrounds. Effective multicultural counseling is based on the understanding that human beings share commonalities with each other and at the same time have important differences. We propose that this awareness of human beings' similarities and differences is important for the effective management of diverse group, and that leaders having high UDO can effectively manage the diverse groups to produce high group performance such as creativity.

PROPOSED MODEL AND RESEARCH HYPOTHESES

We develop a model in Figure 1, in which value diversity is the source, creativity is the mediator, new product success is the performance outcome at the group level (Im and Workman 2004). Our model also incorporates social integration as an antecedent of creativity (Earley and Gibson 2002; Stahl et al. 2010), and universal-diverse leader as the moderator between social integration and creativity.

Figure 1: Summary of hypotheses and conceptual model.



Solid arrows indicate relationships tested in this study; dotted arrows indicate proposed relationships.

Our first set of hypotheses addresses the effects of value diversity on creativity and its antecedent, namely social integration. Drawing on prior research, we hypothesize that there is a negative effect of value diversity on social integration which have a positive effect toward creativity.

Value Diversity, Social Integration, and Creativity

Social integration is "the attraction to the group, satisfaction with other members of the group, and social interaction among group members" (O'Reilly, Caldwell, and Barnett 1989, p. 22). It is an important aspect of organizational convergence such as group functioning, collaboration (Smith et al. 1994), and cohesion (Katz and Kahn 1978; Shaw 1981). Many

research suggests that diversity diminishes group cohesion (gender diversity: e.g., Jackson et al. 1991; Kirchmeyer 1995; and cultural diversity: e.g., Stahl et al. 2010).

Social integration, including the development of group cohesion, help to align the group around common objectives, commitment, or conclusions. It contributes positively to group performance, and help the group achieve a single group outcome. Weaker social interactions could impede innovation since social interactions are needed to support the creative potential for innovation (Winkler and Bouncken 2011). Groups can be creative when their members feel safe enough to express their ideas and doubts (Craig and Kelly 1999). This may not occur when group cohesion is low. Therefore, we propose:

Hypothesis 1: Value diversity negatively influences social integration.

Hypothesis 2: Social integration positively influences NPD creativity.

Moderating Role of Universal-Diverse Leaders

We argue that universal-diverse oriented leadership is a key in increasing positive effects of diversity toward creativity. In particular, we hypothesize that universal-diverse leaders moderate the relationships between social integration and NPD creativity.

Leadership, particularly a participative leadership style, contributes to mental model convergence in groups (Dionne et al. 2010). Leaders hold the propensity to influence trust

between group members (Lau and Liden 2008); they ensure group members trust each other (Braun et al. 2013). Leadership signals that the group is a trustworthy entity, such that group members develop shared perceptions of the group's trustworthiness (Dionne et al. 2010; Wildman et al. 2012). Therefore, we propose that universal-diverse leaders contribute in integrating social dispersion and developing new and innovative ideas from various knowledge available from the diverse team members. More formally stated:

Hypothesis 3: Universal-diverse leader moderates the relationship between social integration and NPD creativity.

METHODOLOGY

Sample and Data Collection

A survey was first constructed in English, translated into Japanese by a Japanese bilingual researcher, and then back into English by a professional translator to ensure consistency in the items and scales (double translation; Dillman 1978; Douglas and Craig 1983). We collected data using Tokyo Shoko Research, the company that possesses the largest database of Japanese companies. Screening survey that asked whether the team(s) working on idea generation stage of NPD exist(s) in the company was sent to 5,248 mid- and large-sized

Japanese companies (i.e., more than 500 employees) in November 2016. A week after, a phone call asking for the participation was made. 509 companies replied (9.7% response rate), of which 115 companies met the criteria for the study.

The survey packet was sent to the person indicated as a project leader in charge of NPD project in the screening survey. The survey took place in January 2016. The person who received the survey packet was requested to pass the surveys to the members of the NPD project team. The project leader was asked to also answer the survey. Respondents were asked to answer the survey questions in the context of NPD project led by the project leader who passed the survey.

Reminders to complete the survey were sent twice in February 2016. A total of 274 respondents from 43 companies replied. A response rate was 37% at the company level. To ensure that the respondents in our sample reflected diversity in their teams, we removed one respondent who answered that the team size was one person ("In total, how many members are there on your new-product development project team including yourself?"). We also restricted the sample to include only those teams in which the project leader responded. Thus, our final sample consists of 41 teams with a total of 257 responses. The number of respondents from the 41 teams ranged from 1 to 18 (M = 6.20)[2].

The usable 41 teams consist of 103 NPD project leaders and 148 NPD project members

[2] The number of respondents reported here does not reflect the actual team size. The actual team size indicated by the respondents ranged from 2 to 50 members, with an average size of 10.57 members (SD = 8.41).

(the role of 6 respondents was not identified; in the analyses, these 6 respondents were included as project members). In Table 1, we provide descriptive statistics on the respondents in our sample. Most of the employees in the organization we studied were male, resulting in a sample that was only about 4% female for the project leaders and 14% female for the project members. On average, the project leaders had spent nearly 19 years employed by the company and was about 47 years old; whereas the project managers had spent nearly 11 years and was about 36 years old.

Table 1: Characteristics of Respondents.

	% Female	Mean Age	Mean Tenure in Organization (in years)
Project Leaders	3.88%	46.76	19.32
Project Members	14.19%	36.27	10.90
NA	0.00%	41.00	11.88

As reported in Table 2, with regard to company demographics, the average number of employees was 6,526 and the average revenue was 177,717 million yen (about USD 1.8 million). These companies represented a variety of industries, such as construction, manufacturing, gas, information and communication, transportation, wholesale trade, retail, finance, real estate, accommodation, and restaurant.

Table 2: Sample Characteristics.

Japan Standard Industrial Classification	Industry	Number of Responses (Companies)	% Among Responses	Average Number of Employees	Average Annual Revenue (M JPY)
06, 08	Construction	3	6.98%	1,708	145,786
14, 15, 16, 18, 19, 23, 24, 25, 26, 27, 28, 29, 31	Manufacturing	20	46.51%	2,407	163,571
34	Electricity, gas, energy, water supply	1	2.33%	618	153,103
37, 39	Information and communication	3	6.98%	1,385	42,349
44, 46	Transportation, postal	2	4.65%	80,523	579,155
54	Wholesale trade, retail	1	2.33%	5,325	508,551
64	Finance, insurance	1	2.33%	1,283	48,663
69	Real estate, lease	1	2.33%	711	414,682
74	Academic research, professional and technical services	2	4.65%	550	10,361
76	Accommodation, restaurant	1	2.33%	922	80,233
	Total	35	81.40%	6,526	177,717

Measurement

Measures were drawn from existing studies and adapted where necessary. The items were typically Likert-type 7-point scales with 1 indicating “strongly disagree” and 7 indicating “strongly agree” with the statements. Value diversity was measured with six items scale from Jehn, Northcraft, and Neale (1999), asking whether or not the team members have differences in the values. Social integration was measured with three items scale that measured team’s

cohesiveness from Jehn and Mannix (2001) using a seven-point Likert scale (1 = not at all and 7 = very much).

The focus of this study is universal-diverse leaders. The leaders' UDO was measured using five items Relativistic Appreciation scale from a short form of the Miville-Guzman Universality-Diversity Scale (M-GUDS-S; Fuertes et al. 2000).

Finally, the outcome construct of this study was NPD creativity. It was measured with eight items, by adapting scales from Im and Workman (2004). The survey items for all constructs as well as the Cronbach's alphas are shown in the Appendix.

RESULTS

In Table 3, we provide the descriptive statistics for and correlations between our primary variables of interest at the team level.

Table 3: Descriptive Statistics and Correlations between Variables (Team Level).

	Mean	Std. dev.	1	2	3
1. NPD Creativity	4.55	0.56			
2. Value diversity	3.46	0.65	-0.56***		
3. Leaders' UDO	5.19	0.71	-0.18	0.07	
4. Social integration	4.66	0.79	0.48**	-0.67***	0.21

***$p < .001$, **$p < .01$.

A negative association was found between creativity and value diversity, suggesting that value diversity decreased creativity as its total effect. Social integration was positively

associated with creativity, and negatively with value diversity. These suggest that social integration might mediate the association between value diversity and creativity. To examine hypothesized paths more rigorously as well as the moderating effect by leaders' UDO, the following model was fit to data.

Level 1 equation:

$$\text{creativity}_{ij} = \beta_{0j} + r_{ij}.$$

Level 2 equations:

$$\beta_{0j} = \gamma_{00} + \gamma_{01}(\textit{Value diversity}_j) + \gamma_{02}(\textit{Social integration}_j) + \gamma_{03}(\textit{Leader UDO}_j) + \gamma_{04}(\textit{Team size}_j) + \gamma_{05}(\textit{Value diversity}_j \times \textit{Leader UDO}_j) + \gamma_{06}(\textit{Social integration}_j \times \textit{Leader UDO}_j) + u_{0j}$$

$$\textit{Social integration}_j = \gamma_{10} + \gamma_{11}(\textit{Value diversity}_j) + \gamma_{12}(\textit{Leader UDO}_j) + \gamma_{13}(\textit{Value diversity}_j \times \textit{Leader UDO}_j) + u_{1j}.$$

Creativity_{ij} is the outcome (perceived team creativity) for respondent *i* in team *j* modeled as a function of the intercept β_{0j} of team *j*, and an error r_{ij}. The level 1 coefficient β_{0j} is then modeled at level 2. Level 2 equations contained team-level predictors as well as their interaction effects. Team size was also included in the first Level 2 equation as a covariate. All of the team-level predictors were calculated by averaging team members' responses,

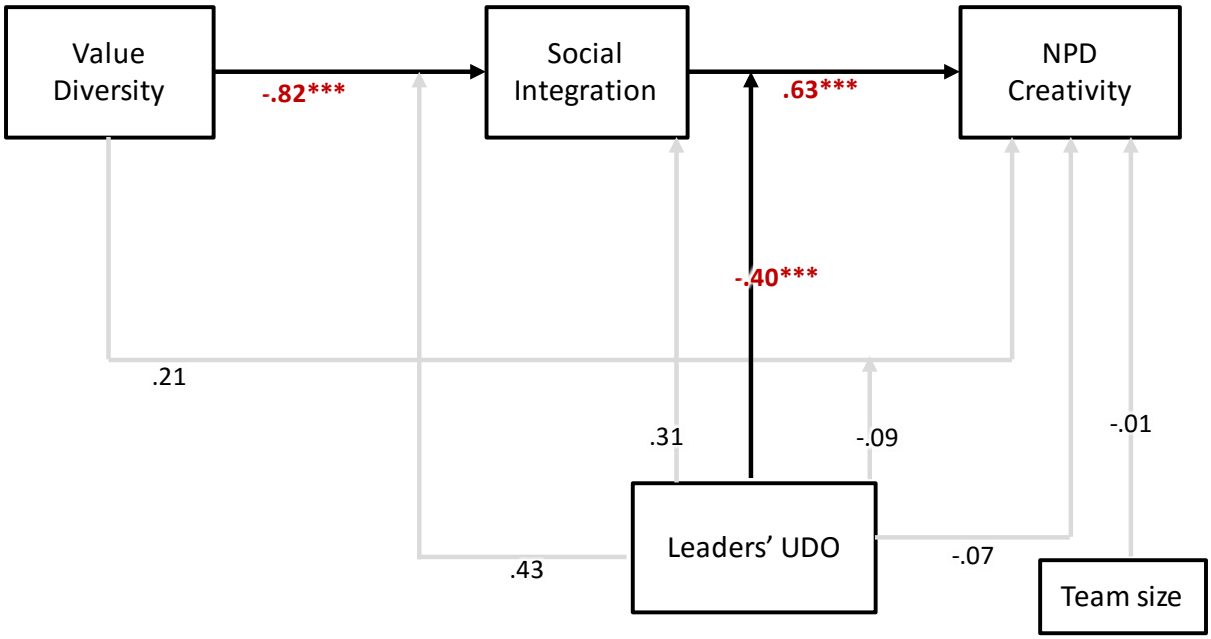
except for Leaders' UDO. Leaders' UDO at the team level was calculated by averaging only leaders' responses within teams (the number of leaders differed across teams, ranging from 1 to 8, $M = 2.51$, $SD = 1.75$). The predictors were centered around respective grand means. In the second Level 2 equation, the mediator (social integration) was predicted by value diversity, leaders' UDO, and their interaction. The moderating effect by leaders' UDO toward the association between value diversity and social integration was included in the model for exploratory purposes. The results of path analysis are shown in Table 4 and Figure 2.

Table 4: Unstandardized Estimates (SE in brackets) for Path Analysis.

	Creativity			Social integration		
	γ	(*SE*)	*p*	γ	(*SE*)	*p*
Independent variable (Team level)						
Value diversity	0.21	(0.18)	.238	**-0.82**	(0.13)	< .001
Social integration	**0.63**	(0.17)	< .001			
Leaders' UDO	-0.07	(0.07)	.325	0.31	(0.21)	.146
Team size	0.01	(0.01)	.427			
Value diversity x Leaders' UDO	-0.08	(0.15)	.571	0.43	(0.28)	.132
Social integration x Leaders' UDO	**-0.40**	(0.10)	< .001			

Note. Estimation method: maximum likelihood estimation with robust standard errors. All predictors were centered around grand mean. Effects with $p < .05$ appear in bold print.

Figure 2: Summary of Path Analysis.



Note. Black arrows indicate effects with $p < .001$; gray arrows indicate effects not significant. Values are unstandardized coefficients. $^{***}p < .001$.

As shown in Figure 2, social integration was negatively associated with value diversity, and positively associated with creativity, suggesting that value diversity decreased social integration, and decreased social integration was, in turn, linked to decreased creativity. However, the association between decreased social integration and decreased creativity was moderated by leaders' UDO. Thus, the negative influence of value diversity on creativity through decreased social integration was mitigated by universal-diverse oriented leadership.

DISCUSSION

The purpose of this study was to examine the moderating role of leadership, particularly the universal-diverse leader, in diversity and NPD creativity relationship. Our results provide support for our conceptual model that incorporates social integration as the antecedent of creativity and universal-diverse leader as a moderator between social integration and NPD creativity.

The results show a strong, negative relationship between value diversity and social integration. The findings suggest that when the group's value diversifies, its social integration such as trust among members, satisfaction with other members, and group cohesiveness decreases (e.g., Stahl et al. 2010). The results also show a strong, positive relationship between social integration and NPD creativity. As suggested in the group performance literatures, social integration is important in bringing success to the group performance (e.g., Winkler and Bouncken 2011).

Most importantly, the results show a strong moderating effect of universal-diverse leaders on the relationship between social integration and NPD creativity. Although value diversity decreases social integration which leads to lower NPD creativity, such effect is weakened by the universal-diverse leaders. Even if the group members feel that the group cohesiveness is low due to the differences among members, the universal-diverse leaders could lead the group to enhance NPD creativity by acknowledging both similarities and differences of group

members and effectively motivating them (Fuertes et al. 2000). Thus, by nourishing the universal-diverse orientation of project leaders, value diversity's positive effect on NPD creativity is more likely to be enhanced.

IMPLICATIONS AND FUTURE RESEARCH

Theoretical Implications

Our results identify a moderating variable, namely the universal-diverse leaders, in the relationship between diversity and creativity, the antecedent of innovation. Past research on the effect of diversity on group performance has shown mixed results (Jehn, Northcraft, and Neale 1999; Stahl et al. 2000). Thus, diversity and group performance literature has had a need to identify the variables that moderate the relationship between diversity and group performance. Stahl et al. (2000) have identified that task complexity and structural aspects of the group, such as group size and group dispersion, moderate the effects of diversity on groups. We extend the research by identifying different moderator in the relationship between diversity and group performance.

In addition, this study connects the diversity and group performance literature and leadership literature. Interestingly, the role of leadership has not yet been much discussed in the diversity and group performance literature. However, in the leadership literature, the

research on the relationships between leadership and variables related with diversity such as conflict (e.g., Gibson and McDaniel 2010), trust (e.g., Shen and Chen 2007), cohesiveness (e.g., Jung and Sosik 2002; Pillai and Williams 2004; Stashevsky and Koslowsky 2006; Wang and Huang 2009; Wendt, Euwemab, and van Emmerik 2009) and communication (e.g., Dewan and Myatt 2008; Flauto 1999; Zerfass and Huck, 2007) has been widely discussed. The findings of leadership research would help us better understand how diversity groups need to be managed in order to bring out the positive effects of diversity toward creativity and innovation. This research is first of such attempts.

Policy Makers and Managerial Implications

The results of the current study have several implications for policy makers and managers. Today, in Japan, diversity is considered as a key for economic growth. However, in order to obtain positive effects of diversity on firm performance, it is not enough simply to diversify their organizations. It is also important to have the universal-diverse leaders to manage the diversified groups. Hence, it is important for government and companies to also increase efforts in educating leaders. Leaders need to have universal-diverse orientation; they need to be able to understand people's similarities and differences and effectively manage the diverse groups.

Limitations and Future Research Directions

As with all research, this study has several limitations. First, this study used a cross-sectional survey design and thus does not test causal relationships. Future research could employ experimental design to overcome this limitation.

Second limitation is related to the choice of sample. The selection of companies in one country, Japan. Thus, generalizations of the results to companies in other countries need caution. Thus, the study of moderating role of leadership in diversity and creativity should be extended to other countries to help generalize the findings.

Third, although this study provides evidence of how leadership moderates the relationship between diversity and creativity, it does not examine the direct impact of creativity on performance. Follow-up research should consider directly examining creativity and performance.

APPENDIX

Construct Measurements and Reliabilities

Constructs	Survey Items	α
Value Diversity	The values of all team members are similar.	.90
	The team as a whole has similar work values.	
	The team as a whole has similar goals.	
	Members have strongly held beliefs about what is important within the team.	
	Members have similar goals.	
	All members agree on what is important to the team.	
NPD Creativity	Compared to your firm's other new products, the new product you're currently developing:	.86
	1. is really "out of the ordinary."	
	2. can be considered as revolutionary.	
	3. provides radical differences from industry norms.	
	4. shows an unconventional way of solving problems.	
	5. is relevant to customers' needs and expectations.	
	6. is considered suitable for customers' desires.	
	7. is appropriate for customers' needs and expectations.	
	8. is useful for customers.	
Social Integration	To what extent is your team cohesive?	.86
	How much do you feel like your team has team spirit?	
	To what degree would you talk up this team to your friends as a great team to work in?	
Leaders' UDO	Persons with disabilities can teach me things I could not learn elsewhere.	.75
	I can best understand someone after I get to know how he/she is both similar and different from me.	
	Knowing how a person differs from me greatly enhances our friendship.	
	In getting to know someone, I like knowing both how he/she differs from me and is similar to me.	
	Knowing about the different experiences of other people helps me understand my own problems better.	

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