Assessing Knowledge Configuration of New Product Development Teams and Performance

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In order to better understand how team composition is related to performance, this research investigates new product development (NPD) team composition and performance based on the individual team member's knowledge rather than the function to which he or she is currently assigned. A survey of 174 technology firms in Korea, rated as "excellent" companies, shows that the inclusion of multi knowledge members with both marketing and technological knowledge in NPD teams significantly improves innovativeness and time efficiency in comparison to NPD teams without such diverse membership. These findings help illuminate previous contradictory findings in the NPD literature and show the important role of multi knowledge members in NPD performance for senior managers to consider when staffing such teams.

Keywords: new product development, innovativeness, time efficiency, multi knowledge

INTRODUCTION

As the success rate of a firm is largely associated with new product development (NPD) activities, numerous studies of NPD have been conducted. One of the research streams involves generating innovative knowledge by establishing NPD teams (Idrees, et al., 2022; Lee, et al. 2021; Strese et al., 2016; Tang & Marinova, 2020). Integrating new members from various organizational levels has generally been considered as one of the key factors to foster innovative knowledge (Marion & Fixson, 2021). Moreover, the NPD process requires the integration of different functions, primarily marketing and R&D, as well as intra-firm integration, such as the involvement of suppliers and customers. Regarding the establishment of an NPD team, previous studies have often focused on the integration of varying organizational levels; for example, cross-functional departments at the team level (e.g., Ayers et al., 2011; Bai et al, 2017; Brettel et al., 2011; Kim et al., 2103; Kolling et al, 2022) and intra-firm at the organizational level (Cousins et al., 2011; Handfield et al., 1999; Peterson et al., 2005). Many studies have addressed establishing NPD teams; however, each team member's unique background is a key resource for attaining successful NPD activities.

Such teams may encounter a task or a relational conflict that triggers different perspectives necessary for innovativeness. In this paper, we argue that teams consisting of members with different functional backgrounds at the individual level positively affect NPD activities.

How is the functional composition of NPD teams related to performance? This is an important question but the current literature is silent. The silence is not for lack of previous research, but rather due to the conflicting results of the findings (Ancona & Caldwell, 1992; Eisenhardt & Tabrizi, 1995; Jehn et al., 1999; Sethi et al., 2001; Smith et al., 1994). We argue that one reason for these conflicting results is that previous authors have confounded two types of teams: teams composed of individuals who are drawn from different functions but individually represent the knowledge from only that single function (i.e., mono knowledge individuals) (Horwitz, 2015) and those teams composed of individuals from different functions who individually represent the knowledge from more than one function (i.e., multi knowledge individuals) (Kolling et al., 2022).

After Pfeffer (1983) proposed using organizational demography in the study of organizational composition, much research on NPD teams has focused on the demographic mix of organizational functions (Ancona & Caldwell, 1992; Cooper & Kleinschmidt, 1994; Eisenhardt & Tabrizi, 1995; González-Zapatero et al., 2019; Henke et al., 1993; Lovelace et al., 2001; Sethi et al., 2001). The implicit premise of the functional demographic mix approach has been the assumption that each team member represents one function within the organization and its associated knowledge (Bereiter & Scardamalia, 1993). For example, a team member from the marketing function is assumed to represent only marketing's functional knowledge, and a team member from R&D represents only the R&D function's technological knowledge. Thus, based on the assumption that team members represent only their function's knowledge in the team, previous research confounds at least two types of team members: those with only one functional knowledge and those with multiple functional knowledge.

Since the integration of marketing knowledge and technological knowledge is critical in NPD (Cui & Xaio, 2019; Johne & Snelson, 1988; Moorman & Slotegraaf, 1999; Love & Roper, 2009; Olson et al., 2001; Zhang & Zhu, 2021), the focus of the present study is the relationship between NPD team performance and the presence of multi knowledge members who have both marketing and technological knowledge. These multi knowledge individuals may exist in the NPD teams because of previous education (e.g. engineers or scientists with an MBA in marketing), company training, inter-functional transfer, or because of their initiative and interests. At Sony, for example, soon after technological people are hired, the company assigns them to jobs in retail selling (Quinn, 1985). Thus, engineers at Sony become sensitive in the ways of retail sales practices, product displays, and nonquantifiable customer preferences affecting product success.

While some studies have suggested that team members with multifunctional knowledge may affect team performance (Iansiti, 1993; Jugend et al., 2015; Leonard-Barton, 1995; Madhavan & Grover, 1998; Smith et al., 2005) or that they are valuable assets (Havtany & Pucik, 1981; Kusunoki & Numagami, 1998), previous NPD team research has not examined the relationship between multiknowledge members with '***marketing and technological knowledge***' and performance. Rather than the functional integration between R&D and Marketing departments, common interests between team members positively impact the generation of innovative ideas (Ayers et al., 2011; Ghonim et al., 2022). Thus, the composition of appropriate team members considerably affects the results of NPD. Recent studies have indicated that the functional heterogeneity of NPD members is associated with generating new ideas (Koch, 2010; Smith et al., 2005; Tsai, 2023). However, our goal is to minimize ambiguous answers that could result from the various knowledge backgrounds of each team member by limiting functional knowledge to marketing and technological knowledge.

To improve understanding of how team composition is related to performance, this research investigates NPD team composition and performance based upon the individual team member's knowledge rather than the function to which they are currently assigned. Hence, the present study examines how functional teams with different knowledge bases impact performance in innovativeness, NPD time efficiency, and financial outcomes.

THEORETICAL BACKGROUND

Breadth and depth of knowledge in NPD become key resources as NPD team members generate new and diverse ideas. Prior research at the organizational level (Aggarwal et al., 2020; Smith et al., 2005) has emphasized the necessity of heterogeneous knowledge for better performance in NPD. Although homogenous knowledge induces incremental improvement in new products and may reduce conflict among team members, market performance resulting from the release of new products appears to be limited (Kogut & Zander, 1992; Leiponen & Helfat, 2010; Tang & Marinova, 2020).

The Concept of Knowledge Generation Within a Team

The accumulation of homogenous knowledge is path-dependent on the breadth of knowledge without obtaining external knowledge (Zahra & George, 2002). Thus, it may be difficult for a team member previously involved in one particular function to fully understand the opinions and thoughts of a separate function. Once the team members obtain information and knowledge from the other function, the members would have a chance for existing knowledge to be heterogeneous.

When team members in NPD projects come from different functional departments, each member may hold biases and stereotypes toward one another (Kolling et al., 2022; Sethi et al., 2001). This causes task conflict for team members when making difficult decisions. Familiarity among team members is necessary to integrate diverse perspectives for better outcomes. When an individual member has a wide range of knowledge of different functions, greater potential exists to create innovative ideas by combining ideas from different functions (Marion & Fixson, 2021; Smith et al., 2005). Various knowledge backgrounds among team members play a key role in mitigating biases and stereotypes toward one another by reducing member conflict. Thus, as a team member holds multi knowledge, common knowledge with other members creates norms, thereby allowing team members to better understand one another. In short, similar backgrounds foster integration and coordination among team members by drawing on common interests (Akgün et al., 2015; Arslan et al., 2021; Tang & Marinova, 2020).

Knowledge Configuration in NPD Teams

Marketing knowledge and technological knowledge are both argued to be important for high performance in new product development (NPD) projects (Johne & Snelson, 1988, Love & Roper, 2009; Moorman & Slotegraaf, 1999; Olson et al., 2001). Marketing knowledge refers to understanding the process of analyzing customer needs and wants, generating product concepts, and launching products into the market (Olson et al., 2001). On the other hand, technological knowledge involves formulating and developing new products and related processes (Moorman & Slotegraaf, 1999).

Firms with advanced technology and skilled marketing knowledge can develop more innovative products for customers than those with fewer resources of modern technology and lack marketing skills and knowledge (Ali et al., 2020). Furthermore, team members who have both marketing and technological knowledge can facilitate information sharing between technological specialists and marketing specialists; such professionals can quickly understand both functions' perspectives, vocabularies, constraints, and options, and thus they can relate to each specialist in his or her specific language (Hahm, 2017, Raskas & Hambrick, 1992; Uitdewilligen & Waller, 2018). Much research has shown that information sharing within teams is directly related to team performance (Al-Dmour, et al., 2020; Byrne & Eddy, 2023; Moenaert et al., 1994; Rochford & Rudelius, 1992; Sethi et al., 2001). Thus, marketing knowledge, experience, and technological information are crucial factors for a fully coordinated team to be successful in new product development processes. Therefore, we hypothesize that:

H1: *Teams with multi knowledge members will have higher performance in innovativeness than teams with only monoknowledge individuals.*

H2: *Teams with multiknowledge members will have higher performance in time efficiency than teams with only monoknowledge individuals.*

H3: *Teams with multiknowledge members will have higher performance in financial outcomes than teams with only monoknowledge individuals.*

METHODOLOGY

Sample

The data was composed of Korean manufacturing firms stratified by technological excellence (i.e., receiving the highest ratings regarding technology vs. not having received such ratings) as evaluated by agencies of the Korean Government, the Korea Industrial Technology Institution, and the Korean Agency for Technology and Standards. The samples are retrieved from the firm strata based on a sampling frame constructed by listing those firms that received one of the following designations: (1) a KT (Excellent Korean Technology) mark; (2) IR-52 (Industrial Research) mark from the Korea Industrial Technology Institution; (3) NT (New Technology) mark; or (4) EM (Excellent Machine, Material) mark from the Korean Agency for Technology and Standards. 849 firms were rated as "excellent" (i.e., received a KT, IR-52, NT, or EM mark). From the initial contact, 321 of 849 firms were willing to participate. Out of 321 firms, 76 project managers were personally interviewed in the Seoul metropolitan area. Additionally, 98 usable responses were obtained remotely, which yielded 174 completed surveys. Thus, the overall usable response rate was 20.5% of 849 firms. The industries in the sample consisted of organizations in the following sectors: electronics, electricity, machinery, chemical, textile, computer, software, and information technology. The average team had 7.1 members (sd = 6.2) and had an average product development time of 22.9 months (sd = 13.7). The firms responding were not significantly different from those not responding in industry representation**.** Therefore, even though the sample was not selected probabilistically, we believe that it was representative of the population of the 849 Korean manufacturing firms with "excellent" ratings.

In order to examine the hypotheses, two categories of each team member's knowledge were identified: marketing knowledge and technological knowledge. Hence, individuals could be identified into one of three types based on their functional knowledge: (1) monoknowledge individuals with only technological knowledge (T), (2) monoknowledge individuals with only marketing knowledge (M), or (3) multi knowledge individuals with both marketing and technological knowledge (B). Next, there are seven theoretical team configurations possible based on the three individual types of functional knowledge: (1) teams with only T, (2) teams with only M, (3) teams with only B, (4) teams with M and T, (5) teams with T and B, (6) teams with M and B, and (7) teams with M, T, and B. Based on the literature review, a team of members with marketing and technological knowledge (Types 3, 5, 6, and 7) should perform better than a team with only monoknowledge individuals (Types 1, 2, and 4). Previous research on team composition, which is based on the function to which they are currently assigned, has not examined the performance difference between Type 4 (teams with M and T) and Type 7 (teams with M, T, and B).

Out of the seven theoretically possible functional knowledge configurations, only four out of seven types were able to be analyzed. There were no teams with only marketing specialists (Type 2, n = 0). Further, teams comprised of only multi knowledge individuals with both marketing and technology knowledge (Type 3, n = 2), as well as teams with only monoknowledge individuals with marketing knowledge and multi knowledge individuals (i.e., marketing and technology) (Type 6, n = 1) were excluded because their sample sizes were too small for statistical analysis. Table 1 presents the seven theoretically possible configurations and the four types utilized in our sample and data analysis (i.e., Types 1, 4, 5, and 7). Thus, the final sample size for examining the hypothesis was 171 (T=24, MT=15, TB=75, and MTB=57).

TABLE 1
THEORETICALLY POSSIBLE FUNCTIONAL KNOWLEDGE CONFIGURATIONS AND STUDY SAMPLE

No.	Code	Theoretically Possible Team Compositions	Sample Frequency
1	T	Teams with only monoknowledge individuals with only technological knowledge	24
2	M	Teams with only monoknowledge individuals with only marketing knowledge	0
3	B	Teams with only multiknowledge individuals with both marketing and technological knowledge	2
4	MT	Teams with only two sets of monoknowledge individuals: those with only marketing knowledge and those with only technological knowledge	15
5	TB	Teams with one set of monoknowledge individuals with technological knowledge and one set of multiknowledge individuals with both marketing and technological knowledge.	75
6	MB	Teams with one set of monoknowledge individuals with marketing knowledge and multiknowledge individuals with both marketing and technological knowledge.	1
7	MTB	Teams with two sets of monoknowledge individuals (one with marketing knowledge and one with technological knowledge) and one set of multiknowledge individuals (both marketing and technological knowledge).	57

Control Variable

No control variables were designated in the analysis. Rather, the sampling procedures were selected and controlled for firms that were deemed as technologically "excellent" (as rated by the Korean Government, the Korea Industrial Technology Institution and the Korean Agency for Technology and Standards), geographically specific (Korean firms in Korea only), and manufacturing based (rather than services). For the analysis, we allowed for variation of other variables, such as size and manufacturing type (i.e., process, discrete parts).

Independent Variable: Team Configuration Based on Team Member's Knowledge

To properly categorize teams based on the individual types of functional knowledge, it was necessary to measure each team member's knowledge. It is difficult to measure an individual's knowledge directly (Meindl et al., 1994), particularly their ability to apply it in a work setting. Nevertheless, team members working closely together are able to recognize who has different types of knowledge. Thus, each respondent was asked to provide a subjective judgment about the other team members' knowledge, based on their personal experience with the team members as evidenced in their work.

Three knowledge variables (T, M, and B) were coded into 0 and 1. For example, if individuals with only marketing knowledge existed within the team, the variable M was defined as 1. If not, M was 0. The same procedure was followed for all three variables (T, M, and B). Please refer to Table 2 for descriptions of the independent variables. Each of these categories was significantly correlated with other indicators of each category, thereby supporting our belief that the respondent's categorization of the other team members' knowledge was reliable. For example, the percentage of team members possessing both marketing knowledge and technological knowledge was correlated with the percentage of team members with previous multifunctional experience ($r = + .26$, $p < .001$; the standardized two-item alpha = .37), the percentage of team members possessing only technological knowledge was significantly correlated with the percentage having science or engineering degrees (r = + .36, p< .001; the standardized two-item alpha = .52), and the percentage of team members possessing only marketing knowledge was significantly correlated with the percentage with a business degree (r = + .39, p< .001; the standardized two-item alpha = .60). We categorized teams by dichotomizing them based on the presence (or absence) of any team member who fit the seven definitions.

Dependent Variables

Three dimensions of performance were considered: (1) innovativeness, (2) time efficiency, and (3) financial outcomes. The three independent survey items were based on a seven-point Likert-scale. ***Innovativeness*** was measured in terms of innovativeness in both technology and marketing (Cooper & Kleinschmidt, 1994). Three items assessed technology-related innovativeness, and three items measured market-related innovativeness. Notably, Sethi et al. (2001) operationalized new product innovativeness as the extent to which a new product is perceived to be novel when compared to other competing products. Slightly modifying this measure, a six-item scale (alpha = 0.92) was used to measure innovativeness. Please refer to Table 2 for Innovativeness items. ***NPD Time Efficiency*** was based on Cooper and Kleinschmidt (1994). A two-item scale (alpha = 0.78) was used to measure NPD time efficiency (i.e., time schedule and development). Please refer to Table 2 for NPD Time Efficiency items. ***Financial Outcomes*** was based on a four-item scale (alpha = 0.91) and was used to measure financial success: break-even point, sales, market share, and ROI. Please refer to Table 2 for Financial Outcomes items. Table 3 shows the composite values of the means, standard deviations, and correlation matrix for Innovativeness, NPD Time Efficiency, and Financial Outcomes variables. To ensure discriminant validity of the three types of performance (i.e., innovativeness, NPD time efficiency, and financial success), a principal component factor analysis using varimax rotation was conducted. The item loading values ranged between 0.906 and 0.745, which all exceed 0.70, thereby indicating acceptable reliability. No items loaded at 0.32 or higher on two or more factors. Thus, no cross-loading issues occurred among the items. Cronbach's alpha (CA) values for Innovativeness, Financial outcomes, and Time efficiency are 0.911, 0.921, and 0.764, respectively. All composite reliability values are between 0.894 and 0.944, which indicates acceptable reliability, as these values exceed 0.70. Table 4 shows the results of each item's loading.

TABLE 2
DESCRIPTIONS OF INDEPENDENT AND DEPENDENT VARIABLES

Independent Variable Evaluate the team member's knowledge: T: Members with only technological knowledge (T) exist in the team. M: Members with only marketing knowledge (M) exist in the team. B: Members with both marketing and technological knowledge (B) exist in the team.
Dependent Variables Innovativeness: (Cooper & Klenischmidt, 1994; Sethi et al., 2001) IN1: The new product is very innovative compared with other products of the company in terms of technology. IN2: The new product is very innovative compared with other domestic products in terms of technology. IN3: The new product is very innovative compared with other products made by advanced countries in terms of technology. IN4: The new product is very innovative compared with other products of the company in terms of marketing. IN5: The new product is very innovative compared with other domestic products in terms of marketing.. IN6: The new product is very innovative compared with other products made by advanced countries in terms of marketing..

NPD Time Efficiency**:** (Cooper & Klenischmidt, 1994) TE1: How much of the intended time schedule is achieved? TE2: How efficiently is the development time managed? Financial Outcomes: FO1: The time to achieve break-even point after market launch FO2: The degree of achievement of expected sales FO3: The degree of achievement of expected market share FO4: The degree of achievement of expected return on investment

TABLE 3
MEANS, STANDARD DEVIATIONS, AND CORRELATION MATRIX OF INDEPENDENT VARIABLES

	# Of Scale Items	Mean	S.D.	1	2
1. Innovativeness	6	5.69	0.92	-	
2. Time efficiency	2	4.09	1.15	.163*	-
3. Financial outcomes	4	4.63	1.22	.384***	.400***

*p < 0.05, **p < 0.01, ***p < 0.001

TABLE 4
IDENTIFYING PERFORMANCE DIMENSIONS: FACTOR ANALYSIS RESULTS

	Factor 1 Innovativeness (CA= 0.911, CR= 0.931)	Factor 2 Financial outcomes (CA= 0.921, CR= 0.944)	Factor 3 Time efficiency (CA= 0.764, CR= 0.894)
IN2	**.877**	.132	1.162E-02
IN5	**.850**	.221	3.913E-02
IN1	**.824**	.109	-.116
IN4	**.815**	.221	-.103
IN6	**.788**	.167	.225
IN3	**.745**	7.198E-02	.288
FO3	.176	**.906**	.129
FO2	.175	**.901**	.170
FO4	.165	**.853**	.145
FO1	.183	**.820**	.191
TE1	2.757E-02	.225	**.857**
TE2	6.069E-02	.210	**.844**

CA= Cronbach alpha, CR= composite reliability

RESULTS

One-way Analysis of Variance (ANOVA) was utilized to test the hypothesis that the presence of a multi-knowledge member enhanced performance. As Table 5 shows, the analysis of variance for innovativeness was marginally significant ($p < .10$), while the same analysis reveals significance ($p < .05$) for time efficiency. The ANOVA analysis for financial outcomes shows results in the expected direction, but the difference was not statistically significant. Additionally, Type 7 (Group MTB) with team members consisting of monoknowledge individuals (one with marketing and one with technological knowledge) along with at least one multi-knowledge individual with both marketing and technological knowledge resulted in higher mean values for Innovativeness (mean = 5.79), Financial outcomes (mean = 4.71), and NPD Time efficiency (mean = 4.43) compared to other types of groups (Type 1:Group T, Type 4: Group MT, and Type 5: Group TB).

TABLE 5
ONE-WAY ANALYSIS OF VARIANCE (ANOVA)

	Type 1 Group T (n=24)	Type 4 Group MT (n=15)	Type 5 Group TB (n=75)	Type 7 Group MTB (n=57)	F-test
Innovativeness	5.53 (S.D. 1.0)	5.17 (S.D. 1.4)	5.77 (S.D. 0.8)	5.79 (S.D. 0.8)	2.32†
NPD Time efficiency	3.94 (S.D. 0.8)	3.40 (S.D. 1.1)	4.03 (S.D. 1.2)	4.43 (S.D. 1.1)	3.86*
Financial outcomes	4.50 (S.D. 1.2)	4.23 (S.D. 1.3)	4.69 (S.D. 1.3)	4.71 (S.D. 1.1)	.77

† $p < 0.10$, * $p < 0.05$

In order to explore the relationships further, we conducted a multiple pairwise comparisons analysis using the method of least significant difference (LSD) (Saville, 1990) to test each hypothesis. For Hypothesis 1, Table 6 provides the results of multiple pairwise comparisons between groups for innovativeness. As shown, teams composed of two sets of monoknowledge individuals (i.e., one with marketing knowledge and one with technological knowledge), working in conjunction with multiknowledge members (MTB) were significantly more innovative than teams comprised of only two sets of monoknowledge individuals (MT) (mean difference: -0.62). In addition, teams with monoknowledge individuals with technological knowledge (T) and multiknowledge individuals (TB) were significantly more innovative than teams with only monoknowledge individuals (MT) (mean difference: -0.60). There were no significant differences for the other team configuration comparisons. Thus, the analysis results described above (as summarized in Table 6) support Hypothesis 1 that teams with multiknowledge members will have higher performance in innovativeness than teams with monoknowledge individuals.

TABLE 6
MULTIPLE COMPARISONS BETWEEN GROUPS: INNOVATIVENESS

	Type 4 Group MT	Type 5 Group TB	Type 7 Group MTB
Type 1 Group T	.36	-.24	-.26
Type 4 Group MT		-.60*	-.62*
Type 5 Group TB			-.02

* $p < 0.05$

As for Hypothesis 2, Table 7 shows the results of multiple pair-wise comparisons between groups for time efficiency. Consistent with the results for innovativeness in Table 6 (above), the results provided in Table 7 regarding time efficiency indicate that team configurations with two sets of monoknowledge individuals (one with marketing knowledge and one with technological knowledge) combined with another set of multi knowledge individuals (MTB) were significantly more time efficient than teams with only two sets of monoknowledge individuals (MT) (mean difference: -1.03), as well as teams with one set of monoknowledge individuals with technological knowledge and a second set of multi knowledge individuals (TB) (mean difference: -0.40). Also consistent with the results for innovativeness, teams with one set of monoknowledge individuals with technological knowledge and a second set of multiknowledge individuals (TB) were marginally significantly more time efficient than teams with only two sets of monoknowledge individuals (MT) (mean differences: -0.63). Thus, in the team configurations that our sample allowed us to test, the results show that the presence of multi knowledge individuals with both forms of knowledge (marketing and technology) is significantly more innovative and time efficient than teams composed of monoknowledge individuals. Therefore, the results provide support for Hypothesis 2 that the presence of multi knowledge individuals will improve performance as measured by time efficiency.

TABLE 7
MULTIPLE COMPARISONS BETWEEN GROUPS: TIME EFFICIENCY

	Type 4 Group MT	Type 5 Group TB	Type 7 Group MTB
Type 1 Group T	.54	-.09	-.49
Type 4 Group MT		-.63†	-1.03**
Type 5 Group TB			-.40*

† $p < 0.10$, *$p < 0.05$, ** $p < 0.01$

For Hypothesis 3, since the Analysis of Variance for financial outcomes was not significant (as noted in Table 5), we did not conduct any team configuration comparisons. Hence, Hypothesis 3 is not supported.

DISCUSSION

In contrast to previous research that found equivocal results for the relationship between functional composition and NPD performance (González-Zapatero et al., 2019; Sethi et al., 2001), our study offers support for the hypotheses that the presence of multi knowledge individuals within NPD teams improves performance. Furthermore, we found that multiknowledge individuals improves performance when the other team members are monoknowledge individuals from different functions. This result suggests the equivocality of previous studies on this issue may have resulted from the unmeasured and uncontrolled inclusion of multi knowledge individuals in certain studies. Notably, Eisenhardt & Tabrizi (1995) reported positive results in functional diversity and performance in NPD teams, as well as their absence from the groups evaluated in other studies (Ancona & Caldwell, 1992) in which negative relationships occurred between functional diversity and performance in NPD teams. These findings imply that the presence of such individuals should be identified by future investigators and encouraged by management.

Furthermore, the presence of multi knowledge individuals appears, in our data, to be most strongly associated with time efficiency followed by innovativeness and then, perhaps, financial performance. This relationship implies that facilitating the rapid transfer of information between team members is a more central function than transferring new and different ideas or meeting sales and financial targets. Therefore, previous research that looked broadly at performance (Moenaert et al, 1994; Rochford & Rudelius, 1992) should be extended to examine the specific forms of performance related to participation by multi knowledge individuals.

Implications for Practice

This study offers several substantial implications for NPD practitioners. Our findings demonstrate that integration of multiknowledge individuals in an NPD team can achieve higher team innovativeness and time efficiency in developing new products. This finding can assist the managers seeking to achieve NPD outcomes by organizing the project team in a multi knowledge members' format. Moreover, our results benefit firms pursuing certain NPD outcomes in a competitive market environment. Specifically, when firms plan to accelerate their NPD speed, integrating various functional and knowledge team members should be an effective choice. Managers should realize that organizational learning behaviors such as diverse functional knowledge can benefit NPD success. Thus, organizations seeking to improve the innovativeness of their products in order to obtain a competitive advantage through differentiation in a product market should utilize current organizational practices, such as combining a diverse team structure as a crucial element.

Limitations and Future Research

Despite the relevant findings of this study, cultural issues may exist (Evanschitzky et al., 2012). Thus, further research is needed to determine whether this phenomenon is unique to highly-ranked (i.e. "excellent") technology manufacturing companies in Korea or is generalizable to other industries and locations. Also, a group consisting of multi knowledge individuals may encourage the NPD team to have social cohesion. This causes NPD members to exhibit groupthink, which limits the generation of new ideas, although it helps team members to be socially tied (Sethi et al., 2001). In addition, the results of van Knippenberg (2004) and Dayan et al. (2017) show the inverted U-shape relationship between functional diversity within NPD teams and the innovativeness of new products. Hence, the relationship between functional diversity and the performance of NPD teams may not be a simple linear relationship due to variations in the knowledge of individual members. In future research, it would be interesting to explore whether a curvilinear relationship exists between the knowledge levels that individual team members hold and NPD performance.

CONCLUSION

This study explores how the composition of new product development (NPD) teams, specifically the knowledge of individual team members, as opposed to their current job roles, influences team performance. The study focused on Korean manufacturing firms with ratings of 'excellent' based on industry standards. The findings affirm the hypotheses that NPD team members with diverse knowledge enhance innovation and time efficiency performance, whereas financial outcomes may be unaffected. In sum, team members with diverse knowledge should be considered by senior managers when forming NPD teams.

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