



Universiteit Utrecht

How does functional diversity lead to team innovation?

The roles of information elaboration and shared meta-knowledge

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Abstract

Optimal conditions for team innovation are critical for organizations to adapt to current fast-paced market. This study examines the knowledge resources of teams, through investigating how functional diversity leads to team innovation, through potential mediation of information elaboration and moderation of shared meta-knowledge. The team level analysis conducted with 37 teams revealed a significant negative relationship between functional diversity and information elaboration, and a significant positive relationship between information elaboration and team innovation. However, the results do not show a mediating effect of information elaboration or moderating effect of shared meta-knowledge. Additionally, at the individual level, results show a significant relationship between shared meta-knowledge and team innovation, mediated by information elaboration. The implications, regarding the variables that reflect the knowledge integration perspective of team innovation, have been discussed to gain a better understanding of an innovative team's cognition and to guide future research. On a practical level, teams are advised to incorporate information elaboration as a tangible step into innovation processes, highlight pro-diversity beliefs and contributions by each subgroup to minimize negative effects of functional diversity and support development of shared meta-knowledge within the team.

Keywords: functional diversity, team innovation, shared-meta knowledge, information elaboration, knowledge integration perspective

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With the rapid changes and the competition of global markets, more organizations are relying on innovation to survive. Teamwork, on the other hand, is valued for its capacity to bring together different resources to solve a complex problem, which lies in the core of innovation (Thayer, Petruzzelli & McClurg, 2018). Bearing in mind the growing reliance on teams with regards to innovation (Ilgen, Hollenbeck, Johnson, & Jundt, 2005), the academic and practical interest towards understanding how teams innovate has been growing (van Knippenberg, 2017). Team innovation is defined as “*the intentional introduction and application within a team, of ideas, processes, products or procedures new to the team, designed to significantly benefit the individual, the team, the organization, or wider society*” (West & Wallace, 1991, p. 303). The widely accepted definition of team innovation includes not only the idea creation of a new product or process, but also the implementation of it. Innovative teams should therefore engage in both divergent and convergent processes (Thayer et al., 2018).

Despite a growing body of research in team innovation, the literature is not yet mature enough to specifically determine the process leading to innovation, due to inconsistent findings and variation in effect sizes (Hülshager, Anderson & Salgado, 2009). Yet, through a comprehensive review of van Knippenberg (2017), two popular perspectives on team innovation, namely knowledge integration and team climate, have been integrated to better understand processes that lead to team innovation. The present research partially tests the integrative model that has been proposed by van Knippenberg, specifically looking into the main part of the model that explains the relationship between functional diversity, information elaboration, and team innovation, with the additional moderation of shared meta-knowledge.

Functional diversity, which is the informational resource within the model, is defined as the variation of functional attributes of team members (Knippenberg & Mell, 2016). The composition of the team is expected to influence performance, because it is related to the range of competence by members, which can be applied to the team task (Hackman, 1987). The Knippenberg model proposes that functional diversity leads to team innovation, but through the mediation of information elaboration, which is the exchange, consideration, and integration of knowledge among group members (van Knippenberg, De Dreu, & Homan, 2004). Information elaboration therefore becomes the integration process to utilize the heterogeneous information among members. Finally, to deepen the understanding on the cognitive processes of an innovative team, the current study will investigate the moderating role of shared meta-knowledge, which is defined as the knowledge of who knows what within a team, between functional diversity and information elaboration relationship.

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Taking into account the increasing need of organizations to make managerial decisions to foster innovation in teams, this study examines how innovation works and how it can be facilitated in the practical setting. It will support the existing literature by aiming to validate Knippenberg's integrative model of innovation, and examining the cognitive system that a team should embody in order to maximize the effect of its members' distributed resources. Investigating shared meta-knowledge, a variable that is reflective of a widely researched cognitive construct; this study can highlight one of the mechanisms that enable the pathway from functional diversity, to information elaboration and team innovation. All in all, the research question this research aims to tackle is; to what extent does functional diversity predict team innovation, and is this relationship mediated by information elaboration? In addition, does shared meta knowledge moderate the relationship between functional diversity and information elaboration?

Theoretical Background

Team Functional Diversity as an Informational Resource and Information Elaboration

Team composition is thought to have a powerful effect on various team outcomes, (Kozlowski & Bell, 2003), including innovation. As a compositional characteristic, team diversity has been widely analyzed in relation to team innovation (Thayer et al., 2018). Diversity is often referred to as a “double-edged sword” due to its conflicting effects on team performance, caused by the possible dysfunctionalities of a heterogeneous group (Horwitz & Horwitz, 2007). While a diverse member base can make a team more vulnerable towards interpersonal biases, miscommunication and conflict, thus negatively affect performance; it can also have a positive effect on performance by supporting innovation and decision-making through a broad range of knowledge and perspectives (Jackson & Joshi, 2011). These two diverging perspectives are referred to as social categorization and information/decision-making perspective (Williams & O'Reilly, 1998) respectively, which are mostly differentiated based on the type of diversity and the outcome that is being researched. Among the different types of diversity (gender, race, ethnicity, age, etc.), functional diversity, referred to as job-related diversity, is the one that is most strongly related to task-relevant knowledge (Joshi & Roh, 2009). Functional diversity has received little yet significant meta-analytic support (Hülsheger et al., 2009) for its positive effect on team innovation. A more recent meta-analysis has shown positive effects of diversity on creativity and innovation; and the relationship is even stronger for functional diversity (Guillaume, Dawson, Otaye-Ebede, Woods & West, 2015). This is in line with the assumption that it is the integration of diverse perspectives that enables

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accomplishing a creative task better (Knippenberg & Mell, 2016). Still, research on the effect of functional diversity on team innovation is inconclusive (Cheung, Gong, Wang, Zhou & Shi, 2016), with other findings showing a negative relationship or no relationship at all. Bearing in mind this conflicting body of research on the topic, the categorization-elaboration model (CEM) was introduced by van Ginkel and van Knippenberg to explain the complexity of diversity-performance relationship (2008). Following this approach, within his integrative model, Van Knippenberg expresses the need to understand the moderating and mediating processes that influence the link between diversity and innovation to grasp the full relationship (2017). This study aims to underpin one moderator and one mediator that allows for the positive affect of functional diversity on team innovation.

The decision to focus on functional diversity is based on the intent to explore the cognitive processes that take place within an innovative team. Functionally diverse teams embody various cognitive patterns that supply the members with a range of unusual ideas (Somech & Drach-Zahavy, 2001), and possess a range of expertise that support the team towards new ways to solve problems (Hülshager et al., 2009). Therefore, functional diversity equips the team with a toolbox of diverse expertise and knowledge to achieve innovation. Yet, as previously explained, innovation requires not only the creation of new ideas, but also their implementation. The processes needed for creativity and implementation can have conflicting demands (West, 2002), such as a relaxed environment supporting creativity in team members yet hindering the implementation process (Thayer et al., 2018). Nonetheless, functional diversity only captures the differentiation needs of innovation, via providing the team with the required knowledge resources to think in a divergent manner. However, functional diversity in itself does not explain how to bring together and integrate this knowledge and expertise (Li, Li, Lin and Liu, 2018) to achieve implementation.

How can a diverse team integrate information? Research has shown that the mere exchange of information that is distributed among members is not sufficient to yield increased performance and better decision-making (Scholten, van Knippenberg, Nijstad & De Dreu, 2007). What the team does with the information is at least as important (van Ginkel & van Knippenberg, 2009). Only the elaboration and integration of the available resources can feed the process of innovation for a team (van Knippenberg, 2017). Information elaboration, defined as *“the exchange, discussion and integration of ideas, knowledge, and insights relevant to the team’s task”* by van Ginkel and van Knippenberg (2008, p. 984), is the underlying process that brings out the positive influence of functional diversity on innovation (Jin & Sun, 2010). When the task at hand embodies information processing and decision-making aspects, as is the case

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in innovation, it is the deep consideration of task-relevant information that causes heterogeneous teams to perform better (De Dreu, 2007). In CEM, van Knippenberg, De Dreu, & Homan (2004) has suggested that functional diversity leads to information elaboration, which in return leads to a positive effect on team innovation. While task conflict has been proposed as the mediating process between diversity and its positive influence on performance, meta-analytic evidence on conflict show a negative relationship with group performance (De Dreu & Weingart, 2003). Van Knippenberg et al. (2004) propose that in cases where teams can overcome the adverse effects of conflict, conflict can mediate the positive effect on innovation; yet, this positive effect is in fact caused by a byproduct of conflict, which is the elaboration of information. In other words, it is not the conflict, but the elaboration of information caused by the conflict, that yields the positive effect of diversity on innovation. Based on these insights; this research proposes:

Hypothesis 1. Information elaboration mediates the relationship between functional diversity within a team and team innovation.

Shared Awareness of Team's Cognitive Resources: Shared Meta-Knowledge

Team characteristics are important factors that can affect the above-mentioned relationship. This research will therefore focus on the moderating role of shared meta-knowledge. According to Richter, Hirst, Van Knippenberg & Baer (2012) a team's informational resources consist of two different constructs: functional diversity and shared meta-knowledge. Shared meta-knowledge, viewed as the cognitions of team members regarding the expertise of other members (Wegner, 1995) or simply the knowledge of who knows what, is a construct that is developed in relation to the research on transactive memory systems (Wegner, 1987). According to Wegner, transactive memory system is a two component construct that refers to (a) the internal memory/knowledge of the member, and (b) a shared awareness of an external memory/knowledge that the members can locate and retrieve through other individuals, just like locating and retrieving from an external storage device. As a central aspect of transactive memory systems (Kanawattanachai & Yoo, 2007), awareness of team members' expertise allows members to turn to each other when in need of information. Thus, it creates an informational system that is greater than any individual member's own memory/knowledge (Moreland, 1999). While in traditional project teams it may be sufficient for one pivotal supervising manager to fully grasp who knows what and resort to task division; for a team that innovates through using diverse resources of all team members, the shared awareness into who knows what is crucial.

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The idea of locating distributed knowledge through shared meta-knowledge is in line with the distributed cognition theory proposed by Edwin Hutchins, which suggests to look at cognition as a distributed process among different sources (1995). Indeed, the shared understanding of where the relevant cognitive resource lies within the team, allows the members to strategize and build processes that effectively seek, locate and share information (Li et al., 2018; Mohammed & Dumville, 2001).

Research has shown interest towards the conditions that affect the extent to which teams integrate distributed information (De Dreu, Nijstad, & van Knippenberg, 2008; van Knippenberg et al., 2004). The awareness of the distribution of knowledge has proven to lead to task representations that highlight information elaboration, therefore causing more information elaboration (van Ginkel & van Knippenberg, 2009). High levels of diversity may decrease the amount of shared information (Hoever, Van Knippenberg, Van Ginkel & Barkema, 2012) and differences within a group cause risk for elaboration process due to social categorization of other team members (Homan, Hollenbeck, Humphrey, Knippenberg, Ilgen, Van Kleef, 2008). Yet, the understanding of who knows what can help members overcome the categorization that causes disruption, and determine the extent to which information can be elaborated. Awareness of how expertise is distributed, is shown to result in more information sharing and increased performance (Stasser, 1992). Similarly, Moreland (1999) suggests that the shared awareness of distributed knowledge influences a team's elaboration process through creating a framework for the contribution of each team member. Finally, the understanding of what others know can support members to infer what they need to share within their expertise (Faraj & Sproull, 2000), motivating them to provide needed information and guiding the team's search efforts in general (Richter et al., 2012).

An efficient system of locating and retrieving information within a team, which can be understood as the shared meta-knowledge within a transactive memory system, is positively related to team performance (Faraj & Sproull, 2000). A high level of expertise location is shown to be useful for effective task-knowledge coordination (Kanawattanachai & Yoo 2007) and development of innovative solutions (Peltokorpi, 2008). This influence can be explained through the successful identification of needed knowledge, ability to effectively move among tasks, and effective communication resulting from the accuracy of understanding the group resources (Austin, 2003). Similarly, locating and retrieving information that is unknown yet accessible to members creates a bigger knowledge base, to be used for creative products (Wegner, 1987).

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In sum, shared meta-knowledge is predicted to moderate between functional diversity and information elaboration. As shown, teams with higher shared meta-knowledge are able to understand and locate the information from functionally diverse members (Li et al., 2018), accessing other sources of knowledge more efficiently (Richter et al., 2012), therefore strengthening the relationship between functional diversity and information elaboration, that eventually leads to team innovation. On the other hand, in case of low shared meta-knowledge among team members, diversity of knowledge may result in the difficulty to locate the right information from other members and therefore mitigate elaboration of diverse information.

Hypothesis 2. Team's shared meta-knowledge moderates the relationship between functional diversity and information elaboration.

Complete moderated mediation model of team innovation

Finally, this research analyzes the relationship between all the above mentioned variables as a complete moderated mediation model, as seen in Figure 1.

Hypothesis 3. Shared meta knowledge will moderate the strength of the mediated relationship between functional diversity and team innovation, specifically the mediated relationship will be stronger under high shared meta-knowledge compared to low shared meta-knowledge.

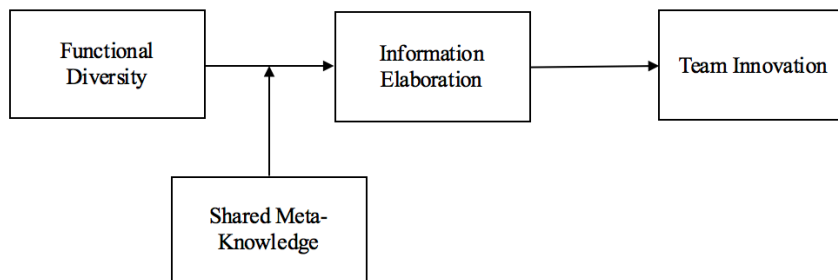


Figure 1. Proposed model of the relationship between functional diversity of a team and team innovation.

Method

Design & Procedure

For this cross sectional, quantitative study, data was collected both from team members and team leaders via online Qualtrics questionnaires. There were two questionnaires: (1) Team member questionnaire; including information elaboration and shared meta-knowledge scales (see *Appendix A*) (2) Team leader questionnaire; including functional diversity and team

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innovation scales (see *Appendix B*). The data was collected by a research group of four, with complementary models explaining team innovation; therefore the questionnaires included variables additional to the ones used in the current study. All questions were available in both Dutch and English. The participants were asked for their informed consent following information on the study, confidentiality and anonymity. The participants were then presented with demographic questions, followed by measures of the study variables.

Sample

Aiming for a team level analysis, the teams that participated in this study were chosen based on certain criteria. Firstly, the teams were expected to be comprised of at least 3 members, including the team leader. Secondly, the teams were expected to engage in innovative work, which is explained to teams during the recruitment process as “creative teams that are involved in the development of new services/products or constantly have to adapt to new ways of working.” The recruitment of the teams was done through contacting different companies and organizations around Europe, with the majority of the participation from the Netherlands. A brochure explaining the study was handed out to contact persons (see *Appendix C*). Pursuant to our multi-source analysis, team leaders and team members received different surveys that assessed different variables. 37 teams, of which a minimum of 30% of team members filled in the questionnaire were included in the analysis, which comprised of 145 individual team members excluding the 37 team leaders. Examining the sample sizes in leading articles focusing on similar constructs (Eisenbeiss, van Knippenberg & Boerner (2008), 33 teams; Anderson & West (1998), 27 teams; Bain, Mann, & Pirola-Merlo (2001), 38 teams; Paulsen, Callan, Ayoko & Saunders (2013), 29 teams), 37 teams were expected to yield significant results.

Regarding demographics of the sample, for the team leader sample ($N=37$), the average age was $M_{age} = 38.68$ ($SD_{age} = 10.83$), ranging between 26 and 68. The sample mostly consisted of males, with 81.1%, and 18.9% were females. Regarding educational level, 5.4% of the sample finished high school, 32.4% finished bachelor/higher education, 56.8% finished masters or higher education, and 5.4% replied “none of the above”.

For the team member sample ($N=144$), the average age was $M_{age} = 32.61$ ($SD_{age} = 9.47$), with a maximum of 61 and a minimum of 17. Within the sample, 58.6% were males and 41.4% were females. For educational level, 0.7% graduated from primary school, 3.4% graduated from high school, 51.7% graduated from bachelors, 42.1% graduated from masters or higher education and 2.1% replied “none of the above”. Team size within this sample varied between 3 to 16, with an average of $M_{teamsize} = 7.49$ ($SD_{teamsize} = 3.79$) team members.

Measures

Functional diversity. Functional heterogeneity was measured through Blau's (1977) heterogeneity index, which is calculated through $(1 - \sum p_i^2)$, where p_i is the proportion of a group members in each of the i categories. The maximum value of Blau's index for a team occurs when members are equally spread across categories. However, for different number of categories possible, the maximum possible value will change, and increase with number of categories (Harrison & Klein, 2007). To standardize Blau's value and create an upper limit of 1 for each group, the index value can be divided by its theoretical maximum $(k - 1)/k$, resulting in Index of Quality (Agresti & Agresti, 1978). This research used Index of Quality to measure functional diversity, as the possible categories within each team was different. In the team leader questionnaire, team leaders were asked to list the different functional categories that each team member falls under.

Information elaboration. For information elaboration, a 4-item scale originally based on Homan et al. (2008) and modified by Kearney, Gebert, & Voelpel (2009) was used. The items were measured with Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). An example item was "*The members of this team carefully consider all perspectives in an effort to generate optimal solutions*". The Cronbach's alpha for the scale was $\alpha = .88$. As a reliability value above 0.70 is considered acceptable (Nunnally, 1978), the scale was accepted as reliable.

Shared meta-knowledge. For shared meta-knowledge, a 3-item scale constructed by Richter et al. (2012) was used. The items were measured with Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). An example item was "*If I need to get expertise on a certain issue, I know exactly who to turn to in this team*". The reliability for the scale was $\alpha = .86$, therefore the scale was deemed reliable.

Team innovation. The construct was measured by the 5-item scale by Litchfield, Karakitapoğlu-Aygün, Gumusluoglu, Carter, & Hirst (2018), and team leaders were asked to elaborate on innovative processes taking place in their team over the last 12 months. The items were measured with Likert scale ranging from 1 (never) to 5 (always). An example item was "*This team gave a lot of consideration to new and alternative methods and procedures for doing their work*". The reliability for the scale was $\alpha = .83$, which is above the needed value.

Control variables. Control variables that were investigated as a part of this research were team size and team tenure, based on the literature (e.g. Li et al., 2018) showing their effect on team innovation processes. Team tenure was calculated in months, taking the mean of team tenure responses provided by team members. For team size, on the other hand, the total number

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of team members distributed into functional categories by the team leaders were used to establish consistency with the functional diversity variable.

Analysis

SPSS version 25 was used to conduct the analysis for the current study. The data from team members was collected at the individual level and aggregated to team level for the purposes of this analysis. From the 47 possible teams, those that had a participation rate below 30% were removed, in addition to the teams that did not have a team leader replying to the relevant questionnaire. The data was then checked for possible outliers, through Mahalanobis, Cook's and leverage distances. One team, that was spotted to be an outlier for all three of the mediation, moderation and mediated moderation analyses was removed from the dataset. This resulted in a final dataset of 145 individuals and 37 teams.

For the functional diversity variable, in several cases, the categories collected for Blau's Index were unclear and the team leaders were contacted to clarify the data. Then, Index of Quality for each team was calculated based on the categorization of team leaders.

In order to aggregate the individual level variable to team level (ie. information elaboration and shared meta-knowledge) and justify averaging individual scores to create a team level construct, ICC1 and ICC2 was calculated. ICC1 and ICC2 values for both constructs (for information elaboration -.02 and - .07, for shared meta-knowledge - .06 and - .27 respectively) were found to be below the cut-off scores of .12 for ICC1 (James, 1982) and .50 for ICC2 (LeBreton & Senter, 2008). However, it is argued that in cases where theory supports aggregation, due to small group sizes and low between group variance, ICC1 and ICC2 values can turn out to be unreliable. For these cases, calculating within group agreement indices can be preferable to reliability indices (Bliese, 1998). Therefore, the intraclass correlation coefficient, rWG, was calculated to be 0.84 for information elaboration and 0.90 for shared meta-knowledge, which are both far above the cut-off value of 0.70, suggesting that the within-group agreement is sufficient to aggregate the data to team level (James, Demaree, & Wolf, 1984).

PROCESS Macro, developed by Hayes (2017) was used to test for the hypotheses of this current study. To test for the mediating hypothesis (H1) investigating the mediating effect of information elaboration between functional diversity and team innovation, PROCESS Macro model 4 was used. To test for the moderating hypothesis (H2), examining the moderation of shared meta-knowledge between functional diversity and information elaboration, PROCESS Macro model 1 was used. Finally, to test for the complete model (H3) where shared meta-

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knowledge is expected to moderate the strength of the mediated relationship between functional diversity and team innovation, PROCESS Macro model 7 was utilized.

Results

Team Level Analysis

The present study analyses the relationship between variables functional diversity and team innovation provided by team leaders, and information elaboration and shared meta-knowledge variables aggregated to the team level.

To start with, correlations between the variables of the study were investigated. Table 1 shows the mean, standard deviation and Pearson correlations for the variables. The only significant correlation was between functional diversity and information elaboration, $r(37) = -.39$, $p < .05$. This implies functional diversity is negatively correlated with information elaboration, and this result will be interesting to analyze along with the analysis of the moderation model.

Table 1.

Means, standard deviations and correlation matrix depicting the variables at the team level

	Mean	SD	FD	IE	SMK	TI	TS	TT
FD	0.80	0.15	-					
IE	4.12	0.47	-.39*	-				
SMK	4.43	0.36	.20	.08	-			
TI	3.82	0.56	.19	.32	.17	-		
TS	7.49	3.79	.17	-.12	.12	.00	-	
TT	24.45	20.87	.05	-.12	.10	-.28	.07	-

Notes. $N = 37$ teams. * $p < .05$ FD = Functional Diversity, IE = Information Elaboration, SMK = Shared Meta-knowledge, TI = Team Innovation, TS = Team Size, TT = Team Tenure

Firstly, hypothesis 1 has been tested through PROCESS Macro model 4, to analyze for mediation. The results are displayed in Table 2. Functional diversity is negatively and significantly predicting information elaboration ($b = -1.17$, $t(33) = -2.24$, $p < .05$). In addition, information elaboration is positively and significantly related to team innovation ($b = 0.51$, $t(32) = 2.64$, $p < .05$). While the total effect between functional diversity and team innovation is found to be positive but non-significant ($b = 0.76$, $t(33) = 1.24$, $p = .222$), once the indirect effect of mediation is taken into account, the direct effect between functional diversity and team innovation shows a significant positive relationship ($b = 1.37$, $t(32) = 2.25$, $p < .05$) (for a path diagram showing the relationship, see *Appendix D*). Finally, the indirect effect of the

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independent variable, functional diversity, on the dependent variable team innovation, through information elaboration, is not significant (Indirect = - 0.61, SE = 0.44, 95% CI [- 1.62, 0.04], resulting in no significant mediation effect. Therefore, hypothesis 1 is rejected.

Table 2
Results of mediation analysis

	<i>b</i>	<i>SE b</i>	<i>t</i>	<i>R</i> ²
<i>Direct effect on information elaboration F(3,33)= 2.18 p=.109</i>				.17
Functional diversity	- 1.17*	0.50	- 2.34	
Control Variable: Team size	- 0.01	0.02	- .31	
Control Variable: Team tenure	- 0.00	0.00	- .62	
<i>Direct effect on team innovation F(4,32)= 3.05 p<.05</i>				.28
Functional diversity	1.37*	0.61	2.25	
Information elaboration	0.52*	0.20	2.64	
Control Variable: Team size	0.00	0.02	0.06	
Control Variable: Team tenure	- 0.01	0.00	- 1.60	
<i>Total effect of functional diversity on team innovation F(3,33)= 1.48 p=.238</i>				.12
Functional Diversity	0.76	0.61	1.24	
<i>Indirect effect of functional diversity on team innovation</i>				
Boot indirect effect		Boot SE	LL 95% CI	UL 95% CI
Information elaboration	- 0.61	0.44	- 1.60	.04

Notes: *N* = 37. * *p* < .05. Bootstrap sample size = 5000.

Secondly, PROCESS Macro model 1 for moderation has been used to test for hypothesis 2. The result of this analysis can be found in Table 3. As a main effect, functional diversity is again found to be a significant predictor of information elaboration ($b = - 1.49$, $t(31) = - 2.91$ $p < .01$). However, the effect of shared-meta knowledge, or the interaction effect, has not shown any significant effect. The simple slopes showing the interaction effect can be seen in Figure 2. Based on the results, Hypothesis 2 is rejected.

Thirdly, PROCESS Macro model 7 has been used to analyze the overall moderated mediation model. The results, displayed in Table 4, show that functional diversity is significantly related to information elaboration, controlling for shared meta-knowledge ($b = - 1.49$, $t(31) = - 2.91$ $p < .01$), yet exhibit no significance for shared meta-knowledge predicting information elaboration. In addition, the interaction effect is not significant either. Similarly, no moderated mediation effect has been found (Index = - 1.12, SE = 1.06, 95% CI [- 3.90, 0.10]. Therefore, Hypothesis 3 is rejected.

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Finally, team tenure and team size has not shown any significant relationship with information elaboration or team innovation.

Table 3

Results of moderation analysis

	<i>b</i>	<i>SE b</i>	<i>t</i>	<i>R</i> ²
<i>Effect on Information elaboration $F(5,31) = 2,21$ $p = .078$</i>				.26
Functional diversity	- 1.49**	0.51	- 2.91	
Shared meta-knowledge	0.19	0.21	0.92	
Interaction	- 2.17	1.29	- 1.68	
Control Variable: Team size	- 0.01	0.02	- 0.55	
Control Variable: Team tenure	- 0.00	0.00	- 0.96	
<i>Unconditional interaction</i>				
	<i>F</i>	<i>df1</i>	<i>df2</i>	<i>R</i> ² change
Shared meta-knowledge	2.83	1	31	.07

*Notes: N = 37. ** $p < .01$ * $p < .05$. Bootstrap sample size = 5000.*

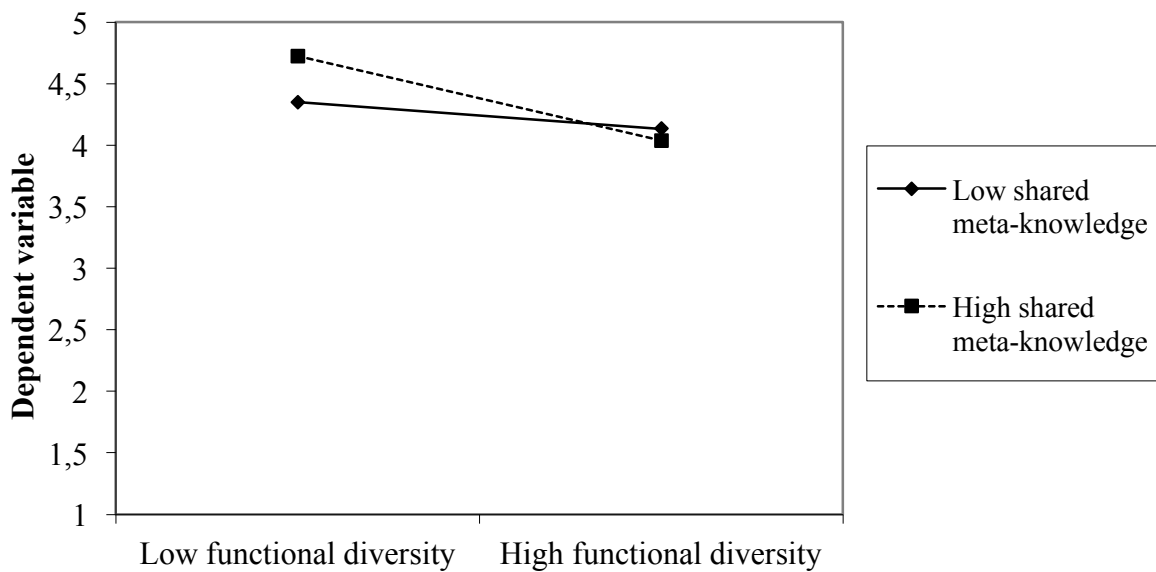


Figure 2. Interaction of functional diversity and shared meta-knowledge on information elaboration.

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Table 4

Results of moderated mediation analysis (overall model)

	<i>b</i>	<i>SE b</i>	<i>t</i>	<i>R</i> ²
<i>Direct effect on information elaboration $F(5,31) = 2.21$ $p = .078$</i>				.25
Functional diversity	- 1.49**	0.51	- 2.91	
Shared meta-knowledge	0.19	0.21	0.92	
Interaction	- 2.17	1.29	- 1.68	
Control Variable: Team size	- 0.01	0.02	- 0.55	
Control Variable: Team tenure	- 0.00	0.00	- 0.96	
<i>Direct effect on team innovation $F(4,32) = 3.05$ $p < .05$</i>				.28
Functional diversity	1.37*	0.61	2.25	
Information elaboration	0.52*	0.20	2.64	
Control Variable: Team size	0.00	0.02	0.06	
Control Variable: Team tenure	- 0.01	0.00	- 1.60	
<i>Conditional indirect effects of functional diversity on team innovation</i>				
Boot indirect effect	Effect	Boot SE	LL 95% CI	UL 95% CI
Meta (-1SD from mean)	- 0.37	0.39	- 1.22	0.30
Meta (mean)	- 0.77	0.51	- 1.98	0.00
Meta (+1SD from mean)	- 1.16	0.81	- 3.15	0.00
<i>Index of moderated mediation</i>	- 1.12	1.06	- 3.90	0.10

Notes: $N = 37$. ** $p < .01$ * $p < .05$. Bootstrap sample size = 5000.

Supplementary Analysis at the Individual Level

In addition to team level analysis, considering the low values of ICC, an additional analysis on the individual level was conducted to provide additional insight into the model. Information elaboration and shared meta-knowledge were measured at the individual level. Team innovation was also measured at the individual level and rated by the team members themselves to be utilized in case the data could not have been aggregated due to insufficient ICC and rWG values. Since functional diversity has only been measured at the team level; shared-meta knowledge, information elaboration and team diversity were the only variables that could be used for the individual analysis, along with team size and team tenure measured at the individual level. As seen in Figure 3, when functional diversity is removed from the model, the existing relationship among the variables reflect a mediation of information elaboration between shared meta-knowledge and team diversity. This remaining part of the model has been analyzed for mediation with PROCESS Macro model 4. For this analysis, the sample size was $N=145$, due to two missing values spotted in individual level data on team innovation.

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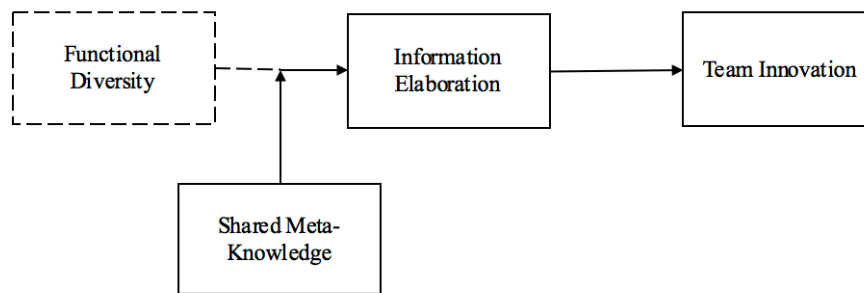


Figure 3. Information elaboration mediating the relationship between shared-meta knowledge and team innovation, excluding functional diversity.

The results of the individual level analysis, regarding information elaboration mediating the relationship between shared meta-knowledge and team innovation yields significant results. Path a, shared meta-knowledge predicting information elaboration is significant ($b = 0.38$, $t(141) = 3.81$, $p < .001$). In addition, path b, between information elaboration and team innovation is also significant $b = 0.30$, $t(140) = 4.21$, $p < .001$). The total effect of shared meta-knowledge on team innovation (c path) is not significant ($b = 0.16$, $t(141) = 1.77$, $p = .079$). Finally, the indirect effect of x on y through information elaboration is found to be significant (Indirect = 0.11, SE = 0.06, 95% CI [0.02, 0.24]), proving a mediation relationship.

Discussion

This study focused on investigating the effect of functional diversity on team innovation, mediated by information elaboration. In addition, the relationship between functional diversity and information elaboration was expected to be moderated by shared meta-knowledge. The results did not support the hypotheses; therefore, all hypotheses have been rejected. However, some interesting patterns between the study variables have been found.

Looking more closely into the results at the team level, the interactions between the variables in the mediation analysis provide valuable insights. The significant relationships identified within the analysis show that functional diversity is negatively related to information elaboration ($b = -1.17$), which constitutes a path of the mediation analysis. Similarly, information elaboration is positively related to team innovation ($b = 0.51$) which shows a significant b path. While the c path, showing the total effect between functional diversity and team innovation is found to be non-significant ($b = 0.76$), once the indirect effect of mediation is taken into account, the direct c' path yields a significant relationship between the two variables ($b = 1.37$), which is also bigger in magnitude than the total effect. This means that

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when information elaboration is controlled for, the direct effect of functional diversity on team innovation becomes bigger and significant. The overall model shows that functional diversity may lead to a decrease in information elaboration, which may suppress the effect of functional diversity on team innovation. To understand this relationship further, the mediation typology can be examined. The traditional mediation analysis by Baron and Kenny (1986) requires three equations (for path a, b, and c) to be significant, while there are divergent views on how to measure mediation. Zhao, Lynch and Chen (2010) focus on the indirect and the direct effect, and use Baron and Kenny's classification help to understand the typology of the mediation at hand. In their opinion, lack of a significant total effect or a non-zero direct effect may merely reflect the existence of other possible omitted mediators between the independent and dependent variable. For the present research, the non-significant a x b and the significant direct effect would be classified as "direct-only no mediation", and show that there may be other mediators within this relationship that is resulting in a significant positive path when the effect of information elaboration is controlled for.

Looking more closely at each relationship in the mediation process, the negative relationship between functional diversity and information elaboration can be explained by various factors. While there are lines of research suggesting functional diversity should lead to information elaboration, such as CEM, there are also findings that show functional diversity to impede information elaboration, through the uncertainty and risk of sharing knowledge with members that are functionally dissimilar (Cheung et al., 2016). This negative relationship may also be caused by salience of subgroup identities and categorization, creating a barrier for information elaboration to occur (Homan et al., 2008). Further, it has been shown that high levels of diversity may inhibit knowledge sharing and communication between members (Hoever et al., 2012). Some processes are proposed in the literature to facilitate information elaboration in diverse teams (Hoever et al., 2012), mostly by motivating members of a team to understand the need to share, such as pro-diversity beliefs (Homan, Van Knippenberg, Van Kleef & De Dreu, 2007), reward structures inducing a superordinate identity (Homan et al., 2008) and shared task-understanding (van Ginkel & van Knippenberg, 2008).

On the other hand, the significant relationship between information elaboration and team innovation show the importance of discussion and integration of task-relevant information, as suggested by the integrative model of team innovation by Knippenberg (2017). While the mediation relationship has not been supported statistically, this significant relationship supports CEM and the theoretical approach that aims to replace task conflict with

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information elaboration, as a variable that motivates the team to integrate information (Van Knippenberg et al., 2004).

While the total effect of functional diversity on team innovation is not statistically significant, the direction of the relationships between the three variables set basis for an interesting discussion. The fact that functional diversity and information elaboration are negatively correlated, yet each of these variables are positively correlated with team innovation, could suggest a cooperative suppression between these three variables. This condition would appear when each of the variables account for more of the variance in the dependent variable when it is in an equation with the other, compared to when the variable is presented alone (Howell, D. C, 2001). Such a relationship would suggest that functional diversity and information elaboration will suppress the variance in each other that is irrelevant to team innovation, and explain more of the variance in team innovation when each other are existent. Regarding this relationship, it should also be underlined that meta-analytic support has been found for functional diversity to show differential relationships with team innovation, both for size and direction of effect (Hülsheger, 2009), proving its complexity. Team tenure, high cohesion and existence of shared mental models have been proposed as conditions that support a positive relationship between functional diversity and innovation (Kozlowski& Bell, 2003). The present research has focused on two of these constructs, team tenure and shared meta-knowledge as a sub category of shared mental models, in order to realize the positive relationship. The limitations will be discussed below regarding why team tenure and shared meta-knowledge may not have yielded the expected results.

At the team level, results show that shared meta-knowledge does not significantly change the ability of heterogeneous teams to elaborate on distributed information. This could be caused by established mechanisms and the environment within a team that account for sharing and asking for relevant information, even without the interaction effect of knowledge on who knows what. Within a well-functioning team with participative safety, members feel free to participate, which increases elaboration of information (Somech, 2006). In such a team, members may ask for help to seek the relevant information that is needed for elaboration, regardless of the level of shared meta-knowledge. Furthermore, even though the interaction between functional diversity and shared meta-knowledge was not significant, the simple slopes show a trend of high levels of shared meta-knowledge resulting in more information elaboration in teams with low functional diversity; yet resulting in even less information elaboration in functionally diverse teams. This can possibly flag a condition in which at high levels of shared meta-knowledge within a diverse team may result in even less elaboration of information

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because members do not ask for, seek or share information; assuming that they already know what the other person's expertise or knowledge resource is. This condition may motivate members towards task division and may decrease information elaboration. On the other hand, a diverse team may still need to discuss the distributed information more when they lack the knowledge of who knows what, resulting in more elaboration. More research is needed to see if this trend yields significant results.

Finally, the individual level results show the mediation of information elaboration between shared meta-knowledge and team innovation, without a significant total effect between shared meta-knowledge and team innovation. This additional analysis shows that when team members are aware of complete knowledge resources and external memory distributed around the team members, this increases the sharing and integration of task related information, which in turn increases team innovation. This is in line with the expected effect of shared meta-knowledge on information elaboration (van Ginkel & van Knippenberg, 2009). The lack of a total effect can be explained by omitted mediators between shared meta-knowledge and team innovation, such as task representations that emphasize elaboration (van Ginkel & van Knippenberg, 2009) or individual factors such as creative self-efficacy, proven to mediate between shared meta-knowledge and creative behavior (Fan, Chang, Albanese, Wu, Yu & Chuang, 2016).

Managerial Implications

The significant relationship between information elaboration and team innovation validates the CEM partially, showing that the integration of task-related distributed information positively predicts team innovation. Organizations and team leaders are advised to establish information elaboration as a clear step in the team's innovation process. To achieve that, constant communication channels, online and offline, should be established among members, so that the exchange of information can be achieved seamlessly. This issue becomes an even bigger necessity for virtual teams, who need to establish of the right communication tools to be able to exchange and integrate knowledge resources. In addition, it is advised for team members to question whether they have exchanged, considered and integrated all the resources that are available. Team reflexivity, the explicit reflection of a team on past processes to plan for future, can be utilized to prevent information-processing failures (Schipper, Edmondson & West, 2014), so that elaboration of task-relevant information gets more efficient over time. Reflexivity has also been proposed to increase knowledge integration, which in turn would increase the creation of novel ideas (Salazar, Lant, Fiore & Salas, 2012). Finally, in order to ensure that

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teams elaborate on the existing knowledge resources, methodologies such as design thinking (Brown, 2008) can be incorporated as a regular practice for different parts of the innovation process. Design thinking requires iterative information elaboration by its nature, so using these specific tools can help teams monitor whether necessary conditions are established to foster innovation.

Looking into the relationship between functional diversity and information elaboration, it is important to mitigate the negative effects of functional diversity, so that information elaboration does not suffer. Salient differences between members are shown to disrupt elaboration through less willingness towards communication of ideas (van Knippenberg et al., 2004). One effective remedy could be increasing pro-diversity beliefs among team members. Pro-diversity beliefs have been proven to increase information elaboration within diverse teams, through motivating members to value information from diverse resources in order to achieve better performance (Homan et al., 2007). Within organizations, pro-diversity beliefs can be assessed at the team level, and benefits of diversity can be a part of learning and development for innovative teams, to change the attitude of members. A second issue arising within diverse teams that decrease information elaboration could be related to sense of security of members. For collaboration between functionally diverse groups to work, organizations are advised to provide reassurance about the group's distinctive value within the organization, and prevent any feeling of threat towards losing power or control over their territory of work (Kwan, 2019). Similarly, especially in teams where members are recently brought together to innovate, team leaders could emphasize the distinctive value and contribution that each member or function group brings to the table. When each function group feels safe about their territory within the work, they would be able to contribute to knowledge integration processes without being threatened about a decreasing value regarding their own group identity. Reward structures that induce a superordinate identity can be similarly used to emphasize the value that each member gains by being a part of an overarching team identity.

Finally, with regards to individual data showing the mediation of information elaboration between shared meta-knowledge and team innovation, teams are advised to create a mental map of their knowledge resources. Interaction and open sharing among members, as well as discussions regarding task failures are advised in order to support the establishment of "who knows what" and skills identification as accurately as possible in the minds of members (Fan et al., 2016). In addition, it is important to keep in mind that this map of distributed knowledge resources is subject to change, not only through inflow and outflow of members, but also through new skills that members develop and sharpen every day. Team leaders should

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therefore be aware of this living team memory, and create recurrent evaluations of meta-knowledge to make sure it is up to date to support the team towards innovation to the fullest.

Limitations and Future Research

While interpreting the results, and setting direction for the future research, certain limitations and learnings from this study can be taken into account. Firstly, the sample size of 37 teams could be considered a limit. On one hand, similar studies found the number of teams to be sufficient to get significant results, and the diverse representation of teams within this sample accounts for a wide representation. Nonetheless, the sample size may still be the reason why some of the relationships in our analyses lacked statistical power. Therefore, there would be value in repeating this study with a bigger sample size, in order to uncover some of the possible significant effects.

Secondly, our functional diversity scale, Blau's Index (1977), which required team leaders to categorize team members according to their functions, may have caused some difficulty for respondents. The recoding of data has yielded some confusion from team leaders, as the replies show that team leaders have different ideas of what a "function" within the team would entail. Elaboration of what is meant by "different functions", and a calibration among different leader's replies could be used to increase the validity of Blau's Index, especially in a study where different types of teams from different organizations and sectors are recruited. Future research may consider such mechanisms to mitigate this effect, or opt for alternate scales.

Finally, this study gathers team level data from different sources, and therefore minimizes the response bias by having multi-source respondents. However, there may still be some limitations regarding response bias. For short scales, high levels of Cronbach's alpha, above the cut of score of .70 may flag response bias, showing that subjects may have provided similar answers to items that are measuring the same construct. For future research, it is advised to randomize the items from different scales to resist this tendency of replying similarly to related items.

Taking into account the insights regarding the mediation analysis; further research can examine the possible cooperative suppression between functional diversity and information elaboration on team innovation. More research looking into omitted mediators between functional diversity and team innovation, as well as shared meta-knowledge and team innovation would be valuable for the literature to deepen the understanding into the cognitive resources and processes of a diverse team and team innovation. To further support managerial

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implications of these processes, team reflexivity in relation to information elaboration can be studied, to see whether reflexivity can realize the need for continuous information elaboration in team settings. Finally, as previously discussed, pro-diversity beliefs and safety within teams could moderate the relationship between functional diversity and information elaboration, and further investigation into their individual and combined effect can help alleviate the negative effects of functional diversity on information elaboration.

Conclusion

The present research investigated the relationship between functional diversity and team innovation, through the mediating effect of information elaboration and moderating effect of shared meta-knowledge. The results at the team level indicate that information elaboration predicts team innovation, and that functional diversity negatively affects information elaboration. At the individual level, the relationship between shared meta-knowledge and team innovation is shown to be mediated by information elaboration. Organizations are therefore advised to integrate information elaboration as an ongoing process within their ways of working, focus efforts on mitigating the negative effects of functional diversity on this process, and support team members to build an awareness into distributed knowledge resources.

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Appendix

Appendix A: Team Member Questionnaires

Teamleden vragenlijst

Wij zijn een onderzoeksgroep van masterstudenten onder leiding van dr. S.M. Ceri-Booms en wij doen namens de Universiteit Utrecht onderzoek naar de verschillende factoren die invloed hebben op teaminnovatie.

Deze vragenlijst wordt op individueel niveau door de teamleden ingevuld en duurt ongeveer 7-12 minuten. Van het team dient minimaal 50% van het team de vragenlijst in te vullen. De gegevens zullen anoniem en vertrouwelijk worden behandeld. De knop rechtsonder geeft u de mogelijkheid om te starten met het onderzoek.

Dank u voor uw tijd.

Team member questionnaire

As a group of masters students at Utrecht University, lead by Dr. S. M. Ceri-Booms, our aim with this research is to understand the factors that influence team innovation, in a novel way that combines previous approaches in the literature. We appreciate your participation in our Team Innovation research.

The questionnaire will be filled out by team members and it will approximately take 7-12 minutes. A minimum of 50% of the team members need to fill in the questionnaire. We would like to remind you that the workplace and the identity of the participants will be kept anonymous and all information will be treated confidentially. Please proceed to the next page to find.

Thank you for your time.

Consent

Ik verklaar op een voor mij duidelijke wijze te zijn ingelicht over de aard, methode, doel en belasting van het onderzoek. Ik weet dat de gegevens en resultaten anoniem en vertrouwelijk behandeld zullen worden. Tijdens mijn deelname zal ik de gegevens nauwkeurig en naar waarheid invullen.

I am informed about the nature, method, goal and duration of the research. I am aware of my anonymity and the discretion with which the data will be treated. I will fill in this questionnaire accurately and truthfully.

☐ Ik ga akkoord/ I agree

Company Naam van uw bedrijf/ Name of your company

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Teamnaam/ Name of the team

Uw functie binnen het team/ Function within the team

Vul uw geslacht in alstublieft/ Please indicate your gender

- ☐ Man/ Male
- ☐ Vrouw/ Female
- ☐ Anders/ Other

Hoogst afgeronde opleiding/ Please indicate your educational level

- ☐ Basisonderwijs/ Primary school
- ☐ VMBO/HAVO/VWO/ High school
- ☐ MBO/HBO/ WO bachelor/ Higher education
- ☐ WO master/ University master
- ☐ Anders namelijk/ None of the above _____

Geef uw leeftijd aan/ Please indicate your age

Hoe lang werkt u al voor dit bedrijf?/ How long have you worked for this company?

Hoeveel jaar werkervaring heeft u?/ How many years of work experience have you got?

Hoe lang werkt u al in uw huidige team?/ How long have you worked in your current team?

Uit hoeveel mensen bestaat uw team?/ How many people does your team consist of?

Wat is de huidige omvang van het bedrijf?/ What is the current size of the company?

- ☐ 1-50 Werknemers/ Employees
- ☐ 50-100 Werknemers/ Employees
- ☐ 100-150 Werknemers/ Employees
- ☐ 150-250 Werknemers/ Employees
- ☐ 250+ Werknemers/ Employees

HOW DOES FUNCTIONAL DIVERSITY LEAD TO TEAM INNOVATION?

Appendix A.1. Information elaboration (Kearney, Gebert, & Voelpel, 2009)

	<i>Strongly disagree</i>			<i>Strongly agree</i>	
	1	2	3	4	5
1. De teamleden vullen elkaar aan door hun kennis openlijk te delen./ The members of this team complement each other by openly sharing their knowledge.	1	2	3	4	5
2. De teamleden overwegen alle mogelijke perspectieven om tot een optimale oplossing te komen./ The members of this team carefully consider all perspectives in an effort to generate optimal solutions.	1	2	3	4	5
3. De teamleden houden rekening met de unieke informatie die door elk afzonderlijk teamlid wordt verstrekt./ The members of this team carefully consider the unique information provided by each individual team member.	1	2	3	4	5
4. Als een team genereren we ideeën en oplossingen die veel beter zijn, dan wanneer we deze zouden ontwikkelen als individuen./ As a team, we generate ideas and solutions that are much better than those we could develop as individuals.	1	2	3	4	5
1 = Strongly disagree, 2 = Disagree, 3 = Undecided, 4 = Agree, 5 = Strongly agree					

Appendix A.2. Shared meta-knowledge (Richter et al., 2012)

	<i>Strongly disagree</i>			<i>Strongly agree</i>	
	1	2	3	4	5
1. Als ik expertise over een bepaald onderwerp nodig heb, weet ik precies wie ik in dit team moet bereiken./ If I need to get expertise on a certain issue, I know exactly who to turn to in this team.	1	2	3	4	5
2. Ik weet welke teamleden expertise hebben op specifieke gebieden./ I know which team members have expertise in specific areas.	1	2	3	4	5
3. Ik heb een goed begrip van wie wat weet in dit team./ I have a good understanding of 'who knows what' in this team.	1	2	3	4	5
1 = Strongly disagree, 2 = Disagree, 3 = Undecided, 4 = Agree, 5 = Strongly agree					

HOW DOES FUNCTIONAL DIVERSITY LEAD TO TEAM INNOVATION?

Appendix A.3. Team Innovation (Litchfield, Karakitapoğlu-Aygün, Gumusluoglu, Carter, & Hirst, 2018)

Geef uw mening over de volgende verklaringen voor de periode van de afgelopen 12 maanden./ Please indicate your views on the following statement regarding the last 12 months.

	<i>Strongly disagree</i>			<i>Strongly agree</i>	
	1	2	3	4	5
1. Teamleden implementeren vaak nieuwe ideeën om de kwaliteit van de producten en diensten te verbeteren./ Team members often implement new ideas to improve the quality of our products and services					
2. Dit team besteedt veel aandacht aan nieuwe en alternatieve methoden en procedures om hun werk te doen./ This team gives a lot of consideration to new and alternative methods and procedures for doing their work					
3. Teamleden produceren vaak nieuwe diensten, methoden of procedures./ Team members often produce new services, methods, or procedures					
4. Dit is een innovatief team./ This is an innovative team					
5. Dit team creëert nieuwe ideeën voor lastige problemen en vraagstukken./ This team creates new ideas for difficult issues					

1 = Strongly disagree, 2 = Disagree, 3 = Undecided, 4 = Agree, 5 = Strongly agree

HOW DOES FUNCTIONAL DIVERSITY LEAD TO TEAM INNOVATION?

Appendix B: Team Leader Questionnaires

Teamleider vragenlijst

Wij zijn een onderzoeksgroep van masterstudenten onder leiding van dr. S.M. Ceri-Booms en wij doen namens de Universiteit Utrecht onderzoek naar de verschillende factoren die invloed hebben op teaminnovatie.

Deze teamleider vragenlijst wordt alleen door de teamleider ingevuld, of door iemand die een goed overzicht heeft van het team. De vragenlijst duurt ongeveer 3-5 minuten. De gegevens zullen anoniem en vertrouwelijk worden behandeld. De knop rechtsonder geeft u de mogelijkheid om te starten met het onderzoek.

Dank u voor uw tijd.

Team leader questionnaire

As a group of masters students at Utrecht University, led by Dr. S. M. Ceri-Booms, our aim with this research is to understand the factors that influence team innovation, in a novel way that combines previous approaches in the literature. We appreciate your participation in our team innovation research.

The team leader questionnaire will be filled out by the team leader or someone who has a clear overview of the team, and it will approximately take 3-5 minutes. We would like to remind you that the workplace and the identity of the participants will be kept anonymous and all information will be treated confidentially. Please proceed to the next page to find the questionnaire.

Thank you for your time.

Consent

Ik verklaar op een voor mij duidelijke wijze te zijn ingelicht over de aard, methode, doel en belasting van het onderzoek. Ik weet dat de gegevens en resultaten anoniem en vertrouwelijk behandeld zullen worden. Tijdens mijn deelname zal ik de gegevens nauwkeurig en naar waarheid invullen.

I am informed about the nature, method, goal and duration of the research. I am aware of my anonymity and the discretion with which the data will be treated. I will fill in this questionnaire accurately and truthfully.

☐ Ik ga akkoord/ I agree

Company Naam van uw bedrijf/ Name of your company

Teamnaam/ Name of the team

HOW DOES FUNCTIONAL DIVERSITY LEAD TO TEAM INNOVATION?

Uw functie binnen het team/ Function within the team

Vul uw geslacht in alstublieft/ Please indicate your gender

- ☐ Man/ Male
- ☐ Vrouw/ Female
- ☐ Anders/ Other

Hoogst afgeronde opleiding/ Please indicate your educational level

- ☐ Basisonderwijs/ Primary school
 - ☐ VMBO/HAVO/VWO/ High school
 - ☐ MBO/HBO/ WO bachelor/ Higher education
 - ☐ WO master/ University master
 - ☐ Anders namelijk/ None of the above
-

Geef uw leeftijd aan/ Please indicate your age

Hoe lang werkt u al voor dit bedrijf?/ How long have you worked for this company?

Hoeveel jaar werkervaring heeft u?/ How many years of work experience have you got?

Hoe lang werkt u al in uw huidige team?/ How long have you worked in your current team?

Uit hoeveel mensen bestaat uw team?/ How many people does your team consist of?

Wat is de huidige omvang van het bedrijf?/ What is the current size of the company?

- ☐ 1-50 Werknemers/ Employees
- ☐ 50-100 Werknemers/ Employees
- ☐ 100-150 Werknemers/ Employees
- ☐ 150-250 Werknemers/ Employees
- ☐ 250+ Werknemers/ Employees

Appendix B.1. Functional Diversity (Blau, 1977)

Noteer de functie of expertise van uw teamleden in het team (voeg jezelf alsjeblieft toe)/
Please write down your team members' function or expertise within the team (please include yourself)

Team Member 1 _____
Team Member 2 _____
Team Member 3 _____
Team Member 4 _____

HOW DOES FUNCTIONAL DIVERSITY LEAD TO TEAM INNOVATION?

Team Member 5 _____

...

Over het algemeen, hoeveel verschillende expertises heeft u in uw team?/ Overall, how many different expertise do you have in your team?

Appendix B.2. Team Innovation (Litchfield, Karakitapoğlu-Aygün, Gumusluoglu, Carter, & Hirst, 2018)

Geef uw mening over de volgende verklaringen voor de periode van de afgelopen 12 maanden./ Please indicate your views on the following statement regarding the last 12 months.

	<i>Strongly disagree</i>			<i>Strongly agree</i>	
	1	2	3	4	5
6. Teamleden implementeren vaak nieuwe ideeën om de kwaliteit van de producten en diensten te verbeteren./ Team members often implement new ideas to improve the quality of our products and services	1	2	3	4	5
7. Dit team besteedt veel aandacht aan nieuwe en alternatieve methoden en procedures om hun werk te doen./ This team gives a lot of consideration to new and alternative methods and procedures for doing their work	1	2	3	4	5
8. Teamleden produceren vaak nieuwe diensten, methoden of procedures./ Team members often produce new services, methods, or procedures	1	2	3	4	5
9. Dit is een innovatief team./ This is an innovative team	1	2	3	4	5
10. Dit team creëert nieuwe ideeën voor lastige problemen en vraagstukken./ This team creates new ideas for difficult issues	1	2	3	4	5

1 = Strongly disagree, 2 = Disagree, 3 = Undecided, 4 = Agree, 5 = Strongly agree

HOW DOES FUNCTIONAL DIVERSITY LEAD TO TEAM INNOVATION?

Appendix C: Brochure

Appendix C.1. Brochure in English



Research on team innovation

Dear Sir / Madam,

Our research group of master students at Utrecht University, led by dr. S.M. Ceri-Booms, is investigating various factors that influence team innovation. The target group of this research are teams within creative and innovative companies. We are looking for creative teams that are involved in the development of new services/products or constantly have to adapt to new ways of working.

Based on the found results, statements can be made about the ideal conditions for innovation within teams. The present research focuses on teams as a whole and is unique in its kind and its considerable size. Some of the different factors that will be investigated are:

- Information elaboration
- Shared team vision
- Functional diversity
- Participative leadership

What does this research mean for you:



The questionnaire will take up between 7-12 minutes to fill out



The questionnaire needs to be filled out by at least 50% of the team members



The team leader will fill out a different questionnaire that will take up to 3 minutes to fill out



The questionnaire is available digitally or on paper



The results of the research will be shared with your company after the research is done



The data will be anonymous and will be treated confidentially

Appendix C.2. Brochure in Dutch



Onderzoek naar teaminnovatie

Geachte heer/mevrouw,

Onze onderzoeksgroep van masterstudenten, onder leiding van dr. S.M. Ceri-Booms, onderzoekt namens de Universiteit Utrecht verschillende factoren die invloed hebben op teaminnovatie. De doelgroep van dit onderzoek zijn teams binnen creatieve en innoverende bedrijven. Wij zijn op zoek naar creatieve teams die zich bezighouden met het ontwikkelen van nieuwe diensten/producten of werkwijzen.

Op basis van de gevonden uitkomsten kunnen er uitspraken gedaan worden over de ideale omstandigheden voor innovatie binnen teams. Het onderhavig onderzoek focust op teams in zijn geheel en is uniek in zijn soort en zijn aanzienlijke omvang. Een aantal van de verschillende factoren die onderzocht zullen worden zijn:

- Informatie uitwisseling
- Gedeelde teamvisie
- Functionele diversiteit
- Participerend leiderschap

Wat betekent het onderzoek voor u:



De vragenlijst voor de teamleden duurt 7-12 minuten



De vragenlijst dient door minimaal 50% van de teamleden te worden ingevuld



De teamleider vult een aparte vragenlijst in, deze duurt 1 minuut



De vragenlijst is digitaal of op papier beschikbaar



De resultaten worden achteraf met uw bedrijf gedeeld



De gegevens zijn anoniem en worden vertrouwelijk behandeld

HOW DOES FUNCTIONAL DIVERSITY LEAD TO TEAM INNOVATION?

Appendix D: Mediation Analysis Path Diagram

