

The Complementarity of Team Meetings and Cross-Functional Communication: Empirical Evidence From New Services Development Teams

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Abstract

This article investigates the respective influence of two different forms of communication on performance in new services development teams, namely, formal *team meetings* and informal *cross-functional communication*. Based on the work by Gebert and colleagues, the authors suggest a complementary relationship between these two forms of communication. They posit that *team meetings* enhance knowledge integration but may challenge knowledge generation. Inversely, they posit that *cross-functional communication* fosters knowledge generation but hinders knowledge integration. The authors therefore expect that cross-functional communication and team meetings will interact to predict team performance. A study on 55 new services development teams in consulting and financial services confirmed the authors' hypothesis.

Keywords

cross-functional communication, team meetings, knowledge generation, knowledge integration, new services development teams

New services development (NSD) has been recognized as an increasingly important yet underinvestigated field of research. According to Menor (2000, p. 138), a new service is defined "as an offering not previously available to a firm's customers resulting from the addition of a service offering or changes in the service concept that allow for the service offering to be made available." NSD teams are charged with the task to create those offerings. They constitute a relevant field of study, since service organizations are increasingly under pressure to innovate and devise new services (Spohrer, Maglio, Bailey, & Gruhl, 2007). According to empirical studies, this is particularly true for teams in the consulting sector and the banking sector. In the consulting sector, reputation is one of the most important resources (Armbrüster, 2006). However, negative experiences of some companies and publicly held prejudices have contributed to reduce the expertise ascribed to consulting organizations. To gain new reputation, consulting firms have to constantly produce new services (Armbrüster, 2006). In the banking sector, services become increasingly indistinguishable from similar services of nonbanks (Bossone, 2001). Thus, banks are more and more forced to develop special services that sharpen their particular profile (Asaftei, 2008). Taken together, research is needed on how the effectiveness of NSD teams can be enhanced.

NSD teams are often heterogeneous in their composition, including, for example, members of both the R&D and the marketing departments (Keller, 2001). Those cross-functional teams are expected to be particularly successful. Cross-functionality, that is, "the extent to which team members differ in the functional areas in which they have spent the greater part of their careers" (Bunderson & Sutcliffe, 2002, p. 878), is considered to enhance the performance of development teams (Brown & Eisenhardt, 1997; Pearce & Ensley, 2004).

However, according to the literature on team diversity, the expected positive effects of functional diversity on team performance can be doubted (e.g., Jackson & Joshi, 2010; van Knippenberg & Schippers, 2007; Williams & O'Reilly, 1998). Following the information/decision-making perspective, the differences in expertise, knowledge, and perspectives of the functionally diverse team members may promote the

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development of creative and innovative solutions in the team (van Knippenberg, De Dreu, & Homan, 2004). In contrast, the social categorization perspective proposes negative diversity effects due to in-group/out-group categorizations that may disrupt group functioning (Brewer, 1996). Empirical findings on the effects of functional diversity on team performance reflect this ambivalent theoretical debate (Gebert, Boerner, & Kearney, 2006; Hüttermann & Boerner, 2011; Jackson, Joshi, & Erhardt, 2003). Studies have revealed positive (e.g., Keller, 2001; Lovelace, Shapiro, & Weingart, 2001), negative (e.g., Cabrales, Medina, Lavado, & Cabrera, 2008), and nonsignificant (e.g., Pelled, Eisenhardt, & Xin, 1999) effects of cross-functionality on team performance.

Consequently, a cross-functional team composition constitutes a potential for enhanced performance; to unlock this potential, careful team management is required (Van der Vegt & Bunderson, 2005). To open the black box of how functional diversity is related to team performance, the literature has discussed a wide range of processes. Particular attention has been given to communication between members of cross-functional teams (e.g., Peters & Fletcher, 2004). Given that both the benefits (i.e., differences in expertise, knowledge, and perspectives) and the risks of cross-functionality (i.e., relationship conflicts rising from in-group/out-group categorizations) will mainly come to the fore in team communication, this finding is not surprising. For example, Keller (2001) investigated the role of external communication in cross-functional new product development (NPD) teams. Montoya et al. (2009) analyzed the role of information and communication technologies in virtual product development teams. Peters and Fletcher (2004) investigated the effectiveness of different communication strategies in cross-functional teams.

To contribute to this body of literature, the article analyzes the role of communication in NSD teams. We investigate two types of communication, namely, formal and informal communication. (a) *Team meetings* are an organized, formal type of intrateam communication. We define team meetings as gatherings in which all team members are present, including the team supervisor. Team meetings will enhance the convergence of team members' cooperation model and task model (Mathieu, Goodwin, Heffner, Salas, & Cannon-Bowers, 2000), thereby enabling them to better coordinate and align their respective activities (Mathieu et al., 2000), which in turn may enhance a common social identity. (b) In contrast, *cross-functional communication* refers to a spontaneous, informal type of interpersonal communication in the team. We define cross-functional communication as team members' communication with other team members who have a different functional background (i.e., representing a different functional department or division within the organization). Cross-functional communication can thus be interpreted as the utilization of functional diversity (Jackson

et al., 2003) within the team. That is, via cross-functional communication, members' different opinions and perspectives will become manifest. Only if cross-functional communication is assured, team members will become aware of different approaches to accomplish the team task—according to the different functional areas the team members belong to. This awareness in turn may stimulate task conflicts in the team (Pelled, 1996), that is, controversies among team members about how to best accomplish tasks assigned to the group. Thus, there is a need for creativity.

According to studies conducted with industrial teams (Atuahene-Gima, 2003), we define team performance in NSD teams as the degree to which a team develops services that are rated as being of high quality and, in doing so, adheres to time and budget constraints. With respect to this criterion, we discuss how cross-functional communication and team meetings function as complementary measures to enhance performance in service developing teams.

We explain the complementarity of both types of communication by referring to the framework that Gebert, Boerner, and Kearney (2010) recently developed based on the work by Sheremata (2000). Cross-functional communication may foster the emergence of task conflicts (Jehn, 1995) in the team, which in turn will facilitate the process of knowledge generation. Following Sheremata (2000), knowledge generation is the degree to which team members develop new and useful ideas and communicate these ideas to others. Under high levels of task conflicts, different knowledge bases, which have thus far existed merely as a potential for increased knowledge generation within the team (Stasser & Titus, 1985), are now more likely to become stimulants for creative thinking. However, since task conflicts also tend to spawn deleterious effects such as relationship conflicts (DeDreu & Weingart, 2003; Pelled, 1996), value conflicts (Pelled, 1996), and divergent interests (Ancona & Caldwell, 1992; Pinto, Pinto, Prescott, 1993), the process of knowledge integration may be hampered. Following Sheremata (2000), knowledge integration refers to the extent to which a group combines the voiced ideas, evaluates their relative merits, and attempts to find ways of putting these ideas into practice. Under high levels of task conflicts, the combination and evaluation of the ideas may thus be hindered. To sum it up, by fostering task conflicts, cross-functional communication thus fosters knowledge generation while hindering knowledge integration. Inversely, team meetings enhance a common social identity in the team, thereby facilitating the process of knowledge integration. However, by also fostering rigid, stagnant, and redundant mental models, a common social identity may threaten the process of knowledge generation (Gebert et al., 2010; Lewis, Welsh, Dehler, & Green, 2002). Thus, via stimulating a common social identity, team meetings are likely to facilitate knowledge integration while impeding knowledge generation.

To promote NSD teams, both knowledge generation and knowledge integration should be fostered (see Gebert et al., 2010). We therefore assume that both cross-functional communication and team meetings are necessary for high-level performance in service development teams (see Gebert et al., 2006). Accordingly, we investigate the complementarity of both forms of communication. Our study thus provides the first investigation of this complementarity in the service sector. Inspired by the work of Menor, Tatikonda, and Sampson (2002), we assume that the complementarity of knowledge generation and knowledge integration should be of relevance for NSD teams as well. In their analysis of the processes in NSD teams, the authors distinguish between the “front-end” (i.e., strategic positioning, idea generation, and concept development/refinement) and the “back-end” (i.e., implementing the concept). They claim,

The front and back-ends need to be understood as potentially different processes, but also must be simultaneously coordinated and integrated. The lack of such linkage could lead to inappropriate specification of the service concept; that is, service concepts which are not inherently executable or are resource inefficient. (p. 146)

Thus, by investigating the complementarity of knowledge generation and knowledge integration on the field of NSD teams, our article is the first contribution to test this statement empirically.

The contribution of our article to the extant literature is threefold. First, we investigate the effects of two types of communication, namely, formal versus informal communication on the performance of cross-functional teams. Thereby, we contribute to the body of literature on the role of communication in functional diverse teams. Second, we outline the complementarity of these communication types, thereby relying on work by Sheremata (2000) and Gebert et al. (2010). While both these works are conceptual papers, our study adds empirical evidence to the idea of complementarity. Third, we chose to study NSD teams in business consulting and financial services organizations. As was outlined above, this field is in need for more empirical investigation because of increasing pressure to innovate. In addition, the analysis of NSD teams is promising because decision making in those teams may have tremendous economic effects—as has been demonstrated, for example, during the last worldwide financial crises in the banking sector. Last, it appears timely to study NSD teams since previous studies on cross-functional teams have primarily focused on industrial teams and/or new product development teams (e.g., Lovelace et al., 2001). In particular, the complementarity of knowledge generation and knowledge integration has only been demonstrated for the manufacturing sector (Lewis et al.,

2002; Sheremata, 2002). However, insights from research on new product development teams in the industrial sector cannot be easily transferred to the service sector (Nijssen et al., 2006). Compared with the industrial sector, developing new services requires higher degrees of new services delivery. Although in the industrial sector the success of new product development teams largely depends on the budget available, in the service sector “sound communication/coordination, and reducing intra-organizational conflicts” are decisive for the development of new services (Nijssen et al., 2006, p. 242). By investigating different forms of communication, we thus analyze a central feature of the development of new services.

In the remainder of the article, we first analyze the effects of team meetings in cross-functional teams on knowledge generation and knowledge integration. Next, the impact of cross-functional communication on both knowledge generation and knowledge integration is outlined. Based on this analysis, the complementary effects of team meetings and cross-functional communication on team performance are investigated. Finally, the results of an empirical study of 55 NSD teams are presented which confirm our hypothesis. Implications for the management of cross-functional services teams are discussed.

Theory and Hypothesis

Formal team meetings attended by all members including the team leader or supervisor serve the purpose of specifying short- and medium-term tasks, the division of labor, and the pertinent budget and time constraints, thereby facilitating coordination (Gaertner et al., 1999; Reagans & Zuckerman, 2001). First, during team meetings, all members have the opportunity for timely exchanges of information that is important to the team. These exchanges are likely to include relevant background information (e.g., results of market analyzes) that enhances a common understanding of the opportunities and risks involved in pursuing the team’s tasks (McGrath, Macmillan, & Venkataraman, 1995; Pinto et al., 1993). This common understanding enables the entire team (and not just subgroups within the team) to develop a common task model (Mathieu et al., 2000), which in turn benefits knowledge integration. Second, by helping prevent the development of cliques and subgroups (Beal, Cohen, Burke, & McLendon, 2003), frequent meetings of the whole team may enhance cohesion and help develop high levels of convergence of the team’s cooperation model (Mathieu et al., 2000). Thereby, formal team meetings are likely to strengthen a common team identity. Under high levels of team identity, cooperation in teams will enhance, thereby facilitating knowledge integration.

However, a high frequency of team meetings is likely to be associated with adverse effects on knowledge generation. First, if a team develops high levels of cohesion, team

members may become more cautious and restrained in voicing deviant arguments (Brodbeck, Kerschreiter, Mojzisch, & Schulz-Hardt, 2007; Langfred, 2004). Thus, instead of using unshared information to enable a synergistic cross-fertilization of ideas, exchanges may become increasingly stagnant and redundant. As a result, there will be low levels of knowledge generation (Levin & Cross, 2004). Second, a common task model may at some point no longer be questioned regarding its appropriateness and become rigid (Dougherty, 2006). Since a rigid task model restricts the range of possible problem solutions, knowledge generation will be impaired.

The frequency of *informal cross-functional communication* is indicative of the degree to which the cross-functional potential of development teams is used. Cross-functional communication entails a heightened potential for useful new ideas (Amabile, 1996). Frequent cross-functional communication can spawn task conflicts (Jehn, 1995) by making manifest hitherto latent differences of opinion concerning how best to pursue a particular goal. As a result, different knowledge bases, which have thus far existed merely as a potential for increased knowledge generation within the team (Stasser & Titus, 1985), are now more likely to become stimulants for creative thinking. By increasing the respective team's absorptive capacity (Cohen & Levinthal, 1990), task conflicts can raise the level of complexity, which can in turn galvanize performance on new tasks (Amabile, 1996). To sum up, informal cross-functional communication is likely to enhance knowledge generation.

However, cross-functional communication may have deleterious effects on knowledge integration in cross-functional teams (Brown & Eisenhardt, 1997; Dougherty, 2006; Gebert et al., 2006). The desired effects of task conflicts that foster knowledge generation are accompanied by undesired effects that impair the equally necessary process of knowledge integration. First, task conflicts are significantly positively related with relationship conflicts (DeDreu & Weingart, 2003). These relationship or affective conflicts (Pelled, 1996) limit the acceptance of others' ideas and thus primarily hinder knowledge integration. Second, attempts to resolve task conflicts may lead to the realization that persons with different organizational functions inhabit different thought worlds (Dougherty, 2006). This in turn may give rise to value conflicts (Jehn, 1995), which may likewise inhibit knowledge integration (Pinto et al., 1993). Third, during attempts to resolve task conflicts, the representatives of different organizational functions typically show a keen interest in having their function-specific concerns addressed in the process of developing new services for customers (Ancona & Caldwell, 1992; Pinto et al., 1993). Such divergent interests may curtail the consensus potential attainable in cross-functional teams.

While formal team meetings are likely to benefit knowledge integration, informal cross-functional communication in service development teams may further knowledge

generation. Since both processes are necessary to enhance performance (Sheremata, 2000), neither team meetings nor cross-functional communication are sufficient on their own. Rather, we hypothesize that team performance will be improved when cross-functional communication and team meetings are combined.

More precisely, the dilemma of positive and negative effects of team meetings that offset each other can be diffused by a high frequency of cross-functional communication. By making task conflicts manifest (as described above), cross-functional communication can countervail the adverse effects of team meetings on knowledge generation (i.e., rigid, stagnant, and redundant cognitive structures). When discussing alternative ways to accomplish a given task, team members' rigid, stagnant, and redundant cognitive structures are challenged and probably altered. Hence, knowledge generation will become easier, and the positive effects of team meetings on knowledge integration can now take effect, as there is now knowledge that requires integration. In contrast, if the frequency of cross-functional communication is low, the danger of negative effects of team meetings such as rigidity, stagnancy, and redundancy will not only remain but also increase. Since no new knowledge is generated, there is only little to be integrated. Hence, the potential for knowledge integration entailed by frequent team meetings will remain unused and team performance will stagnate or decrease.

Looking at the positive and negative effects of cross-functional communication that offset each other (see above), analogous arguments can be made. By fostering team identity, team meetings can countervail the adverse effects of cross-functional communication on knowledge integration (i.e., relationship conflicts, divergent thought worlds, and divergent interests). Under high levels of team identity, task conflicts are less likely to turn into relationship conflicts (Hüttermann & Boerner, 2011). Similarly, a common team identity will reduce the emergence of divergent thought worlds and divergent interests. Knowledge integration will thus become easier, and the positive effects of cross-functional communication on knowledge generation can now take effect, as knowledge integration is assured. In contrast, if the frequency of team meetings is low, the danger of negative effects of cross-functional communication such as relationship conflicts, divergent thought worlds, and divergent interests will not only remain but also increase.

Hypothesis: Team meetings and cross-functional communication interact to predict team performance such that the team meeting–team performance relationship is *more* positive when cross-functional communication is high as opposed to low and the cross-functional communication–team performance relationship is *more* positive when team meeting frequency is high as opposed to low.

Method

Sample and Data Collection

We randomly selected 200 business consulting and financial services companies and asked them to participate in our study, promising feedback in return. Out of these 200 companies, 38 agreed to participate. Thus, at the organizational level, our response rate was 19%. The sample comprised 373 members (63.3% were male) of 55 services development teams from 38 different German companies. Each team included 6.76 members ($SD = 3.43$) from 3.86 different functional departments or divisions ($SD = 1.72$) on average. The average age of the team members was 33.86 years ($SD = 7.93$). All the teams had been working together for at least 6 months. The objective of all teams was to develop new services for external clients or groups of clients. While 31 teams worked in banks and insurance companies, 24 were from business consulting firms.

Separate questionnaires were used for team supervisors and team members. In each team, three to six members were asked to provide information on the frequency of team meetings and cross-functional communication. In addition, the team members provided information concerning their organizational and team tenure and their functional background. Only if we had received this biographical information from at least 80% of the team members we did retain this respective team in our sample. To avoid the single-source bias (Avolio, Yammarino, & Bass, 1991), information on team performance was provided by the team supervisors (instead of team members).

Measures

To measure the *frequency of team meetings*, the following item was used: "On average, how often do meetings take place that are attended by all team members?" The response format ranged from "at least every 3 months" (1), "at least once a month" (2), "at least every 2 weeks" (3), and "at least once a week" (4), to "every day" (5).

We measured the *frequency of cross-functional communication* with the following item: "In an average week, how often do you communicate with team members who represent a different functional area (department, division)?" The response format ranged from "not at all" (1), "1 to 3 times" (2), "4 to 6 times" (3), and "every day" (4), to "several times a day" (5).

Team performance was measured with four items adapted from Van der Vegt, Bunderson, and Oosterhof (2006) by using the translation-back-translation procedure as specified by Brislin (1980).

The team supervisors were asked to evaluate the teams for which they were responsible with respect to the following criteria: budget constraint adherence, time constraint adherence, reputation of the team, and quality of team results.

Cronbach's alpha for this scale was .73. A principal components analysis revealed a single factor with an eigenvalue greater than 1 (2.25), which explained 56.25% of the variance.

To justify aggregation for the variables conceptualized at the team level of analysis but measured at the individual level, we first checked rwg indices for the within-team agreement on the frequency measures that were all above 0.70 (James, Demaree, & Wolf, 1984). Second, we calculated intraclass correlation coefficients (ICCs), using the procedure suggested by Shrout and Fleiss (1979). Table 1 presents these ICC values. Our ICC(1) scores, which represent the ratio of between-group to total variance, ranged between 0.36 and 0.69. ICC(2) scores, which represent the reliability of average group perceptions, ranged between 0.65 and 0.93. Together, these results justified data aggregation to the team level (see Bliese, 2000).

Control variables. First, we included *team size* as a control by asking team supervisors about the number of persons on their team. Previous research has shown that team size affects team cohesion (Stewart, 2006), which is likely to be important for knowledge integration. Second, we included *average team tenure* (in months) because of its potential influence on the degree of familiarity among the team members and on team cohesion (Harrison, Price, & Bell, 1998). Third, long *organizational tenure* may induce team members to simply follow organizational routines without questioning them. This would entail the danger of increasing stagnancy and redundancy in team discussions. We therefore controlled for average organizational tenure (in months). Fourth, the *number of different functional backgrounds* represented on the teams was included as a control. This variable determines a team's level of task-related diversity, which in turn constitutes a potential for knowledge generation (Becker & Gerhart, 1996; Jehn, Northcraft, & Neale, 1999; Van der Vegt & Bunderson, 2005). Fifth, the dummy variable *consulting (1) versus nonconsulting (0)* was included, because we expected differences between business consulting firms on the one hand and financial services companies on the other. Compared with financial services companies, business consulting firms tend to rely to a greater degree on decentralized project teams and to be less hierarchical (Anand, Gardner, & Morris, 2007). Regarding knowledge exchange, they may thus be more experienced, which, in turn, may facilitate knowledge integration. In addition, business consulting firms are likely to have higher turnover rates than financial services companies (Armbrüster, 2006), resulting in a higher potential for conflicts (Gruenfeld & Fan, 1999).

Results

As depicted in Table 1, none of the variables under study was significantly related to the dependent variable team performance. Team size was negatively correlated with the frequency of team meetings ($r = -.30, p < .05$), and average

Table 1. Means, Standard Deviations, Intraclass Correlation Coefficients, and Correlations

	<i>M</i>	<i>SD</i>	ICC(1)	ICC(2)	1	2	3	4	5	6	7
1. Team meetings	3.47	0.85	.45	.73	—						
2. Cross-functional communication	3.62	0.98	.36	.65	.02	—					
3. Team size	6.76	3.43			-.30*	.02	—				
4. Functional backgrounds	3.86	1.72	.69	.93	-.06	-.12	.11	—			
5. Organizational tenure	81.00	80.55			-.04	.11	.05	-.22	—		
6. Team tenure	26.52	21.72			-.16	.14	.10	-.17	.70**	—	
7. Dummy consulting vs. non consulting					.35*	-.11	-.13	.33*	-.44**	-.53**	—
8. Team performance	3.94	0.66			.19	.04	-.13	.00	-.11	-.01	-.12

NOTE: ICC = intraclass correlation coefficients. *N* = 55 teams.

p* < .05. *p* < .01.

Table 2. Results of Ordinary Least Squares Estimates for Team Performance

Variables	Team Performance		
	Step 1	Step 2	Step 3
1. Control			
Team size	-.09	-.05	-.03
Functional backgrounds	-.03	-.00	.06
Organizational tenure	-.25	-.27	-.31
Team tenure	.17	.16	.22
Dummy consulting vs. nonconsulting	.11	.05	.21
2. Main effects			
Team meetings (TM)		.15	.21
Cross-functional communication (CF)		.11	-.00
3. Interaction			
TM × CF			.37**
<i>R</i> ²	.06	.09	.21
ΔR^2	.06	.03	.12**
<i>F</i>	.56	.60	1.42

NOTE. *N* = 55 teams. Standardized regression coefficients are reported.

p* < .05. *p* < .01.

team tenure was positively associated with average organizational tenure ($r = .70, p < .001$). The dummy variable consulting versus nonconsulting was positively related to the frequency of team meetings ($r = .35, p < .05$) and to the number of functional backgrounds ($r = .33, p < .05$). Moreover, it was negatively related to both organizational tenure ($r = -.44, p < .01$) and team tenure ($r = -.53, p < .01$).

Ordinary least squares regression analysis with mean-centered predictor variables was conducted to test our hypothesis. In the first step, team performance was regressed on the control variables (i.e., team size, number of different functional backgrounds represented on the team, average team tenure, average organizational tenure, and the dummy variable). In the second step, the independent variables frequency of team meetings and frequency of cross-functional communication were added. In the third step, the interaction term of the independent variables was entered into the

regression equation. The results of all steps are shown in Table 2.

None of the control variables turned out to be significant. Moreover, as expected, we did not find a main effect of either the frequency of team meetings or the frequency of cross-functional communication on team performance. In line with our hypothesis, the interaction of these two predictor variables turned out to be significant ($\beta = .37, p < .01$), yielding a significant increase in the amount of variance explained ($\Delta R^2 = .12, p < .01$). Simple slope analyses (Aiken & West, 1991) were performed to further investigate this interaction effect. As Figure 1 illustrates, the relationship between the frequency of team meetings and team performance was positive when the frequency of cross-functional communication was high ($b = .44, t = 2.56, p < .05$) but negative (albeit nonsignificant) when the frequency of cross-functional communication was low ($b = -.13,$

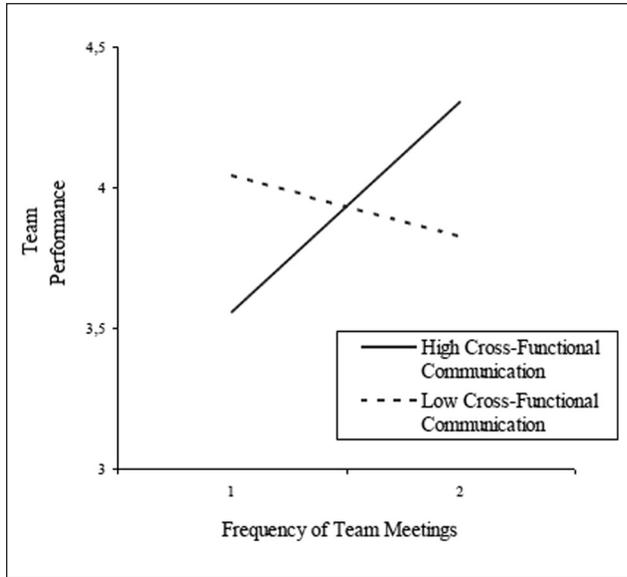


Figure 1. Effect of the frequency of cross-functional communication on the relationship between team meetings and team performance

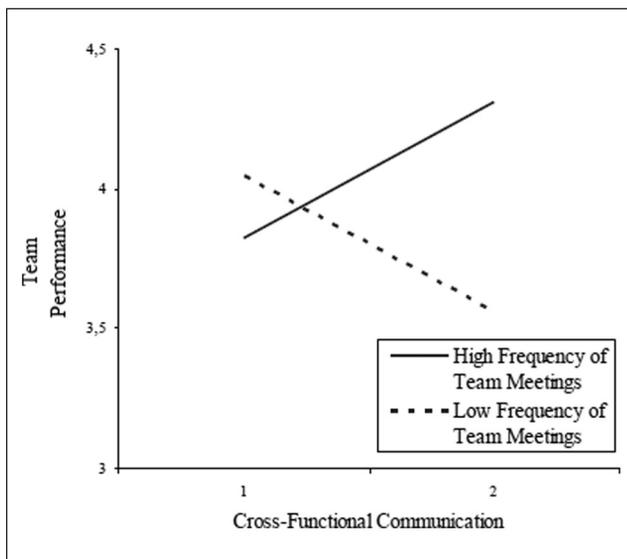


Figure 2. Effect of the frequency of team meetings on the relationship between cross-functional communication and team performance

$t = -.88, p = .39$). Similarly, as depicted in Figure 2, the relationship between the frequency of cross-functional communication and team performance was positive when the frequency of team meetings was high ($b = .25, t = 2.18, p < .05$) but negative (albeit nonsignificant) when the frequency of team meetings was low ($b = -.25, t = -1.62, p = .11$). Taken together, these findings support our hypothesis and the related reasoning.

Discussion

Summary

NSD teams constitute a relevant field of study, since service organizations are increasingly under pressure to innovate and devise new services (Spohrer et al., 2007). According to empirical studies, this is particularly true for teams in both the consulting sector and the banking sector. In addition, the analysis of NSD teams could be interesting because decision making in those teams may have tremendous economic effects—as has been demonstrated, for example, during the last worldwide financial crisis in the banking sector. It appears timely to study NSD teams since previous studies on cross-functional teams have primarily focused on industrial teams and/or new product development teams (e.g., Lovelace et al., 2001). However, insights from research on new product development teams in the industrial sector cannot be easily transferred to the service sector.

Since both knowledge generation and knowledge integration are necessary for NSD teams to be successful (see Menor et al., 2002), we analyze the complementary effects of two forms of intrateam communication. Team meetings enhance the process of knowledge integration while endangering knowledge generation. Contrariwise, cross-functional communication facilitates task conflicts and creative tensions, which in turn promote knowledge generation. At the same time, however, cross-functional communication may challenge knowledge integration. As hypothesized, our findings show that the interaction between the frequency of team meetings and the frequency of cross-functional communication explained a significant amount of performance variance in services development teams.

The results of our study can be interpreted in analogy to theses in the knowledge governance literature (e.g., Krafft & Ravix, 2008) on the level of the organization. Governance of knowledge is necessary since knowledge located in organizations is specialized and dispersed. In analogy to the team level, one could assume that informal cross-functional communication will support the governance of knowledge by helping organization members to identify which parts of the specialized and dispersed knowledge are relevant to accomplish the organization's task. By integrating these parts, members of the organization will enlarge both their individual knowledge base and the organization's absorptive capacity (Cohen & Levinthal, 1990), thereby supporting the process of knowledge generation. Formal meetings in organizations can be interpreted as hierarchical governance mechanisms (Gooderham, Minbeava, & Pedersen, 2011). By enhancing an organization-wide shared task and cooperation model, these mechanisms will favor the process of knowledge transfer within the organization (Gooderham et al., 2011). Our results on the complementarity of formal and informal types of communication can thus be fruitful for further research on the governance of

knowledge in organizations. However, since this stream of research is dealing with the aggregate level of organization (instead of the team level), further perusing of this analogy requires a careful study of level-of-analysis issues.

Moreover, by contrasting formal and informal forms of team communication, our findings could be interesting for the research on ambidexterity in organizations (Raisch & Birkinshaw, 2008). As Gebert et al. (2010) have demonstrated, organizational competitiveness and flexibility require the use of opposing action strategies, such as directive and delegative leadership. Our findings reveal that such opposing action strategies—that is, formal and informal forms of team communication—should equally be applied in NSD teams. Considering this body of literature thus provides an alternative explanation for the complementarity of the two forms of team communication discussed in this article. Accordingly, our findings can additionally contribute to this body of ambidexterity research.

Limitations

We acknowledge several limitations of our study. First, we did not measure the processes of knowledge generation and knowledge integration as mediators of the communication–performance relationship. Including these process variables in our analyses would have required a larger sample, which is difficult to obtain when studying teams rather than individuals. As a result, the interpretation of our findings rests primarily on the soundness of our theoretical argumentation. Second, our hypothesis was tested with cross-sectional data. However, to further explore the dynamics of the interplay of team meetings and cross-functional communication, future longitudinal research is needed. Third, to operationalize formal meetings and informal communications, we focused on frequencies. However, we acknowledge that the length of formal meetings may also play a role here. To explore this role, we encourage further research to test a more complex measure for formal team meetings. Fourth, subjective team performance ratings were used, provided by the respective team supervisors. Objective data, such as customer satisfaction with the newly developed services, would have been desirable. However, given the time and budget constraints of our study, we refrained from including objective data. Nevertheless, by surveying both team supervisors and team members, we were able to avoid the single-subject bias (Avolio et al., 1991), which is usually an issue in cross-sectional data. In our study, team members were asked about the frequency of team meetings and cross-functional communication, while team performance was provided by the team supervisors. Thus, an overestimation of the communication–performance relationship can be excluded, enhancing the reliability of our data.

Theoretical Implications and Future Research

In the literature on cross-functional diversity, team communication is usually considered to be one construct, such as the elaboration of task-relevant information (e.g., Kearney & Gebert, 2009; Kearney, Gebert, & Voelpel, 2009). In contrast, the results of our analysis suggest that it is necessary to distinguish between team communication related to knowledge generation on one hand and team communication related to knowledge integration on the other. Since both these processes require different antecedents, we regard this distinction as highly useful. As was demonstrated in our article, this distinction helps explain the different but complementary effects of the formal type of team meetings and the informal type of cross-functional communication. Accordingly, future research should integrate the processes of knowledge generation and knowledge integration.

Managerial Implications

Our study shows that fostering team performance is a complex process that can best be explained by examining the interaction of pertinent measures. The better a manager understands this process, the more likely he or she will be to take appropriate steps to unlock a team's potential. A cross-functional team composition increases the level of task-related diversity. However, this diversity merely constitutes a potential for improved team performance. Specific processes must be initiated to realize this potential (Taggar, 2002). In our data, this is reflected in the fact that the number of different functional backgrounds represented on a team was unrelated to team performance. Many previous studies have found similar results (Stewart, 2006; van Knippenberg & Schippers, 2007). Hence, functional diversity does not automatically translate into team performance.

Fostering cross-functional communication is necessary to use the potential inherent in a cross-functional team composition (Becker & Gerhart, 1996). Many managers, however, may not be aware of the need to actively leverage this potential. At least in our study, the number of different functional backgrounds represented on the team—which reflects the range of available task-relevant knowledge resources—was unrelated to the frequency of cross-functional communication, that is, the actual utilization of these resources (see Table 1). This disconnection between the available resources and their utilization may reflect the difficulties involved in attempting to foster communication among dissimilar individuals (Brewer, 1996). But even if teams succeeded in using the resources entailed by diversity by establishing a high frequency of cross-functional communication, this would still be insufficient to obtain high levels of team

performance. As expected, we found no main effects of either cross-functional communication or team meetings on team performance (see Table 1).

Managers who believe that a team is not performing well because it underutilizes the available cognitive resources might promote cross-functional communication. However, it is necessary for a manager to realize that this strategy by itself will remain largely ineffective. He or she must also be aware that implementing only one strategy may not just be ineffective, but even harmful. In our study, given a low frequency of team meetings, the relationship between cross-functional communication and team performance was negative (albeit nonsignificant; see Figure 2). According to the results of our study, combining frequent team meetings with a high frequency of cross-functional communication appears to be most conducive to team performance. Surprisingly, these two variables are unrelated in our sample (see Table 1). Thus, in our sample team leaders do not combine frequent team meetings with cross-functional communication. Among other things, leaders may assume that cross-functional communication and team meetings are practically identical. Alternatively, they may expect that frequent team meetings already guarantee a high level of team performance. However, our study reveals that these assumptions may be erroneous. To achieve high levels of team performance, both frequent team meetings and frequent cross-functional communication are required. Team leaders might, for example, set an example for others by frequently engaging in cross-functional communication themselves and by reinforcing others in doing so. In addition, they may explicitly declare cross-functional communication as an important objective of team meetings.

In sum, our data indicate that few team supervisors seem to take into account that fostering team performance requires a combination of complementary measures. As a result, the performance potential of many teams may remain underutilized. Learning to view the ramifications of different measures and their interactions as complementary units would thus be a vital step for leaders to make better use of the knowledge resources available in their respective teams.

Declaration of Conflicting Interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The authors received no financial support for the research, authorship, and/or publication of this article.

References

- Aiken, L. S., & West, S. G. (1991). *Multiple regression: Testing and interpreting interactions*. Newbury Park, CA: SAGE.
- Amabile, T. M. (1996). *Creativity in context: Update to the social psychology of creativity*. Boulder, CO: Westview Press.
- Anand, N., Gardner, H., & Morris, T. (2007). Knowledge based innovation: Emergence and embedding of new practice areas in management consulting firms. *Academy of Management Journal*, 50, 406-428.
- Ancona, D. G., & Caldwell, D. F. (1992). Bridging the boundary: External activity and performance in organizational teams. *Administrative Science Quarterly*, 37, 634-665.
- Armbrüster, T. (2006). *The economics and sociology of management consulting*. Cambridge, England: Cambridge University Press.
- Asaftei, G. (2008). The contribution of product mix versus efficiency and technical change in US banking. *Journal of banking & finance*, 32(11), 2336-2345.
- Asaftei, G., & Kumbhakar, S. C. (2008). Regulation and efficiency in transition: the case of Romanian banks. *Journal of Regulatory Economics*, 33(3), 253-282.
- Atuahene-Gima, K. (2003). The effects of centrifugal and centripetal forces on product development speed and quality: How does problem solving matter? *Academy of Management Journal*, 46, 359-373.
- Avolio, B. J., Yammarino, F. J., & Bass, B. M. (1991). Identifying common methods variance with data collected from a single source: An unresolved sticky issue. *Journal of Management*, 17, 571-587.
- Beal, D., Cohen, R., Burke, M., & McLendon, C. (2003). Cohesion and performance in groups: A meta-analytic clarification of construct relations. *Journal of Applied Psychology*, 88, 989-1004.
- Becker, B., & Gerhart, B. (1996). The impact of human resource management on organizational performance: Progress and prospects. *Academy of Management Journal*, 39, 779-801.
- Bliese, P. D. (2000). Within-group agreement, non-interdependence, and reliability: Implications for data aggregation and analysis. In K. J. Klein & S. W. Kozlowski (Eds.), *Multilevel theory, research, and methods in organizations: Foundations, extensions, and new directions* (pp. 349-382). San Francisco, CA: Jossey-Bass/Pfeiffer.
- Bossone, B. (2001). Do banks have a future?: A study on banking and finance as we move into the third millennium. *Journal of banking & finance*, 25(12), 2239-2276.
- Brewer, M. B. (1996). Managing diversity: Can we reap the benefits without paying the costs. In S. E. Jackson & R. N. Ruderman (Eds.), *Diversity in workteams: Paradigms for a changing workplace* (pp. 47-68). Washington, DC: American Psychological Association.
- Brislin, R. W. (1980). Back-translation for cross-cultural research. *Journal of Cross-Cultural Psychology*, 1, 185-216.
- Brodbeck, F. C., Kerschreiter, R., Mojzisch, A., & Schulz-Hardt, S. (2007). Improving group decision making under conditions of distributed knowledge: The information asymmetries model. *Academy of Management Review*, 32, 459-479.
- Brown, S. L., & Eisenhardt, K. M. (1997). The art of continuous change: Linking complexity theory and time-paced evolution in relentlessly shifting organizations. *Administrative Science Quarterly*, 42, 1-34.

- Bunderson, J. S., & Sutcliffe, K. M. (2002). Comparing alternative conceptualizations of functional diversity in management teams: Process and performance effects. *Academy of Management Journal*, *45*, 875-893.
- Cabral, A. L., Medina, C. C., Lavado, A. C., & Cabrera, R. V. (2008). Managing functional diversity, risk taking and incentives for teams to achieve radical innovations. *R&D Management*, *38*, 35-50.
- Cohen, W. M., & Levinthal, D. A. (1990). Absorptive capacity: A new perspective on learning and innovation. *Administrative Science Quarterly*, *35*, 128-152.
- DeDreu, C. K. W., & Weingart, L. R. (2003). Task versus relationship conflict, team performance, and team member satisfaction: A meta-analysis. *Journal of Applied Psychology*, *88*, 741-749.
- Dougherty, D. (2006). Organizing for innovation in the 21st century. In S. R. Clegg, C. Hardy, T. B. Lawrence, & W. R. Nord (Eds.), *The Sage handbook of organization studies* (pp. 598-617). London, England: SAGE.
- Gaertner, S. L., Dovidio, J. F., Rust, M. C., Nier, J. A., Banker, B. S., Ward, C. M., . . . Houlette, M. (1999). Reducing intergroup bias: Elements of intergroup cooperation. *Journal of Personality and Social Psychology*, *76*, 388-402.
- Gebert, D., Boerner, S., & Kearney, E. (2006). Cross-functionality and innovation in new product development teams: The dynamics of the dilemmatic structure and consequences for the management of diversity. *European Journal of Work and Organizational Psychology*, *15*, 431-458.
- Gebert, D., Boerner, S., & Kearney, E. (2010). Fostering team innovation: Why is it important to combine opposing action strategies? *Organization Science*, *21*, 593-608.
- Gooderham, P., Minbeava, D. B., & Pedersen, T. (2011). Governance mechanisms for the promotion of social capital for knowledge transfer in multinational corporations. *Journal of Management Studies*, *48*, 123-150.
- Gruenfeld, D. H., & Fan, E. T. (1999). What newcomers see and what oldtimers say: Discontinuities in knowledge exchange. In L. L. Thompson, J. M. Levine, & D. M. Messick (Eds.), *Shared cognition in organizations: The management of knowledge* (pp. 245-266). Mahwah, NJ: Lawrence Erlbaum.
- Harrison, D. A., Price, K. H., & Bell, M. P. (1998). Beyond relational demography: Time and the effects of surface- and deep-level diversity on work group cohesion. *Academy of Management Journal*, *41*, 96-107.
- Hüttermann, H., & Boerner, S. (2011). Fostering innovation in functionally diverse teams: The two faces of transformational leadership. *European Journal of Work and Organizational Psychology*, *20*, 833-854.
- Jackson, S. E., & Joshi, A. (2010). Workteam diversity. In S. Zedeck (Ed.), *APA handbook of industrial and organizational psychology* (pp. 651-686). Washington, DC: American Psychological Association.
- Jackson, S. E., Joshi, A., & Erhardt, N. L. (2003). Recent research on team and organizational diversity: SWOT analysis and implications. *Journal of Management*, *29*, 801-830.
- James, L. R., Demaree, R. G., & Wolf, G. (1984). Estimating within-group interrater reliability with and without response bias. *Journal of Applied Psychology*, *69*, 85-98.
- Jehn, K. A. (1995). A multimethod examination of the benefit and detriments of intragroup conflict. *Administrative Science Quarterly*, *40*, 256-282.
- Jehn, K. E., Northcraft, G. B., & Neale, M. A. (1999). Why differences make a difference: A field study of diversity, conflict, and performance in workgroups. *Administrative Science Quarterly*, *44*, 741-763.
- Kearney, E., & Gebert, D. (2009). Managing diversity and enhancing team outcomes: The promise of transformational leadership. *Journal of Applied Psychology*, *94*, 77-89.
- Kearney, E., Gebert, D., & Voelpel, S. C. (2009). When and how diversity benefits teams: The importance of team members' need for cognition. *Academy of Management Journal*, *52*, 581-598.
- Keller, R. T. (2001). Cross-functional project groups in research and new product development: Diversity, communications, job stress, and outcomes. *Academy of Management Journal*, *44*, 547-555.
- Krafft, J., & Ravix, J. L. (2008). Corporate governance and the governance of knowledge: Rethinking the relationship on terms of corporate coherence. *Economics of Innovation and New Technology*, *17*(1&2), 79-95.
- Langfred, C. W. (2004). Too much of a good thing? Negative effects of high trust and individual autonomy in self management teams. *Academy of Management Journal*, *47*, 385-399.
- Levin, D. Z., & Cross, R. (2004). The strength of weak ties you can trust: The mediating role of trust in effective knowledge transfer. *Management Science*, *50*, 1477-1490.
- Lewis, M. W., Welsh, M. A., Dehler, G. E., & Green, S. G. (2002). Product development tensions: Exploring contrasting styles of project management. *Academy of Management Journal*, *45*, 546-564.
- Lovelace, K., Shapiro, D., & Weingart, L. R. (2001). Maximizing cross-functional new product teams' innovativeness and constraint adherence: A conflict communications perspective. *Academy of Management Journal*, *44*, 779-793.
- Mathieu, J. E., Goodwin, G. F., Heffner, T. S., Salas, E., & Cannon-Bowers, A. (2000). The influence of shared mental models on team process and performance. *Journal of Applied Psychology*, *85*, 273-283.
- McGrath, R. G., Macmillan, I. C., & Venkataraman, S. (1995). Defining and developing competence: A strategic process paradigm. *Strategic Management Journal*, *16*, 251-275.
- Menor, L. J. (2000). *An empirical investigation of new service development competence and performance* (Doctoral dissertation). University of North Carolina, Chapel Hill.
- Menor, L. J., Tatikonda, M. V., & Sampson, S. E. (2002). New service development: Areas for exploitation and exploration. *Journal of Operations Management*, *20*, 135-157.
- Montoya, M. M., Massey, A. P., Hung, Y. T. C., & Crisp, C. B. (2009). Can You Hear Me Now? Communication in Virtual

- Product Development Teams. *Journal of Product Innovation Management*, 26(2), 139-155.
- Nijssen, E. J., Hillebrand, B., Vermeulen, P. A. M., & Kemp, R. G. M. (2006). Exploring product and service innovation similarities and differences. *International Journal of Research in Marketing*, 23(3), 241-251.
- Pearce, C. L., & Ensley, M. D. (2004). A reciprocal and longitudinal investigation of the innovation process: The central role of shared vision in product and process innovation teams (PPITs). *Journal of Organizational Behavior*, 25, 259-278.
- Peters, L. D., & Fletcher, K. P. (2004). Communication strategies and marketing performance: An application of the Mohr and Nevin framework to intra-organisational cross-functional teams. *Journal of Marketing Management*, 20(7-8), 741-770.
- Pelled, L. H. (1996). Demographic diversity, conflict, and work group outcomes: An intervening process theory. *Organizational Science*, 7, 615-631.
- Pelled, L. H., Eisenhardt, K. M., & Xin, K. R. (1999). Exploring the black box: An analysis of work group diversity, conflict, and performance. *Administrative Science Quarterly*, 44, 1-28.
- Pinto, M. B., Pinto, J. K., & Prescott, J. E. (1993). Antecedents and consequences of project team cross-functional cooperation. *Management Science*, 39, 1281-1297.
- Reagans, R., & Zuckerman, E. W. (2001). Networks, diversity, and productivity: The social capital of corporate R&D teams. *Organization Science*, 12, 502-517.
- Raisch, S., & Birkinshaw, J. (2008). Organizational ambidexterity: Antecedents, outcomes, and moderators. *Journal of Management*, 34, 375-409.
- Sheremata, W. A. (2000). Centrifugal and centripetal forces in radical new product development under time pressure. *Academy of Management Review*, 25, 398-408.
- Shrout, P. E., & Fleiss, J. L. (1979). Intraclass correlations: Uses in assessing rater reliability. *Psychological Bulletin*, 6, 420-428.
- Spohrer, J., Maglio, P. P., Bailey, J., & Gruhl, D. (2007). Steps toward a science of service systems. *Computer*, 40(1), 7-77.
- Stasser, G., & Titus, W. (1985). Pooling of unshared information in group decision making: Biased information sampling during discussion. *Journal of Personality and Social Psychology*, 48, 1467-1478.
- Stewart, G. L. (2006). A meta-analytic review of relationships between team design features and team performance. *Journal of Management*, 32, 29-54.
- Taggar, S. (2002). Individual creativity and group ability to utilize individual creative resources: A multilevel model. *Academy of Management Journal*, 45, 315-330.
- Van der Veegt, G. S., & Bunderson, J. S. (2005). Learning and performance in multidisciplinary teams: The importance of collective team identification. *Academy of Management Journal*, 48, 532-548.
- Van der Veegt, G. S., Bunderson, J., & Oosterhof, A. (2006). Expertness diversity and interpersonal helping in teams: Why those who need the most help end up getting the least. *Academy of Management Journal*, 49, 877-893.
- van Knippenberg, D., De Dreu, C. K. W., & Homan, A. C. (2004). Work group diversity and group performance: An integrative model and research agenda. *Journal of Applied Psychology*, 89, 1008-1022.
- van Knippenberg, D., & Schippers, M. C. (2007). Work group diversity. *Annual Review of Psychology*, 58, 515-541.
- Williams, K. Y., & O'Reilly, C. A. (1998). Demography and diversity in organizations: A review of 40 years of research. *Research in organizational behavior*, 20(20), 77-140.

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