Paper to be presented at
the DRUID16 20th Anniversary Conference
Copenhagen, June 13-15, 2016

The relevance of Organizational Context in the Relationship between Cross-functional collaboration New Product Performance

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Abstract

Prior research highlights that cross-functional collaboration is key driver for new product performance. But cross-functional collaboration does not go without challenges because collaborations among employees from different functions with different cultural backgrounds makes the combination of knowledge and capabilities for new product development difficult. Because cross-functional collaboration and the associated knowledge exchange are embedded in the firm's context, organizational context is of importance to motivate employees to exchange function specific knowledge, which will finally benefit the whole firm in terms of increased new product performance. However, literature does not provide a detailed explanation of the role of organizational context (i.e., structural factors and relational factors) in the relationship between cross-functional collaboration and new product performance. Rather research often implicitly assumes that appropriate structural and relational factors are used by the management to enhance new product performance. Based on the analysis of a random data sample of heads of works councils of 450 large-sized firms in Germany, working with innovation, this paper finds, first, that the effect of cross-functional collaboration on innovation climate is significant and positive. Second, the results show that the relationship between cross-functional collaboration and innovation performance is complementary mediated by innovation climate (relational factor). Third, the paper demonstrates that the indirect effect of cross-functional collaboration on innovation performance through innovation climate increases with increasing organizational stretch (structural factor).

Jelcodes:O32,M10

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Keywords: Works councils, cross-functional collaboration, innovation climate, innovation performance.

Introduction

Increasing competitive and economic pressures have enforced firm's to continuously develop new products that creates long-term growth (Coad and Rao, 2008, Hong et al., 2013). Thus, firms are increasingly seeking for new approaches and supportive actions that drive innovation and ensure their survival (Gundry et al., 2015; Patterson et al., 2005; Oke et al., 2013). Consequently, firms have focused strongly on determinants enhancing new product performance (e.g., Song & Perry, 1997, Hong et al., 2013; Atuahene-Gima & Murray, 2007; Dul & Ceylan, 2014). Achieving higher new product performance relies on different drivers such as the involvement of external knowledge (e.g., Blazevic 2008; Bogers; 2010; de Luca & Atuahene-Gima, 2007) and organizational (e.g., structure, climate) factors (e.g., Gundry et al., 2015; de Clercq et al., 2011; Montoya-Weiss and Calantone, 1994). In regard to the organization factors, research highlights that the integration across different functions, such as R&D and marketing (e.g., de Luca & Atuahene-Gima, 2007), are key driver for new product performance (e.g., Griffin & Hauser, 1992; Troy et al., 2008). But cross-functional collaboration does not go without challenges because collaborations among employees from different functions with different cultural backgrounds makes the combination of knowledge and capabilities for new product development difficult (de Luca & Atuahe-Gima 2007, Troy et al., 2008; Olson et al., 1995). Further, cross-functional collaboration can hardly be regulated as it is intangible in nature and thus it does not automatically end up in increased new product performance (Appley and Winder, 1997). Rather, firms might experience that cross-functional collaboration comprises the risk that employees from different functions have different goals which might create conflicts among them and/or over resources (Olson et al., 1995). As a result the effect of cross-functional collaboration might be more costly for the firm then beneficial for new product performance if not managed properly.

Because cross-functional collaboration and the associated knowledge exchange are embedded in the firm's context, organizational context is of importance to motivate employees to exchange function specific knowledge, which will finally benefit the whole firm in terms of increased new product performance (Nahapiet and Ghoshal, 1998). However, intrigues and power struggles regarding resources might limit knowledge exchange among departments and thus decrease the effectiveness of cross-functional collaboration in new product development (de Clercq et al., 2011). The extent to which these challenges can be addressed depends on organizational context (consisting of structural and relational factors) the management applies to guide cross-functional collaboration (Ghoshal and Bartlett, 1994). Extant research

highlights the importance of structural factors on achieving superior performance, such as, performance management (Gibson and Birkinshaw, 2004), job rotation, centralization (Jansen et al., 2005) and job autonomy (de Clercq et al., 2011). Besides those structural factors that can be used by the management, new product development performance also depends on intangible factors such as trust (e.g., Barzak et al., 2010; Brattström et al., 2015), climate for innovation (Scot, 1994), or norms (Nahapiet and Ghoshal, 1998). However, literature does not provide a detailed explanation of the role of structural factors and relational factors in the relationship between cross-functional collaboration and new product performance. Rather research often implicitly assumes that appropriate structural factors are used by the management for new product development and the relational factors simply exist in firms (e.g., Ghoshal and Bartlett, 1994; Bertels et al., 2001). In this regard, existing studies investigated structural and relational factors as independent antecedents of new product performance without considering their interrelationship with cross-functional collaboration.

Given the above mentioned gap in the literature, the paper extends previous research. First, by explicitly examining the interplay of cross-functional collaboration and organizational context in the complex path to enhance new product performance. Second, the paper investigates to which extent the relational factor climate for innovation mediates the relationship between cross-functional collaboration and new product performance.

This contributes to the literature in the following ways. First, it contributes to the new product development literature by clarifying the role of organizational context and cross-functional collaboration and to which extent these factors influence new product performance.

Second, this paper advances the understanding of how structural context can be used by the management to overcome individual departmental interests in favor of the overall well-being of the entire firm. It is therefore proposed that the structural factor stretch purposefully guides cross-functional collaboration. Third, this investigation shows that the indirect effect of cross-functional collaboration on innovation performance through the relational factor climate for innovation increases with increasing stretch. More in detail, our findings demonstrate that stretch is a complementary asset, which further stimulates the relationship between cross-functional collaboration and new product performance which is mediated by climate for innovation. Hence, this study also addresses recent calls for investigating the complex interrelationships between cross-functional collaboration and new product performance (de Clercq, 2011).

The remainder of this paper is structured as following. First, conceptual model and research hypotheses are proposed. Second, the variables, the data collection and the empirical results are presented. Finally, the main conclusions and suggestions for future research are provided.

Theoretical Framework

In an ideal world, employees are eager to engage in cross-functional collaboration and firms encourage cross-functional collaboration to develop new products (e.g., de Clercq et al., 2011). Although cross-functional collaboration has been highlighted to enhance new product performance (Troy et al., 2008), it does not emerge automatically. Rather, employees engaged in cross-functional collaboration are often experience the exchange of conflicting and ambiguous information relevant for new product development (e.g., Zohar and Tenne-Gazit, 2008). Such contradictory information exchange can lead to frustration among employees and hamper the development of a shared understanding or collective mind (e.g., Crossan et al., 1999; Weick and Roberts, 1993), which is needed when developing new products. More specifically, through cross-functional collaboration emplyoees communicate and discuss their meanings to work activities, such as new product development, and try to develop a shared interpretation of the organizational environment (Ashforth, 1985; Roberson, 2006). Consequently only if employees understand each other they can effectively combine the other's knowledge and their own knowledge needed to develop success new products (Szulanski, 1996; Tsai and Ghosal, 1998). From this perspective, prior research shows that cross-functional collaboration fosters the emergence of a supportive organizational climate, as climate for innovation is. Literature indicates also that the concept of organizational climate has similarities to the concepts of organizational culture, structural context, and organizational climate (Gibson and Birkinshaw, 2004). Organizational culture refers to the underlying individual values, beliefs, and principles in organizations (Denison, 1990). Prior research describes organizational members' behavior as practices and procedures that foster the development of a supportive organizational climate (González-Romá, et al., 2002). Further, a supportive organizational climate is helpful for a firm's new product performance as it encourages organizational members to feel responsible for their job and to develop alternative solutions for identified challenges (Baer and Frese, 2003). In addition, in a supportive organizational climate employees are more inclined to accept challenging tasks (Bertels et al., 2011; Baer and Frese, 2003; Scott, 1994; Patterson et al., 2005). Developing new products benefits from a supportive innovation climate and, furthermore, climate for innovation can help to align individual employees goals during new product development (e.g., Atuahene-

Gima and Murray, 2007). Consequently, climate for innovation should enhance the extent to which cross-functional collaboration can be influenced towards successful new product development, in the way that climate for innovation induce employees' willingness to dedicate resources while collaboratively developing new products (Somech and Drach-Zahavy, 2011). Furthermore, climate for innovation should also facilitate to combination of diverse knowledge relevant for new product development (Lane and Lubatkin, 1998). Therefore, climate for innovation mediates the relationship between cross-functional collaboration and new product development performance.

H1: Cross-functional collaboration is positively related to a firm's climate for innovation.
H2: The effect of cross-functional collaboration on new product performance is mediated by the firm's climate for innovation.

Besides the relational factor (i.e., climate for innovation) which enhances the relationship between cross-functional collaboration and new product performance, firms need structural factors through which their management can push employees (Ghoshal and Bartlett, 1994). In this sense, organizational stretch can be an element that supports cross-functional collaboration and therefore enhances the climate for innovation. Organizational stretch refers to an organizational characteristic which induces employees to voluntarily strive for more, rather for less ambiguous goals (Gibson and Birkinshaw, 2004). Firms that foster stretch encourage employees to push for ambitious goals, as developing new products might be (Ghoshal and Barlett, 1994). This sense of aiming for ambitious goals guides employees during the new product development process. When stretch is silent, employees use development teams' goals, norms, and values in regulating their behavior (Ashford at al., 2008; Jasmand et al., 2012). Such consensus reduces the range of means that might be used to attain goals. Employees then reduce active consideration of other possibilities while striving for ambitious goals. While stretch enhances the continuous striving for more it purposefully guides cross-functional collaboration resulting in greater climate for innovation which in turn will promote new product performance. Accordingly:

H3: The indirect effect of cross-functional collaboration on new product performance through firm's innovation climate is moderated by stretch.

Methodology

Our sampling frame is a group of German firms. We collected the data through an online survey, conducted in 2012, across a random sample of 450 large-sized firms in Germany. Although smaller firms are highly innovative, in the context of this paper, a focus on medium and large-sized firms is suitable as larger firms in Germany systematically engage in new product development activities and consequently support new products (e.g. Burlemann and Jahn, 2014). Further, larger-sized firms are covered to a much higher degree by works councils than smaller firms, as in German firms (with at least five employees) the initiation of works councils depends on employees' decisions and activities. Focusing on works councils in large-sized German firms is in the context of this study is further highly interesting, because of the works council special position in German firms. Works councils in Germany are for example responsible in codetermining the firms continuous idea generation process and to monitor that labor agreements are met (Jirjahn and Smith, 2006; Pries, 2006; Jirjahn, 2010; Mueller, 2011). Further, heads of works councils can push through cross-functional collaboration for certain new products but are also responsible in managing the organizational context.

To the extent possible, the questions used in the online survey were based on innovation management, human resources management, and organizational design literature. The developed survey was presented and discussed with academics knowledgeable in the research area; as a result some questions were revised to improve their clarity. Afterwards, 25 appointments with head of works councils were scheduled to pre-test the survey. On the bases of their feedback we identified ambiguities and unclear questions, and eliminated or shorted several items. In 2012, we administered the survey to 450 firms located in Germany which have a works council. We guaranteed confidential and anonymous treatment of the responses for the survey. After three reminders, a total of 211 firms had responded to the survey. This equals a response rate of 46.8 %. However, because of missing values, only 200 responses were used for the analysis. Only heads of works' councils responded the online-survey. In most of the large-sized firms in our sample the heads of the works councils are released from their original work activities and can focus full-time on their tasks as elected employee representatives (Gumbrell-McCormick and Hyman, 2010). Due to this privilege they can regularly participate in cross-functional collaboration, both on firm and project level. Based on the intensity of such managerial and strategic and project activities, heads of German works councils can be characterized as 'cross-departmental' members of the middle

management of their firms (Rogers and Streeck, 2009; Gumbrell-McCormick and Hyman, 2010). The 198 firms included in the data set have an average of 606 employees. Further, the participating firms operate in industries such as transportation, financial services, retailing, and machinery.

To rule out systematic effects on our data and hypothesis testing, we tested for selection and nonresponse bias by comparing early and late respondents on our key variables and firm characteristics. None of these comparisons revealed significant differences. To minimize common method variance, we followed the suggestions of Podsakoff et al. (2003). We psychologically separated the measures of the independent variables from those of the proposed mediators and dependent variables by placing them into different thematic sections in the questionnaire, such that they appeared unrelated. In addition, Harman's one-factor test on all items did not reveal a single factor accounting for most of the covariance in the variables, suggesting that common method bias is not present in this study.

To measure our study constructs, we relied on established scales and adapted them where necessary. For innovation climate 7 items adapted from Scott (1994) were used. Based on Müller-Jentsch (1998) we measured cross-functional collaboration with 5 items that reflected the extent of cooperation within the firms. For example, we asked the respondents to rate the extent to which employees from different departments are fully cooperated in establishing goal and priorities for the firm's strategy. On the basis of the study of Gibson and Birkinshaw (2004), we measured stretch with 3 items. The items asked respondents to indicate the extent to which their firm encourages organizational members to set challenging goals and to strive for more. Finally, Song and Perry (1997) informed the measure of new product performance. As our outcome variable was measured on the firm level, we included relevant firm-level control variables in our analysis. First, we included a dummy variable representing the number of full-time employees, provided by the employment office. Second, we included a dummy variable representing whether each firm was offering products or services.

Before we started our data analysis, we carefully checked among our continuous variables for univariate outliers by inspecting the standardized scores (measures with a z score in excess of ± 3) and the normal probability plots. Since we did not detect any outliers we did not exclude any further cases.

Results

Table 1 provides a summary of the correlation matrix, descriptive statistics, and Cronbach's alpha values for the performed statistical calculations.

	M	SD	α	1	2	3	4	5	6
1. New product performance	5.17	1.21	.803	1.0					
2. Climate for innovation	4.09	1.25	.901	.49**	1.0				
3. Cross-functional collaboration	4.05	1.27	.819	.42**	.49**	1.0			
4. Stretch	5.13	1.26	.848	.36**	.57**	.45**	1.0		
5. Industry sector	1,36	.48	N.A.	-.07	.02	-.11	-.09	1.0	
6. Number of employees	606.1	773.22	N.A.	.02	.07	.03	.11	-17*	1.0

* p < .05 (two-tailed)
** p < .01 (two-tailed)

Table 1: Descriptive Statistics

The theoretical model (cf. figure 1) of our study implies a moderated mediation model (Hayes, 2015; Preacher, Rucker and Hayes, 2007), in which the relationship between cross-functional collaboration and climate for innovation is moderated by organizational stretch and climate has a direct effect on new product performance. We used the approach of Hayes (2015) to test our hypotheses with the mediator climate and the new product performance as outcome variables (table 2). The control variables (industry sector and number of employees), the independent variable cross-functional collaboration, and the moderator variable stretch were included as fixed effects in each of the two equations predicting climate for innovation and new product performance.

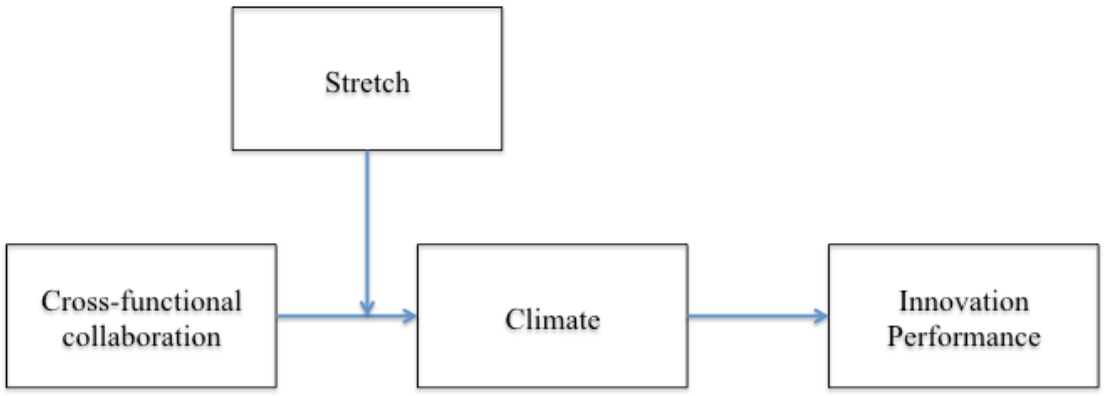

Figure 1: Theoretical model

	Climate for innovation		New product performance	
	Coeff.	95% CI	Coeff.	95% CI
Cross-functional collaboration	.302** (.062)	.181 - .424	.199* (.069)	.063 – .334
Climate for innovation	–	–	.345** (.075)	.197 – .494
Stretch	.439** (.061)	.318 – .561	.051 (.073)	-.092 – .195
Industry sector	.224 (.147)	-.065 – .513	-.087 (.158)	-3.93 – .218
Number of employees	.000 (.001)	-.0002 – .0002	.000 (.001)	.000 – 001
Constant	.328 (.387)	-.436 – 1.092	2.72** (.408)	1.92 – 3.52
	R^2 = .404; p = .000		R^2 = .301; p = .000	

* p < .01; ** p < .001

Table 2: Test of Mediation (Standard Errors in parentheses)

In support of H1, the effect of cross-functional collaboration on climate for innovation is significant and positive (.302) with a 95% confidence interval excluding zero (.181 - .423). In H2 we predicted that the relationship between cross-functional collaboration and new product performance is mediated by climate for innovation. Consistent with our prediction, we found the mean indirect effect from the bootstrap analysis (by means of bootstrapping of 5.000 repetitions (Zhao et al., 2010) is positive and significant (effect = .104) with a 95 % confidence interval excluding zero (.0514 - .1804). The direct effect between cross-functional collaboration and new product performance (.1987) is also significant ($p < .05$). Since, both the indirect effect (.104) and the direct effect (.1987) are significant and the result of the multiplication of both effects leads to a positive result (.021) it can be concluded that a complementary mediation exist. Thus, hypothesis 2 is supported.

Hypotheses 3 proposed that the relationship between cross-functional collaboration and new product performance which is mediated through climate for innovation is not independent of the moderator stretch. As can be seen in table 3, the interactive effect of cross-functional collaboration and stretch on climate for innovation is non-significant as the confidence interval includes the zero. However, as stated by Hayes (2015) based on this result it cannot definitely be claimed that the indirect effect is not moderated by stretch because the interaction effect of cross-functional collaboration and stretch does not quantify the relationship between the moderator and the indirect effect. Therefore, Hayes (2015) recommends a formal test between the relationship of the moderator and the size of the indirect effect. The result of this formal test shows, that the indirect effect of cross-functional collaboration on new product performance through climate increases with stretch (see table 3)

as the 95 % bootstrap confidence interval for the moderated mediation index (.027) is between .001 and .062. As this confidence interval does not include zero and the lower bound is positive it can be concluded that the indirect effect of cross-functional collaboration on new product performance through climate for innovation is positively moderated by stretch. We plotted this moderated mediation function following Hayes (2015). As shown in figure 2, the indirect effect of cross-functional collaboration on new product performance through climate for innovation increases with increasing stretch. Thus, hypothesis 3 is supported.

	Climate for innovation		New product performance	
	Coeff.	95% CI	Coeff.	95% CI
Cross-functional collaboration	-.09 (.239)	-.56 – .381		
Climate for innovation	–	–	.369** (.067)	.237 – .501
Stretch	.194 (.157)	-.116 – .503	–	–
Cross-functional collaboration × Stretch	.073^{+} (.043)	-.012 – .157	–	–
Industry sector	.246 (.146)	-.043 – .534	-.096 (.154)	-.400 – .208
Number of employees	.000 (.001)	-.002 – .002	.000 (.001)	.000 – .003
Constant	1.58 (.831)	-.06 – 3.219	2.85 (.361)**	2.138 – 3.564
	R^2 = .413; p = .000		R^2 = .299; p = .000	

$^{+}$ p < .1; * p < .01; ** p < .001

Table 3: Test of Overall Model

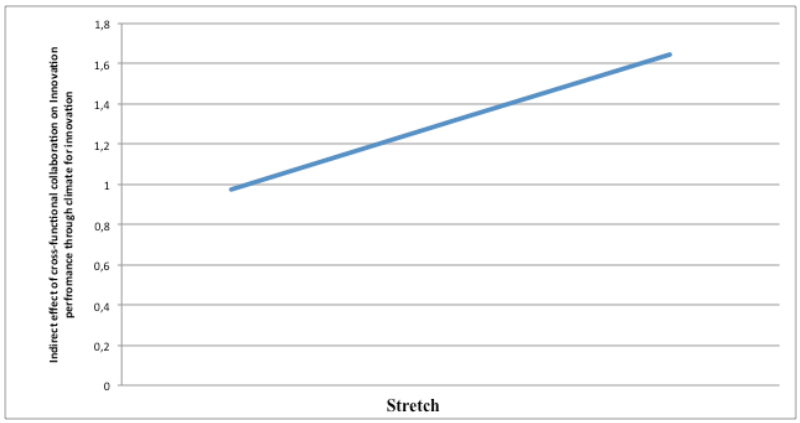

Figure 2: visualization of the moderated mediation linear function

DISCUSSION

The starting point of this paper, inspired by contingency theory (Damanpour, 1991; 1996), was our aim to investigate the complex relationship between cross-functional collaboration, stretch, climate for innovation, and new product performance. To investigate this complex relationship, we collected a random data sample of heads of works councils, resembling cross-departmental middle managers, of 450 large-sized German firms. To the best of our knowledge, this is the first empirical study investigating the relationship between cross-functional collaboration, climate for innovation and new product performance. Most research in this area has previously considered climate for innovation to exist and to facilitate new product development and consequently enhance a firm's new product performance (for example, McLean, 2005; Patterson et al., 2005). Literature, however, suggests that cross-functional collaboration aligns goals among employees and facilitates the development of a shared understanding (Crossan et al., 1999; Ernst et al., 2010) which is needed for developing new products. Hence, we based our three hypotheses on the assumption that cross-functional collaboration fosters the emergence of a climate fo.

In support of our hypothesis 1, we demonstrated (Table 2) that cross-functional collaboration proved to be a predictor of climate for innovation. This finding suggests that climate for innovation can be stimulated via organizational factors, as for example the composition of cross-functional new product development or innovation teams. Furthermore, we could confirm hypothesis 2 of our study that the effect of cross-functional collaboration on new product performance is mediated by the firm's climate for innovation (Table 2). If organizational factors as team composition are suitable, it may be possible to foster climate for innovation by selecting employees with high willingness to collaborate with diverse other emplyoees.

However, facilitating cross-functional collaboration might be valuable to foster climate for innovation but as our study highlights combining it with stretch (hypothesis 3) leads to a higher level of climate for innovation and consequently higher new product performance (Table 3). Specifically, our results showed that stretch is a complementary asset with which a firm's climate for innovation is further stimulated. Overall, this finding leads us to the conclusion that firms need to balance relational factors and structural factors in order to guide cross-functional collaboration in new product development.

In addition, the findings of our study are in line with the results of the work of Belassi et al. (2007). They found that firms with financially successful new product development projects support an organizational climate that "encourages employees to exert maximal effort, and

that makes them comfortable in dealing with unfamiliar situations and in expressing their opinions, even when in disagreement with supervisors or managers" (p. 19). Furthermore, the contributions of this paper point into the same direction as the finding of Patterson et al. (2005) that "subsequent productivity (collected one year after the climate survey)" (p. 398) was significantly correlated with organizational climate. The results of our study also show similarity to the recent finding of Somech and Drach-Zahavy (2013) that team creativity only translates to innovation implementation under high levels of climate for innovation. Although 'cross-functional collaboration' and 'team creativity' refer to different theoretical constructs, we can assume a certain overlapping between them. The 'functionally heterogeneous' teams which Somech and Drach-Zahavy (2013) investigated seem to rely on cross-functional collaboration.

From a theoretical perspective, the paper helps to clarify the importance of the role of climate for innovations in the complex relationship between cross-functional collaboration, stretch and new product performance. Furthermore, our findings confirm that climate for innovation is only one necessary theoretical building block for the explanation of firms' new product performance. This relational factor needs to be balanced by top and middle managers with further building blocks such as stretch on the one hand and cross-functional collaboration as 'enabler' of knowledge transfer between firms' different departments on the other (for example, Belassi et al., 2007). The fact that the heads of works councils of large-sized firms who participated in our survey per se cover a cross-functional managerial key position (Pries, 2006; Jirjahn, 2010) highlights this contribution.

CONCLUSIONS: LIMITATIONS AND FUTURE RESEARCH

The present study has limitations that reveal possible avenues for further research. Our sample is based on a relatively small group of cross-departmental middle managers (heads of work's councils) of German firms, which may limit the generalizability of our findings. A comparison of our sample with those of other studies suggests, however, the representativeness of our sample. Furthermore, we conducted our empirical study in randomly selected firms and controlled for industry and number of employees. Therefore, we cannot rule out any effects based on firm differences, but following studies should replicate our study in a single firm to receive a deeper understanding of this complex relationship between cross-functional collaboration, climate for innovation and new product performance. Our data regarding climate for innovation were self-reported. This issue does not differ from previous studies (e.g., Somech and Drach-Zahavy, 2013); although, in our data collection we followed

suggestion provided in the literature (e.g., Podsakoff, et al., 2003) to minimize common method variance. Finally, our study focused on heads' of works councils perception which have a key role in developing new products in German firms (Jirjahn, 2010; Mueller, 2011). However, that employees and middle managers from different departments are needed for cross-functional collaboration and successful, firm-specific tailored new product development is undisputed. Subsequent studies should therefore extend our study by obtaining quantitative and qualitative data from different sources.

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