J PROD INNOV MANAG 2011;28:680–697

DOI: 10.1111/j.1540-5885.2011.00830.x

A Closer Look at Cross-Functional Collaboration and Product Innovativeness: Contingency Effects of Structural and Relational Context

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This study applies a contingency perspective to examine how the intra-organizational context influences the relationship between cross-functional collaboration and product innovativeness. It focuses on the role of (1) formal, structural factors directly controllable by top management decisions and (2) more intangible, relational factors as potential enhancements of the firm's ability to convert cross-functional collaboration into product innovativeness. A study of 232 firms confirms the hypotheses, finding that the relationship between cross-functional collaboration and product innovativeness is stronger for higher levels of decision autonomy and shared responsibility (structural context) and social interaction, trust, and goal congruence (relational context). In addition, a post-hoc analysis using a configurational approach to organizational contingencies reveals that organizations' relational context is more potent than their structural context for converting cross-functional collaboration into product innovativeness. The study's implications and future research directions are discussed.

A firm's ability to develop new products and services can enhance its performance (Li and Atuahene-Gima, 2001; Moran and Ghoshal, 1999; Teece, Pisano, and Shuen, 1997) and thus represents an important topic for scholarly investigation (Szymanski, Kroff, and Troy, 2007). To this end, prior research has examined the determinants and decision processes underlying firms' product innovativeness (e.g., Hult, Hurley, and Knight, 2004; Lovelace, Shapiro, and Weingart, 2001; Sethi, Smith, and Park, 2001), defined as "the capacity of a new innovation to influence the firm's existing marketing resources, technological resources, skills, knowledge, capabilities, or strategy" (Garcia and Calantone, 2002, p. 113). Such examinations offer valuable insights into the deeper mechanisms underlying a firm's competitive advantage.

To develop new products and services, a firm needs not only to foster external relationships that afford it vigilance over ever-changing market conditions (Payne and Frow, 2005) but also to ensure buy-in from its different functional areas (Srivastava, Shervani, and Fahey, 1998; Workman, 1993). The latter requires integration across different functions, such as R&D and marketing (De Luca and Atuahene-Gima, 2007; Lovelace et al., 2001). But such cross-functional integration also is fraught with challenges, because exchanges among people from different functional areas bring together varied "thoughtworlds" (Griffin and Hauser, 1996), cultures, and attitudes (Gupta, Raj, and Wilemon, 1986), which makes combining their knowledge to create new products difficult (De Luca and Atuahene-Gima, 2007). Extant research conceives of cross-functional integration as consisting of two dimensions: interaction and collaboration (Kahn, 1996). The former captures formal coordination mechanisms, whereas the latter emphasizes the harmonious, collaborative nature of interdepartmental relationships (Atuahene-Gima, 2005; Olson, Walker, and Ruekert, 1995; Ruekert and Walker, 1987; Song, Xie, and Dyer, 2000). The focus of this study is on this affective, collaborative component of cross-functional integration. Importantly, the translation of cross-functional collaboration into product innovativeness does not occur automatically, because such collaboration cannot be easily regulated and often is intangible in nature (Appley and Winder, 1977).

Because intrafirm knowledge exchanges do not occur in isolation but rather are embedded in an organizational context, the context can play a prominent role in determining whether function-specific knowledge gets unlocked and combined to benefit the whole organization through the development of new products (Nahapiet and Ghoshal, 1998). Concerns about resource allocations (Luo, Slotegraaf, and Pan, 2006; Tsai, 2002) and political battles (Ancona and Caldwell, 1992) can easily undermine the quality of knowledge exchange among departments and thus the effectiveness of their collaborative efforts. The extent

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to which these challenges can be addressed depends significantly on decisions about structural aspects of the organization, over which top management tends to have substantial discretion (Griffin and Hauser, 1996; Leenders, van Engelen, and Kratzer, 2007; Ruekert and Walker, 1987), as well as on relational issues, which are more intangible and therefore less controllable (Lawson, Petersen, Cousins, and Handfield, 2009; Tsai and Ghoshal, 1998). Indeed, extant literature notes the importance of various structural conditions in the innovation process, such as cross-functional teams (Jassawalla and Sashittal, 1998), top management team diversity (Auh and Menguc, 2005), level of centralization (Devinney, 1995; Leenders et al., 2007), reward structures (Feldman, 1996; Song, Montoya-Weiss, and Schmidt, 1997), or job rotation (Leenders and Wierenga, 2002). Similarly, innovation and new product development depend on various relational processes, such as informal interactions (Tsai and Ghoshal, 1998), the development of trust between functional departments (Bosch-Sijtsema and Postman, 2009; Bstieler, 2006), or the presence of shared goals across the organization (Xie, Song, and Stringfellow, 2003).

Yet research at the nexus of cross-functional collaboration and innovation typically treats these contextual characteristics as independent predictors of product innovativeness, without considering their interdependence with cross-functional collaboration. Despite prior efforts to examine the contingent nature of a firm's innovation capabilities (e.g., Citrin, Lee, and McCullough, 2007; Lee and Na, 1994; Liker, Collins, and Hull, 1999; Montoya, Massey, Hung, and Crisp, 2009; Sethi and Nicholson, 2001), there remains a clear need for more context-bound work, especially examining the interplay of cross-functional collaboration and organizational context in fostering product innovativeness. This gap represents the main motivation for this paper and designates a key question: How might the relationship between cross-functional collaboration and product innovativeness vary across different intra-organizational settings?

By considering the moderating effects of structural and relational context, this study highlights the roles that intra-organizational arrangements, both within and beyond the control of the organization's top decision makers, can play in converting cross-functional collaboration into innovation output. This process hinges on the organization's ability to assemble and combine dispersed knowledge across functional boundaries (Floyd and Lane, 2000). As its contribution, the study explicates that such knowledge integration and leverage is sensitive not only to formal decisions that specify and motivate the collaboration between different functions but also to the informal, relational context in which such collaboration takes place (Nahapiet and Ghoshal, 1998).

BIOGRAPHICAL SKETCHES

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Theory

Ideally, a firm should encourage close collaborative relationships between functional managers to develop new products and services (Lovelace et al., 2001). Although cross-functional collaborative relationships can be beneficial for product innovativeness (Sethi et al., 2001), such benefits do not come about automatically. For instance, managers may experience ambiguity in their collaboration with peers in other departments, given the unstructured nature of such collaboration, which can lead to frustration and anxiety (Kahn, 1996; Song et al., 2000). Further, the conversion of collaborative relationships, even if marked by harmony, into product innovativeness can be hampered by uncertainty about how different departments will contribute to the generation of specific deliverables, such as the provision of timely and high-quality knowledge (Adams, Day, and Dougherty, 1998; Hitt, Hoskisson, and Nixon, 1993). Strong collaborative relationships, though necessary for product innovativeness, also may create a sense of relinquished power that can function as a disincentive to disclose function-specific knowledge (Kim and Mauborgne, 1998).

This study seeks to understand the contingencies underlying the link between such cross-functional collaboration and product innovativeness in the context of collaboration among midlevel managers

responsible for different functions such as R&D or marketing (Floyd and Wooldridge, 1997). Such managers oversee the subprocesses involved in implementing an organization's higher-level, strategic decisions and epitomize the enactment of a firm's innovative pursuits. In their unique positions, from which they can evaluate and combine knowledge flows, these midlevel managers help leverage internal relationships to encourage product innovativeness (Floyd and Lane, 2000). Several intra-organizational conditions that can shape the extent to which collaboration leads to product innovativeness are considered, and a distinction is made between the structural and relational contexts.

Structural Context

Top management decisions with respect to structural aspects of intra-organizational functioning play an instrumental role in firms' innovation processes (Leenders et al., 2007; Ruekert and Walker, 1987). For instance, the level of decentralization granted to individual departments (Devinney, 1995; Leenders et al., 2007) and the extent to which departments are connected through performance evaluation measures (Hill, Hitt, and Hoskisson, 1992; Hill and Hoskisson, 1987; Xie et al., 2003) represent critical ways for top management to influence the nature and patterns of intra-organizational knowledge. The enactments of such features emerge as the level of decision autonomy and shared responsibility across functional departments, and these two structural elements in turn can affect managers' motivations to combine their knowledge, based on their belief that intensive knowledge exchange is *feasible* or that the outcomes of such knowledge exchange are *desirable* for them (Klein, 1991; Vroom, 1964), as outlined subsequently.

Decision autonomy (or decentralization) reflects the extent to which functional managers perceive that cross-functional knowledge exchange is feasible (Ambrose and Kulik, 1999; Sethi and Sethi, 2009; Takeuchi, Shay, and Li, 2008) and have the support of top management in making discretionary decisions (Klein and Sorra, 1996). Decision autonomy also is akin to the notion of organizational support, as reflected in top management's propensity to provide organizational members with access to resources and stimulate them to take initiatives (Ghoshal and Bartlett, 1994; Gibson and Birkinshaw, 2004). The counterpart of decision autonomy is centralization, or the degree to which decisions must be approved initially by top management (Dyer and Song, 1998). *Shared responsibility*—a second structural mechanism through which top management aims to influence cross-functional knowledge exchange—reflects the extent to which functional managers perceive knowledge exchanges with peers in other departments as desirable (Pinto, Pinto, and Prescott, 1993). It relates closely to the presence of joint reward systems that provide functional managers with economic incentives to achieve firm-level rather than individual goals (Xie et al., 2003). It also mirrors the presence of "stretch," in that functional managers share a common ambition associated with the overall well-being of their organization rather than prioritizing their individual departmental interests (Gibson and Birkinshaw, 2004).

Relational Context

An important tenet of this study is that the potency with which cross-functional collaboration leads to product innovativeness is contingent not only on tangible factors over which top management has direct control but also on intangible factors that capture the relational context in which cross-functional interactions take place. To this end, the nature and role of social capital among functional departments are considered as a lever for successful cross-functional collaboration. Social capital has emerged in management and organization research as a key aspect of organizations' relational context, in that it promotes internal knowledge exchange and the creation of new knowledge and intellectual capital (Leana and van Buren, 1999; Nahapiet and Ghoshal, 1998; Tsai, 2000). It represents an organizational characteristic that reflects "the sum of the actual and potential resources embedded within, available through, and derived from the network of relationships possessed by an individual or social units" (Nahapiet and Ghoshal, 1998, p. 243). As such, a firm's internal social capital can be instrumental for innovation (Auh and Menguc, 2005; Tsai and Ghoshal, 1998). Significantly, management researchers identify three critical dimensions of social capital: social interaction, trust, and goal congruence (De Clercq and Sapienza, 2006; Tsai and Ghoshal, 1998; Yli-Renko, Autio, and Sapienza, 2001), as instrumental for unlocking knowledge among exchange partners.

In the context of this study, *social interaction* captures the strength of the social relationships between functional managers and the informal nature of these relationships (Yli-Renko et al., 2001). The exchanges

between functional departments differ with respect to the presence of close personal relationships among functional managers in their day-to-day activities, as well as the extent to which these managers spend significant time together in social situations outside work (Tsai and Ghoshal, 1998). The notion of social interaction is conceptually different from that of cross-functional collaboration, in that functional managers who maintain collaborative, harmonious relations with other functional departments may not always maintain informal relationships or engage in social events with the managers of these departments. Further, *trust* refers to functional managers' positive expectations about others' motives in situations entailing risk and vulnerability (Boon and Holmes, 1991). Although some researchers broadly refer to trust as exchange partners' belief and expectation about the reliability and predictability of others' behavior (Cummings and Bromiley, 1996; Sitkin and Roth, 1993), such characteristics may not necessarily reflect "true" trust; the presence of repeated defective behavior for example may be predictable but not involve trustworthiness (Zaheer, McEvily, and Perrone, 1998). Therefore, trust is conceived of as instilling a willingness to leave oneself vulnerable to the actions of others, which is deemed particularly relevant in uncertain and risky situations (Dayan, Di Benedetto, and Colak, 2009; Rousseau, Sitkin, Burt, and Camerer, 1998). Finally, *goal congruence* refers to the extent to which functional managers across different departments share the same goals (Xie et al., 2003). This dimension reflects the presence of a shared paradigm that facilitates how individual departmental interests can fit into the firm's overall strategy and goals (Pinto et al., 1993). Goal congruence can help coordinate the activities of individual departments toward the accomplishment of the common good for the whole organization (McDonough, 2000).

Hypotheses

As mentioned, cross-functional collaboration captures the unstructured, affective nature of interdepartmental exchanges (Kahn, 1996; Song et al., 2000). It can facilitate the smooth and effective combination of knowledge across functional departments (Sherman, Berkowitz, and Souder, 2005) and thus increase a firm's ability to convert existing competencies into new ones (Zahra, Ireland, and Hitt, 2000). The study starts with the intuitive premise that cross-functional collaboration enhances product innovativeness and focuses on the internal contingencies that may amplify this relationship. The conceptual model appears in Figure 1. The moderating effects of the two structural factors (decision autonomy and shared responsibility) on the contribution of cross-functional collaboration to product innovativeness are first discussed, and then those of the three relational factors (social interaction, trust, and goal congruence).

Moderating Effect of Decision Autonomy

The extent to which functional managers have decision autonomy is an important component of a firm's structural context (Yukl and Fu, 1999). In conditions of high decision autonomy, functional managers can voice their opinions about how to combine their expertise optimally with the expertise of colleagues from other departments, and they receive consideration for these efforts (Burgelman, 1991; Gibson and Birkinshaw, 2004). In contrast, the presence of strongly centralized decision making (low decision autonomy) likely

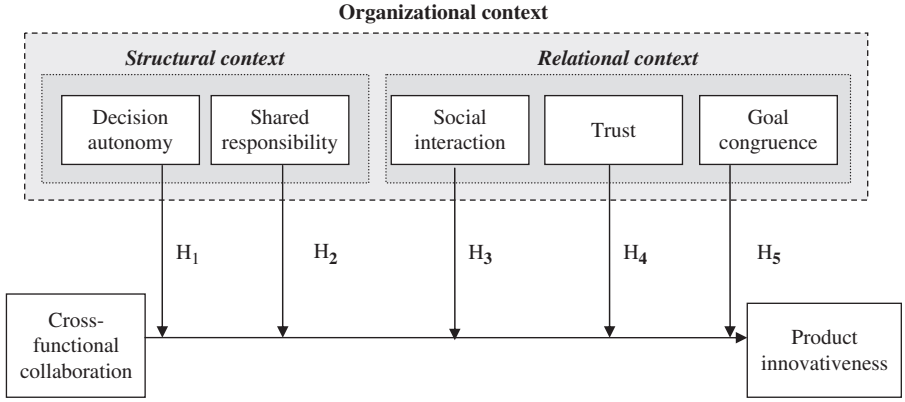

Figure 1. Conceptual Model

prompts functional managers mainly to carry out their assigned, function-specific tasks, with little interest in leveraging their relationships with other functional departments to generate new ideas, products, or markets (Devinney, 1995; Sethi and Sethi, 2009).

Accordingly, this study argues that cross-functional collaboration should be more instrumental for product innovativeness when decision autonomy is higher. That is, the generation of innovative outcomes that stem from cross-functional collaboration should improve when functional departments do not need to get permission from top management every time they want to take an initiative. Granting decision autonomy to functional managers may help them understand how knowledge combinations across departments affect the organization as a whole, as it stimulates them to gain insight into how departments might use or be affected by others' expertise (Cohen and Levinthal, 1990; Floyd and Lane, 2000; Song, Dyer, and Thieme, 2006). As a result, functional managers might learn over time how to manage and optimize knowledge recombinations in cross-functional exchanges and help their departments turn these activities, collectively, into product innovativeness (Hargadon and Fanelli, 2002). Ultimately, by decentralizing decision making to functional managers, and thus increasing their perceived control over how to combine their knowledge with that of others, firms can enhance the innovation potential inherent to cross-functional collaboration.

H1: The positive relationship between cross-functional collaboration and product innovativeness is moderated by the level of decision autonomy, such that this relationship is stronger for higher levels of decision autonomy.

Moderating Effect of Shared Responsibility

Cross-functional collaboration also should result in greater product innovativeness to the extent that functional departments enjoy shared responsibility for the organization's overall performance. By emphasizing joint rather than individual rewards, top management expresses its reliance on functional managers' commitment to the firm's shared mission and objectives, rather than on purely utilitarian exchanges through individual compensation (Bloom, 1999; Collins and Clark, 2003). This study argues that the successful application of cross-functional collaboration to product innovativeness requires the presence of such shared responsibility, because the reconfiguration of existing activities demands the combination of disparate knowledge across functional boundaries (Floyd and Lane, 2000) and the transcendence of individual interests (Collins and Smith, 2006). Group-based rewards can stimulate such transcendence (Milkovich and Newman, 1990) and the likelihood that knowledge combines effectively across functional borders (Lee and Ahn, 2007). Moreover, whereas individual functional managers may be myopic regarding the opportunities for effective knowledge sharing, top management can oversee and effectively reward synergistic value across functional areas (Gilbert, 2006; Smith and Tushman, 2005). Finally, a joint rewards system might enhance the contribution of cross-functional collaboration to product innovativeness by increasing the flexibility of the timing of the rewards, such that they match the accomplishment of complex new tasks or are contingent on specific targets pertaining to innovative activities (Gomez-Mejia and Balkin, 1989).

H2: The positive relationship between cross-functional collaboration and product innovativeness is moderated by the level of shared responsibility, such that this relationship is stronger for higher levels of shared responsibility.

Moderating Effect of Social Interaction

Social interaction captures the presence of social contacts and personal relationships between functional departments. Tsai and Ghoshal (1998) find that social interaction enhances high-quality knowledge exchange by stimulating close cooperation among organizational actors in their efforts to achieve the firm's innovation-related goals. In turn, it is hypothesized that the positive relationship between cross-functional collaboration and product innovativeness should be stronger when strong social ties exist between functional departments.

First, strong ties facilitate the ability to *learn* from collaborative exchanges between exchange partners (Larson, 1992; Uzzi, 1997). Uzzi (1997) finds that a critical aspect of socially "embedded" ties is an improved ability to solve problems jointly, which enables decision makers to get direct feedback from one another, search deeply for solutions, and integrate these solutions into day-to-day practices. Similarly, Heide and Miner (1992) indicate that when collaborative partners confront different opinions, close social interactions enhance their mutual adjustment and efforts to engage in shared problem solving. Second,

and in the same vein, strong social ties across functional departments can help settle disagreements and conflicting points of view that may emerge in their cross-functional exchanges (De Dreu, Weingart, and Kwon, 2000). Third, informal relationships between functional managers increase the firm's absorptive capacity and thus the ability to tap into a broader array of knowledge when collaborating with peers in other departments (Woodman, Sawyer, and Griffin, 1993). In short, to the extent that different functions engage in close social interactions, they should be better able to maximize the benefits of cross-functional collaboration for product innovativeness by facilitating productive translations of different pieces of knowledge into joint solutions.

H3: The positive relationship between cross-functional collaboration and product innovativeness is moderated by the level of social interaction, such that this relationship is stronger for higher levels of social interaction.

Moderating Effect of Trust

The role of the goodwill aspect of trust or the willingness of functional managers to leave themselves vulnerable to the actions of colleagues in other departments is also considered (Dayan et al., 2009; Rousseau et al., 1998). The beneficial effect of cross-functional collaboration on product innovativeness should be greater when higher levels of such trust exist among the different functions. First, trust reduces the time and money consumed in monitoring the behavior of functional peers (Zaheer et al., 1998) and therefore enables managers to devote more time to productive activities, such as figuring out how their own knowledge can be effectively combined with that of others during the development of new products or services (Adams et al., 1998; Jassawalla and Sashittal, 1998).

Second, cross-functional interactions are often marked by a certain level of "coopetition," whereby the partners not only collaborate with each other but also compete for the firm's scarce resources in the pursuit of their own agendas and strategic priorities (Luo et al., 2006; Tsai, 2002). Therefore, when functional managers are confident that their colleagues will *not* take advantage of them—for instance, they will not demand excess resources and ignore other departments' needs—even if the opportunity arises, their collaborative efforts should be more effective, given their greater willingness to exchange privileged and confidential knowledge (Yli-Renko et al., 2001) or even exchange insights derived from prior failures (De Luca and Atuahene-Gima, 2007; Sherman et al., 2005). In a similar vein, trust reduces fears of criticism or looking foolish (Atuahene-Gima and Murray, 2007) and enhances the willingness of functional managers to implement risky actions or transform new ideas and novel alternatives into concrete innovation-driven actions (Dooley and Fryxell, 1999). Thus, when trust exists, functional managers are more prone to ask for help and take risks in their collaborative relationships (Jassawalla and Sashittal, 1998), which increases the potency of these relationships to be leveraged toward the generation of new products.

Third, cross-functional trust increases managers' propensity to consider conflicting viewpoints, even if those opinions do not appear to reflect the short-term interests of their own department (Simons and Peterson, 2000), which then improves the likelihood that new knowledge combinations and product solutions get generated (Nahapiet and Ghoshal, 1998). In conditions of trust, there is increased confidence in the truthfulness of proposed opinions and higher chances that functional managers take each other's opinions seriously (Larsson, Bengtsson, Henriksson, and Sparks, 1998; Uzzi, 1997).

H4: The positive relationship between cross-functional collaboration and product innovativeness is moderated by the level of trust, such that this relationship is stronger for higher levels of trust.

Moderating Effect of Goal Congruence

Goal congruence represents the cognitive dimension of social capital and refers to the degree to which functional managers' goals and values converge (Nahapiet and Ghoshal, 1998). For firms to develop new products or services, their managers need to understand the "ways that things are done" in other departments, so that their own and other's knowledge bases can be effectively integrated (Szulanski, 1996; Tsai and Ghoshal, 1998). In turn, it is argued that the positive impact of cross-functional collaboration on product innovativeness will be enhanced at higher levels of goal congruence.

First, Larsson et al. (1998) suggest that when exchange partners share similar goals, they are likely to provide each other with wider access to their own knowledge base; in contrast, when their goals are at odds, there may be a tendency to keep such knowledge to themselves. In the same vein,

extant research on cross-functional collaboration suggests that goal conflict among functional units may diminish willingness to share complete information with one another (McDonough, 2000; Pinto et al., 1993; Xie et al., 2003) and thus decrease the innovative potential of cross-functional collaboration. Second, goal congruence should increase the extent to which cross-functional collaboration can be leveraged toward product innovativeness, in that common goals induce a common "dominant logic," that is, a preference for how to process knowledge and how to solve problems (Lane and Lubatkin, 1998). Such logic creates a deeper understanding of which knowledge is most important to solve a particular problem and how to combine disparate pieces of knowledge in a creative manner (Lane and Lubatkin, 1998). Thus, when different departments share the same goals and expectations, they can achieve improved insights into the acquisition and delivery of function-specific knowledge necessary for the development of new products (Xie et al., 2003). In short, when functional departments share preferences and goals, their collaborative relationships are characterized by a deeper level of communication, which in turn increases the potency of such relationships in terms of their potential exploitation for product innovativeness.

H5: The positive relationship between cross-functional collaboration and product innovativeness is moderated by the level of goal congruence, such that this relationship is stronger for higher levels of goal congruence.

Research Methods

Sample and Data Collection

To ensure the wide applicability of the study's findings, the hypotheses are tested with a sample of firms active in a variety of industrial sectors. From a private market research company, a list of 1,500 randomly selected Canadian firms, representative of the country's provinces and industrial sectors, was obtained. Similar to approaches employed in prior research (e.g., Simons and Peterson, 2000; Song et al., 2006), a single-respondent design was used and contact information about managers active in either an R&D- or marketing-related function was obtained. A survey instrument was then sent to one randomly selected functional manager per firm. To pretest the survey and ensure that the questions were clear and understandable, informal interviews were undertaken with six randomly chosen functional managers (three R&D, three marketing) who were not included in the initial sample and with whom the survey instrument was discussed, as well as the challenges associated with cross-functional cooperation in their firms. Their input helped us improve the readability and relevance of the survey instrument.

The data collection relies on Dillman's (1978) total design method. A mailing packet was prepared containing (1) a cover letter addressed personally to the functional managers of the sampled firms, (2) a questionnaire, and (3) a postage-paid return envelope. Two weeks after the initial mailing, "thank you" calls were conducted to those who had responded and reminder calls to those who had not. Four weeks after the initial mailing, replacement questionnaires were sent to nonrespondents. Some initially selected firms were unfit for the final sample because they were not active any more, had moved and their new address could not be identified, or no longer employed the selected respondents. There were 950 potential respondents and 232 completed surveys were received, for a response rate of 24%, which is approximately consistent with other studies pertaining to innovation and social exchange (Aiken and Bousch, 2006; Schatzel and Calantone, 2005). The responding firms operate in a wide variety of sectors, including manufacturing (standard industrial classification [SIC] 20–39), nonfinancial services (SIC 70–89), mining (SIC 10–14), construction (SIC 15–17), transportation (SIC 40–49), wholesale (SIC 50–51), retail (SIC 52–59), and finance (SIC 60–67). No substantial differences mark respondents and non-respondents or early and late respondents (Armstrong and Overton, 1977).

Following prior research (Yli-Renko et al., 2001), the validity of the study's key constructs was tested by administering a follow-up survey six months after the initial one. In the follow-up survey, a shortened format of the original questionnaire was used: for each construct, one proxy item was chosen, different from the specific items in the original survey, that captured best the content domain of the construct (De Clercq and Sapienza, 2006); 78 responses to the follow-up survey were received and all validation items were found to correlate positively with the original measures.

Measures of Constructs

In Table 1, the measures used in the analyses are listed, detailing their individual items, overall reliability estimates (Cronbach's alpha, composite reliability),

Table 1. Constructs and Measurement Items[a]

	Factor Loading	*t*-Value
Product innovativeness ($\alpha = 0.80$; CR = 0.81; AVE = 0.52)		
Our company accepts demands that go beyond existing products and services.	0.606	8.122
We focus on inventing new products and services.	0.776	10.003
We experiment with new products and services in our local market.	0.740[b]	
We commercialize products and services that are completely new to our company.	0.737	9.869
Cross-functional collaboration ($\alpha = 0.80$; CR = 0.80; AVE = 0.58)		
The other function carries out its responsibilities and commitments most of the time.	0.565[b]	
Spending time and effort on developing and maintaining a relationship with the other function is worthwhile.	0.812	8.537
People are satisfied with their relationship with the other function.	0.877	8.927
Decision autonomy ($\alpha = 0.90$; CR = 0.90; AVE = 0.69) (reverse coded)		
Any decision our department makes needs to be approved by top management.	.697[b]	
Even small matters have to be referred to someone higher up for a final answer.	.887	12.495
Individual departments need to get permission from top management almost every time they want to do anything.	.915	12.658
Individual departments are strongly discouraged from making their own decisions.	.812	11.477
Shared responsibility ($\alpha = 0.78$; CR = 0.78; AVE = 0.54)		
Different departments share the rewards of a successfully commercialized new product.	.763	9.368
Individual departments are evaluated on their joint performance instead of separate departmental performance.	.674[b]	
Our senior management promotes cross-departmental team cohesion over separate departmental loyalty.	.766	9.179
Social interaction ($\alpha = 0.81$; CR = 0.83; AVE = 0.57)		
People in the two functions spend significant time together in social situations.	0.830	16.013
People in the two functions maintain close social relationships with one another.	0.955[b]	
People in the two functions know members of the other function on a personal level.	0.695	12.144
Our relationship with people from the other function is very informal.	0.437	5.588
Trust ($\alpha = 0.88$; CR = 0.88; AVE = 0.60)		
People from the other function can always be trusted to do what is right for us.	0.756	12.136
People from the other function always keep the promises they make to us.	0.758	12.748
People from the other function are perfectly honest and truthful with us.	0.828[b]	
People from the other function are truly sincere in their promises.	0.811	16.277
People from the other function would not take advantage of us, even if the opportunity arose.	0.723	12.098
Goal congruence ($\alpha = 0.86$; CR = 0.86; AVE = 0.62)		
People in the two functions share a similar vision regarding the company's future.	0.818[b]	
People in the two functions think alike on most issues.	0.815	14.031
Most of our objectives are fully aligned with those of the other function.	0.843	14.673
Both functions perceive their problems as mutual problems.	0.644	10.419

Notes: [a] CR = construct reliability; AVE = average variance extracted; [b] Initial loading was fixed to 1 to set the scale of the construct.

and average variance extracted (AVE). In line with the research focus, the measures assess respondents' perceptions about the relationship between the R&D- and marketing-related functions in their organizations, and the questions in the survey were worded to capture phenomena that take place at the firm level rather than functional manager level.

Product innovativeness. Following prior research (Jansen, Van Den Bosch, and Volberda, 2006; Uzzi and Lancaster, 2003), product innovativeness is measured using items that reflect the extent to which the firm develops new products and services (e.g., accepts demands that go beyond existing products and services, experiments with new products or services in the local market). The measure (alpha = .80) correlates positively with its single-item counterpart from the follow-up survey ($r = .44$, $p < .001$). As a confirmation of this measure's predictive validity, it correlates positively with income growth over the past year ($r = .27$, $p < .001$), according to data gathered from a secondary source about a subset ($n = 70$) of the firms in the study's sample.

Cross-functional collaboration. Cross-functional collaboration is measured in a manner similar to that used by prior research on functional managers' development of harmonious relationships with peers in other departments (Kahn, 1996; Song et al., 2000; Xie et al., 2003). For instance, respondents assessed whether other functional departments carry out their responsibilities and commitments or whether spending time and effort to develop and maintain a relationship with other functions is worthwhile. The measure (alpha = .80)

correlates positively with its single-item counterpart from the follow-up survey ($r = .41$, $p < .001$).

Decision autonomy. Following prior studies (e.g., Dyer and Song, 1998), the level of decision autonomy is measured with four items that reflect the extent to which decision making is decentralized by top management. The questions are reverse coded in the survey. For example, the respondents were asked to what extent individual departments need to get permission from top management when they want to make a decision. The measure (alpha = .90) correlates positively with its single-item counterpart from the follow-up survey ($r = .41$, $p < .001$).

Shared responsibility. The level of shared responsibility is measured with a three-item scale assessing the company's reward system (Xie et al., 2003). For example, respondents indicated the extent to which individual departments are evaluated on their joint performance instead of separate departmental performance. The measure (alpha = .78) correlates positively with its single-item counterpart from the follow-up survey ($r = .46$, $p < .001$).

Social interaction. Following prior studies (Tsai and Ghoshal, 1998; Yli-Renko et al., 2001), social interaction is measured with four items that reflect the strength of social relationships between functional departments. For example, the respondents were asked to rate the extent to which people in different functions know one another on a personal level or maintain close social relationships. The measure (alpha = .81) correlates positively with its single-item counterpart from the follow-up survey ($r = .44$, $p < .001$).

Trust. Drawing on interpersonal trust (Rempel, Holmes, and Zanna, 1985) and interfirm trust (De Clercq and Sapienza, 2006) literature, the overall level of trust between R&D and marketing managers is measured using a five-item scale. Respondents indicated, for example, whether people from other functions keep their promises and avoid taking advantage of them, even if the opportunity arises. The measure (alpha = .88) correlates positively with its single-item counterpart from the follow-up survey ($r = .36$, $p < .001$).

Goal congruence. The level of goal congruence is measured with a four-item scale adapted from Tsai and Ghoshal (1998) and Yli-Renko et al. (2001). For example, respondents indicated the extent to which people in different functions share a similar vision regarding the company's future or whether objectives are fully aligned across functions. The measure (alpha = .86) correlates positively with its single-item counterpart from the follow-up survey ($r = .30$, $p < .05$).

Control variables. Several control variables take into account possible alternative explanations for variations in product innovativeness and help avoid model misspecification. First, *firm size* is controlled for, which is measured as a log transformation of the number of full-time employees. Second, *firm age* assesses the number of years the firm has been in business. Third, to account for the possible variation across industries in terms of their maturity and associated innovative propensity, the *industry* of the firm is also controlled for. Fourth, the study controls for whether the respondent represents the R&D or marketing *function*. To determine whether the results might be influenced by the functional background of the respondents, as a post-hoc test, two separate sets of regressions for the R&D- and marketing-related functions are run. The results are consistent with the reported regression results.

Assessing the Reliability and Validity of Measures

Following Anderson and Gerbing (1988), a seven-factor measurement model that includes the seven key constructs of the conceptual model, using AMOS 6.0, is estimated. The confirmatory factor analysis (CFA) reveals factor loadings greater than .40, normalized residuals less than 2.58, and modification indices less than 3.84 (Anderson and Gerbing, 1988). No deletions of scale items are needed to improve the model fit. It is found that the measurement model fits the data well: $\chi^2_{(299)} = 445.57$, goodness-of-fit index (GFI) = .90, Tucker-Lewis index (TLI) = .95, confirmatory fit index (CFI) = .96, and root mean squared error of approximation (RMSEA) = .05.

The convergent validity of the scales is affirmed with the significant factor loadings in the measurement model ($t > 2.0$; Gerbing and Anderson, 1988) and the magnitude of the AVE estimates (equal to or greater than .50, Bagozzi and Yi, 1988). Several assessment criteria also support the discriminant validity of the constructs. None of the confidence intervals for the correlations between constructs includes 1.0 ($p < .05$) (Anderson and Gerbing, 1988), and the AVE estimates of the constructs are greater than the squared correlations between the corresponding pairs of constructs (Fornell and Larcker, 1981). In addition,

significant differences are found between the unconstrained model and a constrained model (Anderson and Gerbing, 1988) for all 21 pairs of constructs.

Several diagnostic analyses are conducted to rule out the possibility of common method bias. First, a CFA for a single-factor model is conducted and a poor fit with the data is found ($\chi^2_{(320)} = 1740.32$, GFI = .61, TLI = .55, CFI = .59, RMSEA = .14), significantly worse ($\Delta\chi^2_{(21)} = 1294.75$, $p < .001$) than the fit of the seven-factor model. Second, several pairs of structural equation models (SEM) are compared in which a model that includes an interaction term is paired with another model in which a common method factor is added (Podsakoff, MacKenzie, Jeong-Yeon, and Podsakoff, 2003; Song et al., 2006). For example, for the SEM that includes the cross-functional collaboration × decision autonomy term (i.e., equivalent to Model 4, Table 3), the comparison reveals virtually no differences in the fit indices between the model without the common method factor ($\chi^2_{(93)} = 168.22$; GFI = .93, TLI = .94, CFI = .96, RMSEA = .06) and the corresponding model with the added common method factor ($\chi^2_{(92)} = 166.58$; GFI = .93, TLI = .94, CFI = .96, RMSEA = .06). The chi-square difference between the two models is not significant ($\Delta\chi^2_{(1)} = 1.64$; ns), and only small changes in the size and significance of the paths across the two models emerge. The same pattern of results emerges for the SEM equivalents of the models in which the other two-way interactions are included. These results, together with arguments that common method bias is less prevalent in studies using highly educated respondents and multi-item scales (Bergkvist and Rossiter, 2007) and for moderating effects rather than main effects (Brockner et al., 1997; see also Simons and Peterson, 2000), alleviate concerns related to the use of a common respondent in the study. It is further noted that the study used a proxy item in the follow-up survey, which differs from the items used in the first survey. This approach increases confidence that the positive and significant correlations between the original and follow-up items can be interpreted as evidence contrary to the presence of common method bias (De Clercq and Sapienza, 2006; Yli-Renko et al., 2001).

Analysis and Results

The correlations and descriptive statistics for the study variables are provided in Table 2. Moderated hierarchical regression analysis is used to test the study's hypotheses (Cohen and Cohen, 1983). After

Table 2. Descriptive Statistics and Correlations (N = 232)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. Product innovativeness	1.000																
2. Cross-functional collaboration	.323**	1.000															
3. Decision autonomy	.228**	.366**	1.000														
4. Shared responsibility	.274**	.576**	.321**	1.000													
5. Social interaction	.263**	.414**	.328**	.328**	1.000												
6. Trust	.192**	.638**	.483**	.483**	.346**	1.000											
7. Goal congruence	.238**	.671**	.534**	.534**	.510**	.724**	1.000										
8. Company size	−.039	.051	.117	.117	−.160*	.046	−.017	1.000									
9. Company age	−.168*	.029	.053	.053	−.146*	.059	.000	.522**	1.000								
10. Industry: manufacturing	.048	.145*	−.098	−.098	−.041	.092	.102	.108	.091	1.000							
11. Industry: services	.022	.012	.090	.090	.004	−.078	−.133*	−.155*	−.132*	−.580**	1.000						
12. Industry: mining	−.082	−.111	.094	.094	.053	−.063	−.008	−.064	−.100	−.307**	−.198**	1.000					
13. Industry: construction	.117	.099	.031	.031	.033	.121	.090	.037	.046	−.126	−.081	−.043	1.000				
14. Industry: transportation	−.114	−.102	−.023	−.023	−.023	.011	−.023	.097	.014	−.231**	−.149*	−.079	−.032	1.000			
15. Industry: wholesale	.057	−.056	.043	.043	.079	.062	.107	−.069	−.084	−.191**	−.123	−.065	−.027	−.049	1.000		
16. Industry: retail	.033	−.068	−.069	−.069	−.046	−.051	−.008	.084	.345**	−.155*	−.099	−.053	−.022	−.040	−.033	1.000	
17. Marketing-related function	−.064	.002	−.059	−.059	−.032	.071	−.068	.167*	.193**	.034	−.038	−.083	.069	−.015	.026	.003	1.000
Mean	3.615	3.662	3.722	3.269	2.804	3.380	3.294	5.647	32.871	.474	.272	.095	.017	.056	.039	.026	.491
Standard deviation	.865	.786	.920	.919	.782	.790	.860	1.991	36.305	.500	.446	.294	.130	.230	.194	.159	.501

** $p < .01$; * $p < .05$

Table 3. Regression Results (Dependent Variable: Product Innovativeness) (N = 232)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Company size (log employed)	.045	.038	.038	.038	.051†	.044	.046	.043
Company age (years)	−.006***	−.007***	−.006***	−.006***	−.007***	−.006***	−.006***	−.006***
Industry: manufacturing[a]	.735*	.541	.550	.597†	.517	.578†	.591†	.590†
Industry: services	.679†	.515	.442	.520	.446	.488	.479	.495
Industry: mining	.397	.329	.186	.276	.202	.239	.282	.274
Industry: construction	1.512**	1.161*	1.115*	1.184*	1.034*	1.127*	1.153*	1.147*
Industry: transportation	.250	.211	.162	.194	.069	.077	.192	.129
Industry: wholesale	.861	.772†	.633	.709	.641	.696	.696	.695
Industry: retail	1.307**	1.272**	1.254**	1.247**	1.148*	1.122*	1.091*	1.218**
Marketing-related function[b]	−.067	−.058	−.039	−.021	−.043	−.044	−.038	−.033
Cross-functional collaboration		.335***	.214*	.216*	.230*	.255*	.257**	.240*
Decision autonomy			.156**	.183**	.155**	.134*	.166**	.159**
Shared responsibility			.072	.072	.086	.079	.081	.077
Social interaction			.188*	.178*	.194**	.136†	.212**	.199**
Trust			−.059	−.045	−.034	−.030	−.047	−.048
Goal congruence			−.060	−.054	−.073	−.057	−.093	−.084
H1: Cross-functional collaboration × Decision autonomy				.145*				
H2: Cross-functional collaboration × Shared responsibility					.172**			
H3: Cross-functional collaboration × Social interaction						.249**		
H4: Cross-functional collaboration × Trust							.215**	
H5: Cross-functional collaboration × Goal congruence								.133*
R^2	.099	.187	.230	.244	.253	.263	.263	.242
R-square		.088***	.043*	.014*	.023**	.033**	.033**	.012*

Notes: Unstandardized coefficients (two-tailed p-values).
$^{***}p<.001$; $^{**}p<.01$; $^{*}p<.05$; $^{\dagger}p<.10$.
[a] Base case = Finance industry.
[b] Base case = R&D-related function.

mean-centering the interacting variables, the variance inflation factor values are found to be far below the threshold of 10, which suggests that multicollinearity is not a problem in the analyses (Aiken and West, 1991). In Table 3, the regression results are provided for several models. Model 1 contains only the control variables, Model 2 adds the effect of cross-functional collaboration, and Model 3 adds the direct effects of decision autonomy, shared responsibility, social interaction, trust, and goal congruence. In Model 2, consistent with the starting point of the study's theoretical exposition, a positive effect of cross-functional collaboration on product innovativeness ($\beta = .335$, $p<.001$) is found, and this collaboration variable explains additional variance ($\Delta R^2 = .088$, $p<.001$). In Model 3, among the organizational context variables, only decision autonomy and social interaction have significant, direct effects on product innovativeness ($p<.01$ and $p<.05$, respectively).

Hypotheses 1–5 predict positive moderating effects of the two structural and three relational contextual variables on the relationship between cross-functional collaboration and product innovativeness. To test these hypotheses, the individual interaction terms are added in Models 4–8. It is found that each of the interaction terms improves the explanatory power of the models.

Model 4 indicates a positive interaction effect between cross-functional collaboration and decision autonomy on product innovativeness ($\beta = .145$, $p<.05$), which provides support for H1. In Model 5, a positive interaction between cross-functional collaboration and shared responsibility on product innovativeness ($\beta = .172$, $p<.01$) supports H2. Model 6 reveals a positive interaction effect between cross-functional collaboration and social interaction on product innovativeness ($\beta = .249$, $p<.01$), which provides support for H3. In Model 7, the interaction effect between cross-functional collaboration and trust on product innovativeness is positive ($\beta = .215$, $p<.01$), which supports H4. Finally, Model 8 shows support for H5; the interaction effect between cross-functional collaboration and goal congruence on product innovativeness is positive ($\beta = .133$, $p<.05$).

Post-hoc Analysis

Beyond the examined individual moderating effects lies the question of whether the structural and relational contexts are equally potent for turning cross-functional collaboration into product innovativeness. To explore this question, a post-hoc analysis is undertaken in which the firms' structural and relational contexts are conceived of as two organizational subconfigurations (Drazin and Van de Ven, 1985; Vorhies and Morgan, 2003). Prior studies in strategy and marketing show how a configuration of contingencies can increase understanding of the simultaneous effects of multiple organizational characteristics on particular organizational outcomes (Govindarajan, 1988; Miller, 1986; Vorhies and Morgan, 2003; Wiklund and Shepherd, 2005). A holistic configuration of various organizational characteristics can be modeled as an "ideal type" construct, an abstract representation of related yet complex empirical phenomena (Burger, 1987; Shils and Finch, 1949). In essence, the configurations approach suggests that the more an organization approaches the "ideal" combination of a particular set of components, the stronger is the instrumentality of these components for attaining desirable organizational goals (Drazin and Van de Ven, 1985).

Consistent with prior work (Doty, Glick, and Huber, 1993; Govindarajan, 1988; Vorhies and Morgan, 2003), for each firm the Euclidean distance between its actual structural and relational configuration was calculated, and the respective "ideal" configurations then used its opposite to assess the similarity to these "ideal" configurations. Formally, $\text{Similarity(i)} = -\sqrt{\Sigma(X_{ij} - X_{mj})^2}$, where X_{ij} represents the value of attribute j (e.g., decision autonomy, social interaction) for firm i, and X_{mj} represents the maximum (i.e., ideal) value of "five" for that attribute (Govindarajan, 1988). On one hand, empirically, the assumption that the maximum value represents the ideal value (i.e., the higher the firm scores on the five attributes, "the better") is consistent with the notion that the survey questions on the five attributes assess respondents' degree of agreement with whether what are described as optimal manifestations of the attributes exist in the organizations. On the other hand, conceptually, this assumption is grounded in the notion that firms typically operate below their "global performance frontier" (Swink, Talluri, and Pandejpong, 2006). In other words, to the extent that they can make significant improvements in how the attributes are currently implemented, firms can increase the levels of the five attributes simultaneously without encountering important trade-offs between them. To give some further empirical credence to this assumption, a post-hoc analysis (not reported) explores whether the five attributes have a diminishing (i.e., curvilinear) moderating effect on the cross-functional collaboration–product innovativeness relationship. No evidence for such effects is found, which gives tentative support for the notion that the attributes in this study individually operate below their "global optimal level" (Swink et al., 2006).

The values for the similarity scores were used to estimate different models, as shown in Table 4. The interaction effects of cross-functional collaboration with both the structural (Model 9) and relational (Model 10) configurations are positive and significant ($\beta = .141$, $p < .01$ and $\beta = .161$, $p < .01$, respectively). Therefore, consistent with the main results, organizations with greater similarities to the ideal structural and relational configurations exhibit stronger relationships between cross-functional collaboration and product innovativeness. To make a direct comparison between the two configurational effects, they were also entered simultaneously in Model 11. It is found that the interaction effect of cross-functional collaboration with the relational configuration remains significant ($\beta = .121$, $p < .05$), but the significance of the interaction with the structural configuration disappears. Thus, the intangible, relational factors over which top management tend to have less direct control appear to be more potent for converting cross-functional interactions into product innovativeness compared with those that are structural in nature and more directly controllable by top management decisions.

Discussion

This study tests the argument that a firm's ability to leverage cross-functional collaboration into product innovativeness depends not only on formal decisions with respect to the structural features of the organization but also intangible elements that capture its social fabric (De Luca and Atuahene-Gima, 2007; Sherman et al., 2005; Song, Thieme, and Xie, 1998). To this end, it is argued that effective knowledge exchange between functional departments—and the associated capability to convert intra-organizational collaboration into product innovativeness—depends

Table 4. Post-hoc Analysis (Dependent Variable: Product Innovativeness) (N = 232)

	Model 9	Model 10	Model 11
Company size (log employed)	.052†	.042	.049
Company age (years)	−.007***	−.006***	−.007***
Industry: manufacturing[a]	.574	.554	.563
Industry: services	.540	.500	.549
Industry: mining	.304	.288	.336
Industry: construction	1.086*	1.081*	1.063*
Industry: transportation	.129	.077	.077
Industry: wholesale	.707	.666	.693
Industry: retail	1.170*	1.068*	1.063*
Marketing-related function[b]	−.039	−.032	−.035
Cross-functional collaboration	.227*	.232*	.228*
Decision autonomy		.132*	
Shared responsibility		.072	
Social interaction	.167*		
Trust	−.023		
Goal congruence	−.063		
Similarity to "ideal" structural configuration	.156**		.134*
Similarity to "ideal" relational configuration		.047	.053
Cross-functional collaboration × Similarity to "ideal" structural configuration	.141**		.071
Cross-functional collaboration × Similarity to "ideal" relational configuration		.161**	.121*
R^2	.243	.246	.243

Notes: Unstandardized coefficients (two-tailed p-values).
*** $p<.001$; ** $p<.01$; * $p<.05$; † $p<.10$.
[a] Base case = Finance industry.
[b] Base case = R&D-related function.

in critical ways on two dimensions of organizations' structural context (decision autonomy and shared responsibility) and three dimensions of their relational context (social interaction, trust, and goal congruence). This study thus contributes to the scholarly conversation about the internal conduits for product innovativeness (De Luca and Atuahene-Gima, 2007; Griffin and Hauser, 1996; Lovelace et al., 2001) and explicates how a firm can optimize its internal context to exploit its integrative efforts across functional departments. It focuses on the interplay between the organizational context and the aspect of cross-functional integration that comes closest to the affective aspects of such integration, cross-functional collaboration (Kahn, 1996; Song et al., 2000).

First, the study lends empirical credence to the argument that formal decisions about how interactions across different functions should be structured and organized matter in terms of the benefits that can be derived from cross-functional collaboration. The findings support the argument that decision autonomy amplifies the successful nurturance of new, innovative initiatives that emerge from cross-functional interactions. Organizations that want to innovate should award sufficient autonomy to functional departments to allow them to combine their knowledge across functional boundaries. In contrast, strongly centralized decision making (or low decision autonomy) likely will stifle their responsiveness to others' knowledge (Song and Dyer, 1995) and hamper the successful leveraging of cross-functional collaboration. With too much centralization, functional managers conduct only their assigned, function-specific tasks, with little interest in using cross-functional exchanges to create innovation-oriented activities (Gerwin and Moffat, 1997).

Furthermore, the positive interaction effect between cross-functional collaboration and shared responsibility illustrates that product innovativeness fares better with reward mechanisms that acknowledge the interdependence of performance across departments and thereby discourage individual departments from focusing only on their own interests (Collins and Smith, 2006; Floyd and Lane, 2000; Sethi and Nicholson, 2001). This result echoes successful transformation stories about companies that reward employees on the basis of aggregated, company-wide performance. For example, since its founding in 1965, Analog Devices, a semiconductor designer and producer, has maintained its innovative posture throughout several technological generations and market shifts, arguably because of its group-based incentive

system and structure (Govindarajan and Trimble, 2005).

Yet the results also indicate that the cross-functional collaboration–product innovativeness relationship can be strengthened by the relational context in which such collaboration takes place, an aspect of the internal context over which top management arguably has less direct control (Bosch-Sijtsema and Postman, 2009; Lawson et al., 2009). Furthermore, the post-hoc analysis indicates that organizations' relational context may be more potent than their structural context in terms of converting cross-functional collaboration into product innovativeness. First, the beneficial aspects of cross-functional collaboration for product innovativeness become more pronounced when stronger social ties connect functional departments. When cross-functional interactions are informal, functional departments such as R&D and marketing might be more open and forthcoming in response to disagreements about how to implement innovation-related decisions (De Dreu et al., 2000). Social interactions also facilitate the sharing of tacit and sticky information across functional boundaries (Szulanski, 1996), making it less likely that managers retain their function-specific knowledge only for themselves, which leads to increased joint problem solving (Atuahene-Gima and Murray, 2007; Uzzi, 1997) and effective translations of cross-functional collaboration into innovative solutions.

Second, when functional managers have confidence in one another's honesty and truthfulness, they can invest more in productive exchanges that unlock function-specific knowledge rather than in activities aimed at monitoring and checking whether other departments will take advantage of them and their own interests (Adams et al., 1998; Jassawalla and Sashittal, 1998). Their resultant motivation to share tacit knowledge (Nonaka, 1994) facilitates the effective translation of collaborative efforts into product innovativeness. In contrast, at low levels of trust, the relationship between cross-functional collaboration and product innovativeness is subdued, perhaps because people in such cases hate to relinquish power when sharing knowledge (Kim and Mauborgne, 1998), and therefore their ability to find innovative solutions through interactions with peers declines (Floyd and Lane, 2000).

Third, goal congruence amplifies the benefits of cross-functional collaboration: The presence of shared goals increases the openness of different functions about one another's viewpoints and, in doing so, favors the development of new, innovative initiatives when they emerge from cross-functional interactions (Pinto et al., 1993; Xie et al., 2003). Organizations that want to innovate thus benefit from encouraging the development of shared interpretative schemes or shared languages across functional departments, because they allow for effective knowledge combinations across internal boundaries. In contrast, a lack of a "dominant logic" (Lane and Lubatkin, 1998) can stifle functional managers' responsiveness to others' knowledge and hamper the successful leverage of cross-functional collaboration. With no commonality in goals, functional managers may conduct only their assigned, function-specific tasks, with little interest in using cross-functional collaboration to create innovation-oriented activities (McDonough, 2000).

Practical Implications

From a practice perspective, this study suggests that as firms aim to develop new products or enter new markets, their top managers should be aware that formal decisions about structural arrangements—or the extent to which they grant autonomy to individual departments and the extent to which individual rewards connect to the performance of other departments—can influence the innovation-related benefits derived from cross-functional collaboration. Yet just as important, if not more so, is the internal relational context in which their key functional managers operate. In particular, as much as they can, top management should not only grant departments control over their own decisions and link performance to overall organizational results, but also encourage informal interactions across functional boundaries, breed trust among their managers, and stimulate their adherence to common goals. In turn, functional managers should move away from their self-identities as just marketers, salespeople, product designers, or engineers and instead imagine themselves and others as "partners" who share a set of common tasks: to combine their knowledge and realize the firm's innovative goals through collaborative efforts. Ultimately, the structural and relational boundary conditions studied herein, when correctly established, can encourage managers to focus on "pie-expanding" efforts to benefit the entire firm, rather than the fight for resources. The study's findings also provide insight then into the selection criteria that firms with innovative aspirations should maintain. Not only should functional managers be proficient in their respective

domains of expertise and be able to adapt themselves to their structural context, but they also should be effective team players, willing to go out of their way to build and cultivate a "social community" within their organization's borders (Collins and Clark, 2003; Tsai, 2000).

Limitations and Future Research

Despite the aforementioned practical insights, the study contains some limitations that also offer opportunities for further research. First, though strong evidence is found that the structural and relational components studied herein each have strong positive influences on firms' ability to leverage their cross-functional efforts to achieve product innovativeness, more qualitative research should consider the possible day-to-day challenges associated with the actual implementation. For example, the coordination costs associated with decision autonomy may be counterproductive if unexpected external circumstances confront the organization (Gibson and Birkinshaw, 2004). Further, the socialization of organizational members through social events may not always align well with people's individual dispositions and thus may provoke some resistance (Brewer and Gardner, 1991; Dutton and Dukerich, 1991). Future research could also consider contextual factors different from those studied herein, such as job rotation (Leenders and Wierenga, 2002) or organizational commitment (Meyer, Becker, and Vandenberghe, 2004), as potential moderators of the cross-functional collaboration–product innovativeness relationship. Another potential research stream pertains to whether the interaction effects examined herein might work differently for various types of product innovativeness, such as new to the firm, industry, or customer or, alternatively, incremental versus radical innovation (Garcia and Calantone, 2002). Finally, this study has focused on the antecedents of firms' product innovativeness rather than its consequences. Although many studies demonstrate the beneficial influence of innovation on performance (e.g., Adams and Jaffe, 1996; Kafouros, 2005; Li and Atuahene-Gima, 2001), some studies report insignificant or even negative relationships (Capon, Farley, and Hoenig, 1990; Kafouros, Buckley, Sharp, and Wang, 2008). Therefore, research could examine whether the contingency factors influence not only the extent to which collaborative efforts lead to product innovativeness but also the strength or nature of the product innovativeness–performance relationship.

To conclude, by providing an investigation of the combined moderating roles of structural and relational components in the cross-functional collaboration–product innovativeness relationship, this study draws a nuanced picture of the instrumentality of formal decision making for converting collaborative efforts into innovation outcomes. In addition to the structural components of organizational context, the social fabric in which cross-functional exchanges take place also plays an important role in leveraging the innovation potential inherent in cross-functional collaboration. It is hoped then that this work offers a catalyst for a clearer understanding of how firms might translate intra-organizational processes into stronger market and competitive positions.

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