STRUCTURAL AND RELATIONAL INFLUENCES ON THE ROLE OF REWARD INTERDEPENDENCE IN PRODUCT INNOVATION

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Abstract

This study examines the relationship between reward interdependence, or the extent to which managers' rewards are tied to the performance of colleagues in other functions, and product innovation. It also considers how structural and relational features of the organizational context might moderate this relationship. Our analysis of a sample of Canadian-based firms reveals a positive relationship between reward interdependence and product innovation that is invigorated at higher levels of job rotation, social interaction, and interactional fairness, but we find no evidence of a moderating effect of decision autonomy. Consistent with a systems approach to organizational contingencies, we also find that the reward interdependence–product innovation relationship is stronger when the organization's context comes closer to an "ideal" holistic configuration that is most conducive to knowledge exchange within the organization, with a more prominent role played by the relational sub-context (social interaction and interactional fairness) than the structural sub-context (job rotation and decision autonomy). The findings have important implications for innovation research as they shed light on how the extent to which individual rewards are tied to collective performance can be channeled to enhance innovation pursuits.

Keywords: product innovation; reward interdependence; knowledge-based view; structural context; relational context

To increase their performance in the global marketplace, firms benefit from enhancing their innovative capacity, particularly their ability to engage in product innovation (Li and Atuahene-Gima, 2001; Moran and Ghoshal, 1999). A firm's product innovation in turn is critically informed by the effective coordination of managerial efforts across functional units, including both technology- and marketing-oriented functions (Barczak and Wilemon, 2003; Lopez Cabrales et al., 2008; Townsend et al., 2010). Such coordination can provide important foundations for novel ideas to emerge and flourish (Sherman et al., 2005; Sundgren et al., 2005), though it also inherently confronts challenges, such as clashes between departmental subcultures (Griffin and Hauser, 1996; Strang and Jung, 2009), or fights for company resources (Luo et al., 2006). To stimulate cross-functional coordination despite these challenges, some organizations make managers' rewards contingent on the performance of colleagues in other functional units (Song et al., 1996; Xie et al., 2003). This reward interdependence implies that managerial rewards are tied to or constrained by the performance of others (Dougherty, 2008; Wageman, 1995).

Reward interdependence can facilitate product innovation by reconciling rival internal positions or perspectives (McDonough, 2000; Xie et al., 2003). Thus, previous research has suggested that interdependent rewards can be instrumental for integrating the divergent opinions that emerge when organizations strive to renew their existing product set in response to new external market conditions (Song et al., 1996). The theoretical mechanisms that underpin this beneficial role of reward interdependence is the motivation to collaborate across functional boundaries (Collins and Clark, 2003; McDonough, 2000) and the associated ability to create and reward synergies across functional domains (Gilbert, 2006; Smith and Tushman, 2005). However, translating reward interdependence into enhanced product innovation is not an automatic process; it is fundamentally dependent on whether managers openly share their function-specific knowledge (De Dreu, 2007; Lee and Ahn, 2007; Love and Roper, 2009). In particular, when managers' rewards depend on others' performance, managers actually may become less motivated to share and leverage function-specific knowledge with organizational peers, to the extent that they believe that others' contributions will jeopardize their own efforts (Lee and Ahn, 2007).

Furthermore, in practices where interdependent rewards are blended with individual ones (Parker et al., 2000), researchers find that this combination does not necessarily capture the best of both worlds. For instance, Wageman (1995) and Wageman and Baker (1997) find that a mixed reward model, if not properly structured, can result in managers investing much of their time on their own agendas and pursuits, and avoiding interdependent actions in their cross-functional responsibilities and tasks. Similarly, Quigley et al. (2007) find that the inclusion of interdependent rewards can reduce intra-firm knowledge exchange and undercut group cooperation. Against this backdrop, recent studies emphasize the need for further exploration into the contextual contingencies that make interdependent rewards beneficial (Barnes et al., 2011; Chen and Tjosvold, 2012). This gap, therefore, provides the main motivation for this article: How might the relationship between reward interdependence and product innovation depend on specific characteristics of the organization's internal context?

In response, we draw from the knowledge-based view (Grant, 1996; Szulanski, 1996) to investigate how knowledge-enhancing organizational features may increase the effectiveness of reward interdependence for product innovation. Echoing the established importance of structural arrangements (Griffin and Hauser, 1996; Leenders et al., 2007) and social relationship building (Lawson et al., 2009; Tsai and Ghoshal, 1998) for spurring innovation, we focus on the moderating roles of job rotation and decision autonomy (two structural features), and social interaction and interactional fairness (two relational features). *Job rotation* captures the degree to which managers rotate across or are assigned to different units (Campion et al., 1994). As a cooperative management tool, job rotation can promote managers' understanding and appreciation of the activities undertaken in functional areas other than their own (de Weerd-Neerhof et al., 2002). *Decision autonomy* reflects the extent to which decision making is decentralized and managers have greater control over their collaboration efforts with peers in other functions (Takeuchi et al., 2008). *Social interaction* involves the strength of the social relationships between managers: It taps informal relationships, as epitomized in the extent to which managers interact beyond formal work routines (Tsai and Ghoshal, 1998). *Interactional fairness* is the extent to which managers believe they receive high-quality interpersonal treatment when interacting with others, including respect and consideration (Qiu et al., 2009). Significantly, the glue that binds these four features is their ability to promote cross-functional knowledge flows, which in turn can help resolve the constraint or tension that managers may experience when their individual rewards are tied to how well colleagues perform (Dougherty, 2008)

In addition, acknowledging the complexity of the organizational processes that may accompany the conversion of interdependent rewards into product innovation (Barnes et al., 2011; Beersma et al., 2003; Chen and Tjosvold, 2012; Wageman and

Baker, 1997), we apply a systems perspective (Drazin and Van de Ven, 1985; Ketchen et al., 1993, 1997) to understand how these four organizational contingencies *collectively* translate interdependent rewards into enhanced product innovation. Thus, we consider how these features constitute a conceptually meaningful gestalt (Covin et al., 2006; Weber, 1904) that influences an organization's ability to exploit reward interdependence effectively. Through this simultaneous consideration of contextual features, we take into account their mutual dependencies (Drazin and Van de Ven, 1985; Payne, 2006). In particular, we explicate how the proximity to an "ideal" configuration of organizational features that is best suited to promote internal knowledge flows informs the conversion of reward interdependence into production innovation (Burger, 1987; Meyer et al., 1993). To the best of our knowledge, this systems approach has rarely been applied to studies in the realm of R&D management research.

THEORY

Developing new products typically requires not only the combined efforts of various functional units—notably technology-oriented units, such as R&D and engineering, and their marketing-oriented counterparts, such as marketing and sales (Lovelace et al., 2001; De Luca and Atuahene-Gima, 2007)—but also the ability to coordinate and collaborate in these efforts (Benghozi, 1990; Crossan and Apaydin, 2010; Hauptman and Hiriji, 1999). Reward interdependence can be instrumental in this process because it increases feelings of shared "ownership" across units that search collectively for creative solutions to organizational problems (McDonough, 2000). When managers' rewards are connected to the performance of colleagues in other functional areas, managers' will likely focus less on their personal turf and instead become more receptive to the suggestions and expertise of others (Johnson and Johnson, 1989; Lin, 2010; Zhang et al., 2007). Furthermore, when functional managers earn rewards for their collective rather than individual performance, their contributions to the product innovation process can be synchronized more easily by top management (Smith and Tushman, 2005).

Despite its possible benefits, reward interdependence might also constrain managerial actions toward product innovation (Farjoun and Starbuck, 2007). First, managers in better performing units may believe that the returns on their product innovation efforts are in jeopardy if their rewards depend on colleagues who may be less committed to the firm's innovative pursuits (Lee and Ahn, 2007). Second, reward interdependence may induce the better performing units to exert undue pressure on poorly performing counterparts (Barnes et al., 2011; Drabman et al., 1974), such that the latter experience feelings of extreme anxiety and become less collaborative (Ames, 1981; Wageman and Baker, 1997). Third, when individual rewards link to collective performance, the danger of free-riding looms large (Chen and Tjosvold, 2012; Wageman, 1995), whereby managers in underperforming areas exploit reward interdependence to lessen their contributions to product innovation projects and anticipate that more diligent colleagues will take up the slack, especially if individual contributions cannot be easily observed (Williams et al., 1981). Poorly performing managers thus may feel as though they can "hide in the crowd," knowing that they are less likely to be held personally accountable for their individual performance or potential missteps (Karau and Williams, 1993). Finally, when reward interdependence is high, weaker managers may come to believe that their efforts and actions do not affect collective outcomes with respect to product innovation at all (Harkins and Petty, 1982; Latane et al., 1979). Thus, reward interdependence can lead to both a lower sense of individual accountability and a greater feeling of personal dispensability (George, 1992; Price et al., 2006).

We draw from the knowledge-based view (Floyd and Lane, 2000; Grant, 1996) to argue that the ability to counter these challenges—to ensure that the use of reward interdependence spurs product innovation—critically depends on organizational conditions that prompt effective combinations of knowledge across functional units, including structural (job rotation and decision autonomy) and relational (social interaction and interactional fairness) features. According to the knowledge-based view, knowledge exchanges among areas that span different content domains reduce the uncertainty that managers experience when undertaking collective tasks (Grant, 1996; Spender, 1996). Because the effective application of reward interdependence requires an understanding of the capabilities that are dispersed across the organization's ranks (Lin, 2010), knowledge exchanges that span different functional areas thus may be critical for reducing the aforementioned challenges of implementing reward interdependence (Floyd and Wooldridge, 1999; Levin and Cross, 2004). In other words, our main theoretical premise is that organizational features, such as job rotation, decision autonomy, social interaction, and interactional fairness, that promote intra-firm knowledge sharing should be particularly useful for enhancing the effective implementation of reward interdependence.

First, in the context of product innovation, job rotation across different functional units (Campion et al., 1994) can help disseminate knowledge about new markets and technologies by exposing managers to the diversity of the firm's activity portfolio (Xie et al., 2003). Second, by granting them the autonomy to make decisions and control their activities, the firm can encourage managers to show initiative and engage in knowledge integration efforts with colleagues in other units (Takeuchi et al., 2008). Third, because social interaction entails the presence of strong informal relationships within an organization (Tsai and Ghoshal, 1998), it is a critical component of the firm's internal social capital, which in turn enhances the creation of new ideas and knowledge (Nahapiet and Ghoshal, 1998). Fourth, when managers treat one another with kindness and consideration—that is, when interactional fairness is high—personal biases likely get suppressed, and their mutual respect enhances the likelihood they will share their knowledge with one another (Bies and Moag, 1986; Qiu et al., 2009).

In what follows, we offer several arguments with respect to both the direct relationship between reward interdependence and product innovation as well as the moderating effects of the aforementioned structural and relational features on this relationship. In addition, we apply a systems perspective to the role of organizational contingencies (Drazin and Van de Ven, 1985; Govindarajan, 1988; Vorhies and Morgan, 2003) to investigate how the *simultaneous* presence of these four features, through their holistic configuration, informs the effectiveness of reward interdependence for enhancing product innovation. Figure 1 shows our conceptual framework.

Insert Figure 1 about here

Direct Effect of Reward Interdependence

As our baseline premise, we anticipate a positive relationship between reward interdependence and product innovation. The pursuit of product innovation demands the transcendence of individual interests across functional boundaries (Floyd and Lane, 2000; Gibson and Birkinshaw, 2004), which can be stimulated by collective rewards (Collins and Smith, 2006). To the extent that the firm emphasizes joint rather than individual rewards, individual managers should be more committed to the firm's product innovation pursuits, even if they are risky and complex, because the rewards install a normative form of control rather than a purely utilitarian one based on individual interests (Bloom, 1999; Collins and Clark, 2003). Similarly, reward interdependence creates a sense of project ownership in cross-functional collaborations (McDonough, 2000), which promotes efforts to introduce innovative ideas and integrate others' ideas into the firm's current operating domains (O'Reilly and Tushman, 2004). Further, while functional managers may appreciate opportunities for generating innovative output, top management are typically better placed to grasp the potential for synergistic value creation through the combination of novel ideas that are dispersed across functional areas, and then to determine ways to reward these synergies (Gilbert, 2006; Smith and Tushman, 2005). Based on these arguments, we formulate the following hypothesis:

> H1: *There is a positive relationship between the extent of reward interdependence across functional units and product innovation.*

Moderating Effect of Job Rotation

We also postulate that the relationship between reward interdependence and product innovation should be stronger with higher levels of job rotation. Job rotation leads to enhanced learning and knowledge acquisition among managers (Campion et al., 1994; Dedoussis, 1995), including a better understanding of how their coordinated efforts can lead to an improved collective performance (Kusunoki and Numagami, 1998). Job rotation also can induce a common "dominant logic" among managers, an organization-wide template for how function-specific knowledge should contribute to the collective goal of spurring product innovation (Burke and Steensma, 1998). This logic can create a deeper understanding of how synergistic value might emerge from the combination of function-specific knowledge (Lane and Lubatkin, 1998), which lets managers reap the intended benefits of reward interdependence more easily. In contrast, with minimal job rotation, individual managers are less likely to perceive possibilities for combining or integrating knowledge residing in the various functions, nor to recognize the merits of their colleagues' expertise and its contributions to collective performance (Xie et al., 2003). In turn, they may resist the implementation of reward interdependence because they doubt that combinations of function-specific knowledge actually can foster aspirations with respect to product innovation (Floyd and Lane, 2000).

> H2: *The relationship between reward interdependence and product innovation is moderated by job rotation, such that the relationship is stronger at higher levels of job rotation.*

Moderating Effect of Decision Autonomy

Reward interdependence should also be more instrumental for product innovation when decision autonomy is higher. First, decision autonomy affords functional managers the freedom and flexibility to exchange knowledge with their peers in a way that leads to innovative outcomes that benefit all parties involved (Takeuchi et al., 2008). That is, granting decision autonomy gives managers the freedom to explore how their function-specific knowledge relates to that of colleagues in other areas (Gibson and Birkinshaw, 2004), which may help them understand how novel knowledge combinations across functional units can improve their collective performance in product innovation (McDonough, 2000). Further, high levels of decision autonomy signal greater consideration by top management, which should stimulate individual managers' motivation to accept an evaluation system in which their rewards are contingent on the efforts and actions of others (Yukl and Fu, 1999). In contrast, in the presence of strongly centralized decision making, individual managers should be more inclined to carry out just their assigned, function-specific tasks, even if their rewards are tied to the performance of others, and should express reduced interest in finding out how their knowledge might be leveraged or combined with that of other functional units to generate new products (Sethi and Sethi, 2009). Thus, the promotion of product innovation through reward interdependence should be curtailed when individual managers perceive less control over their own decision making.

> H3: *The relationship between reward interdependence and product innovation is moderated by decision autonomy, such that the relationship is stronger at higher levels of decision autonomy.*

Moderating Effect of Social Interaction

We also expect that the relationship between reward interdependence and product innovation is stronger at higher levels of social interaction. Strong social relationships across functional units may enhance the diversity of the knowledge exchanged, as well as improve insights into how the dispersed knowledge is interconnected—types of understanding that may not come to the surface through formal mechanisms (Nonaka, 1994). Because strong social interactions expose individual managers to a broader and richer set of information (Nahapiet and Ghoshal, 1998; Yli-Renko et al., 2001), the managers have a larger arsenal of *collective* knowledge at their disposal when pursuing novel ideas and searching for collaborative new product solutions to current organizational problems (Sundgren et al., 2005); thus, a system that ties individual rewards to collective performance should be more effective in this case. When interdependent partners work toward a common goal, their strong social relationships can also enhance the intensity of their efforts to reach that goal and, as a result, their ability to reach a collective outcome that benefits all parties involved (Tsai and Ghoshal, 1998; Xie et al., 2003). Similarly, Uzzi (1997) has argued that informal exchanges increase joint problem-solving efforts and thus the ability to learn more from cross-functional collaboration through coordination mechanisms such as reward interdependence. Finally, social interaction may help leverage the instrumentality of reward interdependence because it prompts greater trust among managers (Granovetter, 1985), which decreases feelings of anxiety that managers might experience when their rewards are constrained by the performance of others (Ames, 1981).

> H4: *The relationship between reward interdependence and product innovation is moderated by social interaction, such that the relationship is stronger at higher levels of social interaction.*

Moderating Effect of Interactional Fairness

Further, the beneficial effect of reward interdependence on product innovation should be stronger at higher levels of interactional fairness. First, higher levels of reward interdependence imply greater vulnerability as individual managers come to rely increasingly on efforts and actions of others that are beyond their own control (Lee and Ahn, 2007; Kuvaas, 2008). When interactions are perceived as fair and respectful, these feelings of vulnerability will be mitigated, including the fear that efforts undertaken by colleagues will jeopardize one's own efforts to attain high collective performance (Coyle-Shapiro et al., 2004; Qiu et al., 2009). Second, fairness perceptions reduce the time that managers spend questioning or fighting the decisions of others (Bies and Moag, 1986) so they can devote more attention to how to combine their function-specific knowledge with that of others to enhance collective organizational performance on product innovation projects (Floyd and Lane, 2000; Love and Roper, 2009). Conversely, in conditions of low interactional fairness, the anxiety that interdependent managers might feel about others' contributions, and particularly their lack of contributions, may be exacerbated by the psychological tension and distress that typically accompanies unfair situations (Rupp and Cropanzano, 2002). The resulting negative response to reward interdependence may decrease the intensity of managerial efforts to find effective combinations of their own and others' function-specific knowledge, thereby reducing the instrumentality of reward interdependence for product innovation.

> H5: *The relationship between reward interdependence and product innovation is moderated by interactional fairness, such that the relationship is stronger at higher levels of interactional fairness.*

Moderating Effect of Proximity to the Ideal Holistic Configuration

Hypotheses 2–5 capture the individual moderating effects of job rotation, decision autonomy, social interaction, and interactional fairness on the reward interdependence–product innovation relationship and may provide an incomplete picture by focusing on their independent effects (De Clercq et al., 2010; Payne et al., 2006). That is, the hypotheses assume the knowledge-promotion effect of each of the four contextual features separately, without considering the possibility that their individual effects may be suboptimal if any of the other features is low (Drazin and Van de Ven, 1985). In contrast, when we acknowledge that these aspects of the organizational context operate simultaneously and represent a holistic configuration, a systems approach to understanding their collective effect provides useful, complementary insights (Meyer et al., 1993; Vorhies and Morgan, 2003).

Previous research in strategic management and entrepreneurship indicates that holistic configurations of multiple contingencies enhance the understanding of their *simultaneous* roles in leveraging organizational decision-making policies (e.g., Dess et al., 1997; Govindarajan, 1988; Wiklund and Shepherd, 2005), such as decisions on how managers are to be rewarded. This holistic configuration of organizational features can be modeled as an "ideal type" construct, which captures the presence of complex interrelated organizational processes (Burger, 1987; Weber, 1904). Ideal type constructs do not only allow the empirical investigation of the simultaneous interplay among multiple organizational variables (Stinchcombe, 1968), they also provide a useful platform for theory testing (De Clercq et al., 2010; Doty and Glick, 1994). In particular, a systems approach to the study of organizational contingencies postulates that the more an organization *deviates* from the ideal configuration, the less is its expected effectiveness (Drazin and Van de Ven, 1985; Ketchen et al., 1997).

We have argued that specific features of the organizational context—as captured in high levels of job rotation, decision autonomy, social interaction, and interactional fairness—promote knowledge flows across functional areas, which in turn is essential to realizing the innovation-promotion effect of interdependent rewards. In this sense, the "ideal" holistic configuration pertains to the situation in which the individual contextual features reinforce each another in promoting knowledge sharing (Grant, 1996; Floyd and Lane, 2000) and, consequently, take their most beneficial forms with respect to the successful exploitation of reward interdependence. In contrast, to the extent that organizations do *not* reach that ideal state, their internal organizational context may limit how interdependent rewards can be effectively leveraged. Conceptually, the resulting “friction” in knowledge exchange informs the extent to which internal organizational features deviate from the “ideal” holistic configuration (Doty and Glick, 1994); higher deviations should undermine the effective implementation of reward interdependence (Venkatraman, 1989).

On the basis of these arguments, we hypothesize that the relationship between reward interdependence and product innovation is stronger when the organizational context comes closer to the “ideal” holistic configuration of job rotation, decision autonomy, social interaction, and interactional fairness. In particular, these four features—in addition to individually affecting the level of knowledge exchange—reinforce one another in promoting knowledge flows within the organization and thus in turning reward interdependence into enhanced product innovation.

> H6. *The proximity of the organizational context to the ideal holistic configuration of job rotation, decision autonomy, social interaction, and interactional fairness positively moderates the relationship between reward interdependence and product innovation such that the relationship is stronger when the proximity is higher.*

Beyond examining the collective contingency effects of the aforementioned organizational features is the question whether the structural and relational features are equally potent for turning reward interdependence into enhanced product innovation. On the one hand, organizations may have more direct control over structural features such as job rotation and decision autonomy (Campion et al., 1994; Gibson and Birkinshaw, 2004), such that their usefulness for enhancing knowledge flows and hence for leveraging reward interdependence may be stronger. On the other hand, relational features, such as social interaction and interaction fairness, are more tightly connected to managers’ day-to-day functioning (Payne et al., 2011; Tsai and Ghoshal, 1998), such that their beneficial effects on the exploitation of reward interdependence may be more enduring. In light of these two opposing arguments, we do not present a formal hypothesis that compares the moderating effects of organizations' proximity to their ideal structural and relational configurations, but instead undertake this comparison in an exploratory fashion.

RESEARCH METHOD

Sample and Data Collection

Similar to approaches in prior research (De Clercq et al., 2010; Simons and Peterson, 2000; Song et al., 2006), we applied a single-respondent design and obtained contact information about managers, active in either technology- or marketing-oriented functions, who worked for Canadian-based firms. Although this specification does not span all possible functional areas, extant research points to the critical role these functional areas have in shaping a firm's innovative endeavors (e.g., Griffin and Hauser, 1996; Li and Calantone, 1998; Song and Parry, 1993). To ensure that the contacted managers were knowledgeable about their firms' innovative postures and overall internal functioning, we included only managers who held either a vice-president or director/department head title as possible participants.

We sent survey instruments to these managers using a random selection of 1,500 firms from a database maintained by a private organization and applied Dillman's (1978) total design method. First, we sent a mailing packet that included a cover letter addressed personally to the managers, a questionnaire, and a pre-paid return envelope. Second, follow-up calls were conducted two weeks after the initial mailing to those who had not responded. Third, four weeks after the initial mailing, we sent replacement questionnaires to the non-respondents. Because some of the initially selected firms were not active any more, had moved and their new address could not be identified, or no longer employed the selected respondents, the number of potential respondents equaled 950. We received 232 completed surveys, which represented a response rate of 24%. We found no substantial differences between respondents and nonrespondents, or early and late respondents (Armstrong and Overton, 1977).

A follow-up survey, conducted six months after the initial one, used a shortened format and was sent to the original respondents. Specifically, for each construct, we chose one proxy item, different from the specific items in the original survey, that best captured the general content domain of the construct (De Clercq and Sapienza, 2006; Yli-Renko et al., 2001). This approach reduces recall and consistency bias and enhances confidence that positive and significant correlations between original and follow-up survey items can be interpreted as evidence of the absence of common method bias (Yli-Renko et al., 2001). We received 78 responses; all validation items correlated positively with the original measures, as we report subsequently. Further, we did not find significant differences between firms that responded to the follow-up survey and those that did not for the dependent, independent, or control variables captured in the original survey; thus, attrition bias between the first and second surveys should not be a concern.

Measurement

The scales used to measure the constructs came from extant literature. All items were measured on five-point Likert scales, ranging from 1 (strongly disagree) to 5 (strongly agree). We summarize the study’s key measures along with their psychometric properties in Table 1, and we include the correlations and descriptive statistics of these key measures in Table 2. In light of our research focus, we worded the items to capture phenomena that take place at the firm level rather than the functional manager level.[2]

Insert Tables 1 and 2 about here

Product innovation. Drawing from previous research (Jansen et al., 2006), we measured product innovation with items that captured the extent to which the firm develops new products and services, such as whether the firm accepts demands outside its existing products or commercializes products that are completely new to it.[3] This measure (alpha = .80) correlated positively with its single-item counterpart from the follow-up survey ($r = .44$, $p < .001$). Unlike "objective" proxies (such as R&D intensity relative to total assets) which tend to capture a specific innovation outcome, our measure includes a comprehensive set of items that reflect the extent to which the introduction of new products is common practice within the firm. Nonetheless, to assess our measure's predictive validity, we used Hoovers Online Prospector Database to collect data on "income growth over the past year" for a subset of the sampled firms ($n = 70$). We found a positive correlation ($r = .26$, $p < .05$) between our measure and income growth.

Reward interdependence. We measured the level of reward interdependence with three items that assessed the interdependence of functional units' rewards (Xie et al., 2003). For example, respondents indicated the extent to which the functional units in their

[2] The social interaction and interactional fairness items assessed relationships between people in technology- and marketing-oriented functions. Yet to ensure that the responses would cover organization-wide phenomena rather than idiosyncratic issues that have to do with specific departments, in the survey instrument we defined these "function" types in a broad sense. Particularly, we clarified that we were not interested in interactions or relationships between specific departments but rather between "the managers who typically are most preoccupied with technological (or technical) issues such as operations, engineering, or research and development on the one hand, and those who are typically most preoccupied with commercial activities such as marketing or sales on the other."
[3] In essence, our measure captures firms' "exploratory" product innovation, which emphasizes the novelty of the firm's product offerings, instead of incremental changes to existing products (Jansen et al., 2006).

company were evaluated on their joint performance instead of separate departmental performance and whether they shared the rewards of successfully commercialized new products. The measure (alpha = .78) correlated positively with its single-item counterpart from the follow-up survey (r = .46, $p < .001$).

Job rotation. The job rotation measure was based on three items adapted from Xie et al. (2003); respondents thus indicated the extent to which employees rotated across functional areas or whether people in a given functional unit sometimes took on roles in another functional unit. The measure (alpha = .80) also correlated positively with its single-item counterpart from the follow-up survey (r = .33, $p < .01$).

Decision autonomy. Following Dyer and Song (1998), we measured the level of decision autonomy with four items reflecting the extent to which decision making was decentralized in the organization. These questions were reverse coded. For example, respondents indicated to what extent individual units needed to get permission from top management when they wanted to make a decision. The measure (alpha = .90) correlated positively with its counterpart from the follow-up survey (r = .49, $p < .001$).

Social interaction. Following prior studies (Tsai and Ghoshal, 1998; Yli-Renko et al., 2001), we measured social interaction with four items that reflected the strength of social relationships among managers in different functional units. For example, we asked the respondents to rate the extent to which managers knew one another on a personal level or maintained close social relationships. The measure (alpha = .81) correlated positively with its single-item counterpart from the follow-up survey (r = .42, $p < .001$).

Interactional fairness. The four-item measure of interactional fairness was adapted from prior research on organizational justice (Colquitt, 2001; Masterson, 2001), and assessed, for example, whether people were treated with kindness and consideration by colleagues in other functions and whether their rights as working partners were respected by others. The measure (alpha = .87) correlated positively with its single-item counterpart from the follow-up survey ($r = .38$, $p < .001$).

Proximity to the ideal holistic configuration. Ideal type patterns among variables can be generated either empirically or theoretically (Doty and Glick, 1994; Drazin and Van de Ven, 1985). While empirical approaches involve arbitrary decisions about what constitutes the optimal profile and reduce the statistical power for testing hypotheses (Govindarajan, 1988), the theoretical approach, which is informed by conceptual judgments about the ideal values of each underlying construct, aligns best with the logical structure of typology theories (De Clercq et al., 2010; Doty and Glick, 1994). Hence, we adopted the latter approach to specify the ideal holistic configuration of job rotation, decision autonomy, social interaction, and interactional fairness. Since the four constructs were measured on 1-to-5 scales, we assessed their highest value (5) as representing the most beneficial representation of each construct. The ideal configuration thus constitutes the situation in which these four constitutive constructs reach their highest values.[4] Consistent with previous research (e.g., De Clercq et al., 2010; Vorhies and Morgan, 2003), we calculated the Euclidean distance of each firm from this ideal configuration. We then transformed this distance into its opposite, negative value to represent it as the *proximity* to the ideal configuration (i.e., higher values capture higher proximity). Thus,

[4] The assumption that the maximum value represents the ideal value (i.e., the higher the firm scores on the four features, the "better") aligns with the fact that the survey questions capturing the four features assessed respondents' extent of agreement with whether what are conceived of as optimal manifestations of the features exist in their organizations. In addition, this assumption is based on the notion that firms typically perform below their "global performance frontier" (Swink et al., 2006). In particular, to the extent that firms can make significant improvements in how the four features are implemented at a given time, they can increase their levels simultaneously without facing significant trade-offs between them (De Clercq et al., 2010).

the measure of proximity to the ideal configuration is presented by $Prox(i) = -\sqrt{\sum(X_{ij} - X_{mj})^2}$, where X_{ij} represents the value of the individual feature j (job rotation, decision autonomy, social interaction, and interactional fairness) for firm i, and X_{mj} represents the maximum (i.e., ideal) value for that feature.

Control variables. We controlled for firm size using a log transformation of the number of full-time employees. Because different industries vary in their propensity to engage in product innovation, we controlled for industry sector too, 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). We also measured whether the respondent represented a technology- or marketing-oriented function.

ANALYSIS AND RESULTS

Measurement Estimation

We undertook confirmatory factor analysis (CFA) of a six-factor measurement model. The model's factor loadings were greater than .40, normalized residuals less than 2.58, and modification indices less than 3.84 (Anderson and Gerbing, 1988). This measurement model also fit the data well: $\chi^2_{(190)} = 259.10$, goodness-of-fit index (GFI) = .91, Tucker-Lewis index (TLI) = .97, confirmatory fit index (CFI) = .97, and root mean square error of approximation (RMSEA) = .04. The significant factor loadings ($t > 2.0$; Gerbing and Anderson, 1988) and magnitude of the average variance extracted (AVE > .50; Bagozzi and Yi, 1988) provided evidence of the convergent validity of the scales. Further, we found strong evidence of discriminant validity in the significant differences between the unconstrained model and constrained model (Anderson and Gerbing, 1988) for all 15 pairs of constructs, as well as in the lack of confidence intervals that included

1.0 for the correlations between construct pairs ($p < .05$) (Anderson and Gerbing, 1988). Finally, the AVE estimates of the constructs were greater than the squared correlations between corresponding pairs of constructs (Fornell and Larcker, 1981).

We conducted several diagnostic analyses to rule out common method bias. First, a CFA for a single-factor model revealed poorer fit with the data ($\chi^2_{(205)} = 1{,}623.99$, GFI = .58, TLI = .37, CFI = .44, RMSEA = .17)—significantly worse ($\Delta\chi^2_{(15)} = 1{,}364.89$, $p < .001$) than the fit of the aforementioned six-factor model—so common method bias did not appear to be a serious concern. Second, similar to previous studies that relied on individual common source data to investigate organization-level innovation or entrepreneurship (e.g., Camarero and Garrido, 2012; De Clercq et al., 2010; Song et al., 2006) and following Podsakoff et al.'s (2003) recommended approach to test for common method bias, we ran several pairs of structural equation models (SEM) that enabled a comparison between a model that included an interaction term and another model with an added common method factor. For example, for the reward interdependence × job rotation interaction models (i.e., the equivalent of regression Model 4 in Table 3), the chi-square difference between the two models was not significant ($\Delta\chi^2_{(1)} = .572$; ns), and only small changes in the size and significance of the paths across the two models emerged. The same pattern of results emerged for the SEM equivalents of the three models that included the other two-way interactions. Third, we applied the CFA marker technique (Williams et al., 2010), which requires the estimation and comparison of a baseline model with the Method-C (or non-congeneric) model and Method-U (or congeneric) model as a means to test for the presence of common method variance (for a detailed explanation, see Williams et al. 2010, p. 494). Using a two-item measure of respondents' organizational experience (which captured their organizational tenure and job tenure) as the theoretically unrelated marker variable, we found that the fit statistics for the two method models were not statistically better than those for the baseline model. Rather, there were no significant differences in fit between the baseline model ($\chi^2_{(234)}$ = 319.76) and either the Method-C model ($\chi^2_{(233)}$ = 318.47; $\Delta\chi^2$ = 1.29, Δdf = 1, ns) or the Method-U model ($\chi^2_{(212)}$ = 284.78; $\Delta\chi^2$ = 34.98, Δdf = 22, ns) when we tested for the presence of equal or unequal method effects, respectively. Therefore, the CFA marker analysis offered no evidence of an influence of common method variance on the relationships among the six focal constructs in the theoretical model. Fourth, common method bias is less salient in studies that include highly educated respondents and multi-item scales (Bergkvist and Rossiter, 2007). In all, these considerations alleviate concerns related to the use of single respondents.

Hypotheses Testing

We used regression analysis to test the hypotheses (Table 3). After mean-centering the interacting variables, the variance inflation factor values were far below the threshold of 10, so multicollinearity was not a concern in our analyses (Aiken and West, 1991). Model 1 contained only the control variables, Model 2 added the effect of reward interdependence, and Model 3 included the direct effects of job rotation, decision autonomy, social interaction, and interactional fairness. Model 2 revealed a positive relationship between reward interdependence and product innovation (β = .235, p < .001), in support of the baseline H_1. Of the four contextual variables, only decision autonomy and social interaction had significant (positive) effects on product innovation (p < .01).

Insert Table 3 about here

In H_2–H_5 we predicted moderating effects of the two structural (job rotation and decision autonomy) and two relational (social interaction and interactional fairness) features on the relationship between reward interdependence and product innovation. To this end, in Models 4–7 we added the four corresponding interaction terms, one at a time, to avoid multicollinearity problems or masking true interaction effects (Aiken and West, 1991) as recommended in prior studies that test multiple interactions (e.g., De Clercq et al., 2010; Zahra and Hayton, 2008). Model 4 revealed a positive and significant interaction effect between reward interdependence and job rotation on product innovation ($\beta = .164$, $p < .01$). To clarify the nature of the interaction, in Figure 2 (Panel A) we plotted the corresponding effects (Cohen et al., 2003): The reward interdependence–product innovation relationship was strongly positive at high levels of job rotation but neutral at low levels, in support of H_2. In Model 5, the interaction effect between reward interdependence and decision autonomy was not significant, so we cannot confirm H_3.

Model 6 supported H_4: the interaction effect between reward interdependence and social interaction on product innovation was positive and significant ($\beta = .235$, $p < .001$). Its plot in Figure 2, Panel B, indicates that the reward interdependence–product innovation relationship was positive at high levels of social interaction and neutral at low levels. Finally, we found support for H_5 in the positive interaction between reward interdependence and interactional fairness in Model 7 ($\beta = .235$, $p < .001$). The plot in Figure 2, Panel C, shows that the reward interdependence–product innovation relationship was attenuated at low levels of interactional fairness.[5]

[5] In order to account for possible direct interrelationships *among* the four moderators, as well as between reward interdependence and the moderators, we undertook a robustness check, using structural equation modeling, whereby we included all possible covariances among the independent and moderating variables

When we included all four interaction terms simultaneously in Model 8, the interaction effects, though consistent in their positive signs, become subdued and even insignificant in the case of job rotation and decision autonomy. This result can be attributed to the specific interpretations of each of the individual interaction terms in the presence of the three other interaction terms. In particular, each of the interaction terms in Model 8 represents the differential effect of reward interdependence on product innovation for (a) the non-average values of the specific moderator (job rotation, decision autonomy, social interaction, or interactional justice, respectively) and (b) the average values of the other three moderators Thus, their simultaneous inclusion implies that each moderator operates in a space that only contains the average values of the other moderators (Aiken and West, 1991). For example, while the moderating effect of job rotation in Model 8 reflects the situation in which the values of the other three moderators are average, in Model 4 this moderating effect covers the entire range of values for the other three moderators. The diminished or absent significance levels in Model 8 thus suggest that each of the moderating effects is sensitive to the other moderators, which is in line with the configurational hypothesis tested next (De Clercq et al., 2010).[6]

Hypothesis 6 argues that when the organizational context is more proximate to the ideal holistic configuration of job rotation, decision autonomy, social interaction, and interactional justice, the relationship between reward interdependence and product

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(Lattin et al., 2003). We find that the signs and significance levels of the hypothesized moderating effects in these models are consistent with those of the focal analysis reported in Table 2. Thus we find support for the theorized moderating effects on the reward interdependence–product innovation relationship, *beyond* the presence of possible interdependencies among the variables.

[6] Furthermore, while the simultaneous inclusion of multiple interaction terms may obscure the detection of true moderating effects due the complex constellation of multiple factors (Aiken and West, 1991; Neter et al., 1985), a model that includes all interaction terms together indicates the robustness of the results to the extent that the signs of the interactions are consistent with those found in the models in which the interaction terms are included separately (Arnold, 1982; Covin et al., 2006), which is the case here.

innovation will be stronger. In Model 9, we included the main effect of the proximity variable to the model that included the control variables and the main effect of reward interdependence.[7] The effect of the proximity variable was positive and significant (β = .161, p < .01), explaining significant additional variance (ΔR^2 = .026, p < .01), relative to Model 2. In Model 10, we added the interaction term between reward interdependence and proximity, and found that its effect is positive and significant (β = .172, p < .001). Figure 2 (Panel D) visualizes this effect, showing the relationship between reward interdependence and product innovation for high and low values of the proximity to ideal holistic configuration. When proximity is high, the relationship between reward interdependence and product innovation is positive; when proximity is low, reward interdependence has virtually no relationship to product innovation. These results provide support for Hypothesis 6.

Insert Figures 2A-D about here

In a post-hoc analysis, reported in Table 4, we compared the relative potency of firms' proximity to the ideal structural and relational configurations in converting reward interdependence into enhanced product innovation.[8] The interaction effects of reward interdependence with both the ideal structural (Model 11) and relational (Model 12) configurations are positive and significant (β = .138, p < .05 and β = .245, p < .001, respectively). Therefore, consistent with the main results in Table 2, organizations with greater proximities to the ideal structural and relational configurations exhibit stronger

[7] We do not include the individual direct effects of the four organizational features in this model because of their strong overlap with the proximity variable (De Clercq et al., 2010).
[8] These two proximity variables were calculated in a fashion similar to the "holistic" proximity variable used in the main analyses. In particular, we calculated the opposite values of the Euclidean distances from the ideal values (5) of job rotation and decision autonomy for the structural configuration, and from the ideal values (5) of social interaction and interactional fairness for the relational configuration.

relationships between reward interdependence and product innovation. To make a direct comparison of the two configurational effects, we also entered them simultaneously in Model 13. We found that the interaction of reward interdependence with the proximity to ideal relational configuration remains significant ($\beta = .219$, $p < .001$), but the significance of its interaction with the proximity to the ideal structural configuration disappeared. Thus, the results indicate that because the less tangible, relational features may be more deeply anchored in managers' day-to-day functioning, they are more powerful for converting interdependent rewards into production innovation compared to the structural features which perhaps are perceived as being imposed or enforced by top management and hence are less potent in leveraging reward interdependence.

Insert Table 4 about here

DISCUSSION

For organizations to develop new products, their functional units must coordinate their efforts (Sherman et al., 2005; Townsend et al., 2010). One way to do so is to make managers' rewards dependent on the performance of colleagues across the organization (Barnes et al., 2011; Chen and Tjosvold, 2012; Xie et al., 2003). When the performance of colleagues in other units has ramifications for returns on their own efforts, managers feel shared ownership of new creative ideas (McDonough, 2000), which stimulates their collective motivation to bring such ideas to a successful end (O'Reilly and Tushman, 2004). High reward interdependence thus can stimulate the synchronization and coordination of efforts across functional borders, which enhances the firm's ability to develop new products (Bharadwaj and Menon, 2000). Our study finds empirical support for this thesis in the positive relationship between reward interdependence and product innovation.

Yet even if reward interdependence enhances product innovation, its effectiveness does not materialize automatically because managers in higher-performing functional units may exhibit less motivation (Lee and Ahn, 2007), whereas lower-performing counterparts suffer increased anxiety (Ames, 1981; Drabman et al., 1974). For example, weaker managers may “counter-react” to reward interdependence and become less forthcoming with their important function-specific knowledge, even if it is needed to support the firm’s product innovation pursuits, because they hope to conceal their poor performance (Wageman and Baker, 1997). High levels of reward interdependence also can lead to “free riding,” whereby managers count on the efforts and actions of others, rather than their own, to contribute to collective performance in product innovation projects (Albanese and Van Fleet, 1985; Lee and Ahn, 2007). In response, we have investigated how several features of organizational context might help overcome these challenges and increase the instrumentality of reward interdependence for product innovation pursuits through their promotion of intra-firm knowledge sharing.

First, we find that the contribution of reward interdependence to product innovation increases to the extent that managers rotate across functional units or take on specific roles in units other than their own (Campion et al., 1994). When functional managers shift across departments, they gain greater exposure to new experiences and complementary skills, which can offer them insights into how to leverage function-specific knowledge to attain higher collective performance, thus enhancing the effectiveness of reward interdependence (Xie et al., 2003). By trying on different "organizational hats," managers experience firsthand how the contributions of each unit might enhance collective performance, which will increase their own rewards under a reward interdependence system. In contrast, when job rotation is minimal, managers have less understanding of or confidence about how the expertise of colleagues in other functional units might contribute to collective performance in product innovation, which increases the likelihood that they keep function-specific knowledge for themselves, even if it would be useful for the firm's product innovation pursuits, thereby diminishing the effectiveness of reward interdependence.

Second, and contrary to what we anticipated, granting decision autonomy to functional units does *not* increase the translation of reward interdependence into product innovation. We had hypothesized that the freedom associated with enhanced levels of decision autonomy would encourage cross-functional exchanges and thus understanding of how the combination of function-specific knowledge might enhance collective performance. Nevertheless, other mechanisms may counter these effects. For example, the freedom afforded to managers in conditions of high decision autonomy might exacerbate their perceptions or fears of relinquished decision power if they were to share sensitive information with peers who are granted the same decision autonomy by top management. In this scenario, managers might consider their own unit to be "personal turf" that needs protection (Luo et al., 2006). Further, when functional units enjoy high levels of autonomy in their decision making, top management may lose its ability to "synchronize" or match the efforts of individual managers to attain enhanced levels of organization-wide product innovation (Hill et al., 1992), such that the potential inherent in reward interdependence never gets fully realized. We acknowledge that these explanations are somewhat speculative; a more detailed and perhaps qualitative investigation of the interplay between decision autonomy and reward interdependence is warranted.

With respect to the relational context, we find support for a positive interaction between reward interdependence and social interaction, such that the effect of reward interdependence on product innovation is stronger at higher levels of social interaction. Social capital literature suggests that embedded relationships motivate exchange partners to work harder to attain collective goals, which enables them to work more effectively together to overcome problems, obtain direct feedback during the process, and ultimately reach superior innovative solutions (Nahapiet and Ghoshal, 1998; Uzzi, 1997). Similarly, strong relationships induce greater motivation to coordinate efforts with exchange partners because of the satisfaction that coordination infuses into socially connected actors (Granovetter, 1985). Strong social ties may also create a common identity among managers (Leana and van Buren, 1999), such that the goal of achieving greater collective performance in product innovation projects is easier to obtain.

We find a similar positive role for interactional fairness. When managers treat one another fairly and show respect for others' opinions, their perception that reward interdependence can make them vulnerable to the whims of poorly performing colleagues will be mitigated (Qiu et al., 2009; Rupp and Cropanzano, 2002). Their motivation to work hard to attain a common goal, such as pursuing organization-wide product innovation, thus increases. If interactions appear fair, managers may work more intensively toward the integration of disparate pieces of function-specific knowledge that can enhance collective performance, and the implementation of reward interdependence then should be more effective. In contrast, when perceptions of interactional fairness are low, managers may be less forthcoming about sharing their expertise, even if that attitude hampers collective performance, because they feel that their opinions will be unfairly criticized (Bies and Moag, 1986).

We also find a strong holistic configurational effect of the four organizational features. Consistent with the systems approach to the study of organizational contingencies (Drazin and Van de Ven, 1985; Ketchen et al., 1993, 1997), we show that deviations from the ideal holistic configuration of the four features can undermine the effective implementation of interdependent rewards. In particular, the relationship between reward interdependence and product innovation is stronger when the organizational context exhibits higher proximity to an ideal configuration that promotes knowledge flows. We attribute this effect to the notion that these organizational features *reinforce* one another in enhancing knowledge flows within the organization (De Clercq et al., 2010; Floyd and Lane, 2000), and thus collectively they are particularly instrumental for channeling reward interdependence into higher product innovation. Although organizational features individually encourage managers to exchange knowledge with one another, their simultaneous presence can make the exchange deeper and more sustainable (Cohen and Levinthal, 1990; De Clercq et al., 2010; Grant, 1996). In other words, if none of these features is deficient, the *quality* of the knowledge flows may be amplified, such that the effective implementation of interdependent rewards becomes more salient. Furthermore, the post-hoc analysis indicates that the relational context is particularly potent, more so than the structural context, in terms of converting reward interdependence into enhanced product innovativeness. This finding may be attributed to the aforementioned challenges of political battles (Luo et al., 2006) and limited synchronization (Hill et al., 1992) when decision autonomy is high, as well as to managers' beliefs that structural measures (whether they pertain to job rotation or decision autonomy) are forced upon them.

Limitations and Future Research

This study contains some limitations that offer opportunities for further research. For example, it could be useful to consider the role of more complex reward structures—such as the ratio of independent and interdependent rewards—in shaping product innovation, and the enabling roles of different organizational features for effectively implementing these reward structures (Barnes et al., 2011). Additional research could also adopt longitudinal designs to investigate the causal processes that link reward interdependence and product innovation, as well as to consider possible interdependencies among the organizational features included in this study. Further, by focusing on four specific features of organizational context, we may have ignored other factors relevant to the successful conversion of reward interdependence into product innovation, such as the formality of the firm's decision-making process (Auh and Menguc, 2007) or different forms of organizational justice, such as distributive or procedural justice (Colquitt, 2001). Future research could also undertake industry comparisons, for example, in terms of how external competitive pressures may make employees more willing to accept that their rewards depend on the performance of organizational peers (Lahiri et al., 2008).

Another avenue for research would be to determine whether the potency of the interaction effects we examined is different for cross-functional teams that are formally assigned or self-selected (Feng et al., 2010; Rulke, 1996), or for exploratory (radical) versus exploitative (incremental) innovations (Jansen et al., 2006; Garcia and Calantone, 2002). For example, it could be that the uncertainty associated with radical changes to the firm's current product offerings makes the role of interdependent rewards particularly prominent, as well as invigorates the enabling roles of the studied contextual features in converting these rewards into higher innovative outcomes. Moreover, given the different tradeoffs between incremental and radical innovations in terms of innovation speed, product quality, and development cost, future research could build on Barnes et al. (2011) to examine the possibility of both beneficial and detrimental effects of independent rewards on the speed, quality, and cost of product innovation.

Moreover, this study focused on an important driver of firms' product innovation pursuits rather than the consequences of these pursuits. Extant research indicates a beneficial impact of firms' product innovation levels on their performance (e.g., Li and Atuahene-Gima, 2001), yet some researchers suggest insignificant or even negative relationships (e.g., Capon et al., 1990). Therefore, research could examine whether the contingency factors in this study influence not only the extent to which reward interdependence leads to product innovation but also the nature of the product innovation–performance relationship.

Practical Implications

This study also offers important implications for the management of product innovation. It suggests that in the pursuit of product innovation, top management must consider linking individual rewards to collective performance, and then enhance the innovation potential that reward interdependence generates by creating organizational conditions that lend themselves to the open sharing of function-specific knowledge. These conditions can diminish feelings of constraint and suspicions that managers will misuse or free-ride on others' efforts. That is, the organizational context in which functional managers operate is critical, particularly with regard to structural and relational boundaries.

Thus, the intra-organizational boundary conditions we study reveal how firms that aim to develop new products can benefit the most from implementing reward interdependence: They should be prepared to rotate key personnel across different functions, stimulate informal encounters that go beyond formal working routines, and ensure that managers are treated with respect and goodwill. For recruitment purposes then, the effective implementation of reward interdependence to enhance product innovation requires managers who are versatile enough to rotate throughout different parts of the organization, are willing to go out of their way to interact with colleagues in social settings, and have respect for the opinions of others, even if they differ from their own ideas.

The study may also have importance for multinational corporations with subsidiaries in different countries. Because perceptions about the effectiveness of structural and relational arrangements are in part culturally driven (Hofstede, 1991), the potency of these arrangements to convert reward interdependence into enhanced product innovation may vary across countries. For instance, job rotation may be a more potent instrument for channeling reward interdependence toward product innovation in individualistic countries (e.g., United States, Great Britain, Canada) than in their collectivistic counterparts (e.g., Japan, Korea, China), even if the practice is more common in countries of the latter group such as Japan (Dedoussis, 1995). In individualistic countries, achieving success through personal means is regarded more highly than success derived through collective efforts, so managerial practices in these countries tend to emphasize functional specialization over the development of generalist skills (Song et al., 2010), despite the benefits of those skills for product innovation. Therefore, compared with collectivistic countries that value and encourage interactions with peers throughout the organization (Dien, 1999), individualistic societies may gain the most *incremental* value from the introduction of job rotation as a mechanism to increase the effectiveness of interdependent rewards for enhanced product innovation. Furthermore, internal resistance to reward interdependence itself might be greater in individualistic countries (Hofstede, 1991), such that the structural and relational contingencies studied herein may be most valuable for spurring product innovation in these countries.

Conclusion

To conclude, by considering various structural and relational contextual factors, this study has directed greater attention to the internal boundary conditions that determine the effectiveness of reward interdependence across functional units in terms of firms' ability to enhance product innovation. We hope this work is a catalyst for efforts to pursue a greater understanding of how firms with strong innovative aspirations can translate various cross-functional arrangements and processes into stronger competitive positions in the global marketplace.

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Table 1: Constructs and Measurement Items

	Factor Loading	t-Value
Product innovation (α = .80; CR = .80; AVE = .51)		
Our company accepts demands that go beyond existing products and services.	0.590	7.054
We focus on inventing new products and services.	0.760	9.267
We experiment with new products and services in our local market.	0.744[a]	
We commercialize products and services that are completely new to our company.	0.743	7.911
Reward interdependence (α = .78; CR = .78; AVE = .54)		
Different departments share the rewards of a successfully commercialized new product.	0.762	9.754
Individual departments are evaluated on their joint performance instead of separate departmental performance.	0.666	9.131
Our senior management promotes cross-departmental team cohesion over separate departmental loyalty.	0.773[a]	
Job rotation (α = .80; CR = .84; AVE = .64)		
Planned job rotation of employees is emphasized as a device for developing employees' capabilities.	0.832[a]	
Employees are rotated across functional areas.	0.950	13.773
People in a given functional department (e.g., R&D, marketing) sometimes take on roles in another functional department.	0.565	8.920
Decision autonomy (α = .90; CR = .88; AVE = .71) (reverse coded)		
Any decision that is made needs to be approved by top management.	0.697	12.675
Even small matters have to be referred to someone higher up for a final answer.	0.886	19.653
Individual departments need to get permission from top management almost every time they want to do anything.	0.918[a]	
Individual units are strongly discouraged from making their own decisions.	0.809	16.596
Social interaction (α = .81; CR = .83; AVE = .57)		
People in technology- and marketing-related functions spend significant time together in social situations.	0.830[a]	
People in the two functions maintain close social relationships with one another.	0.959	15.694
People in the two functions know members of the other function on a personal level.	0.691	11.687
The relationship between people in the two functions is very informal.	0.423	5.390
Interactional fairness (α = .87; CR = .87; AVE = .64)		
Generally speaking, in the working relationship between technology- and marketing-related functions…		
People are treated in a polite manner by the other function.	0.878	17.602
People are treated with kindness and consideration by the other function.	0.883[a]	
People's personal biases are suppressed and properly managed by the other function.	0.582	9.511
People's rights as working partners are respected by the other function.	0.806	14.832

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

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

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. Product innovation																
2. Reward interdependence	.274															
3. Job rotation	.155	.430														
4. Decision autonomy	.228	.321	.133													
5. Social interaction	.263	.328	.334	.087												
6. Interactional fairness	.205	.506	.187	.382	.331											
7. Prox. to ideal hol. config.	.287	.574	.761	.499	.691	.578										
8. Company size (log)	-.039	-.042	.048	.117	-.160	.041	.001									
9. Industry: manufacturing	.048	-.049	-.019	-.098	-.041	.127	-.030	.108								
10. Industry: services	.022	-.003	-.069	.090	.004	-.061	-.027	-.155	-.580							
11. Industry: mining	-.082	.012	.040	.094	.053	-.108	.051	-.064	-.307	-.198						
12. Industry: construction	.117	.154	.062	.031	.033	.070	.080	.037	-.126	-.081	-.043					
13. Industry: transportation	-.114	-.017	.046	-.023	-.023	-.016	.006	.097	-.231	-.149	-.079	-.032				
14. Industry: wholesale	.057	.095	.120	.043	.079	.034	.116	-.069	-.191	-.123	-.065	-.027	-.049			
15. Industry: retail	.033	.002	-.039	-.069	-.046	-.070	-.077	.084	-.155	-.099	-.053	-.022	-.040	-.033		
16. Marketing-related funct.	-.064	-.040	-.136	-.059	-.032	.001	-.086	.167	.034	-.038	-.083	.069	-.015	.026	.003	
Mean	3.615	3.269	2.494	3.722	2.804	3.683	-4.01	0.000	0.474	0.272	0.095	0.017	0.056	0.039	0.026	0.491
Standard deviation	0.865	0.919	0.910	0.920	0.782	0.720	1.082	1.991	0.500	0.446	0.294	0.130	0.230	0.194	0.159	0.501

Note: Correlations greater than |.13| are significant at $p < .05$

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

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10
Company size (log employed)	-.010	-.007	-.008	-.005	-.009	.006	.002	.010	-.011	.003
Industry: manufacturing[a]	.621	.512	.458	.410	.461	.493	.348	.361	.495	.456
Industry: services	.595	.479	.377	.363	.406	.428	.322	.332	.467	.491
Industry: mining	.335	.212	.059	.045	.084	.097	-.004	.003	.172	.161
Industry: construction	1.369*	.994+	.955+	.838	.949+	.961+	.780	.762	.981+	.835
Industry: transportation	.173	.067	.016	-.041	.022	-.031	-.094	-.133	.042	-.032
Industry: wholesale	.819+	.599	.466	.407	.479	.383	.331	.270	.523	.415
Industry: retail	.760	.636	.669	.632	.670	.542	.360	.323	.705	.533
Marketing-oriented function[b]	-.120	-.103	-.087	-.096	-.075	-.059	-.090	-.087	-.079	-.064
H1: Reward interdependence		.235***	.131+	.174*	.128+	.168*	.145*	.186*	.127+	.192**
Job rotation			.002	-.016	.003	-.006	.005	-.009		
Decision autonomy			.170**	.157*	.180**	.161**	.178**	.158*		
Social interaction			.229**	.209**	.223**	.179**	.206**	.177*		
Interactional fairness			-.033	-.025	-.014	-.032	.034	.013		
H2: Reward interdependence × Job rotation				.164**				.080		
H3: Reward interdependence × Decision autonomy					.070			-.053		
H4: Reward interdependence × Social interaction						.235***		.132+		
H5: Reward interdependence × Interactional fairness							.235***	.194*		
Proximity to ideal holistic configuration									.161**	.136*
H6: Reward interdependence × Proximity to ideal holistic configuration										.172***
F-value	1.412	2.837**	3.272***	3.564***	3.161***	3.993***	3.998***	3.761***	3.265***	4.338***
R^2	.054	.114	.174	.198	.180	.217	.217	.241	.140	.192
$\Delta R^{2,c}$		.060***	.060**	.024**	.006	.043***	.043***	.067***	.026**	.052***

Notes: Unstandardized coefficients (two-tailed *p*-values). ****p* < .001; ***p* < .01; **p* < .05; $^{+}$ *p* < .10.

[a] Base case = Finance industry. [b] Base case = technology-oriented function.

[c] The ΔR^2 value for Model 2 reflects the change relative to Model 1; the ΔR^2 value for Model 3 reflects the change relative to Model 2; the ΔR^2 values for Models 4 to 8 reflect the changes relative to Model 3; the ΔR^2 value for Model 9 reflects the change relative to Model 2; the ΔR^2 value for Model 10 reflects the change relative to Model 9.

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

	Model 11	Model 12	Model 13
Company size (log employed)	.001	.006	.013
Industry: manufacturing[a]	.471	.418	.464
Industry: services	.497	.392	.484
Industry: mining	.183	.079	.172
Industry: construction	.894+	.845	.871
Industry: transportation	.024	-.076	-.037
Industry: wholesale	.498	.326	.388
Industry: retail	.681	.389	.434
Marketing-oriented function[b]	-.083	-.068	-.071
Reward interdependence	.160*	.165*	.181*
Job rotation		.006	
Decision autonomy		.155**	
Social interaction	.176*		
Interactional fairness	.057		
Similarity to ideal structural configuration	.064		.068
Similarity to ideal relational configuration		.136*	.142*
Reward interdependence × Similarity to ideal structural configuration	.138*		.032
Reward interdependence × Similarity to ideal relational configuration		.245***	.219***
F-value	3.336***	4.530***	4.092***
R^2	.177	.226	.209
$\Delta R^{2,c}$	.063***	.112***	.095***

Notes: Unstandardized coefficients (two-tailed *p*-values). ****p* < .001; ***p* < .01; **p* < .05; $^+ p < .10$.
[a] Base case = Finance industry. [b] Base case = technology-oriented function.
[c] The ΔR^2 values for Models 11 to 13 reflect the changes relative to Model 2.

Figure 1: Conceptual Model

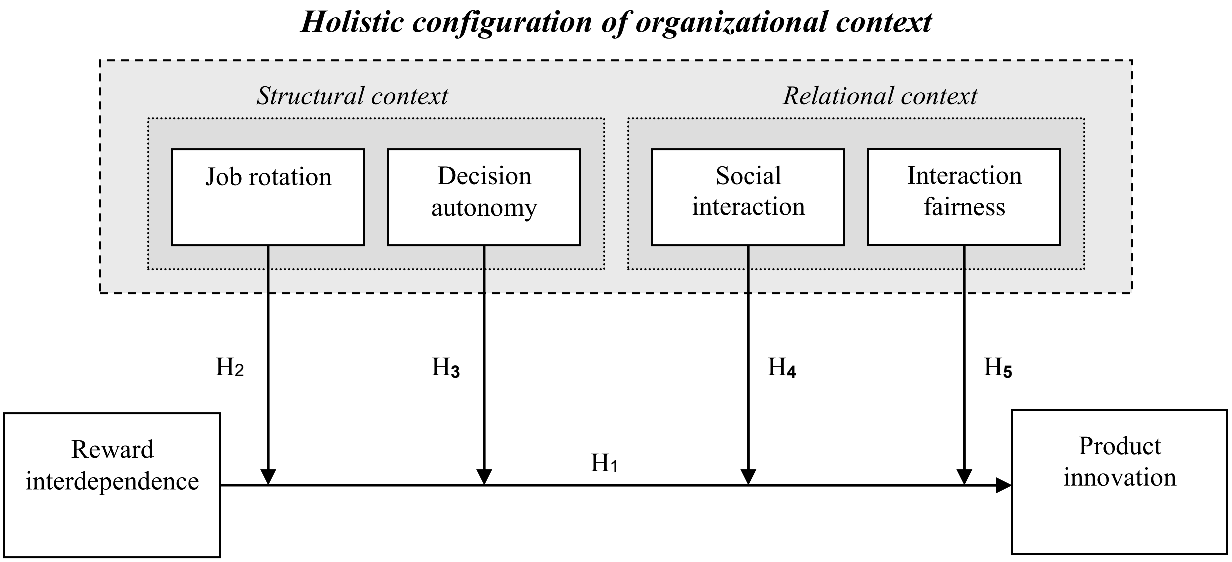
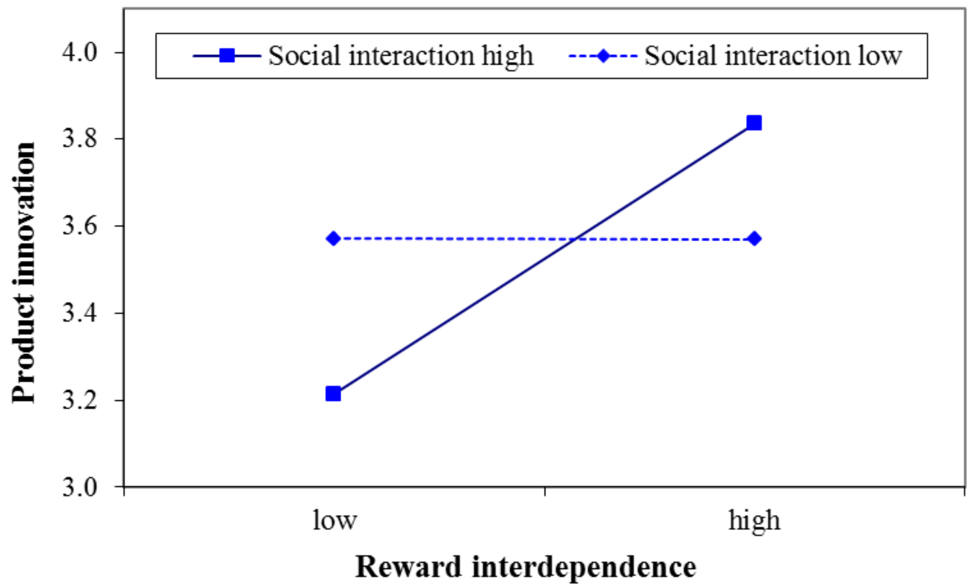


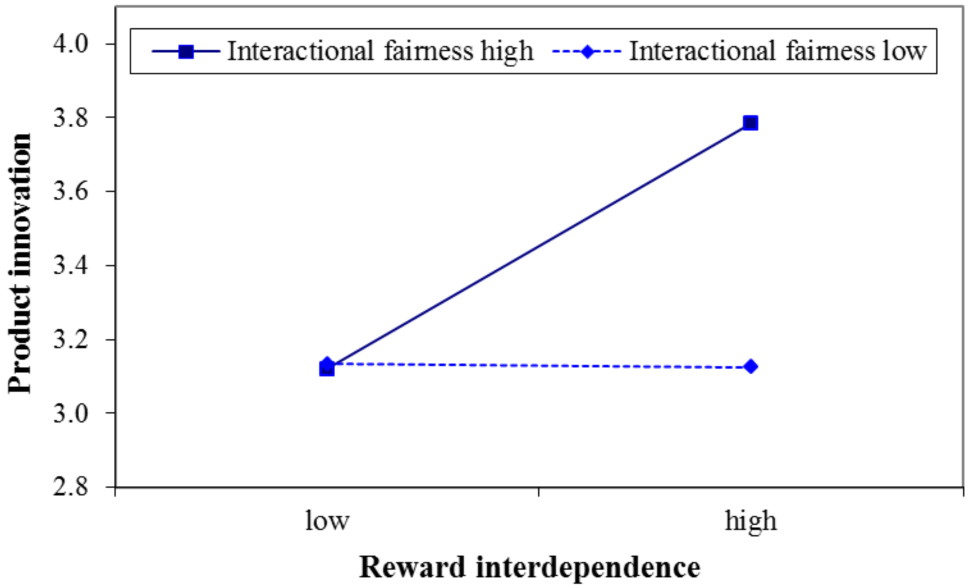
Figure 2: Moderating Effects on the Reward Interdependence–Product Innovation Relationship

(A) Job Rotation

(B) Social Interaction



(C) Interactional Fairness



(D) Proximity to the Ideal Holistic Configuration