Balancing New Product Quality and Innovativeness Through Learning and Knowledge Sharing in NPD Teams

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MAR10-12

Institute for Management Research

Working Paper Series in Management

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Abstract

To satisfy customers' and other stakeholders' requirements, firms must develop new products that are at the same time innovative *and* of high quality. A common belief among researchers and practitioners is that a strong quality focus has an adverse effect on innovativeness, but recent research seems to point in a different direction. This article challenges this common belief and investigates the role of cognitive team processes in developing high quality products without jeopardizing their innovativeness. Using the idea of the ambidextrous organization, we argue that simultaneously achieving high product quality (through exploitation of existing knowledge) and high product innovativeness (through exploration of new knowledge) is indeed possible when cross-functional new product development (NPD) teams are encouraged to concurrently learn and share knowledge. In a field study, data were collected by means of an online survey. Data obtained from members of 105 NPD teams were analyzed using structural equation modeling in the SmartPLS implementation. The study shows that in a NPD context, team learning, which has traditionally been associated with exploration, has significant positive effects on new product quality and innovativeness. Furthermore, knowledge sharing was found to positively affect quality in a new product development context. Surprisingly, knowledge sharing, which is often exclusively associated with the exploitation of existing knowledge, was also found to have a weak but positive effect on product innovativeness. No inverse effects were found between learning and knowledge sharing. Knowing that is possible to develop high quality products that are innovative at the

same time, project managers should encourage NPD team members to engage in learning and knowledge sharing processes.

Introduction

Innovativeness and quality are major drivers of new product performance (Angelmar, 1990; Danneels & Kleinschmidt, 2001), long term firm success and market growth (Sethi, 2000). Improving product quality, i.e. "the degree to which the product meets or exceeds a customer's expectations" (Paladino, 2008, p. 580), and product innovativeness, i.e. "the extent to which the product differs from competing alternatives in a way that is meaningful to customers and therefore reflects meaningful uniqueness" (Fang, 2008, p. 90) are two key objectives simultaneously sought by modern companies (Henard & Szymanski, 2001; Sethi & Sethi, 2009), and requiring managers' and researchers' attention (Morgan & Vorhies, 2001).

It is thought that when firms strongly focus on quality they are likely to hamper their chances to develop highly innovative products and vice versa (Benner & Tushman, 2002; Benner & Tushman, 2003). Thus, managers are seeking guidance on how to develop innovative products without jeopardizing high quality levels (Sethi & Sethi, 2009).

The use of cross-functional teams is often said to be beneficial to new product development (NPD) performance (Bond III et al., 2004; Griffin, 1997; Qiu et al., 2009). Most studies investigating the issue have primarily focused on the impact of cross-functional teams on either new product quality (e.g. Keller, 2001) or on product innovativeness (e.g. Lovelace et al., 2001; Sethi et al., 2001). Several researchers have put forward the idea of adverse effects of pursuing quality improvement on innovativeness (Benner & Tushman, 2002; Kyriakopoulos & Moorman, 2004). They argue that high levels of product quality can only be reached by reducing or minimizing variation in the ways teams do things, which is not always beneficial to the generation of new insights and original features to integrate into the new product (Sethi & Sethi, 2009).

Hoegl and Parboteeah (2006) highlighted the role of cognitive processes at a team level, such as learning and knowledge sharing, as important determinants of the effectiveness

of NPD teams. Team learning is "an activity of central importance to NPD" (Edmondson & Nembhard, 2009, p. 125). Learning likely enables team members to find new combinations, methodologies and processes to develop innovative and original products. Sharing knowledge with each other may help NPD team members to solve problems related to the new product development (Hong et al., 2004).

In the present article, we simultaneously investigate the role of team learning and team knowledge sharing as antecedents of new product quality and innovativeness. In doing so, we respond to a call to further examine how cross-functional teams could develop high quality products without adversely affecting product innovativeness (Sethi & Sethi, 2009). The following research question guides this paper:

To what extent do team learning and team knowledge sharing affect new product quality and innovativeness?

Research in the field of organizational learning and knowledge management has observed that learning and knowledge sharing are cognitive processes that do not happen automatically between individuals and should be managed (Sarin & McDermott, 2003). Bearing this in mind, we also investigate effects of charismatic leadership and organizational climate, two well-known antecedents of team performance, on managing team learning and knowledge sharing. We add the following sub-questions to our main research question:

To what extent does charismatic leadership affect team learning and team knowledge sharing?

To what extent does an innovative organizational climate affect team learning and knowledge sharing?

By answering the questions cited above, the present study aims to contribute to a better understanding of a) the mechanisms responsible for the potential coexistence of new product quality and innovativeness, and b) how charismatic leadership and organizational climate

affect these outcomes through team learning and team knowledge sharing. The study aims to help NPD managers to develop high quality *and* innovative products.

Approach

Reviewing literature on team learning, knowledge management, charismatic leadership, organizational climate and NPD, a theoretical model is developed and tested in a quantitative field study. Implications for theory and practice are provided. Finally, limitations of the study and suggestions for further research are outlined.

Literature Review

In this section we introduce and define the main constructs used in the study. Then, hypotheses are formulated, investigating the relationships between team learning, team knowledge sharing, new product quality and innovativeness, leadership and organizational climate.

Product Quality

High-quality products are generally perceived by consumers to be superior to competitors' offerings (Song & Parry, 1997). As a consequence, the quality of a new product is often considered an antecedent of its market success and profitability (Millson & Wilemon, 2008; Morgan & Vorhies, 2001; Sethi, 2000). Past studies have developed different conceptualizations of product quality, depending on their perspective. From the customer's perspective, product quality is related to product features, functionality, and performance (Tatikonda & Montoya-Weiss, 2001). A more operational definition of product quality emphasizes technical and functional performance and the adherence of the newly developed product to pre-established specifications (Tatikonda & Montoya-Weiss, 2001). In the present article we adopt Paladino's (2008) customer-based definition of new product quality.

Product Innovativeness

Research indicates that, in order to be successful, new products must also offer novel (Angelmar, 1990; Cooper & Kleinschmidt, 1987; Dahl et al., 1999), and unique (Danneels & Kleinschmidt, 2001; De Brentani, 2001; Sethi et al., 2001) benefits to the customer. The product's novelty and uniqueness differentiate it from competing offerings, so the product may be judged superior by customers (Fang, 2008). In a recent article, Salavou (2005, p. 311) suggests that "new, superior products require advantages based on both the generation and application of knowledge (information, experience, etc.)".

Team Learning

Teams that continue to learn have been reported to be more effective than teams that do not (Akgün et al., 2006), particularly in an innovation context, since learning is essential for the new product success (Dayan et al., 2009). The literature on organizational learning refers to two types of learning: exploitative learning (expanding and deepening existing knowledge) and exploratory learning (acquiring new knowledge) (Atuahene-Gima & Murray, 2007). According to March (1991, p. 71), "exploration includes things captured by terms such as search, variation, risk taking, experimentation, flexibility, discovery, and innovation. Exploitation includes such things as refinement, choice, production, efficiency, selection, implementation, and execution." Drawing on March's (1991) definition of exploration and exploitation, we refer to exploratory learning as the acquisition of entirely new knowledge, skills and technologies, such as when the NPD team experiments with unfamiliar activities. In this context, exploitative learning refers to the extension and deepening of existing knowledge, skills and technologies.

Knowledge Sharing

NPD projects are considered an ideal example of a knowledge intensive activity (Lawson et al., 2009). According to the resource-based view, knowledge is an important organizational resource (King & Zeithaml, 2003). It acts as a source of sustainable competitive advantage

(Grant, 1996; Kearns & Lederer, 2003) and long term survival of organizations (Nonaka & Takeuchi, 1995). Thus, firms and researchers alike search for effective ways to share knowledge between different levels of an organization (Ipe, 2003) particularly in NPD projects. Moreover, sharing knowledge between members of work groups and with others outside the workgroup is considered crucial to the performance of organizations (Argote & Ingram, 2000; Argote et al., 2003). Consequently, this study investigates knowledge sharing within and between NPD teams. At the "within-team" level, knowledge sharing refers to "team members sharing task-relevant ideas, information, and suggestions with each other" (Srivastava et al., 2006, p 1239). Engaging in information exchange and task-related communication between group members has benefits to the whole group (Cummings, 2004). Huang (2009) found a positive effect of knowledge sharing within R&D teams on their performance. In analogy with the definition of "within-team" level, sharing knowledge between different teams will be defined as sharing task-relevant ideas, information, and suggestions with coworkers that are not part of the focal team, but of other NPD teams. Many studies have demonstrated advantages of knowledge sharing with outsiders (Ancona & Caldwell, 1992; Cummings, 2004). For example, Cummings (2004) found that external knowledge is important to work group performance.

Knowledge sharing activities within and between NPD teams may actually be complementary with respect to their influence on team processes. Sharing knowledge between teammates, who engage in close interaction, may explicate tacit knowledge that is not codified in the organizational knowledge base (Lam, 2000). Sharing knowledge with outsiders could help NPD team members to find knowledge they may need, but which does not exist within the team (Berends et al., 2006).

Charismatic Leadership

Leadership style has been found to exert a substantial effect on team performance (Judge et al., 2004; McDonough & Barczak, 1991; Norrgren & Schaller, 1999; Somech, 2006) and team processes (Schippers et al., 2008). A positive effect might occur on team performance, as a result of the effectiveness by which leaders manage cognitive team resources – by encouraging team members to share knowledge between them (Srivastava et al., 2006). Simply imposing that knowledge should be shared may not be sufficient to encourage employees to do so (Bock et al., 2005). Beyond norms and guidelines, team members need a climate of trust and fairness to participate in knowledge sharing activities. A leadership type known to establish trust among employees is charismatic leadership (Halverson et al., 2004). Charisma in particular has been identified as one of the most important attributes of effective leaders (Conger et al., 2000; Rowold & Laukamp, 2009). Johnson & Dipboye (2008) reported that in a recent study including more than 850 of the largest companies in US, charismatic CEOs were preferentially hired over non charismatic CEOs. Shea and Howell (1999, p. 375), describe charismatic leadership as "leadership whereby leaders inspire followers to accomplish challenging goals by articulating a compelling vision of the future, communicating high expectations and expressing confidence in followers' abilities to meet expectations." Charismatic leadership is perceived by employees to promote a sense of mission and determination (Waldman et al., 2001). Moreover, charismatic leaders convey signals that they and their roles are extraordinary (Conger et al., 2000), which is likely to motivates their employees to follow them. Using a laboratory study, Johnson & Dipboye (2008) found that charismatic leadership behaviors lead to a greater task performance of collaborators. Moreover, charismatic leadership was found to directly affect perceived task group performance (Conger et al., 2000).

Organizational Climate

Literature on new product development has also recognized the effects of organizational climate on employee performance (Wei & Morgan, 2004). The innovative capacity of a firm depends not only on its members' abilities but also on the work atmosphere or climate in which they are working (Burningham & West, 1995). Organizational ''climate represents signals individuals receive concerning organizational expectations for behavior and potential outcomes of behavior'' (Scott & Bruce, 1994, p. 582). It refers to employees' perceptions and behaviors regarding the organizational value system. The climate takes its importance through its influences on organizational processes such as problem solving, decision-making, communication, coordination, learning, creating, motivation and commitment (Ekvall, 1996). These organizational processes represent basic conditions for knowledge sharing between employees of a company particularly a team level.

Scholars interested in understanding the role of climate in knowledge sharing have identified three dimensions of organizational climate: fairness, innovativeness and affiliation (Bock et al., 2005). Fairness refers to employees' perception of the equitability with which they are treated by their organization (Qiu et al., 2009). For example, employees may feel fairly or unfairly treated depending on the allocation of rewards in proportion to their contributions. An organizational climate is perceived as innovative when organization policies and procedures value and support creative ideas (Bain et al., 2001) and tolerate risk-taking and mistakes in new areas where employees have no prior experience (Ekvall, 1996). Affiliation refers to climate characterized by pro-social norms (Bock et al., 2005). In such a climate, feelings of togetherness and interpersonal helping between firm members prevail (Wasko & Faraj, 2000).

Hypotheses

In the following section, hypotheses are formulated, investigating relationships between team learning, team knowledge sharing, new product quality and innovativeness, leadership and organizational climate.

Team Learning and Product Quality

Engaging in exploratory and/or exploitative learning is likely to help NPD teams in developing new and more effective ways of doing things, improving new product quality, and better meeting customer expectations (Atuahene-Gima & Murray, 2007). Building on prior technological and market knowledge reduces errors, avoids mistakes, and improves the new product quality (Shane, 2000). Exploring new knowledge, skills and technologies helps NPD team to deal with complex product development and in turn may enhance product quality. Thus, we hypothesize the following:

Hypothesis 1: Team learning will have a positive effect on outcome quality.

Team learning and Product Innovativeness

In a recent article, Salavou (2005, p. 311) states that "new superior products require advantages based on both the generation and application of knowledge (information, experience, etc.)." In this respect, learning new knowledge and skills could be viewed as a critical NPD team capability to develop original products. Katila and Ahuja (2002) stated that there is a limit to the number of new ideas that can be created using existing knowledge. Learning new things may, then, add new elements to existing knowledge and improve the chances of finding a new useful combination (Katila & Ahuja, 2002). Thanks to learning team members may develop new features and integrate them into the product (Atuahene-Gima & Murray, 2007). Thus, we hypothesize the following:

Hypothesis 2: Team learning will have a positive effect on outcome innovativeness.

Knowledge Sharing and Product Quality

NPD teams are often heterogeneous, while their members have different perspectives and backgrounds (Qiu et al., 2009). Members are assigned different roles and responsibilities, while each member possesses special knowledge of one or several functional domains (Park et al., 2009). To improve performance they must coordinate and integrate their diverse knowledge and activities (Lee & Chen, 2007). Without a shared understanding of the situation they face, NPD team members may take actions that are inconsistent with other members' actions (Hinds & Weisband, 2003), which may have negative consequences for the quality of the new product. In addition, when sharing knowledge, NPD project teams, both the provider and the receiver, exchange lessons derived from their past experiences. Doing so, they are more likely to avoid repeating the mistakes committed earlier (Arora, 2002). Moreover, as a result of interaction and knowledge sharing, the NPD team as a whole will have access to a broader range of relevant knowledge and information (Huang, 2009). NPD team members will combine knowledge and information in new ways to adapt the product in order to meet or exceed a customer's quality expectations. Thus we hypothesize:

Hypothesis 3: Team knowledge sharing will have a direct positive effect on product quality.

Charismatic Leadership and Team Learning

"(T)eam leaders coach team members, help develop their capabilities, foster interactions and learning within the team and champion the team's activities to others in the organization" (Sarin & O'Connor, 2009, p. 189). Particularly, charismatic leaders are known to foster participation and inspire team members to accomplish challenging goals (Whittington et al., 2004). By fostering team members participation, charismatic leadership is likely to create opportunities to learn from each other and acquire new competences (Srivastava et al., 2006).

Hypothesis 4: Charisma on the part of an NPD project team leader will have a positive effect on team learning.

Charismatic Leadership and Knowledge Sharing

Team processes and behaviors vary depending on the actions of a leader (Boone et al., 2005). Moreover, characteristic behaviors of the leader are likely to stimulate or inhibit specific team behaviors, such as knowledge sharing. Srivastava et al. (2006, p. 1241) report that "knowledge sharing does not happen automatically in a team and that the team's leader has an important role to play in making it come about."

Charismatic leadership appears likely to stimulate knowledge sharing between NPD team members: inspired by the charisma of the project manager, team members identify with his or her vision which results in the development of cohesion (Waldman et al., 2001). As a result of this cohesion, NPD team members are likely to engage in helping each other by sharing their knowledge and expertise about how to perform a task or to develop a new product.

Second, charismatic leaders support their team members' inputs, and recognize their expertise and contributions as valuable (Srivastava et al., 2006). Moreover, in the presence of a charismatic project manager, team members have the feeling that they are treated fairly. This recognition by the project manager in addition to team members' feelings of equitability are likely to encourage them to freely engage into open communication with each other and motivate them to share what they know with their teammates.

Finally, thanks to the charismatic soft skills, NPD members freely create relationships with others, outside the team. Through these relationships, NPD team members could exchange task-related information and knowledge. Accordingly, we hypothesize the following:

Hypothesis 5: Charisma on the part of a NPD project manager will have a positive effect on knowledge sharing in NPD teams.

Organizational Climate and Team Learning

In an innovative organizational climate employees are encouraged to think freely, to communicate their opinions and ideas openly (Edmondson, 1999). Moreover, fairness and affiliation are particularly crucial in cross-functional teams because members must not only work together but they have to interact with, communicate and help each other in order to achieve their common NPD project goals (Qiu et al., 2009). Such a climate is likely to promote team learning within NPD team members

Hypothesis 6: Organizational climate will have a positive effect on team learning

Organizational Climate and Knowledge Sharing

Team members appear to cooperate better when they believe that they are evaluated fairly by their organization (Barczak & Wilemon, 2003; Qiu et al., 2009). In a climate characterized by fairness, NPD members could go beyond their duty and engage in more pro-social behavior to support teammates and coworkers and provide them with necessary knowledge to solve their problems (Yang et al., 2007). Second, firms that encourage risk-taking and experimentation and do not penalize their workers for taking them (i.e. in a climate of innovativeness) would foster knowledge creation and dissemination (Janz & Prasarnphanich, 2003). Finally, in a climate characterized by affiliation, feelings of togetherness and interpersonal helping between employees prevail (Bock et al., 2005). Affiliation may favor closer interpersonal relationships between NPD team members, which in turn may facilitate knowledge sharing. In line with the above we hypothesize:

Hypothesis 7: Organizational climate will have a positive effect on knowledge sharing in NPD teams

Methods

Research Design and Sampling Procedure

Data were collected by means of an online survey. We used databases collected by two large trade organizations (Agoria and Kompass), which contain companies operating in various

industries. Sampling from various industries increases the generalizability of the results. Several steps were taken to create the sample. First, firms from various industries, engaging in new product development activities, were identified. Retailer organizations and distributors were eliminated from the databases. Second, contact persons were contacted by email. The aim of this first contact was to explain the purpose of the study and ask to provide the e-mail address of a project manager involved in a recently completed new product development project. 870 email addresses were collected. Finally, a detailed description of the subject of the study and a link to the questionnaire were sent by email to the 870 project managers. To warrant an accurate recall of the innovation project by the project manager, it was stressed that the project should be recently finished. Respondents were assured that all data would be treated confidentially and only be used in aggregate statistical analyses; no individual firm or project manager would be identifiable in the results. To increase the response rate, respondents were promised a summary of the results. Moreover, follow-up emails were made to respondents. A total of 108 questionnaires were filled out, implying a response rate of almost 13%.

Table 1 provides the sample characteristics.

Insert Table 1 about here

Questionnaire Design

For each NPD project in the sample, responses concerning exogenous and endogenous variables of the conceptual model were obtained from a single respondent.

In addition, following the guidelines of Podsakoff et al. (2003), several procedures were used to reduce the potential for common method bias. First, an online questionnaire was used for the data collection. Intentionally one web page was reserved for each set of questions, thus making it difficult for respondents to use previous answers to fill the gaps. Second, a variety

of scale formats were used to measure the constructs (i.e. semantic differential and Likert scales). Product quality was measured on a seven-point semantic differential scale. For the other variables, statements were formulated and project managers were asked to express their degree of agreement on seven-point Likert scales.

Many reasons were behind the choice of an online survey to collect data. Online questionnaires generate minimal costs in terms of distribution, collection and data entry (Klassen & Jacobs, 2001). Even though response rates of online questionnaires are lower than traditional mail surveys, the item completion rates in questionnaires using Web technology are higher than those using mail surveys (Klassen & Jacobs, 2001).

Before making the final questionnaire available, a draft was sent to seven project managers who were asked to fill in the questionnaire and comment on the clarity of questions. After receiving their feedback, some minor changes were made.

Measures

Most constructs used in the study were measured with scales and instruments validated in previous studies. Some existing scales were adapted to better fit the context of NPD project teams.

Product quality. Product quality is the extent to which the new product meets customer expectations (Paladino, 2008). Accordingly, product quality was operationalized as the extent to which a new product met or exceeded technical and functional specifications. Product quality was measured with a 4-item scale.

Product innovativeness. Respondents were asked to rate the extent to which the new product was novel to the industry and offered new ideas. It was measured with a 6-item semantic differential scale developed by Fang (2008).

Team learning. Team learning was captured using two dimensions (exploitative learning and exploratory learning). To measure exploitation and exploration, scale items were

developed based on Zahra et al. (2000). Exploitative learning and exploratory learning were measured with a 4-item scale and used as two reflective dimensions of team learning.

Knowledge sharing. Team knowledge sharing was captured using two dimensions (i.e. intra- and inter-team knowledge sharing). To measure knowledge sharing within and between NPD teams, scale items were adapted based on Faraj and Sproull (2000) to fit team level knowledge sharing. Within and between NPD teams knowledge sharing were measured with a 4-item scale for each and used as two reflective dimensions of knowledge sharing.

Charismatic leadership. Charismatic leadership was measured with a scale used by Waldman et al. (2001). These authors, in turn, developed their scale using items from the Multifactor Leadership Questionnaire (MLQ) developed by Bass et al. (1990).

Organizational climate. In this article, organizational climate consists of three dimensions: affiliation, fairness and innovativeness. These three dimensions were measured using validated scales developed by Bock et al. (2005). Affiliation was measured with a 4-item scale, fairness and innovativeness were measured with a 3-item scale for each. Affiliation, fairness and innovativeness were used as three reflective dimensions of organizational climate.

The data were checked for outliers. Following Tabachnick and Fidell (1996), the Mahalanobis distance at $p < .001$ was used to identify multivariate outliers. Three observations were eliminated. The final sample consisted of 105 responses. Using t-tests, no significant differences in the means were detected across respondents from different groups (e.g. age, industry). A comparison of early respondents (20%) with late respondents (20%) did not show significant differences in the means of these two groups which confirm non response bias (Armstrong & Overton, 1977).

Partial Least Squares

Partial least squares (PLS) regression is a variance-based technique that is suitable for testing structural models with latent constructs. It consists of maximizing the amount of explained variance in the latent constructs. PLS path modeling does not make assumptions about data distributions (Fornell & Cha, 1994), sample size or variable metrics and it is suitable in case of theory building which was the aim of the current study. Furthermore, PLS estimation has the advantage of being robust against multicollinearity between items used to measure latent constructs (Cassell et al., 1999).

To avoid suboptimal parameter estimation in PLS, the sample size must be larger than both ten times the scale with the largest number of items and ten times the largest number of paths leading to any latent construct (Barclay et al., 1995). In the current study, the largest number of items per scale was 10 and the largest number of paths leading into any latent construct was 2. Consequently, the sample size of 105 observations exceeded the required minimum of 100 observations and could be considered adequate.

Results

To assess the validity and reliability of the measurement model and to estimate the structural model, PLS path modeling (Chin, 1998) was used.

Common Method Bias

To test for common method bias resulting from the single-source responses, Harman's one-factor test (Podsakoff & Organ, 1986) was used. A principal components factor analysis resulted in 8 factors with Eigen values higher than 1.0. No single global factor was found. The factor with the highest Eigen value explained 32% (<50%) of the total variance, meaning that the risk of common method bias is limited (Podsakoff & Organ, 1986).

Validity and Reliability

First, a principal components factor analysis was executed to detect if there were any hidden dimensions. The results of the factor analysis revealed the anticipated factor structure. Results

showed that organizational climate construct consisted of three dimensions which corroborates the findings of Bock et al. (2005). Results also showed that there were two levels/dimensions of sharing knowledge: within and between teams.

Second, convergent and discriminant validity of the latent constructs and reliability of the scales were examined. According to Hulland (1999), the convergent validity of a factor is confirmed if all item loadings on this factor exceed .50. Table 2 shows that all items comply with this assumption. Four items were kept for new product quality, 6 items for product innovativeness, 4 items for time to market, 3 items for cost, 8 items for team learning, 8 items for knowledge sharing, 6 items for charismatic leadership and 10 items for organizational climate.

Insert Table 2 about here

In order to confirm discriminant validity, the square root of the average variance extracted (AVE) of each factor should be higher than the correlation between this factor and other factors in the model (Fornell & Larcker, 1981). In Table 3, correlations between factors as well as the square root of the average variance extracted (AVE) are reported. Results show that the discriminant validity is adequate.

Insert Table 3 about here

Validity of the scales was further assessed by determining the composite reliability of the factors. Table 2 shows that all composite reliability values exceed the suggested cut-off value of .70.

Hypothesis Testing

Figure 2 shows the β coefficients of the estimated relationships and the corresponding t-values. A bootstrap technique (500 samples) was used to determine the t-values. Relationships

are significant if the calculated t-value is greater than the standard t-value ($t = 1.96$ for $n= 106$ and $\alpha = 0.05$).

Hypotheses 1 and 2, stating that team learning positively affects new product quality and product innovativeness, were supported ($\beta = .22$; $t = 2.488$) and ($\beta = .522$; $t = 8.279$). Hypothesis 3, stating that knowledge sharing positively affects product quality, was also supported ($\beta = .171$; $t = 2.172$). Hypotheses 4 and 5 stating that charismatic leadership has positive effects on team learning and knowledge sharing, were supported ($\beta = .428$; $t = 3.81$) and ($\beta = .237$; $t = 2.425$). Hypotheses 6 and 7 stating that organizational climate has positive effects on team learning and knowledge sharing, were supported ($\beta = .221$; $t = 1.98$) and ($\beta = .277$; $t = 3.497$).

Discussion and Conclusions

The main objective of this study was to investigate the cognitive mechanisms allowing cross-functional teams to simultaneously improve product quality and product innovativeness. We argued that team cognitive processes, learning and knowledge sharing, could positively affect the quality and innovativeness of a new product without improving one of them at the expense of the other.

Three main results can be highlighted. First, this study shows that team learning is positively related to both new product quality and product innovativeness. Second, it was found that knowledge sharing had a positive impact on new product quality. Together, these results challenge a prevalent assumption in prior literature that a too strong quality orientation could harm product innovativeness. We, therefore, provide an explanation of Sethi and Sethi's (2009) findings that autonomous cross-functional teams are an appropriate structural arrangement for organizations that seek quality and innovativeness. Finally, charismatic leadership and organizational climate were found to be positively related to both team learning and knowledge sharing.

Theoretical Implications

This article contributes to literature in various ways. First, we included quality and innovativeness of a new product in one model and investigated their antecedents simultaneously.

Second, previous literature suggested that a strong quality focus could have negative effects on product innovativeness (Benner & Tushman, 2002). It was argued that product quality could be reached by reducing variation in how team members do things while the NPD project evolves, which is not always beneficial to develop new insight and original features to integrate into the new product (Sethi & Sethi, 2009). In this study, we challenge this common belief and demonstrate that cross-functional teams could develop innovative and higher quality products if team members are encouraged to learn and share knowledge.

Finally, we contribute to literature by showing that charismatic leadership and organizational climate act as two important antecedents of both team learning and knowledge sharing in an NPD context. This finding confirms the crucial role of leadership, particularly a leader who shows a charismatic behavior, to manage team cognitive processes.

Managerial Implications

Quality and innovativeness are key drivers of new product success. Managers could use guidance on how to develop products that meet customer expectations while differing from competitors' offerings. As our findings suggest, managers must realize that quality and innovativeness of new products can coexist. To develop such products, managers should encourage both team learning and knowledge sharing within their team members. To promote team learning and knowledge sharing, managers should adopt charismatic leadership behaviors and set up a climate of fairness, innovativeness and affiliation.

Limitations and Suggestions for Further Research

Some limitations to this study suggest directions for future research. First, a single-informant approach was used to collect data. The effect of common method bias on the relationships cannot be completely avoided, even though a Harman's one-factor test was used, and no evidence of such a bias was found (Langerak et al., 2008). Future research should take this potential bias into account and collect data from different sources (Podsakoff et al., 2003). Second, the study did not include demographics of the teams executing the NPD projects (e.g. heterogeneity in terms of functions or tenure). Future research may examine the differences between homogenous vs. heterogeneous NPD teams. It seems that demographically heterogeneous teams are more likely to create bridges with outsiders than homogenous teams (See Reagans et al., 2004).

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Table 1: Profile of Companies and Respondents

Industry type, Organization Size and Project Time Completion			
Measure	**Items**	**Freq.**	**Percent**
Industry	Manufacturing	33	31.43
	Chemicals	5	4.76
	Foods	4	3.81
	Information and communication	21	20.00
	Financial and insurance activities	5	4.76
	Professional, scientific and technical activities	9	8.57
	Other	28	26.65
Organization Size	Up to 49	26	24.76
	From 50 to 99	8	7.62
	From 100 to 249	9	8.57
	From 250 to 499	9	8.57
	From 500 to 999	7	6.67
	1000 and more	48	45.71
Project Time Completion (in years)	**Mean**	**Minimum**	**Maximum**
	1.77	0.25	10
Demographic Information of Respondents			
Measure	**Items**	**Freq.**	**Percent**
Gender	Male	89	84.76
	Female	16	15.24
Age	25 or less	3	2.86
	25–34	15	14.29
	35–44	35	33.33
	45–54	41	39.05
	55+	11	10.48
Tenure (in years)	**Mean**	**Minimum**	**Maximum**
	6.56	0.5	38

Table 2: Descriptive statistics, Factor loadings, T-values, and composite reliability

Factor (Composite Reliability)	Load	T-value	Mean	S.D.
Product Quality (.91)				
The result of your latest NPD project met or exceeded customer expectations	.86	25.17	5.31	1.44
The result of your latest NPD project met or exceeded technical specifications	.87	29.40	5.22	1.25
The result of your latest NPD project met or exceeded functional specifications	.86	23.28	5.33	1.25
Generally speaking. the project team was very satisfied with the outcome of the project	.81	15.23	5.33	1.46
Product Innovativeness (.93)				
The result of your latest NPD project was very ordinary/very novel for your industry	.82	14.44	5.16	1.48
The result of your latest NPD project was not challenging/challenging existing ideas in your industry	.81	13.08	5.15	1.60
The result of your latest NPD project was not offering/offering new ideas to your industry	.89	31.77	5.30	1.51
The result of your latest NPD project was not creative/creative	.90	41.91	5.44	1.41
The result of your latest NPD project was uninteresting/uninteresting	.85	13.81	5.74	1.28
The result of your latest NPD project was not capable of generating ideas	.73	9.49	5.67	1.43
Team Learning (.95)				
During this project, the team improved its competencies in searching for pre-existing solutions	.88	38.53	4.53	1.69
During this project, the team increased its knowledge and skills that improved the efficiency of the new product development process	.90	37.84	4.68	1.75
During this project, the team enhanced its skills in exploiting mature technologies	.86	25.90	4.46	1.72
During this project, the team improved its existing skills	.88	25.67	5.00	1.73
During this project, the team acquired manufacturing technologies and skills that were entirely new to the firm	.71	12.45	4.60	1.80
During this project, the team learned product development skills and processes that were entirely new to the industry	.75	14.56	3.90	1.93
During this project, the team acquired entirely new managerial and organizational skills that are important for product development	.79	15.61	3.99	1.88
During this project. the team strengthened innovation skills in areas where the team had no prior experience	.90	47.89	4.50	1.89
Knowledge Sharing (.90)				
During this project members in your NPD team share their special knowledge and skills with one another	.80	25.56	5.60	1.31
During this project if someone in your NPD team had some special knowledge about how to perform a task he or	.65	8.56	5.33	1.82

she was not likely to tell the other member about it				
During this project there was virtually no exchange of information. knowledge or sharing of skills among your NPD team members	.72	11.43	6.17	1.07
During this project more knowledgeable members of your NPD team freely provided other members with hard-to-find knowledge or specialized skills	.84	31.71	5.40	1.58
During this project Members in our NPD team share their special knowledge and skills with others outside your team	.74	16.91	4.78	1.58
During this project if someone in our NPD team had some special knowledge about how to perform a task he or she was not likely to tell the others outside your team	.57	6.88	5.09	1.70
During this project there was virtually no exchange of information. knowledge or sharing of skills between your NPD team members and others outside your team	.72	12.02	5.33	1.62
During this project more knowledgeable members of your NPD team freely provided others outside your team with hard-to-find knowledge or specialized skills	.72	9.70	4.78	1.70
Charismatic Leadership (.96)				
The project manager showed determination when accomplishing goals	.82	21.19	5.30	1.50
You had complete confidence in the project manager	.92	59.86	5.26	1.62
The project manager made people feel good to be around him/her	.87	28.71	4.81	1.69
The project manager communicated high performance expectations	.83	15.65	5.08	1.62
The project manager generated respect	.92	39.20	5.10	1.63
The project manager transmitted a sense of mission	.90	33.57	5.16	1.53
The project manager provided a vision of what lies ahead	.90	42.95	4.76	1.73
Organizational Climate (.92)				
Members in your organization keep close ties with each other	.71	17.39	5.03	1.42
Members in your organization consider other members' standpoint highly	.79	17.66	4.92	1.41
Members in your organization have a strong feeling of one team	.80	21.66	4.80	1.55
Members in your organization cooperate well with each other	.83	24.36	4.96	1.37
Your organization encourages suggesting ideas for new opportunities	.83	30.30	5.08	1.76
Your organization puts much value on taking risks even if that turns out to be a failure	.80	23.15	3.93	1.90
Your organization encourages finding new methods to perform a task	.83	24.45	4.62	1.76

You can trust your superiors' evaluation to be good	.69	10.23	4.50	1.60
Objectives which are given to you are reasonable	.88	35.73	4.52	1.54
Your superiors don't show favoritism to any one	.85	26.63	4.11	1.90

Table 3: Descriptive Statistics and Correlations between Factors (Square root of AVE on diagonal)

Factor	Mean	S.D.	1	2	3	4	5	6
Product Quality (1)	5.30	1.15	**.85**					
Product Innovativeness (2)	5.41	1.21	.44	**.83**				
Team Learning (3)	4.46	1.50	.43	.53	**.84**			
Knowledge Sharing (4)	5.31	1.12	.34	.19	.20	**.73**		
Charismatic Leadership (5)	5.07	1.42	.51	.42	.56	.41	**.88**	
Organizational Climate (6)	4.65	1.22	.42	.37	.48	.42	.61	**.76**

***Correlation is significant at the .05 level (2-tailed)**

**** Correlation is significant at the .01 level (2-tailed)**

Figures

Figure 1: Conceptual Model

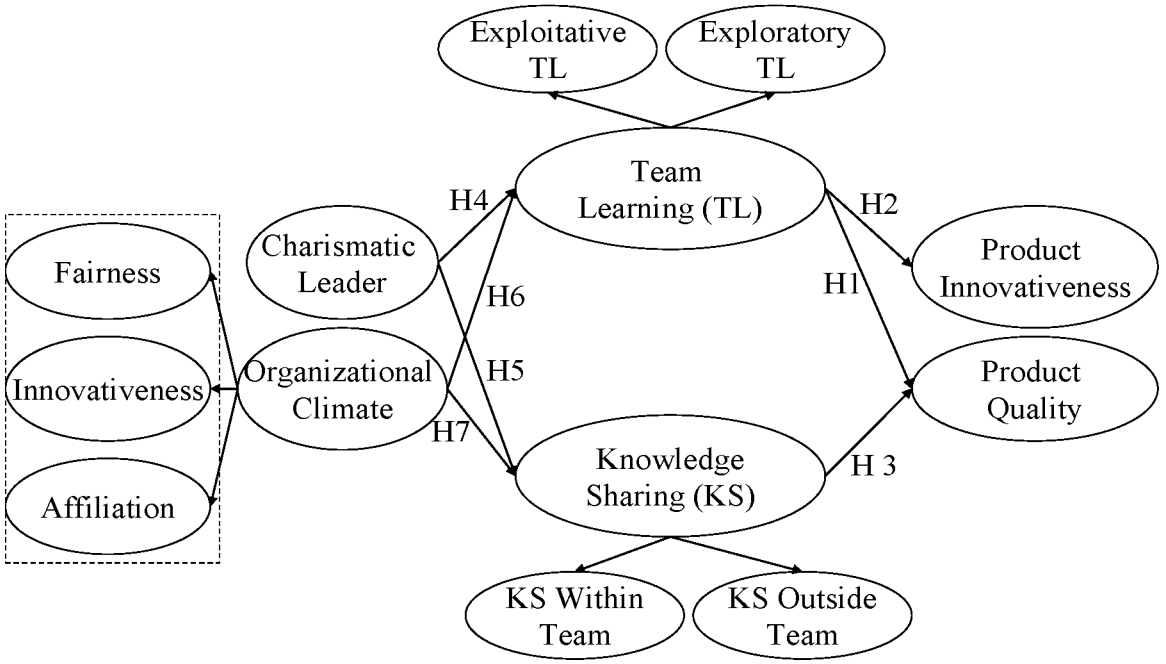

Figure 2: Empirically Validated Model