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THE INFLUENCE OF THE PERCEPTION OF FAIRNESS ON INNOVATION IDEA VALUE AND KNOWLEDGE SHARING BEHAVIOR IN INNOVATION IDEA NETWORKS

Complete Research

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Abstract

This article explores the relationships between innovation idea value, innovators' perceptions of fairness, and their participation behavior and knowledge sharing behavior in the intrafirm social network. The study uses survey data and a database from a large company that is one of Europe's top performers in idea management. In addition to the idea database, this study surveys participating employees about their perceptions of fairness and their participation behavior and knowledge sharing behavior. The results show that there is a clear relationship between innovation idea value, employees' perceptions of fairness, and employees' participation behavior and knowledge sharing behavior. Furthermore, there is clear evidence that tenure increases the value of innovation ideas. The findings suggest a number of implications for ideation management and for the design of social networks for innovation ideas. To increase the value of innovation ideas, social networks for innovation ideas can be used if the allocation of rewards for idea providers is positively associated with the fairness perceptions of network members.

Keywords: Knowledge sharing behavior, social networks, fairness perception, innovation management, idea value.

1 Introduction

Idea management can enrich the innovation process by generating new ideas. Employees can provide these ideas via idea management systems, which are platforms through which employees can actively participate in intra-corporate improvement processes. Innovations can be regarded as ideas that have been developed and implemented (Van de Ven, 1986). If significant innovations originate from ideas, then a sustainable flow of ideas is critical for efficient innovation management (Boeddrich, 2004). Francis and Bessant (2005) show that successful firms implement ideas with higher value and at a higher quantity relative to their competitors. This innovative edge appears to be a decisive competitive advantage. Their findings indicate that ideas can be viewed as a foundation for innovative products or processes and are essential for the performance of innovation management.

Current studies provide clear evidence that the value of innovation ideas can be increased by social interactions and knowledge sharing among idea providers (Brown and Duguid 1991; Howells, 2002). This social interaction enables idea providers to learn from others. This institutional exchange can be seen as a type of induced organizational learning (Adler and Clark, 1991; Alavi and Leidner, 2001; Bock et al., 2005). Björk and Magnusson (2009) contribute empirical evidence regarding the role of social networks for innovation ideas and show that the value of innovation ideas is a prominent factor that must be considered when addressing innovation. Furthermore, Liebeskind et al. (1996) show that social connections are a decisive factor in learning and creating new knowledge. Similar evidence is contributed by Dahlander and Magnusson (2005), who show that ideation can be successful if informal

social structures, such as networks, are used. The participation behaviors of idea providers in collective action depend on the design of the incentives and institutions of these systems (Bock et al., 2005; Falk et al., 2005). The key factor in this study is the participants' sense of fairness. Furthermore, there is evidence that fairness has an influence on the persistence of noncompetitive wage premia, which are often used in idea management systems (Kokott and Rötzel, 2008). In addition, Janssen (2004) shows that innovative behavior is positively related to perceptions of fairness.

Despite the vast amount of research on idea and knowledge networks, few studies have examined the influence of cooperative behavior on the effectiveness of idea management systems using knowledge networks, specifically social networks for innovation ideas.

Björk and Magnusson (2009) state that to increase innovation capabilities, it is necessary to provide individuals and groups with opportunities to connect with others and to promote knowledge sharing without decreasing the size of the innovation network. Consequently, if it is possible for individuals and groups to connect and share knowledge, then the effectiveness of the connectivity platform (social networks for innovation ideas) may be strongly influenced by the perceptions of fairness among its members. In an experimental study, Gaechter et al. (2010) show that such knowledge sharing is affected not only by monetary incentives but also by fairness. However, their study does not focus on idea management or social networks for innovation ideas but rather indicates that perceptions of fairness may affect knowledge sharing in general in these networks.

This study addresses the question of how innovation idea value is influenced by the idea providers' fairness perceptions and how these perceptions of fairness affect the providers' behavior in knowledge networks. Therefore, this research has three objectives. First, this study explores the factors that directly influence innovation idea value. Second, this study analyzes the additional problem of whether and how participation behavior and knowledge-sharing behavior are affected by fairness perceptions. Third, this study uses structural equation modeling to explore the relationship between innovation idea value and the fairness perceptions of idea providers. This article complements extant work on how fairness influences innovation outcomes (Janssen, 2004) and innovation idea value (Björk and Magnusson, 2009) by considering the importance of social networks for innovation ideas as necessary platforms for intra-corporate interaction and collaboration in ideation. Furthermore, this study shows that fairness influences idea providers' participation and knowledge-sharing behaviors, which are important factors in innovation outcomes (Thieme et al., 2003).

This study is the first to demonstrate the relationships between innovation idea value, fairness perception, and participation behavior and knowledge-sharing behavior using a structural equation model. Hence, this study links the studies of innovation idea value by Björk and Magnusson (2009) and Tsai (2001) with the studies of fairness perception by Stigler (1959), Frey et al. (1993), and Haucap and Just (2010). Based on this investigation, new insights on idea generation are obtained, and implications for ideation management are discussed.

The results of the current study have important implications for the design of incentives in social networks for innovation ideas. In particular, the proposed model shows that the fairness perceptions of idea providers play a decisive role in ideation. Moreover, the proposed model explains why innovation idea value depends on idea providers' participation behavior and knowledge-sharing behavior in the intrafirm social network.

2 Theory and Hypotheses

Scott and Bruce (1994) state that all innovative improvements within firms are founded on ideas that are supplied by individual employees (Van de Ven, 1986). Based on the work of West and Farr (1989), innovative behavior is defined as the intentional creation, introduction, and application of new ideas within a group or organization. If all innovations originate from ideas, then firms must optimize their idea input by enabling their employees to generate a sufficient number of ideas on which to base further

innovation. Cooper and Edgett (2007) show that innovation ideas can potentially derive from all parts of an organization and from external agents, such as customers, collaborators, partners, and private inventors. From an intra-corporate perspective, a significant proportion of innovation ideas are generated by employees who are knowledgeable about existing processes and who are able to question current assumptions. The value of these innovation ideas derives from their novelty and their usefulness (Van de Ven, 1986; West and Farr, 1989). Novelty describes the level of newness in comparison with previous ideas. Usefulness reflects the amount of savings or incremental profit for the company resulting from the idea.

Spender (1996) states that the knowledge of individuals is a result of social context and stems particularly from interactions with other individuals. Cooperation in these informal knowledge networks has been shown to be highly important for learning and innovation (Brown and Duguid, 1991; Wenger and Snyder, 2000). Furthermore, research indicates that collaboration between departments and specialists provides a platform for the creation of new ideas. From the idea provider's viewpoint, innovation management depends on individual expertise, which is often undesirable for the organization's overall performance (Von Krogh, 1998). Individual expertise and the idea provider's knowledge is required for innovations and problem solving (Zack, 1999).

This exchange of knowledge can be provided by social networks for innovation ideas. In such networks, idea-providing employees can share their knowledge and can obtain information from others. Innovative behavior with regard to a social network for innovation ideas can be divided into an employee's decision to participate in the network (participation behavior, PB) and his or her knowledge-sharing behavior within the network (KSB). The sharing of knowledge is a decisive factor in the analysis of social networks (Liebeskind et al., 1996; Wenger and Snyder, 2000). Koh and Kim (2004) argue that employees with a low level of participation can provide a high level of knowledge and vice versa. There is clear evidence that networks enable individuals to share existing knowledge as well as to generate and acquire new knowledge (Brown and Duguid, 1991; Howells, 2002). Furthermore, the opportunities for employees to generate ideas with higher value and quantity increase if they use social networks for innovation ideas (Tsai, 2001).

From the firm perspective, the transformation of an idea into an innovation is decisive. Through the sharing of knowledge and discussions with other participants, social networks for innovation ideas support the improvement of ideas and their realization through action. This study generates a second order construct consisting of PB and KSB to measure the network behavior (NB). A second order construct is necessary because it reveals the combined effect of both PB and KSB based on Davenport and Prusak (2000). It is important to address both participation behavior and knowledge sharing behavior due to potential issues regarding free-riding (participating in the network without knowledge sharing). Therefore, the following hypothesis is proposed:

H1: Network behavior increases the innovation idea value.

According to Janssen (2004), the perception of fairness in the exchange relationship within a social network for innovation ideas refers to employee perceptions regarding the balance between the comprehensive scope of the investments that are made in ideation and the resulting rewards that are received. If the comprehensive scope of investments and rewards for ideation are not balanced, then both PB and KSB should decrease. Current studies find that employee reactions to distributive unfairness in an exchange relationship, such as in a social network for innovation ideas, particularly depend on the fairness of the procedures used by the firm to determine employee rewards (Brockner, 2002; Janssen, 2004). The positive relationship between innovation idea value and network behavior may be moderated by the fairness perceptions of employees. A positive fairness perception should increase participation behavior in the intrafirm social network for innovation ideas. Therefore, the following hypothesis is proposed:

H2: Fairness perceptions of idea providers increase network behavior.

Moreover, existing research reports a direct relationship between the perception of fairness and the value of innovation ideas (Janssen, 2004). Kokott and Rötzel (2008) show that positive relationships exist between the number of ideas provided and fairness perception or between the influence of monetary and noncompetitive wage premia and fairness perception. In addition to the participation behavior and knowledge-sharing behavior of network members, the value of the innovation ideas that they provide may depend on the design of the social network for innovation ideas. Research has found that the key factor may be the employees' perceptions of fairness (Falk et al., 2005). Kahneman et al. (1986) show that the allocation method is central to the perception of fairness. In terms of ideation, the allocation of the reward for providing ideas is essential for employees (Kokott and Rötzel, 2008). Following Frey et al. (1993) and Haucap and Just (2010), this study assumes that comparative fairness is the major driver of fairness perceptions. It is further hypothesized that fairness perception influence the value of innovation ideas. Therefore, the following hypothesis is proposed:

H3: The value of innovation ideas is positively related to the fairness perceptions of the idea providers.

Our overall approach is analyzing the influence of both fairness perception, network behavior on the innovation idea value. The simultaneous estimation with a structural equation model allows us to check for an interrelationship between fairness perception and network behavior. We predict that fairness perception has a direct and an indirect effect on innovation idea value. In this model, we link comparative fairness regarding resource allocation with individual behavior in social networks.

3 Method

3.1 Data

Survey data were collected among employees in the R&D division of a large German industrial (automotive) firm. This firm has more than 100,000 employees and earns more than €100,000,000 annually through idea management. Compared to idea management systems in other branches, the automotive industry has the highest level of ideas per employee and the highest level of gains per idea in Germany (Pedell and Roetzel, 2011). This industrial firm uses an intrafirm social network to provide a platform for knowledge sharing among employees. All employees in the intrafirm social network for innovation ideas were contacted and received a link to an online questionnaire through internal e-mail. Participation was voluntary for all employees. The study uses implemented ideas provided by employees limited to the years 2010 to 2012. The provided ideas were for new products, processes, and services. Ideas for other types of improvements were not considered. This study does not include ideas that were rejected in the innovation process. The rationale behind this decision is to identify the innovation idea value. This study assumes that rejected ideas have an innovation idea value of zero because they do not initiate an innovation within the company. The employees contributed ideas using a suggestion box system or via an internal online platform. The suggestion box system was not anonymous in the review process. The questionnaires were completed online, and 719 completed questionnaires were submitted, yielding a response rate of 18.3%. The mean tenure was 12.4 years ($SD = 3.238$), and 16.6% of the respondents were female.

3.2 Measures

3.2.1 Innovation idea value

To measure innovation idea value, ideas were evaluated according to the two criteria of Björk and Magnusson (2009): the novelty (NOVELTY) and usefulness (USEFULNESS) of the idea for the company. Through the use of employee identification numbers, the innovation ideas could be associated with the respondents. In the idea review process, novelty was measured by experts as a ranking on a four-point scale ranging from 1 (for ideas with very little novelty) to 4 (for very novel ideas); usefulness

was coded on a four-point scale ranging from 1 (for slightly useful ideas) to 4 (for very useful ideas). This study used only ideas from the intracorporate idea management and continuous improvement process that had been implemented as a starting point for the innovation of products or processes (Francis and Bessant, 2005).

3.2.2 Fairness perception

In terms of social networks for innovation, if an innovation idea is provided by more than one employee, there is a range of possibilities for designing the allocation of the reward. The reward could be paid based on the timing of entry in the ideation process of an innovation idea. From an economic viewpoint, this allocation method is comparable to queue allocation. Other possibilities could be lottery (random allocation) or an equipartition among the employees participating in the ideation (equal allocation).

To measure fairness perception, this study used the comparative fairness perception model that has been employed in previous studies (Frey et al., 1993; Haucap and Just, 2010; Stigler, 1959) to evaluate fairness perception. This set of questions required the respondents to compare the fairness of five allocation mechanisms: price, queue, random, governmental, and equal allocation. The core question in this case is how a scarce resource (water bottles) should be allocated. A great advantage of this comparison is that each respondent is asked about his or her general preference structure and is not forced to apply this structure to an individual case involving an innovation idea. Frey et al. (1993) provide empirical evidence that a pure price allocation is rejected by the majority of the population. Other allocation methods, such as the “first-come, first-served” (FCFS) or queuing allocation methods, are much more frequently accepted or less frequently rejected, respectively. Concerning innovative ideas, Kokott and Rötzel (2008) show that a preference for the price allocation method is related to a high preference for monetary incentives, whereas a preference for FCFS reflects a high preference for noncompetitive wage premia. Information regarding employee preferences provides important insights for how to design incentives in a social network for innovation ideas. To pose a generalized question, this study used the following comparative fairness perception model employed in previous studies (Frey et al., 1993; Haucap and Just, 2010):

At a sightseeing point that is reachable only on foot, a well has been tapped. The bottled water is sold to thirsty hikers. The price is 1 euro per bottle. Daily production and stock is 100 bottles.

On a particularly hot day, 200 hikers want to buy a bottle. As a consequence, the supplier has the following options for distributing the bottles.

Among the following means for distributing the water among the hikers, please indicate how fair you perceive these options to be:

(a) A price increase to 2 euro per bottle

(b) Selling the water at 1 euro per bottle on a “first-come, first-served” basis

(c) Selling the water at 1 euro per bottle following a random procedure (e.g., to all persons whose surnames begin with A through M)

(d) The local authority buys the water for 1 euro per bottle and distributes it according to its own judgment

(e) Selling half-sized bottles for 0.5 euro per bottle to all hikers (one-half of a bottle per hiker)

Fairness perceptions regarding the five allocation options in the water bottle question ((a), price allocation (PRICE), (b) queuing allocation (FCFS), (c) random allocation (RAND), governmental allocation (GOV), and equal allocation (EQUAL)) were measured on a four-point Likert scale ranging from 1, for “very fair”, to 4, for “very unfair.” The use of the water bottle case as a day-to-day scenario provides a favorable contrast with a scenario specifically for a social network for innovation ideas that is intended to reduce strategic response behavior. Because subjective measures rely on the same source in the same questionnaire, common method variance could be a potential explanation for the findings. The fairness perceptions of employees concerning these five allocation methods are related and bundled in the latent construct of FP, which measures the comparative fairness perception of idea providers.

3.2.3 Network behavior

The measurement of participation in the social network for innovation ideas was adopted from Koh and Kim (2004) and Organ (1988). The measurement indicators were modified to reflect the innovation idea environment. Measurement indicators of the knowledge-sharing behavior of idea providers in the intrafirm social network for innovation ideas (KSB) were adopted from Chai et al. (2011) and Davenport and Prusak (2000). The indicators were measured on a four-point Likert scale (ranging from 1, for “strongly agree”, to 4, for “strongly disagree”). This study generates a second order construct consisting of PB and KSB to measure the network behavior (NB). A second order construct is necessary because it reveals the combined effect of both participating in the network and sharing knowledge as suggested by Davenport and Prusak (2000). It is important to address both participation behavior and knowledge sharing behavior due to potential issues regarding free-riding (participating in the network without knowledge sharing).

3.2.4 Control variables

This study uses three control variables: gender, tenure, and centrality. Gender variables (MALE and FEMALE) were measured using dummy variables. Tenure was measured on a nine-point scale (ranging from 1 (for tenure of less than three months) to 9 (for tenure greater than 20 years)). Innovation network centrality (CENTRALITY) was calculated according to the method recommended by Björk and Magnusson (2009). This study used degree centrality (Freeman, 1979), which can be defined as the number of ties incident upon a node, that is, the sum of each row in the adjacency matrix representing the network. In the analyzed social network for innovation ideas, this degree is equivalent to the number of paths with a length of one that emanate from a node (Borgatti, 2005). The social network for innovation ideas was calculated using UCINET 6, and the normalized degree of centrality of the inventors was computed for each innovation idea (Everett and Borgatti, 1999). As in the cited study, four degrees were used for centrality categories (1, 2, 3, and 4). A greater degree of innovation network centrality was associated with a higher value with respect to the degree centrality category.

4 Results

With regard to common method bias, this study used Harman’s one-factor test (Schriesheim, 1979) to empirically address this common method variance issue. Following Podsakoff et al. (2012), it is assumed that common method variance exists only if a single factor emerges from a factor analysis or if there is one general factor that accounts for most of the covariance in the independent and criterion variables. This study performed a principal component factor analysis on the items and extracted 14 factors, with factor 1 accounting for only 16.987% of the variance. Consequently, the results of this test indicate that common method variance is not a problem in the current study.

This study controls for effects of gender, tenure and centrality. We observed no significant differences between the idea providers for gender. With regard to tenure, in a comparison of means between idea providers with a high level of tenure and those with a low level of tenure, we found a significant difference in novelty ($t(717) = 4.792, p < 0.01, d = 0.419$) and in usefulness ($t(717) = 5.615, p < 0.01, d = 0.459$). In terms of centrality, a comparison of means between idea providers with high centrality and low centrality, we found no difference in novelty ($t(717) = 0.225, p > 0.10, d = 0.019$) and no difference in the usefulness of provided ideas ($t(717) = -0.042, p > 0.10, d = -0.004$).

To test the data structure, this study conducts confirmatory factor analyses (CFA) using AMOS 22 for the constructs. Following the procedure of Jaccard and Wan (1996), we test for the unidimensionality of our constructs. A goodness-of-fit index (GFI) of .90 or above suggests that each of the constructs is unidimensional. Table 1 shows that all constructs have GFI values greater than .90. Consequently, the results support the unidimensionality of models 1 and 2. Models 3 and 4 do not appear to be unidimensional. Validity checks were performed for all scales along four major dimensions: content

validity, convergent validity, discriminant validity, and criterion-related validity. Factor loadings and validity checks are shown in Table 1. Reliability refers to the degree of stability of the scale. The values obtained for Cronbach's alpha for the items and the correlation demonstrate that our constructs are reliable. The second order construct network behavior (NB) shows a good fit (GFI = 0.973; AGFI = 0.960; RMSEA = 0.051).

The general expression of our model is $X = \Delta_x \xi + \delta$, where X is the vector of observed variables, ξ is the vector of latent variables and Δ_x is a matrix of loadings that indicates the magnitude of the effects of ξ on X . δ is a vector of measurement errors. This study uses a structural equation model with three latent variables: IIV for innovation idea value, NB for latent network behavior, and FP for fairness perception. The results of the structural equation model are shown in Figure 1. The squared multiple correlations are shown in the upper right corner of the measured model variables. Fit measures indicate a very good fit (GFI = 0.981; AGFI = 0.964; CFI = 0.972; RMSEA = 0.045). In general, larger values of AGFI and GFI and smaller values of RMSEA indicate better model fit (Bollen, 1989).

The latent variable concerning innovation idea value (IIV) is primarily determined by an idea's novelty ($\beta = 0.771$, $p < 0.01$) and usefulness ($\beta = 0.774$, $p < 0.01$). The latent variable NB is determined by participation behavior in the intrafirm social network for innovation ideas ($\beta = 0.498$, $p < 0.01$) and knowledge-sharing behavior ($r = 0.571$, $p < 0.01$). Surprisingly, the results show a negative influence of NB on IIV ($\beta = -0.126$, $p < 0.01$), rejecting H1.

The results indicate that the level of innovation idea value is negatively related to the idea providers' participation and knowledge-sharing behavior in the intrafirm social network for innovation ideas. The path coefficient implies that a lower level of participation and knowledge-sharing behavior is associated with greater innovation idea value. With regard to the individual relationships of PB and KSB with novelty or usefulness, both PB and KSB correlate negatively with novelty and usefulness.

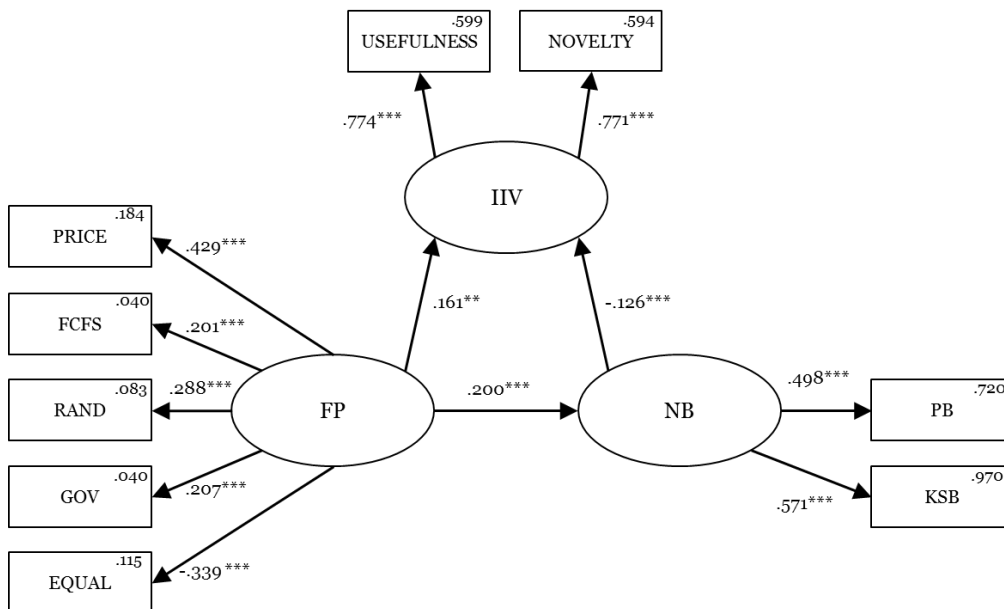
The empirical results show that the latent variable FP has a highly significant influence on both IIV ($\beta = 0.161$, $p < 0.05$) and NB ($\beta = 0.200$, $p < 0.01$), supporting H2 and H3. The positive influence of FP on NB implies that greater perceptions of fairness are associated with greater overall willingness to interact within the social network for innovation ideas.

Construct	Item	Factor Loading	GFI	Cronbach's Alpha	NNFI	R ²
Participation Behavior (PB)			0.955	0.891	0.956	
	I take an active part in our innovation idea network	0.833				0.676
	I do my best to stimulate our innovation idea network	0.866				0.441
	I often provide useful information/content for other members of the innovation idea network	0.858				0.571
	I eagerly reply to postings by those seeking help in our innovation idea network	0.802				0.541
	I care about our members	0.880				0.648

	I often help members who seek support from other members	0.932				0.653
Knowledge-Sharing Behavior (KSB)			0.924	0.908	0.941	
	I frequently chat with other employees to get information and knowledge	0.880				0.775
	I frequently give feedback/comments to other employees	0.766				0.587
	I frequently share my experience or knowledge with other employees	0.819				0.671
	I provide knowledge and useful information at the request of other employees	0.867				0.751
	I share knowledge from my education or training with other employees	0.737				0.544

Table 1. Measures, factor loadings, and reliability.

Moreover, FP is positively associated with the aspects of fairness, except for EQUAL ($\beta = -0.339, p < 0.01$). Employees with greater FP tend to perceive the allocation alternatives to be more unfair. This result implies that the fairness perceptions of PRICE, FCFS, RANDOM, and GOV increase the latent fairness perception. For example, the perception of a fairer FCFS option is associated with greater overall fairness perceptions. Surprisingly, EQUAL negatively affects FP. This finding implies that employees who view the equal allocation option as fairer tend to report lower overall levels of fairness perception.



Levels of Significance: *: $p < 0.10$; **: $p < 0.05$; ***: $p < 0.01$

Figure 1. Structural equation model results.

5 Discussion

The results show that there are significant relationships between innovation idea value, fairness perceptions, and the overall willingness to interact in the intrafirm social network for innovation ideas. Furthermore, the negative influence of the latent variable of network behavior on innovation idea value implies that a higher level of participation and knowledge-sharing behavior in the intrafirm social network for innovation ideas leads to greater innovation idea value. The results support the findings of Brown and Duguid (1991) and Howells (2002), which indicate relationships between innovation idea value and social interaction as well as between innovation idea value and knowledge sharing among idea providers. On the one hand, the results support the findings of Thieme et al. (2003), which demonstrate the relevance of participation and knowledge-sharing behavior as important factors for innovation outcomes. On the other hand, the findings indicate that participation and knowledge sharing decrease innovation idea value. One possible explanation for these results is information overload. The more active the idea providers are in social networks, the more they exchange information and knowledge with other members of the network, which is consistent with the common trade-off between irrelevant and potentially useful information (Hiltz and Turoff, 1985). Moreover, idea providers with a higher level of willingness to participate and to share might tend to increase information overload in the form of multiple asynchronous yet concurrent threads of conversation (Kerr and Hiltz, 1982). Hence, handling these threads of conversation increases the amount of effort required to follow and participate in the discussions, which in turn possibly reduces the willingness to participate and to share (Hahn and Subramani, 2000). Furthermore, the results support the findings of Francis and Bessant (2005) regarding a strong interrelationship between the novelty and usefulness of an innovative idea. Innovative behavior strongly depends on the participation and knowledge-sharing behavior of the idea providers.

Greater fairness perceptions are associated with greater willingness to participate and to share in the intrafirm social network for innovation ideas. This result extends the findings of Janssen (2004) and Gaechter et al. (2010) to a social network context. Here, fairness in the exchange relationship within the social network for innovation ideas refers to employees' perceptions of the balance between the comprehensive scope of investments in ideation and the rewards that are received as a result.

Concerning the comparison of allocation methods, price allocation has the strongest influence on fairness perception. This result implies that employees with a distinctive preference for price allocation participate more actively in the intrafirm social network for innovation ideas and share knowledge more willingly, but the value of innovative ideas may be reduced if the price preference is too high. In contrast, employees with a strong preference for equal allocation are less willing to participate and share knowledge in the intrafirm social network for innovation ideas, but innovation idea value is increased. Given these correlations, the only relationships found are those between both usefulness and novelty and the preference for the equal allocation method. When employees perceive an allocation method as fairer, the levels of usefulness and the novelty of innovation ideas are higher.

In comparing the fairness perception results with those of previous studies, the strong effect of price allocation and the lower preference for this option are not surprising (Frey et al., 1993; Haucap and Just, 2010). In terms of the FCFS and government allocation options, perceptions of fairness improve over time. This finding implies that pure monetary incentives may be less efficient because of their preference for the price mechanism. The allocation method with the greatest fairness perception is equal allocation. The idea behind equal allocation is that every participant in the ideation process receives the same share of the reward for the innovation idea. According to Kokott and Rötzel (2008), a preference for the equal allocation method indicates that nonmonetary and noncompetitive wage premia encourage employees to participate in idea management and increase the number and value of innovation ideas provided by employees. In terms of the intrafirm social network for innovation ideas, fairness perceptions positively influence participation and knowledge-sharing behavior. These findings support the results of Falk et al. (2005).

One important extension of previous research is the simultaneous estimation of the effects of innovation idea value, fairness perceptions, and participation and knowledge-sharing behavior, which eliminates some of the risks that other variables will influence the interrelatedness between innovation idea value and employee motives. Moreover, the results of this study suggest the need to implement some modifications to the existing theory. The critical factors for innovation idea value are usefulness and novelty.

At first glance, the strongly significant positive influence of fairness perception and the negative influence of network behavior on innovation idea value issues a challenge to managers. When fairness perception increases, network behavior increases and innovation idea value decreases. With regard to the total effect, an increase of fairness perception leads to an increase of the innovation idea value, even if the network behavior's increase mitigates innovation idea value.

To increase our understanding of interactions in social networks for innovation ideas and their influence on the process of ideation, more knowledge is needed to understand the behavior of network participants during the ideation process. Furthermore, there is still a lack of evidence concerning the effects of group dynamics in ideation situations and the influence of different perceptions of fairness among group members.

6 Conclusions

The results of this study demonstrate a clear relationship between the value of innovative ideas, employees' perceptions of fairness, and participation and knowledge-sharing behavior in the intrafirm social network for innovation ideas. Using a structural equation model, this study shows that the positive effect of fairness perceptions on innovation idea value indicates that fairness perceptions are an important factor that should be considered in the design of incentive systems for innovative ideas. However, the significant negative influence of network behavior on the value of innovative ideas implies that a greater level of participation and knowledge-sharing behavior in the intrafirm social network for innovation ideas decreases innovation idea value.

In intrafirm social networks for innovation ideas, members' perceptions of fairness are a decisive factor in ideation, which leads to important implications for management. From the company perspective, the results clearly show that the value of innovation ideas that are implemented, which serve as starting points for the innovation of products or processes, is influenced by perceptions of fairness. To increase the value of innovation ideas, opportunities to interact in these networks should be supported and facilitated, and the allocation of rewards should be encouraged. The findings show that the equal allocation method is clearly the most preferred among participants in the analyzed social network for innovation ideas. This result implies that rewards for successfully implemented ideas should be distributed equally among group members. The allocation method that is favored by economists, price allocation, receives little acceptance. Furthermore, the preference for a queuing allocation indicates that a reward system based on the date of participation in the ideation process may be viewed as fair by employees. The founding members of a new innovation would receive the greatest reward, and the newest member would be rewarded the least. Furthermore, the results indicate that managers should enable employees to gain access to social networks for innovation ideas, which increases their opportunities to generate better ideas and foster social networking. Contrarily, high levels of participation and knowledge-sharing behavior lead to a decrease in the value of innovative ideas. More knowledge is needed to understand the interrelationships between preferences among team members to increase understanding of the reward allocation process in innovation teams.

To evaluate the findings presented in this paper, it is necessary to take into account some of our study's limitations. The first limitation is the restriction of our study to implemented ideas, which serve as starting points for the innovation of products or processes. This study does not include ideas that were rejected in the innovation process.

There appear to be four avenues for future research that could deepen our knowledge of the performance of social networks for innovation ideas. First, it is necessary to explore cases that involve more than one incentive system. In a context with multiple competing incentive systems or social networks for innovation ideas, the analyzed effects of fairness perception might be related to different types of incentives. Second, there is a lack of evidence on the evolution of such social networks and group dynamics over time in an innovation management context. Third, more knowledge is needed to comprehend the various configurations of incentive systems to increase the understanding of incentive effects in social networks for innovation ideas and their influence on the ideation process. For this purpose, further research should compare different companies with significantly different incentive systems. Fourth, further research should investigate how information sharing could result in information overload, which could negatively influence innovation idea value.

Further studies should explore how innovation idea value is affected by fairness perceptions and the behavior of employees in social networks in other branches of industry. The rationale for focusing on the automotive industry is that this branch has the highest level of ideas per employee and the highest level of gains per idea in Germany. The fairness perceptions of employees may vary between industries, especially in branches such as health care. The second limitation is the use of one questionnaire per idea provider. We cannot distinguish individual ideas from a single idea provider. A longitudinal study may be appropriate to obtain more information from after the creation of an idea.

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