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USER INTEGRATION IN COMPANY-DRIVEN OPEN SUSTAINABILITY INNOVATION: EXPERIMENTAL RESULTS ON LEADERSHIP AND ORGANIZATIONAL ENABLERS

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INTRODUCTION

Traditionally, the innovation of products, services, and processes has been considered a central function occurring within companies and often residing in specialized research and development (R&D) departments (West & Bogers, 2014). More recently, however, with the advent of the open innovation paradigm (Chesbrough, 2003b), the importance of external sources of knowledge and innovation has been recognized (Gassmann, Sandmeier, & Wecht, 2006; Grimpe & Sofka, 2009; von Hippel, 1988). Current and future users are increasingly included in various steps of new product development (Enkel, Kausch, & Gassmann, 2005a) taking an active role in the creation of products and services (Belz & Schrader, 2012; Enkel, Gassmann, & Chesbrough, 2009; Hoffmann, 2007; Reichwald & Piller, 2009). Companies have to reduce their organizational boundaries enabling the integration of external with internal resources to profit from this development and leverage the innovativeness of their users (Buur & Matthews, 2008; Füller, Bartl, Ernst, & Mühlbacher, 2006). The major challenges, thereby, are the need to motivate users to create innovative ideas and the integration of these ideas into the company itself (Bengtsson & Ryzhkova, 2013).

For sustainable innovation, where the company goals include a change towards more sustainable lifestyles of the users and more sustainable production within the company, integrating users into innovation processes is particularly valuable (Hoffmann, 2007). Sustainable companies and products have to compete with more mainstream offers (Belz & Schrader, 2012). Offering users to participate in new product development increases the likelihood that the resulting sustainable products will be successful in the marketplace (Enkel, Perez-Freije, & Gassmann, 2005b). It also helps anchor sustainability into the values and identities of users, which increases their pro-environmental behavior (Gatersleben, Murtagh, & Abrahamse, 2014; Hay, 2010). With the rising importance of the successful management of sustainability innovation, we focus on this area. In particular, we investigate how user participation in innovation processes can be increased and how user ideas can be successfully integrated into companies.

Innovation communities, focus groups, lead-user workshops, toolkits, and idea contests have been suggested as methods to allow users to participate in companies' innovation efforts (M. Arnold, 2011; Füller et al., 2006; Piller & Walcher, 2006; von Hippel, 1986). In particular, online idea contests have become an increasingly popular instrument in recent years (Bullinger, Neyer, Rass, & Moeslein, 2010; Carvalho, 2009; Leimeister, Huber, Bretschneider, & Krömer, 2009). They enable companies to shift idea generation efforts outside of the organization to make use of their users' competences and potential in solving organizational challenges (Füller et al., 2006; Haller, Bullinger, & Moeslein, 2011; Piller & Walcher, 2006). An

open innovation approach including the integration of users via idea contests has been deemed especially valuable for sustainable innovation endeavors (Belz & Bilharz, 2007; Heiskanen, Kasanen, & Timonen, 2005; Hoffmann, 2007), e.g. to find new ideas on how to combat climate change (Arnold & Ramakrishnan, 2009) or the development and dissemination of sustainable energy technologies (Ornetzeder & Rohracher, 2006). However, open innovation literature with a sustainability focus is still limited, warranting further research (Adamczyk, 2012).

While the necessity to motivate users to participate in such idea contests has been widely recognized (e.g. Füller & Hienerth, 2004; West & Bogers, 2014), previous research has mainly considered communication instruments and activation-enabling functionalities within the online interfaces of the idea contests (Ebner, Leimeister, & Krcmar, 2009; Leimeister et al., 2009; Piller & Walcher, 2006). In addition, discussions on incentives have mostly focused on monetary and other tangible benefits and less on nonmonetary incentives and other sources of motivation (West & Bogers, 2014). Therefore, more research is needed on the psychological and management-related factors, as opposed to technical factors, that influence users' participation in idea contests.

We propose that the leadership style displayed by the company within an idea contest will impact both the quality and quantity of ideas submitted by participants as well as their affective, cognitive, and behavioral reactions during and following the participation in an idea contest. Specifically, as transformational leadership has been found to be instrumental for the generation of innovation (e.g. Braun, Peus, Weisweiler, & Frey, 2013), we expect transformational leadership (TFL) to increase users' performance and lead to positive reactions to the participation in the idea contest compared to transactional leadership (TAL). In addition, the question of whether competition or cooperation is more conducive to innovative performance remains understudied and results have been ambiguous (Bullinger & Möslin, 2010; Bullinger et al., 2010; Hutter, Hautz, Füller, Mueller, & Matzler, 2011). Therefore, we compare the influence of a competitive, individual-focused climate with a cooperative, community-focused climate within the idea contest on participants' performance and reactions. In doing so, we also address a methodological shortcoming of the literature on idea contests which, so far, has been dominated by case studies (Adamczyk, 2012). We augment this qualitative focus by conducting a series of quantitative experiments. These experiments allow us to investigate the causal relationship between the leadership styles and the climates in question and user participation in idea contests.

The next step in the innovation process, the integration of the outcomes of an idea contest into the company, has been largely ignored by the open innovation literature compared to the creation and acquisition of external ideas (Adamczyk, 2012; Baldwin & von Hippel, 2011). In addition, the overwhelming majority of existing research focuses on absorptive capacity as a success factor, while the few other studies often do not go beyond the "not invented here"¹ phenomenon, neglecting organizational culture and other influence factors (West & Bogers, 2014) that are well established in the literature on knowledge management (DeTienne, Dyer, Hoopes, & Harris, 2004; Politis, 2001; Srivastava, Bartol, & Locke, 2006) and innovation (Hammond, Neff, Farr, Schwall, & Zhao, 2011; Hülsheger, Anderson, & Salgado, 2009). However, organizational culture and leadership play important roles in overcoming employee-related barriers to the effective utilization of external inputs.

¹ The „not invented here“ phenomenon describes a group of experts' reluctance to consider external information or ideas because they believe that they hold all the necessary knowledge within the group discarding anything coming from the outside as irrelevant [Katz, Allen, 1982].

We address this gap in the literature by considering the supervisor's leadership style and participative decision-making as antecedents of employees' evaluation of an external user idea, their willingness to implement said idea, and their performance in a related task. Specifically, we hypothesize that transformational leadership more strongly supports employees' affective and cognitive reactions and behavioral intentions towards an external idea as well as their implementation performance than transactional leadership. In addition, we also include the anonymity of the user who submitted the idea as an additional antecedent. We expect that employees who receive information and the possibility to contact the user behind an external idea perceive a stronger relationship with that idea than employees who simply receive general information about the idea contest.

With our experimental studies, we offer several contributions to the literature: First, by focusing on leadership and climate as antecedents we highlight the importance of social factors to increase user participation in idea contests, thus complementing the more technical factors discussed in the literature so far. Second, with our experimental approach we extend the previous methodologies employed in the study of the open innovation process allowing for conclusions on the causal relations. Third, we include the previously neglected integration of the results of idea contests into companies as a next step in company-driven open innovation into our research. Fourth, in doing so, we again focus on the social factors, organizational culture and leadership, extending the narrow previous focus on internal R&D capabilities. Fifth, we conduct our studies within the context of sustainability increasing research results available within this important domain. Based on four experiments with a total of 326 student and 103 working adult participants, with the latter having previous experience as participants in online communities and market research, we show that transformational leadership and employee participation in decision making are crucial to the process of integrating external ideas into organizations, while the choice of a beneficial leadership style and climate for an idea contest are dependent upon contextual factors. Our findings also guide practitioners' efforts to create appealing idea contests and successfully integrate the results within an open innovation process.

THEORETICAL BACKGROUND

Chesbrough (2003a) describes the open innovation approach of companies as "accessing and exploiting outside knowledge while liberating their own internal expertise for others' use" (p.12). Through user involvement, companies can make use of users' implicit knowledge and discover their hidden needs and requirements to improve company success (Gassmann, Enkel, & Chesbrough, 2010; Lüthje & Herstatt, 2004; von Hippel, 1986). According to West and Bogers's (2014) integrative model, the open innovation process consists of four phases: obtaining innovations from external sources, integrating innovations, commercializing innovations, and interaction mechanisms. The first three, thereby, represent a linear process while the fourth phase might occur at any time. For the present studies, we focus on the first and second phases, which cover the search and acquisition of external user ideas and their introduction into the company.

Users have been integral in the development of various innovations (von Hippel, 1988) ranging from sports (Franke & Shah, 2003; Lüthje & Franke, 2003) and household goods (Ogawa & Piller, 2006) to the personal computer (Allerbeck & Hoag, 1989) and software (von Hippel, 2001). Research is also increasingly studying user involvement in the sustainability innovation context (Adamczyk, 2012). However, companies who try to benefit from open innovation need to be able to motivate their users to contribute and afterwards be able to capture the results as well as effectively integrate the user contributions into company

activities (Bengtsson & Ryzhkova, 2013). In a series of experiments, we, therefore, investigate the successful generation of user ideas using an online idea contest and the effective integration of the resulting ideas into the company.

Success factors for idea contests

Based on previous research (Bullinger & Möslin, 2010; Ebner et al., 2009; Walcher, 2009), Adamczyk (2012) defines an idea contest as “an IT-based and time-limited competition arranged by an institutional or individual organizer” (p. 3) and specifies that “the institution or individual is defining a task or a problem for which a capable solution is needed” (p. 3). Idea contests are recognized as effective instruments to involve users at the beginning of the innovation process and to gather innovative ideas (Ebner et al., 2009). While previous research has mostly focused on the technical design elements necessary for successful idea competitions (Ebner et al., 2009; Leimeister et al., 2009), psychological and social factors like commitment to the community, sense of belonging, friendship, and intellectual stimulation have been recognized as having the strongest influence in related research on knowledge contribution in online communities (Butler, Sproull, Kiesler, & Kraut, 2002; Hemetsberger & Pieters, 2001; Hennig-Thurau, Gwinner, Walsh, & Gremler, 2004; Hertel, Niedner, & Herrmann, 2003; Lakhani & von Hippel, 2003; Lakhani & Wolf, 2003; Wiertz & de Ruyter, 2007). Based on these findings, we argue that the leadership style displayed towards participating users and the climate present in the idea contest influence the level of user contribution as well as related behavioral intentions and affective and cognitive reactions of the participating users.

The most researched leadership theory to date (Peus, Braun, & Frey, 2013) is the full range of leadership model (Bass & Avolio, 1990, 1994), which comprises transformational (TFL) and transactional (TAL) leadership behaviors. Transactional leadership focuses on the exchanges between leaders and their employees (performance as a result of rewards). Transformational leaders, in contrast, recognize and respond to each individual follower’s abilities and needs. They have a clear vision and inspire followers to strive for joint goals, thereby supporting followers to achieve these goals. Finally, transformational leaders inspire followers to reach performance beyond expectations and intellectually stimulate them to develop innovative ideas. Transformational leadership has been found to be related to employees’ job satisfaction and trust in the leader as well as follower innovation in research organizations (e.g. Braun, Peus, et al., 2013).

Leadership is a crucial factor for the creation, sharing, and exploitation of organizational knowledge (Bryant, 2003) as well as for team and individual innovation within organizations (Boerner, Eisenbeiss, & Griesser, 2007; Chen, Farh, Campbell-Bush, Wu, & Wu, 2013). We argue that the positive relationship between transformational leadership and individuals’ creative performance found in previous studies (Gumusluoglu & Ilsev, 2009; Mumford, Scott, Gaddis, & Strange, 2002; Sosik, Kahai, & Avolio, 1999) will also hold in the idea contest setting as transformational leadership shown towards the participating users creates social trust, which in turn has been found to increase users’ knowledge sharing in online communities (Hau & Kim, 2011). Intellectual stimulation also positively influences idea sharing and support in online communities (Lakhani & Wolf, 2003). As intellectual stimulation is one of its defining dimensions, we expect transformational leadership to foster users’ intellectual curiosity and imagination leading to new and innovative ideas (Avolio, Bass, & Jung, 1999; Bass, 1985). In line with previous research (Eisenbeiß & Boerner, 2013; Gebert, 2002), we propose that the compelling vision presented by transformational leaders and their ability to increase users’ self-efficacy will also motivate idea generation (Bass, 2010; Pillai & Williams, 2004). Transactional leadership, on the other hand, is effective in stable environments with

clear tasks and goals where a constant performance is required (Bass, 2010). For innovative contexts, it is not suitable. Following the arguments above, we hypothesize:

H1: The a) quality and b) quantity of users' submitted ideas is higher in the presence of transformational leadership than transactional leadership.

The fundamental, and many times repeated, argument for the success of idea contests is that the competitive nature will motivate users' creativity and increase the quality of the submitted ideas (Hayek, 1948; Piller & Walcher, 2006; Shalley & Oldham, 1997). More recently, however, researchers have started to question this underlying assumption as the value of community-based approaches to idea contests has been recognized (Bullinger et al., 2010; Hutter et al., 2011). Friendship and a sense of belonging or community have been found to be required for users to show positive actions in online communities and co-creation efforts (Butler et al., 2002; Gebauer, Füller, & Pezzeri, 2013; Hemetsberger & Pieters, 2001; Hertel et al., 2003). As such, the chance to be rewarded (compared to others) is no longer the sole motivation for participation (Hutter et al., 2011). To address this lack of clarity, we compare users' performance in an idea contest in a competitive versus a cooperative climate. We argue that a focus on individual competition will induce users to try to outperform others by submitting as many ideas as possible in the hope that one of those ideas will be the contest winner, thus increasing the quantity of users' ideas. Previous research has found that in a competitive climate the goal of winning becomes more salient compared to the actual task (Deci, Betley, Kahle, Abrams, & Porac, 1981). On the other hand, a cooperative, community-based setting will lead to users taking the time to extensively think about their ideas and describe them in detail and to evaluate their ideas before deciding to either submit or discard them so as not to bother the community with not yet fully developed ideas. It has been previously argued that users in virtual communities are afraid of misleading others when they are not sure about the importance and relevance of their contributions (Ardichvili, Page, & Wentling, 2002). Therefore, we hypothesize:

H2a: The quality of submitted user ideas is higher in a cooperative than a competitive setting.

H2b: The quantity of submitted user ideas is higher in a competitive setting than a cooperative setting.

In addition to the performance in the idea contest we also expect both leadership and climate to influence users' affective and cognitive reactions and behavioral intentions with regard to the idea contest. Therefore, we, on the one hand, consider users' empowerment with its four dimensions of meaning, competence, self-determination, and impact, as well as users' attitudes during the idea contest as dependent on the leadership style and climate within the idea contest. On the other hand, the perceived usefulness, intended word-of-mouth, involvement, and satisfaction with the idea contest as well as users' intentions to participate in future idea contests are also considered as consequences. We consider these variables central in assessing the successful realization of idea contests because they cover both actual participating users' experience in the current idea contest and willingness to return in the future but also the acquisition of additional participants. Psychological empowerment is a well-established concept in the management literature (Seibert, Wang, & Courtright, 2011; Spreitzer, 1995) and has been shown to be strongly related to innovation and creativity (Pieterse, van Knippenberg, Schippers, & Stam, 2009; Seibert et al., 2011; Zhang & Bartol, 2010). Attitudes, perceived usefulness, and behavioral intentions are elements of the Technology Acceptance Model (TAM) (Davis, 1989; Davis, Bagozzi, & Warshaw, 1989), a key model in information science (IS) research (Schepers & Wetzels, 2007; Taylor & Todd, 1995) which is drawn on when researchers want to explain individuals' willingness to contribute to

the introduction and their usage of any kind of technology (e.g. Lin, 2006; Schepers, Wetzels, & de Ruyter, 2005; Tsang, Ho, & Liang, 2004). They are also included in the social psychology Theory of Planned Behavior (Fishbein & Ajzen, 1977), which has also been used to describe the adoption and usage of technologies (Taylor & Todd, 1995).

Psychological empowerment, with its four dimensions meaning, competence, self-determination, and impact, represents an individuals' intrinsic motivation with regard to his/her role and is dependent upon the environment (Spreitzer, 1995; Thomas & Velthouse, 1990). The positive relationship between transformational leadership and empowerment is well established within organizations in all kinds of contexts (e.g. Avolio, Zhu, Koh, & Bhatia, 2004; Jung & Sosik, 2002). Thus, we expect this relationship to be also valid in the context of idea contests. Furthermore, empowerment might be higher in a cooperative climate. Participants are more likely to feel the freedom to develop their own, unusual ideas, as their focus is not on competing with other (Hutter et al., 2011). This mindset is in line with the self-determination and meaning dimensions of empowerment. In addition, socio-political support, which includes a positive and supportive climate, has been shown to positively relate to empowerment (Seibert et al., 2011) as have support-based relationships due to their creation of a sense of community (Corsun & Enz, 1999), which is a central element in a cooperative climate.

According to Kotler (2000), attitudes are evaluations, emotional feelings, and behavioral tendencies related to an object or idea that are temporally enduring. They are highly related to a person's intentions and behaviors (Taylor & Todd, 1995; Tsang et al., 2004). A common and crucial mediator for transformational leadership (Braun, Peus et al., 2013; Podsakoff, MacKenzie, Moorman, & Fetter, 1990), perceived trust, positively predicts positive attitudes towards participation in virtual communities (Lin, 2006). Furthermore, leaders' articulation of a vision, a central dimension of transformational leadership, has been shown to positively affect followers' work related attitudes (Kirkpatrick & Locke, 1996), while some evidence exists that a competitive climate might negatively affect attitudes (Johnson, Johnson, & Stanne, 1985). In line with these previous results, we, therefore, propose:

H3: Within idea contests, transformational leadership leads to higher a) psychological empowerment and b) positive attitudes towards the idea contest than transactional leadership.

H4: Within idea contests, a cooperative climate leads to higher a) psychological empowerment and b) positive attitudes towards the idea contest than a competitive climate.

With the exception of the influence of climate on perceived usefulness, we suggest that users will display stronger positive behavioral intentions like word-of-mouth or future participation intentions with regard to the experienced idea contest and idea contests in general when confronted with transformational leadership and a cooperative climate as opposed to transactional leadership and a competitive climate, respectively.

Word-of-mouth, a factor crucial for spreading awareness of an idea contest and inviting user participation, is defined as an informal, non-commercial communication or information exchange about a product or service (Arndt, 1967; Goyette, Ricard, Bergeron, & Marticotte, 2010). In their model, van Doorn et al. (2010) describe what they term customer engagement behaviors including word-of-mouth as behavioral expressions of motivational drivers. The motivational effect of transformational leadership has already been discussed above and trust as established mechanism (Braun, Peus et al., 2013) has been empirically found to predict positive word-of-mouth (De Matos & Rossi, 2008). We also expect a cooperative climate to

lead to more positive behavioral displays due to the creation of a sense of community and belonging (Hutter et al., 2011; Tonteri, Kosonen, Ellonen, & Tarkiainen, 2011). Gebauer et al. (2013) empirically found a positive relationship between sense of community and participants' intentions to engage in positive word-of-mouth. Since they are also behavioral intentions most probably dependent upon the pleasantness of the previous experience we expect users' intentions to participate in future idea contests to have similar relationships with our antecedents. Thus we expect transformational leadership and a cooperative climate to increase these behavioral intentions, respectively.

Additionally, organizational research has shown that the positive relation between transformational leadership and job satisfaction is mediated by perceived trust in the leader (Braun, Peus et al., 2013). At the same time trust has also been argued to predict satisfaction in online communities (Cheung, Jin, Lee, & Chen, 2006) leading us to propose that the positive relation also applies in the context of idea contests. Since a sense of community has been found to positively relate to satisfaction in a variety of contexts including online courses (Drouin, 2008) and new graduates (Winter-Collins & McDaniel, 2000), we expect a cooperative climate to lead to higher satisfaction with the idea contest. Furthermore, we suggest a beneficial effect of transformational leadership on user involvement as transformational leadership has been found to support employee involvement within work teams (Richardson & Vandenberg, 2005). On the other hand, a competitive environment has been argued to have a detrimental effect on student involvement in the classroom increasing absenteeism (Moos & Moos, 1978). Given that it has been extensively discussed that classes have different climates which strongly influence members' performance (Anderson, 1970), we take this result as basis to suggest that involvement is higher in an idea contest with a cooperative compared to a competitive climate.

Perceived usefulness is commonly used in information systems research to indicate "a person's believes that using a particular system would enhance his or her job performance" (Davis, 1989, p. 320). We adapt this definition to include the benefits incurred when participating in an idea contest. Previous research found that the intellectual stimulation dimension of transformational leadership positively affected the perceived usefulness of a newly introduced technology, while transactional leadership did not (Schepers et al., 2005), suggesting that a cognitive mechanism (Eisenbeiß & Boerner, 2013; Gebert, 2002) might be in place. We take this result as a first clue to propose that transformational leadership increases the perceived usefulness of participating in an idea contest compared to transactional leadership. While we were not able to identify previous research on the influence of climate on perceived usefulness, we tentatively refer to a study which found that perceived usefulness was more relevant in Western cultures than in non-Western cultures (Schepers & Wetzels, 2007) to postulate that a competitive climate might be conducive to the perceived usefulness of idea contests, as the individualistic nature of western cultures can be considered more focused on competition (Hofstede, 1980). Considering the arguments above, we propose:

H5: Within idea contests, transformational leadership leads to higher a) word-of mouth, b) future participation intentions, c) satisfaction, and d) perceived usefulness for participating users than transactional leadership.

H6: Within idea contests, a cooperative climate leads to higher a) word-of mouth, b) future participation intentions, c) satisfaction, and lower d) perceived usefulness for participating users than a competitive climate.

Success factors for idea integration

Integration represents the second step in West and Bogers's (2014) model of the open innovation process. Also called outside-in process, integration is concerned with making external knowledge, ideas, and other resources available within the organization (Enkel et al., 2009; Enkel et al., 2005b). Companies differ in their readiness to utilize external resources (Granstrand & Sjölander, 1990; Vanhaverbeke, Duysters, & Noorderhaven, 2002). Most research in this regard within the open innovation literature has focused on absorptive capacity as the one central construct (West & Bogers, 2014). It represents the ability of the companies' internal R&D to handle external inputs (Cohen & Levinthal, 1990). Most of the remaining research addressed the "not invented here" phenomenon (Katz & Allen, 1982), a central challenge for integration (West & Bogers, 2014). The impact of factors deemed relevant by the literature on knowledge management, on the other hand, has been largely ignored (Bryant, 2003; Chen & Huang, 2007; West & Bogers, 2014). However, it has been argued that contextual factors that support innovation within organizations are also crucial when integrating external ideas, including organizational culture and leadership (Hameed, Counsell, & Swift, 2012; West & Bogers, 2014). Integration might, therefore, be dependent upon the engagement of the involved organizational members (Huang & Newell, 2003), while resistance stems from the fear of losing control, familiar routines, and status within the company, which can cause organizational inertia (Hienerth, Keinz, & Lettl, 2011; Huston & Sakkab, 2006; Katz & Allen, 1982).

Thus, we turn to the extensive literature on organizational change because change processes encounter similar challenges and the introduction of external ideas most probably demands some change from the persons involved in implementing them. In their review, Oreg, Vakola, and Armenakis (2011) present a model of antecedents, reactions, and consequences of change. Antecedents include the organizational context and personal characteristics of the persons involved as well as content, process and perceived results of the actual change. The explicit reactions cover affective, cognitive, and behavioral factors, while consequences include work-related and personal factors. We emulate this model by considering leadership, participation in decision-making, and anonymity of the idea source as antecedents. Besides the actual performance in an implementation task, we then address the psychological empowerment, psychological safety, commitment to and identification with the idea, implementation intentions, and engagement as affective, cognitive, and behavioral reactions and consequences.

In particular, we argue that transformational leadership will lead to a higher performance in the implementation of external ideas than transactional leadership. Transformational leaders are able to overcome employees' resistance to the external idea by addressing their individual needs and painting a bright vision for the future (Herold, Fedor, Caldwell, & Liu, 2008). Trust in the leader as central mechanism of transformational leaderships' influence (Braun, Peus et al., 2013) has previously been found to increase employees' receptiveness, support, and cooperation for change (Coyle-Shapiro & Morrow, 2003; Cunningham et al., 2002; Eby, Adams, Russell, & Gaby, 2000; Kiefer, 2005; Martins & Martins, 2002; Wanberg & Banas, 2000). On the other hand, managers who instruct their employees to simply go along and try to persuade them without considering their wishes cause a major roadblock for the adoption and implementation of innovations in organizations (Klein & Knight, 2005).

Participation has been identified as a central variable for the success of change processes leading to a plethora of positive reactions and consequences (Oreg et al., 2011). In addition, participation in decision-making supports the absorptive capacity of organizations (Jansen, van den Bosch, & Volberda, 2005) and employee performance (Lam, Chen, & Schaubroeck,

2002), satisfaction and productivity (Miller & Monge, 1986). In line with these results, we propose that employees who receive the opportunity to participate in related decisions will perform better in the implementation of external ideas than employees without this opportunity.

Finally, we suggest that information about the source of an external idea will lead to a higher implementation performance than the absence of such information. Additional information has been found to improve employees' acceptance of change and other positive reactions (Oreg et al., 2011). In addition, personal information might increase relationship-building, while a lack of social cues resulting from anonymity (Spears, Lea, & Lee, 1990) has been found to hinder the building of strong relationships (Hightower, Sayeed, & Warkentin, 2007). Positive relationships, on the other hand, lead to increased employee performance (Luthans, Avolio, Avey, & Norman, 2007). In line with the presented arguments, we hypothesize:

H7: Transformational leadership leads to a higher implementation performance of employees than transactional leadership.

H8: Participative decision-making leads to a higher implementation performance of employees than situations without.

H9: Information on the source of an external idea leads to a higher implementation performance of employees than anonymity of the source.

Similar to above, we expect our antecedents to influence employees' affective and cognitive reactions and behavioral intentions regarding the external idea to be implemented and the implementation process. These factors include the dimensions of empowerment (meaning, competence, self-determination, impact), psychological safety, commitment to the idea, identification with the idea, implementation intention, and engagement for the idea. We again argue that transformational leadership will be more effective in empowering employees than transactional leadership. Additionally, transformational leadership is positively related to employees' psychological well-being (Arnold, Turner, Barling, Kelloway, & McKee, 2007) and voice behavior (Liu, Zhu, & Yang, 2010). We take these results to indicate that employees' perceived psychological safety, an important antecedent of voice behavior (Walumbwa & Schaubroeck, 2009), will be higher in the presence of transformational compared to transactional leadership. In our context, perceived psychological safety represents an individual's belief that it is safe to take interpersonal risks within the organization (Edmondson, 1999). The beneficial nature of transformational leadership for different forms of commitment (e.g. Avolio et al., 2004; Pillai & Williams, 2004) including commitment to change (Michaelis, Stegmaier, & Sonntag, 2010) is well established. The same applies to identification with a work group (Bass, 2010) or the leader (Wang & Howell, 2012). Thus, we propose both commitment to the idea and identification with the idea to be stronger for employees with transformational leaders as opposed to transactional leaders. Transformational leadership has also been empirically shown to be positively related to employees' innovation implementation behavior (Michaelis et al., 2010), which we take as evidence that transformational leadership will also induce higher implementation intentions as it is related to the actual behavior. Finally, transformational leadership is related to organizational citizenship behavior (Pillai, Schriesheim, & Williams, 1999; Podsakoff et al., 1990). Due to their shared nature, as organizational citizenship behavior represents extra-role efforts of employees and is closely related to our conceptualization of engagement as extra-effort to promote an idea, we expect engagement for the idea to be higher for employees with a transformational as opposed to a transactional leader.

The influence of participation in decision-making has been explained using cognitive, affective, and contingent models, although evidence for the latter is mixed (Miller & Monge, 1986; Steel & Loyd, 1988). While the cognitive models consider the effective use of the information present in organizations to be crucial, affective models argue that participation satisfies employees' higher-order needs like respect and self-expression which in turn lead to increased motivation, morale, and satisfaction. Thus, we propose that the opportunity to participate in decision-making leads to a higher level of all of our affective, cognitive, and behavioral reactions and consequences. Additional evidence further strengthens our claim. Participation in decisions within an online community has been suggested to increase members' psychological empowerment (Bucy & Gregson, 2001; Füller, Mühlbacher, Matzler, & Jaweck, 2009). Participative climates have also been found to influence work-related attitudes and involvement (Tesluk, Vance, & Mathieu, 1999) as well as organizational commitment (Welsch & LaVan, 1981) and perceptions of empowerment (Spreitzer, 1996).

The consequences of anonymity have been discussed in a broad variety of subjects. When considering victims and perpetrators, sympathetic and punitive reactions, respectively, have been found to be stronger for identified than for unidentified targets (Kogut & Ritov, 2005; Small & Loewenstein, 2005). Other affective and cognitive reactions such as distress and identification with the victim were more pronounced when the victim was a single identifiable person as well. Identifiability of the own contribution within a group, on the other hand, reduces social loafing (Williams, Harkins, & Latan, 1981) and the expression of in-group stereotypes that are punishable by an out-group (Reicher & Levine, 1994). Experimental research conducted using a threshold public goods game found that individuals who were provided with additional information about identifiable others increased their own contributions (Croson & Marks, 1998). Leadership research has recognized anonymity as relevant factor in the context of creativity (Kahai, Sosik, & Avolio, 2003; Sosik, 1997; Sosik, Kahai, & Avolio, 1998; Sosik et al., 1999). Based on these results from previous research, we argue that employees who receive information about the user who submitted the idea selected for implementation will display higher levels of affective, cognitive, and behavioral reactions and consequences. We hypothesize:

H10: In the presence of transformational leadership, employees' a) psychological empowerment, b) psychological safety, c) commitment to the idea, d) identification with the idea, e) implementation intention, and f) engagement for the idea is higher than in the presence of transactional leadership.

H11: In situations with participative decision-making, employees' a) psychological empowerment, b) psychological safety, c) commitment to the idea, d) identification with the idea, e) implementation intention, and f) engagement for the idea is higher than in situations without.

H12: When provided with information on the source of the idea, employees' a) psychological empowerment, b) psychological safety, c) commitment to the idea, d) identification with the idea, e) implementation intention, and f) engagement for the idea is higher than without such information.

METHOD

Our hypotheses were tested in 4 experimental studies conducted in 2 different countries using different samples. Studies 1a, 1b, and 1c focus on the generation of user ideas via company-organized online idea contests. To improve the generalizability of the results from the student sample from Germany used in Study 1a, Study 1b was conducted with a student sample from

Finland and Study 1c replicates the findings using a German sample of working adults who have previously participated in market research. Study 2 then targets the integration of user ideas by the company with a student sample from Germany.

The setting for all experiments was the fictional Green Bike PLC, which was described as being Europe's leading provider of bicycle sharing services. Participants in Study 1a, 1b, and 1c took part in an idea contest organized by Green Bike to "extend or improve its offers, services, and processes to contribute to more sustainability". Participants in Study 2 were asked to imagine being an employee of Green Bike with the responsibility to utilize the ideas resulting from a previously conducted idea contest. We specifically chose bicycle sharing for three reasons:

First, the context of bicycle sharing falls into the mobility domain, with ties to the energy domain, which represent two of the focal domains the EU-InnovatE project selected for their significant impact on sustainable lifestyles in Europe. The project also argues for the value of an active participation of users in sustainable open innovation. Users are seen as driving innovation and change for the sustainable lifestyle of the future (Hoffmann, 2007) instead of the traditional role on the receiving end of such developments (Chesbrough, 2003a; Von Hippel, 2005).

Second, we confidently assumed that everybody in our target populations (students and employees in Europe) has some basic knowledge about the composition and operation of a bicycle and is able to imagine how a bicycle sharing service would work. We made these assumptions due to the prevalence of bicycles on the streets of Europe and the fact that bicycle and related car sharing operations have been present in major European cities for many years. We also needed to select a product or service as setting for which specialized knowledge would not pose a significant advantage in the idea contests because we would not be able to satisfactorily control for differences in previous knowledge.

Third, bicycle sharing was recognized as a development for environmentally friendly transport within the case studies collected in a previous step of the EU-InnovatE project. The case on bicycle sharing allowed us to more accurately rate the quality of the ideas submitted by participants of our simulated idea contests and to develop three comparable ideas as winning results, which were presented to the participants in our Study 2. It also convinced us that there was no risk of a ceiling effect for the quantity of submitted ideas ensuring enough variance in the data.

Study 1a

Sample and data collection

Study 1a was a 2 X 2 factorial between-subjects design and participants were randomly assigned to the four conditions. The independent variables were leadership (transformational versus transactional) and climate (competitive versus cooperative).

Participants for Study 1a were recruited within the participant pool of the ExperimentTUM, the experimental lab of the Technical University of Munich's School of Management, where the experiment also took place, and were managed with the Software ORSEE (Greiner, 2004). In the experiment, participants were shown a call for participation in an idea contest held by the Green Bike PLC, a major European provider of bicycle-sharing services, on a computer screen. After reading the manipulations, participants were asked to generate ideas to improve Green Bike's products and processes and to focus on sustainability in doing so. After 5 minutes they were able to continue onto the next page by clicking on a continue button and after 10 minutes they were automatically forwarded to the next page. Participants were then

asked to fill out an online-questionnaire containing scales for the study variables and questions regarding demographic information.

Our final sample consists of 36 female and 83 male participants as well as 3 persons who did not indicate their gender (81.51% of initial participants). We excluded participants who indicated that they did not take care in answering the questionnaire (positive answers on the item “I have entered random answers and data without paying attention to the instructions”) and who failed a simple quality check (item “Please select strongly disagree as the answer to this test question”). Average age of participants was 22.10 (SD = 2.76) years (4 persons did not indicate their age). Of all participants, 87.70% selected German as their nationality and 39.34% indicated that they held a job at the time. Only 19 participants had previously participated in idea contests of any kind. While 71.31 % answered that they were using a bicycle at least sometimes, only 31.97% indicated to have ever used a bicycle-sharing service, a number that drops to 14.75% for multiple previous uses.

Experimental manipulations

To create a competitive climate, the call for the idea contest shown to study participants included statements like the following: “We challenge you personally to start the next big trend.” and “Rise to the competition and pit yourself against your rivals.” Additionally, emphasis was put on contributing “individual ideas”. For the cooperative climate, on the other hand, elements included “Let us work together to promote sustainability.” and “We challenge the student community to start the next big trend.” Furthermore, “shared knowledge” and the “student community” were mentioned repeatedly to create a sense of community and togetherness. To further strengthen the climate manipulation, participants were addressed in the second person singular in the competitive condition, strengthening an individualistic view, and in the second person plural in the cooperative condition, to support a collectivistic understanding, throughout the manipulation and instructions for the idea generation task.² The questionnaire did not differ between the experimental conditions. Appendix A shows information on the measures employed and the statistical results.

In the style of previous research (Chaudhry & Krishnan, 2007; Felfe & Schyns, 2006; Jung & Avolio, 1999; Shea & Howell, 1999), we developed a manipulation for TAL and TFL. We first introduced Green Bike as a company that aims to improve traffic and reduce emissions in cities by offering a sustainable mobility solution – bicycle sharing. We then showed participants a message from the CEO of Green Bike. In the condition of TFL the presence of a company vision was emphasized and the CEO was quoted in his statement as considering the “needs and aspirations of [...] [the] employees” to be very important and the achievement of the participants to be essential for the company’s future. In addition, the opportunity to “gain valuable experience” by overcoming this challenge was pointed out. For TAL, the need for “efficiency and avoiding errors” while complying “with all rules and regulations” and following “high performance standards” was emphasized in the CEO statement. The focus was put on finding a solution by “following instructions” and satisfying expectations.

Summary of findings

We conducted a series of univariate analyses of variance (ANOVAs) to test the influence of the independent variables, leadership and climate, on qualitative and quantitative performance in the idea contest as well as on the affective and cognitive reactions to the idea contest and behavioral intentions following participation in the contest introduced above. Our results show that within the student sample of Study 1a the creativity of the submitted ideas

² In the German language the second person singular and plural are very distinct with different personal pronouns and conjugations of the verbs.

was significantly higher in the competitive than in the cooperative condition. We also found the elaboration of the submitted ideas to be higher in the competitive contest climate. Both results contradict our expectations that the quality of ideas would be higher in a cooperative climate (Hypothesis 2a). In addition, participants confronted with a transformational leader considered the idea contest to be less useful than in the transactional leadership condition, and a competitive climate tends to lead to a higher intention of participating in future idea contests, rejecting Hypotheses 5d and 6b.

Leadership and climate interact in predicting idea quality leading to ideas with a higher expected customer benefit when transactional leadership was combined with the competitive rather than the cooperative climate. The opposite is true for the quantity where transactional leadership was more effective when combined with a cooperative rather than a competitive climate.

At this point, it might be worthy to note, that the students rated the level of competitiveness to be very low across all conditions. This might be due to the realization of the experiment within the very artificial setting of the research laboratory as some comments received in the questionnaire suggest and to the fixed remuneration, a fact that most participants were aware of – and which is unusual at this particular laboratory. Nonetheless, the manipulation check for climate indicated that we did succeed in presenting a competitive versus a cooperative climate in participants' perceptions.

Study 1b

Sample and data collection

A 2 X 2 factorial between-subjects design was also used in Study 1b. Participants were randomly assigned to the four conditions. The independent variables were again leadership (transformational versus transactional) and climate (competitive versus cooperative).

We recruited participants for our Study 1b by advertising in social networks, via e-mails, and via flyers within the student population in Helsinki, Finland. The experimental manipulations and measures employed in the data collection were identical to Study 1a but were provided to participants in English. Also, while the experiments for Study 1a took place in a designated experimental laboratory solely used for research purposes in rounds of up to 32 persons, standard computer rooms at two campuses of the Aalto University were used in Study 1b and participation was continuously possible.

For this replication study, the final sample consists of 30 female and 14 male participants (77.19% of initial participants). We again excluded participants using the same quality check items as before. On average, participants were 23.72 years old (SD = 3.06; 1 person did not indicate an age). 52.27% indicated Finnish as their nationality and 31.12% were employed in some capacity. Just 6 participants had previously participated in an idea contest. While 63.64 % stated that they were using a bicycle at least sometimes, 52.27% had previously used a bicycle-sharing service, with 15.91% indicating several previous uses. The measures and statistical results are detailed in Appendix B.

Summary of findings

Due to the small sample size and the not significant manipulation checks, the results from Study 1b need to be considered very cautiously. Nonetheless, we decided to tentatively proceed with our analyses. We found a trend that users submitted more ideas when they experienced a competitive climate, which is in line with our Hypothesis 2b. In addition, we found the satisfaction with the idea contest to be higher in the competitive condition, contrary to Hypothesis 6c. It should also be noted that over both conditions, the climate was rated to

be considerably more competitive than in Study 1a, which might be due to the less formalized and structured interaction with the participants during data collection and the fact that they narratively reported less experience with the participation in experimental research.

Results for the leadership antecedent show that the number of potential beneficiaries and the quantity of submitted ideas were both higher when participants experienced a transactional leadership style. While this result is contrary to our expectations (Hypotheses 1a and 1b) the leadership manipulation also had reverse effects on the manipulation checks for transformational and transactional leadership. Thus, we refrain from further interpreting these results.

Study 1c

Sample and data collection

Study 1c was again a 2 X 2 factorial between-subjects design and participants were randomly assigned to the four conditions. The independent variables leadership (transformational versus transactional) and climate (competitive versus cooperative) were the same as before.

Participants for Study 1c were recruited by the respondi AG, a company that runs panels for studies and market research. We specified that participants needed to be employed at least part-time and to have previously participated in an online focus group, online market research or be part of an online community or forum. The manipulations and questionnaire were the same as before but were adapted to a working adult sample compared to the previous student samples regarding the demographic questions and participants were informed that the Green Bike PLC was indeed fictional and that this was a purely academic effort. Also, participants took part from home or work and did not have to appear in person.

The final sample consists of 47 female and 56 male participants (63.98% of initial participants). Participants were again excluded using the same quality check items as before. Additionally, we excluded participants who indicated that they were not able to provide ideas during the idea generation task. Average age was 43.04 (SD = 9.55) years (3 persons did not indicate their age.) While only 21.36% indicated that they seldom or almost never use a bicycle, 72.82% had never used a bicycle sharing service and only 15.53% had used one more than once. Information on the measures and statistical results are presented in Appendix C.

Summary of findings

Both the creativity of the submitted ideas and the expected number of beneficiaries was higher in the transformational leadership condition supporting our Hypothesis 1a. As a trend, customer benefit ratings of the ideas were found to be higher in a cooperative climate, which suggests support for our Hypothesis 2a. The latter result is in contrast to the student sample from Study 1a where, in the presence of transactional leadership, a competitive climate led to a higher customer benefit. Participants rated the experienced meaning (a dimension of psychological empowerment) to also be higher in the cooperative climate, a trend in line with our Hypothesis 4a.

The perceived usefulness and the satisfaction with the idea contest were both significantly higher for transactional compared to transformational leadership within a cooperative climate, while mean differences in the competitive climate were not significant. The students in Study 1a also perceived the idea contest to be more useful in the transactional leadership condition.

Study 2

Sample and data collection

Study 2 addressed the integration of ideas that result from company-organized idea contests into the company. A 2 X 2 X 2 factorial between-subjects design was used and participants were randomly assigned to the eight conditions. The independent variables were leadership (transformational versus transactional), participation in decision-making (idea selection by participants versus no selection) and anonymity of the user who was the source of the idea (personal information versus anonymous).

For Study 2 the same recruiting procedure as in Study 1a was used to gather a new sample without overlap to the previous study. Participants were again members of the subject pool of the ExperimentUM, where the experiment took place, and were managed with the Software ORSEE (Greiner, 2004). In the experiment, they were asked to imagine that they were employed by the Green Bike PLC, a major European provider of bicycle-sharing services. An idea contest organized by Green Bike had just taken place and it was the participants' responsibility to occupy themselves with the winning ideas that had already been selected by a jury. Participants then read an e-mail from their supervisor discussing the project of integrating the ideas from the idea contest which included the leadership manipulation. The use of a letter or e-mail from the supervisor to manipulate leadership is common in research (Braun, Peus, & Frey, 2015; Felfe & Schyns, 2006). For the participation manipulation they were then either offered a short description of the three winning ideas and were asked to select one for implementation or were randomly assigned one of the ideas. Finally, they either received a short fact sheet on the user that had submitted the idea or were given some general facts about the idea contest. After reading the manipulation materials, they had to raise their hand to receive an A4 page flyer and a pen with the task to correct and improve said flyer. After finishing work on the flyer they were then asked to fill out an online-questionnaire containing scales for the study variables and questions regarding demographic information. They were also told to turn over the flyer and not to work on it anymore. Appendix D presents the measures and statistical results.

Our final sample consists of 65 female and 94 male participants as well as 1 person who did not state their gender (69,87% of initial participants). We again excluded participants who indicated that they did not take care in answering the questionnaire (positive answers on the item "I have entered random answers and data without paying attention to the instructions"). In addition, we asked participants at the very end of the questionnaire whether they had the possibility to choose one of three ideas to work on and whether the inventor of the idea had been presented to them. We only included participants in the final sample who answered both questions correctly. Participants' average age was 22.98 (SD = 3.58) years (7 persons did not indicate their age) and 50.63% indicated that they were employed at the time of the study. Only 16 participants had previously participated in an idea contest of any kind and only 26.25% had ever used a bicycle-sharing service before, a number that drops to 15.00% for multiple previous uses.

Experimental manipulations

In the TFL condition, supervisors, in an e-mail, expressed their confidence in employees' ability to overcome challenges in the task given and to contribute to achieving the company vision. Supervisors also mentioned the value of the task as a learning opportunity and their availability for support. In addition, they also showed openness towards receiving feedback from the employee, mentioned their wish to be a role model, and specifically mentioned that the individual needs, abilities, and goals of the employee are crucial to the company success. In the TAL condition, the supervisors focused on efficiency and the need to avoid problems

and errors. Therefore, they indicated that they would closely monitor the employees' progress and clearly show displeasure if goals are not achieved according to plan. Supervisors also wrote about the importance of adhering to performance standards and the resulting remuneration. Within the instructions for the flyer task, some of these points were repeated to strengthen this manipulation.

To manipulate participation, we developed three different ideas that could have been provided within an idea contest run by a bicycle sharing service provider like Green Bike based on a previous case study from the EU-InnovatE project. The first idea was to use abandoned basements and other locations throughout a city to create safe parking spaces for bicycles and was called Bicycle Garage. The second idea, Cargo Bike, concerned the inclusion of bicycles with a cargo area into the fleet of Green Bike. Cycle & Eat, the third idea, described a food-mobility-package that includes discounts in supermarkets for users of Green Bike services. We consider these ideas to be equal in their levels of creativity and customer and company benefit. Study participants were either shown short descriptions of all three ideas in a randomized order and asked to select the one they would like to implement as employees of Green Bike or were randomly shown one description and told to work on implementing that idea.

The third experimental factor, anonymity of the idea submitter, was manipulated as follows: Study participants in one condition were shown a picture of a male person along with his age, name, and the information that he is a student and lives in Munich. They also read that he has been a member of the innovation community since a date about 1 month prior to the experiment date and had contributed a total of eight ideas to the contest. In the other condition, participants were told that 231 customers aged 18 through 64 took part in the contest submitting eight ideas on average. 59% of participants were students, 32% were employees, 2% were self-employed and 7% did not indicate their employment status.

Summary of findings

While the manipulation checks for participation and anonymity both strongly confirmed the success of our manipulations, participants confronted with a transformational leader scored significantly higher on both the transformational and the transactional leadership scales and the two scales were highly correlated. Therefore, we adjust our comprehension of the leadership manipulation and interpret it to capture differences between conditions of high and low transformational leadership.

Our results show that participants tend to be more diligent in correcting errors when they were allowed to select the idea they wanted to work on and, in doing so, experience more meaning and engagement. Their identification with and commitment to the idea were also significantly higher in the participation condition. These findings provide evidence in support of Hypothesis 8, 11a, 11c, 11d, and 11f. Participants experienced more self-determination and (to a lesser degree) impact, two dimensions of empowerment, when faced with a transformational leader, supporting Hypothesis 10a. In addition, perceptions of psychological safety were also higher in the transformational leadership condition, which is in line with Hypothesis 10b.

Transformational leadership led to higher meaning, engagement, and implementation intentions compared to transactional leadership under almost all conditions regarding participation and user information, although the mean differences are mostly not significant. Unexpectedly, however, the lowest means of all conditions appeared when employees encountered transformational leadership while being allowed to participate in decisions and having user information. Participation in decision making benefitted meaning, engagement and implementation intentions in all conditions aside from the aforementioned exception.

SUMMARY OF RESULTS

Overall, our results provide evidence for the relevance of the selected antecedents. Leadership has an influence on both the generation of ideas in an idea contest as well as the idea integration into an organization. Climate also influences idea generation via idea contests. Furthermore, participation in the selection of ideas has an impact on idea integration, while the anonymity of the idea submitter provides a moderating influence. Leadership, climate and participation in decision-making all also influence some of the proposed affective, cognitive, and behavioral reactions and consequences to idea contests and to the task of implementing the result of such an idea contest.

In the context of integration (Study 2), transformational leadership is highly beneficial for both psychological empowerment and perceived psychological safety. This is in line with previous research that has highlighted the importance of transformational leadership for innovation via a mediating role of psychological empowerment within organizations (Gumusluoglu & Ilsev, 2009). However, to our knowledge, previous research had not yet considered the area of open sustainability innovation and, in particular, idea contests. In addition, our findings on the positive impact of transformational leadership on the integration of user ideas in the area of sustainability innovation extend previous research, which has mostly been limited to absorptive capacity as central parameter (West & Bogers, 2014). We introduce a largely ignored factor deemed relevant by the literature on knowledge management (Bryant, 2003; Chen & Huang, 2007; West & Bogers, 2014) highlighting transformational leaderships' ability to overcome employee-related barriers for the integration of external inputs (Hienerth et al., 2011; Huston & Sakkab, 2006; Katz & Allen, 1982).

Furthermore, our results support the hypothesized positive impact of participation in decision-making on idea integration. Specifically, the opportunity to participate in the selection of the idea intended for implementation led to higher empowerment, commitment to the idea, identification with the idea, and engagement. In addition, participants' performance was higher in the implementation-related task when they had been allowed to select the idea intended for implementation. Therefore, companies need to give employees the opportunity to have their voices heard during decision processes to gain their commitment and support for external ideas.

While research on participation has a long history (Miller & Monge, 1986; Oreg et al., 2011; Steel & Loyd, 1988), our project extends this literature to a context that has only recently gained more attention within the discussion of open sustainability innovation (Adamczyk, 2012; Baldwin & von Hippel, 2011). Users are increasingly taking an active role in the creation of products and services (Belz & Schrader, 2012; Enkel et al., 2009; Hoffmann, 2007; Reichwald & Piller, 2009) that needs to be matched by equally active employees within companies lest their readiness to utilize external resources diminishes (Granstrand & Sjölander, 1990; Vanhaverbeke et al., 2002) as established organizational and psychological factors pertinent to the success of innovation processes are lost (Hameed et al., 2012; West & Bogers, 2014).

The anonymity of the user that was the source of the selected idea, on the other hand, did not have a direct impact on any of the proposed outcomes. We, instead, found indications of its moderating role that match earlier results from research on leadership and innovation (Kahai et al., 2003; Sosik, 1997; Sosik et al., 1998, 1999).

For idea generation in idea contests the picture is less clear as indicated by the results of Study 1a, 1b, and 1c. In the sample of working adults (Study 1c), transformational leadership

and cooperative climate both led to a higher quality in the submitted ideas, in support of our propositions. In addition, the psychological empowerment felt by the participants was also higher in the cooperative climate. These results, again, are in line with previous research (Seibert et al., 2011) as well as theoretical arguments pointing to the innovation-conducive effects of (especially the intellectual stimulation dimension) of transformational leadership (Eisenbeiß & Boerner, 2013; Gebert, 2002).

The student participants in Study 1a, however, found the competitive climate to be more conducive to high-quality ideas in contrast to the aforementioned results from Study 1c. It also increased their intentions to participate in future idea contests, contrary to our hypotheses. One reason for this might be the fact that Study 1a was conducted in an experimental laboratory at a business school – in which participants are used to competitive tasks and a financial reward that is dependent on their performance in this task. This might also explain the fact that for the variable leadership we did not find the expected results. That is, students rated the perceived usefulness of the idea contest to be lower with transformational compared to transactional leadership.

In short, it becomes evident that, more studies are needed to investigate the impact of both leadership and climate on idea generation in online contests. Thereby it is necessary to consider tensions arising when a cooperative climate and competitive elements are simultaneously present and possible moderators of transformational leadership. The intended population of participants (students versus working adults) might be an important context factor relevant for future research.

DISCUSSION

User participation in the innovation and new product development activities of companies has been on the rise since the introduction of the open innovation paradigm more than ten years ago (Chesbrough, 2003a; Enkel et al., 2005a; Gassmann et al., 2006; Grimpe & Sofka, 2009; von Hippel, 1988). Companies are adapting their business models to be more user-centric in an effort to leverage their users' potential and stay competitive in a marketplace thirsty for innovation (Teece, 2010). Organizational boundaries are dissolving to allow users an active role in creating products and services that target their own needs (Belz & Schrader, 2012; Buur & Matthews, 2008; Enkel et al., 2009; Füller et al., 2006; Hoffmann, 2007; Reichwald & Piller, 2009). Including users in company activities is particularly relevant for sustainability focused enterprises because it benefits multiple company goals (Hoffmann, 2007). On the one hand, it allows companies to capture explicit and implicit user knowledge as well as user needs and requirements to improve the success of sustainable products (Enkel et al., 2005b). On the other hand, it promotes pro-environmental behavior and the development towards more sustainable lifestyles (Gatersleben et al., 2014; Hay, 2010).

Online idea contests are a valuable method for companies to connect with users and to capture their innovative potential (Carvalho, 2009; Leimeister et al., 2009). In the context of open sustainability innovation, idea contests have been effectively used to generate innovative ideas on how to combat climate change (Arnold & Ramakrishnan, 2009) and the development of renewable energy solutions (Ornetzeder & Rohracher, 2006). The main challenge for the success of idea contests is attracting and motivating participants to submit a large amount of high-quality ideas (West & Bogers, 2014). Previous research on online idea contests (and related instruments) has mostly focused on technical features and monetary and other tangible incentives to increase user participation (Ebner et al., 2009; Leimeister et al., 2009; Piller & Walcher, 2006). However, psychological drivers of motivation have long been recognized (Amar, 2004). Empirical research has even been able to show that a tradeoff

between monetary rewards and these drivers is possible in the motivation of organizational employees (Smith, 2002) while criticizing that financial incentives might only foster quantitative but not qualitative performance (Jenkins Jr, Mitra, Gupta, & Shaw, 1998). Previous studies have also been able to show the effectiveness of non-monetary incentives in fostering sustainable behavior (McMakin, Malone, & Lundgren, 2002). We follow results showing that psychological and social factors like community commitment, sense of belonging, and intellectual stimulation have the strongest influence on knowledge sharing in online communities (Butler et al., 2002; Hemetsberger & Pieters, 2001; Hennig-Thurau et al., 2004; Hertel et al., 2003; Lakhani & von Hippel, 2003; Lakhani & Wolf, 2003; Wiertz & de Ruyter, 2007) and turn to leadership and climate as antecedents of user participation in idea contests.

We proposed that transformational leadership would lead to a higher quality and quantity of submitted ideas compared to transactional leadership. The motivational effect of transformational leadership has been well established (e.g. Barbuto, 2005). Our results in a sample of working adults support the positive effect on the quality of ideas but not on the quantity suggesting that participants are affected by the cognitive and motivational mechanisms of transformational leadership indicating their effectiveness in this specialized context (Eisenbeiß & Boerner, 2013; Gebert, 2002). However, our student samples could not confirm this effect. Because we find contradictory results between very similar studies conducted with different samples, we suggest that the influence of transformational leadership might be contingent upon contextual factors and that the target population might be highly relevant. Creativity and innovation have been argued to benefit from stimulation and intellectual guidance in questioning the status quo and a strong vision to guide efforts (Eisenbeiß & Boerner, 2010). On the other hand, autonomy and intellectual freedom, which might be constricted by high levels of leadership, also lead to creativity. Students, who have less experience in a follower role might not have been as susceptible to the motivational cues of transformational leadership as the working adults who have more experience in being followers and might have felt it to be constricting their autonomy, reducing their effort in the idea contest. Thus, when setting up an idea contest, we advise companies to carefully consider who the intended participants are and to ensure that the directions given do not register as limitations on participants' autonomy but are instead truly motivational for the targeted population.

A similar situation applies to the influence of climate. Our results show that a cooperative climate boosts idea quality in the adult sample, but competition does so in the student sample. In addition, the overall level of competition experienced by the student sample is relatively low. Thus, students might have considered their participation in the experiment as a collective effort to benefit the community and the competitive triggers might have had an additive effect. This is most certainly not the case for the working adults acquired via the panel provider who participate in studies to gain points that are then converted into financial rewards. In the students' case we might, therefore, need to look at competition and cooperation with a paradoxical lens and see them not as mutually exclusive but recognize the need to integrate the resulting tension (Smith & Lewis, 2011). Advances in this direction have been made both in the organizational literature (Tsai, 2002) and with regard to online contests (Bullinger et al., 2010; Hutter et al., 2011). To be effective, the target population again needs to be considered when deciding on the framing of the contest climate. A way to induce both competition and cooperation, possibly using a combination of technical and psychological drivers might be most promising.

While in the research on open innovation the introduction and adoption of external inputs has mostly been addressed using companies' absorptive capacity as key construct (West &

Bogers, 2014), the literature on knowledge management and innovation makes strong cases for organizational and managerial factors to be relevant (Bryant, 2003; Chen & Huang, 2007; Hameed et al., 2012). Furthermore, external ideas most likely cause some degree of disruption for the involved employees. Parallels to the literature on organizational change become evident as employee resistance to external ideas is based on the same fears described as barriers in change processes (Hienerth et al., 2011; Huston & Sakkab, 2006; Katz & Allen, 1982; Oreg et al., 2011). Based on Oreg, Vakola, and Armenakis's (2011) extensive review we consider affective, cognitive, and behavioral employee reactions to being tasked with the integration of an external idea and consider leadership, participation in decision-making, and information about the user who submitted the idea as antecedents of a successful implementation.

Our results confirm that transformational leaders are able to empower their employees and provide them with a sense of psychological safety. Psychological safety has in turn been established as success factor for the introduction of new processes (Baer & Frese, 2003) and employee engagement in work improvement (Nembhard & Edmondson, 2006). The positive relationship of empowerment and employees' engagement in creative processes has also been found (Zhang & Bartol, 2010). Thus, we feel confident to argue that companies looking to utilize external ideas should make transformational leadership a priority.

We allowed some of our study participants to actively choose which idea they would later work on. Participants who received this opportunity experienced increased empowerment and engagement, identified more with the idea and were more committed to it. They also performed better in an activity related to this idea. In their review of the change literature, Oreg, Vakola, and Armenakis (2011) had already recognized participation as crucial for the success of change endeavors. In light of this overwhelming evidence we encourage companies who are involved in the integration of external resources to render employee participation in decision processes possible. One obvious option is to offer the employees who will later be tasked with the implementation or who might fear being most strongly affected by it, the opportunity to participate in the evaluation and selection of external input. In the case of an idea contest employees could be made part of the panel that selects the winning ideas.

The experimental studies described here empirically addressed how users and their ideas can be successfully incorporated into the first steps of a company's open innovation process – obtaining and integrating external innovations (West & Bogers, 2014). The involvement of users is particularly valuable for sustainability innovation (Belz & Bilharz, 2007; Heiskanen et al., 2005; Hoffmann, 2007), however, previous research has mainly considered technical solutions to increase user participation in idea contests (Ebner et al., 2009; Leimeister et al., 2009; Piller & Walcher, 2006) and monetary and other tangible benefits neglecting other sources of motivation (West & Bogers, 2014). We address this gap by introducing leadership and climate as motivational factors, which are established in the literature on knowledge management (DeTienne et al., 2004; Politis, 2001; Srivastava et al., 2006) and innovation (Hammond et al., 2011; Hülshager et al., 2009). We extend previous discussions on how to take advantage of the results of idea contests, which, so far, have mainly revolved around absorptive capacity (West & Bogers, 2014) by considering the supervisor's leadership style, employees' participation in decision-making and the anonymity of the source of the idea as critical factors in overcoming employee-related barriers to the effective utilization of external inputs. These studies are some of the first that consider the impact of leadership style and climate displayed by an idea contest on participating users' performance quality and quantity, and their affective and cognitive reactions and behavioral intentions with regard to that contest. Furthermore, we include the subsequent need of the organizing company to integrate

the contest results, a previously neglected process within the open innovation literature. The experimental approach taken allows us to investigate causal relationships addressing a methodological shortcoming of the literature on idea contests, which, so far, has been dominated by case studies (Adamczyk, 2012).

We offer several contributions to literature and praxis. Our results provide insights into the effective framing of idea contests to increase user participation via psychological and managerial enablers. The leadership style employed in directing participating users effort needs to be carefully considered when creating an idea contest as transformational and transactional leadership show different effects on the quantity and quality of submitted ideas, also dependent on the target population of the contest. We also offer evidence on the influence of organizational factors that facilitate the integration of user ideas originating from idea contests into organizations. Here, the beneficial effects of transformational leaders based on their compelling vision and their ability to increase users' self-efficacy, intellectual curiosity, and imagination (Avolio et al., 1999; Bass, 1985; Pillai & Williams, 2004) are clearly shown. In line with previous evidence (Braun, Peus et al., 2013), we encourage the development of transformational leaders in companies aiming to profit from open innovation processes. Being able to participate in decision-making positively affected employees' commitment and performance in implementing a selected idea. Matching previous research on the related topic of organizational change (Oreg et al., 2011), we suggest that companies that depend on the utilization of external resources should design their decision processes in a way that employees are included and their voices heard increasing the adoption of external inputs.

At the same time, research has limitations. Findings are based on four experimental studies, three of which were conducted using student samples. The experimental method allowed us to establish causal relationships between the variables of interest and laboratory experiments have high internal validity, but the external validity is limited. Hence, we suggest complementing laboratory experiments with field studies in the future. While it has been argued that student samples are of value for research in psychology and management and their use is common, because we found differing results in our working adult sample compared to the student samples, we encourage future research with a variety of alternative samples. In particular, students have less experience as followers within company structures possibly decreasing the importance attributed to related elements. In addition, within the ExperimentTUM lab, students are used to receiving (competitive) performance-based rewards. The equal payout in our studies, while intended to eliminate the influence of a monetary reward from our results, might have led to perceptions of a cooperative climate resulting in the low perceptions of competition over all conditions. Field experiments where the setting of the realization does not carry inherent expectations could strengthen our findings. Future studies should also attempt to transfer a broader spectrum of independent variables established in research on knowledge management and innovation in organizations as essential for success to the specific context of open sustainability innovation and investigate relations with factors unique to the new context. A possible example could be the inclusion of both technical drivers of user motivation to participate in idea contests like communication and social profile functionalities of online idea contests and psychological drivers like the contest climate.

CONCLUSION

The integration of users into companies' open sustainability innovation processes is crucial not only for company success but also for establishing a sustainable lifestyle. We extend the current knowledge on success factors for idea contests used to generate and acquire innovative user ideas by focusing on leadership and climate as antecedents of users' motivation to participate. Leadership and participative decision-making are identified as enablers of the subsequent absorption of ideas created in idea contests, which contribute to sustainability-oriented innovation in companies. Our results offer guidance for companies aiming to benefit from integrating their users into the early stages of their innovation process.

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APPENDIX

Appendix A: Measures and Results for Study 1a

Manipulation checks

We used five items adapted from the Multifactor Leadership Questionnaire (MLQ 5x-short, Bass & Avolio, 1995) with a German translation from Felfe (2006) as manipulation check for TFL and four items for TAL. A sample item for TFL is “The CEO articulates a compelling vision of the future.” and Cronbach’s alpha was .67. For TAL, a sample item is “The CEO keeps track of all mistakes.” and Cronbach’s alpha was .64. The likert scale ranged from 1 (not at all true) to 5 (completely true).

The manipulation check for the climate consisted of four items that measured the degree of competition experienced by the participants. The items were taken from Baer, Leenders, Oldham, and Vadera (2010) and adapted to the context of the present study and rated on a likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Cronbach’s alpha was .84 and a sample item is “While participating in the idea contest, I felt a high degree of competition.”

Psychological empowerment

We adapted the psychological empowerment scale from Spreitzer (1995) and the German translation from Szenassy (2009) to measure the four dimensions meaning, competence, self-determination, and impact with 3 items each. Sample items are “My task in the idea contest was very important to me.” for meaning, “I was confident about my ability to do my task in the idea contest.” for competence, “I had significant autonomy in determining how I do my task in the idea contest.” for self-determination, and “I had a great deal of control over what happened in the idea contest.” for impact. All items were assessed on a likert scale ranging from 1 (strongly disagree) to 5 (strongly agree) and Cronbach’s alpha was .87 for meaning, .88 for competence, .80 for self-determination, and .78 for impact, respectively.

Attitudes.

A semantic differential combining the measures from Franke, Keinz, and Steger (2009) and Taylor and Todd (1995) was used to measure attitudes towards the participation in the idea contest. The five five-point scales used were “bad – good”, “foolish – wise”, “dislike – like”, “unpleasant – pleasant”, and “not appealing – appealing”. Cronbach’s alpha was .90.

Perceived usefulness.

We assessed perceived usefulness of the idea contest with four items adapted from Davis et al. (1989) on a scale ranging from 1 (strongly disagree) to 5 (strongly agree). A sample item is “Participating in the idea contest helped satisfy my social needs.” and Cronbach’s alpha was .75.

Word-of-mouth.

We adapted the eight items for positive and negative valence word-of-mouth from Goyette et al. (2010) to assess participants’ intentions to engage in word-of-mouth behavior. Cronbach’s alpha was .91 and a sample item is “I would speak of this idea contest’s good sides.”

Involvement.

Six semantic differential scales from Franke et al. (2009) based on Zaichkowsky (1985) were taken to measure participants’ personal involvement. The scales are “doesn’t matter –

matters”, “unimportant – important”, “useless – useful”, “boring – interesting”, “not needed – needed”, and “nonessential – essential”. Cronbach’s alpha reached .89.

Future participation.

Participants’ intentions to take part in future idea contests were assessed with three items adapted from Lin (2006) based on Taylor and Todd (1995). A sample item is “I intend to participate in idea contests in the future.” and Cronbach’s alpha was .90.

Satisfaction.

The overall satisfaction with the idea contest experience was measured with four semantic differential scales based on Spreng, MacKenzie, and Olshavsky (1996). The scales are “dissatisfied – satisfied”, “displeased – pleased”, “frustrated – contented”, and “terrible – delighted”. Cronbach’s alpha was .87.

Quality of the submitted ideas.

We used the consensual assessment technique (CAT) developed by Amabile (1983) to evaluate the quality of participants’ submitted ideas in line with previous research on idea contests (Piller & Walcher, 2006). In addition to the 4 dimensions *creativity* (called originality), *expected customer benefit*, *number of expected beneficiaries* of the ideas, and *level of elaboration* used by Piller and Walcher (2006) we introduce a fifth dimension, the *expected company benefit*, because some ideas that might be beneficial for customers could create cost for the company while other ideas that are aimed at improving the processes within the company might not be relevant for the customers. Two judges rated the single submitted ideas of each participant separately on all five dimensions.

The resulting experts’ judgments were positively correlated for all dimensions of idea quality (creativity: $r = .79$, $p < .001$; expected customer benefit: $r = .60$, $p < .001$; number of expected beneficiaries: $r = .58$, $p < .001$; expected company benefit: $r = .50$, $p < .001$; elaboration: $r = .84$, $p < .001$). Interrater reliability computed as intraclass correlation (Shrout & Fleiss, 1979) was .83, $p < .001$ for creativity, .63, $p < .001$ for the expected customer benefit, .67, $p < .001$ for the number of expected beneficiaries, .52, $p < .001$ for the expected company benefit, and .83, $p < .001$ for elaboration, respectively, indicating a good overall agreement between the two judges (LeBreton & Senter, 2008). Therefore, we use the mean of the two judges ratings as values for the dimensions of the quality of the submitted ideas.

Quantity of the submitted ideas.

Participants were asked to clearly separate their single ideas during the idea generation task. We counted these individual ideas to assess the amount of ideas submitted by a specific person.

Controls.

We also collected participants’ age, gender, whether they were employed in a paid job at the time, and the importance personally attributed to sustainability.

Results

Table 1 shows the means, standard deviations, and bivariate correlations for the variables in Study 1a.

Manipulation checks.

Participants in the TAL condition scored higher on the TAL scale ($M = 2.95$, $SD = .64$) than participants in the TFL condition ($M = 2.40$, $SD = .68$) ($t(1,122) = 1.16$, $p < .001$). In the TFL

condition, participants scored higher on the TFL scale ($M = 3.65$, $SD = .66$) compared to participants in the TAL condition ($M = 3.54$, $SD = .64$). Although this latter difference was not significant ($t(1,122) = .09$, *ns.*), we can conclude that the manipulation for leadership was successful. The leadership condition did not affect the manipulation check for the climate conditions.

Participants rated the climate to be more competitive ($M = 1.92$, $SD = .73$) in the competition condition than in the cooperative condition ($M = 1.56$, $SD = .66$) ($t(1,122) = 1.34$, $p < .01$). The climate manipulation did not influence the leadership manipulation checks. Thus, the climate manipulation can be considered successful.

Ratings of idea quality and quantity.

We conducted a series of ANOVAs with the leadership and climate manipulations and their interaction as independent variables while controlling for participants age, gender and employment status. Creativity was rated significantly higher in the competitive condition ($M = 1.83$, $SD = .83$) than in the cooperative condition ($M = 1.55$, $SD = .68$) ($F(1,118) = 4.35$, $p < .05$, $\eta^2 = .04$). In addition, elaboration was also rated significantly higher in the competitive condition ($M = 3.65$, $SD = 1.07$) than in the cooperative condition ($M = 3.31$, $SD = .93$) ($F(1,118) = 3.98$, $p < .05$, $\eta^2 = .04$). Furthermore, the climate X leadership interaction was significant for the customer benefit ($F(1,118) = 5.59$, $p < .05$, $\eta^2 = .05$). The interaction effect was also significant for the quantity of ideas ($F(1,118) = 3.94$, $p < .05$, $\eta^2 = .04$). Simple contrasts suggested that transactional leadership, as a tendency, induced users to submit more ideas in a cooperative climate compared to a competitive climate while its effectiveness for customer benefit was higher in a competitive climate. Means and standard deviations for all conditions are presented in Table 2.

Participant perceptions and intentions.

ANOVAs were also conducted for the dimensions of empowerment, attitudes, perceived usefulness, word-of-mouth, involvement, future participation, and satisfaction as dependent variables and the importance of sustainability was added as additional control variable. Participants perceived a significantly lower usefulness in the TFL condition ($M = 2.12$, $SD = .82$) than in the TAL condition ($M = 2.44$, $SD = .84$) ($F(1,118) = 4.03$, $p < .05$, $\eta^2 = .04$). The main effect of climate on intentions to participate in future idea contests reached marginal significance ($F(1,118) = 3.83$, $p < .1$, $\eta^2 = .03$) with higher ratings for competition ($M = 3.76$, $SD = .89$) compared to cooperation ($M = 3.41$, $SD = .96$).

Table 1

Overall means, standard deviations, and correlations in Study 1a

| | N | M | SD | 1 | 2 | 3 | 4 | 5 | 6 |
|----------------------------|-----|------|------|-------|-------|---------|---------|------|-------|
| 1. Leadership | 122 | 1.69 | .78 | | | | | | |
| 2. Climate | 122 | 4.54 | .74 | -.02 | | | | | |
| 3. Creativity | 122 | 4.34 | .68 | -.10 | -.18 | | | | |
| 4. Customer benefit | 122 | 3.18 | .71 | -.13 | -.07 | .02 | | | |
| 5. Number of beneficiaries | 122 | 3.45 | 1.01 | -.04 | -.06 | -.32*** | .63*** | | |
| 6. Company Benefit | 122 | 6.93 | 3.20 | .10 | .12 | -.14 | -.39*** | -.09 | |
| 7. Elaboration | 122 | 3.56 | 1.00 | -.00 | -.16 | .49*** | .21* | .04 | .18* |
| 8. Quantity of ideas | 122 | 4.02 | .87 | -.03 | .00 | -.33*** | -.07 | .06 | -.14 |
| 9. Meaning | 122 | 4.27 | .80 | -.07 | -.09 | -.01 | .05 | .00 | -.07 |
| 10. Competence | 122 | 3.63 | .98 | -.08 | -.13 | .06 | -.01 | .09 | -.03 |
| 11. Self-determination | 122 | 3.93 | .77 | -.07 | -.00 | .12 | .05 | .05 | -.10 |
| 12. Impact | 122 | 2.30 | .85 | -.04 | -.05 | .10 | -.06 | -.09 | .03 |
| 13. Attitudes | 122 | 3.65 | .77 | -.11 | -.16 | .04 | .16 | .08 | -.14 |
| 14. Perceived usefulness | 122 | 3.33 | .86 | -.23* | -.15 | -.04 | .12 | .04 | .02 |
| 15. Word-of-mouth | 122 | 3.58 | .9 | -.01 | -.14 | .08 | .08 | -.02 | -.13 |
| 16. Involvement | 122 | 3.69 | .66 | -.05 | -.03 | -.13 | .10 | .09 | -.01 |
| 17. Future participation | 122 | 1.51 | .50 | -.02 | -.18* | -.03 | .07 | .00 | -.11 |
| 18. Satisfaction | 122 | 1.49 | .50 | .06 | -.13 | -.05 | .18* | .08 | -.21* |

Note. *p < .05, **p < .01, ***p < .001. Leadership style is coded as 1 transactional, 2 transformational. Climate is coded as 1 competitive, 2 cooperative.

| | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 |
|----------------------------|---------|------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 1. Leadership | | | | | | | | | | | |
| 2. Climate | | | | | | | | | | | |
| 3. Creativity | | | | | | | | | | | |
| 4. Customer benefit | | | | | | | | | | | |
| 5. Number of beneficiaries | | | | | | | | | | | |
| 6. Company Benefit | | | | | | | | | | | |
| 7. Elaboration | | | | | | | | | | | |
| 8. Quantity of ideas | -.57*** | | | | | | | | | | |
| 9. Meaning | .04 | .18 | | | | | | | | | |
| 10. Competence | .04 | .20* | .54*** | | | | | | | | |
| 11. Self-determination | -.03 | .07 | .31** | .27** | | | | | | | |
| 12. Impact | .08 | -.03 | .51*** | .33*** | .63*** | | | | | | |
| 13. Attitudes | .16 | .06 | .68*** | .55*** | .16 | .38*** | | | | | |
| 14. Perceived usefulness | -.15 | .10 | .41*** | .19* | .18* | .29** | .35*** | | | | |
| 15. Word-of-mouth | .03 | -.00 | .55*** | .26** | .23* | .38*** | .59*** | .43*** | | | |
| 16. Involvement | -.03 | .14 | .70*** | .33*** | .14 | .35*** | .65*** | .53*** | .72*** | | |
| 17. Future participation | -.01 | .13 | .47*** | .26** | -.01 | .19 | .48*** | .29** | .43*** | .47*** | |
| 18. Satisfaction | -.08 | .18* | .52*** | .34*** | .17 | .30** | .58*** | .48*** | .66*** | .72*** | .43*** |

Table 2

Means for each condition in Study 1a

| | Competition | | Cooperation | |
|-------------------------|-------------|-------------|-------------|-------------|
| | TFL | TAL | TFL | TAL |
| Creativity | 1.73 (.65) | 1.93 (.96) | 1.50 (.49) | 1.61 (.92) |
| Customer benefit | 4.37 (.87) | 4.83 (.49) | 4.53 (.73) | 4.44 (.78) |
| Number of beneficiaries | 4.32 (.68) | 4.44 (.70) | 4.30 (.57) | 4.28 (.78) |
| Company Benefit | 3.24 (.72) | 2.93 (.80) | 3.24 (.56) | 3.29 (.69) |
| Elaboration | 3.56 (.78) | 3.64 (1.32) | 3.32 (.88) | 3.26 (.97) |
| Quantity of ideas | 7.16 (3.13) | 6.67 (3.27) | 6.47 (2.71) | 7.40 (3.69) |
| Meaning | 3.45 (1.03) | 3.87 (.75) | 3.54 (1.16) | 3.39 (1.01) |
| Competence | 4.05 (.92) | 4.22 (.59) | 3.86 (1.07) | 3.97 (.81) |
| Self-determination | 4.24 (.93) | 4.30 (.89) | 4.19 (.77) | 4.34 (.58) |
| Impact | 3.62 (1.03) | 3.74 (.93) | 3.56 (1.05) | 3.60 (.93) |
| Attitudes | 3.95 (.74) | 4.16 (.56) | 3.75 (.87) | 3.87 (.85) |
| Perceived usefulness | 2.12 (.75) | 2.74 (.94) | 2.09 (.86) | 2.25 (.68) |
| Word-of-mouth | 3.69 (.68) | 3.84 (.74) | 3.64 (.93) | 3.45 (.69) |
| Involvement | 3.27 (.76) | 3.43 (.87) | 3.31 (.99) | 3.31 (.85) |
| Future participation | 3.65 (1.00) | 3.85 (.70) | 3.47 (.97) | 3.35 (.93) |
| Satisfaction | 3.73 (.64) | 3.81 (.62) | 3.72 (.76) | 3.48 (.60) |

Note. Ratings were given on 7-point scales (0 to 6) for quality dimensions and on 5-point scales (1 to 5) for the reactions and intentions.

Appendix B: Measures and Results for Study 1b

Manipulation checks

We used the same five items for TFL, four items for TAL, and four items for climate as in Study 1a. Cronbach's alpha was .73. for TFL, .85 for TAL, and .68 for climate.

Psychological empowerment.

The Cronbachs' alphas over three items each for the four dimensions of empowerment were .88 for meaning, .72 for competence, .84 for self-determination, and .83 for impact, respectively.

Attitudes.

Cronbach's alpha for the semantic differential was .89.

Perceived usefulness.

The four items for perceived usefulness reached a Cronbach's alpha of .74.

Word-of-mouth.

Cronbach's alpha was .87 for the eight items for word-of-mouth.

Involvement.

The six semantic differentials reached a Cronbach's alpha of .89.

Future participation.

Participants' intentions to take part in future idea contests were assessed with the same three items as before and Cronbach's alpha was .87.

Satisfaction.

The four semantic differential scales for the overall satisfaction with the idea contest experience had a Cronbach's alpha of .89.

Quality of the submitted ideas.

We again used the consensual assessment technique (CAT) developed by Amabile (1983) to evaluate the quality of participants' submitted ideas in line with previous research (Piller & Walcher, 2006). Two judges rated each participant's total contribution on all five dimensions.

The resulting experts' judgments of all dimensions of idea quality were positively correlated (creativity: $r = .77$, $p < .001$; expected customer benefit: $r = .72$, $p < .001$; number of expected beneficiaries: $r = .41$, $p < .001$; expected company benefit: $r = .78$, $p < .001$; elaboration: $r = .69$, $p < .001$). The intraclass correlation was .81, $p < .001$ for creativity, .82, $p < .001$ for the expected customer benefit, .57, $p < .01$ for the number of expected beneficiaries, .82, $p < .001$ for the expected company benefit, and .80, $p < .001$ for elaboration, leading us to again use the mean of the two judges ratings as values for the dimensions of the quality of the submitted ideas.

Quantity of the submitted ideas.

Participants individual ideas were again counted to assess the amount of ideas submitted by a specific person.

Controls.

We also collected participants' age, gender, whether they were employed in a paid job at the time, and the importance personally attributed to sustainability.

Results

The means, standard deviations, and bivariate correlations for the variables in Study 1b are shown in Table 3.

Manipulation checks.

In contrast to our expectations, participants rated themselves higher on the TFL scale ($t(1,44) = .25, ns.$) in the TAL condition ($M = 3.64, SD = .63$) than in the TFL condition ($M = 3.60, SD = .55$) and higher on the TAL scale ($t(1,44) = -.47, ns.$) in the TFL condition ($M = 2.79, SD = .54$) than in the TAL condition ($M = 2.67, SD = 1.00$). Climate was rated to be more competitive in the competitive condition ($M = 2.06, SD = .47$) than in the cooperative condition ($M = 1.94, SD = .62$), but this difference was also not significant ($t(1,44) = .74, ns.$). Nonetheless, since all the differences in means were rather small and not significant and the sample size is also small, we decided to tentatively move forward with our analyses, as we were most interested to assess whether patterns found in Study 1a would carry over to a different sample.

Ratings of idea quality and quantity.

Our ANOVAs with leadership and climate as independent variables and age, gender, and employment status as controls show a significant main effect of leadership on the number of beneficiaries ($F(1,44) = 4.29, p < .05, \eta^2 = .11$), with a higher mean in the TAL ($M = 4.50, SD = 1.12$) than in the TFL condition ($M = 3.83, SD = 1.10$). The quantity of ideas was also rated higher in the TAL ($M = 5.45, SD = 2.46$) than in the TFL condition ($M = 4.38, SD = 1.94$) ($F(1,44) = 4.78, p < .05, \eta^2 = .12$). In addition, we found a marginally significant effect ($F(1,44) = 4.06, p < .1, \eta^2 = .10$) for quantity with a higher mean in the competitive ($M = 5.58, SD = 2.43$) compared to the cooperative condition ($M = 4.42, SD = 2.02$).

Participant perceptions and intentions.

Adding the importance of sustainability as additional control, we found satisfaction with the idea contest to be rated significantly higher in the competitive ($M = 4.09, SD = .50$) compared to the cooperative condition ($M = 3.77, SD = .78$) ($F(1,44) = 5.02, p < .05, \eta^2 = .13$).

Table 3

Overall means, standard deviations, and correlations in Study 1b

| | N | M | SD | 1 | 2 | 3 | 4 | 5 | 6 |
|----------------------------|----|------|------|-------|------|------|--------|-------|------|
| 1. Leadership | 44 | 1.48 | .50 | | | | | | |
| 2. Climate | 44 | 1.55 | .50 | -.13 | | | | | |
| 3. Creativity | 44 | 1.90 | 1.22 | .12 | -.23 | | | | |
| 4. Customer benefit | 44 | 4.19 | 1.35 | -.19 | -.14 | .08 | | | |
| 5. Number of beneficiaries | 44 | 4.20 | 1.15 | -.31* | -.08 | -.09 | .67*** | | |
| 6. Company Benefit | 44 | 2.05 | 1.38 | .12 | .06 | .30 | -.46** | -.24 | |
| 7. Elaboration | 44 | 3.38 | 1.23 | .25 | .08 | .36* | -.22 | -.31* | .33* |
| 8. Quantity of ideas | 44 | 4.25 | 1.92 | -.20 | -.29 | .19 | .49** | .50** | -.06 |
| 9. Meaning | 44 | 3.72 | .76 | .04 | -.10 | .21 | -.08 | -.18 | .11 |
| 10. Competence | 44 | 3.58 | .74 | .09 | -.19 | .17 | -.07 | -.09 | .20 |
| 11. Self-determination | 44 | 4.14 | .75 | -.10 | .15 | -.13 | -.12 | .06 | .21 |
| 12. Impact | 44 | 3.49 | .85 | .22 | .06 | .08 | -.16 | -.10 | .28 |
| 13. Attitudes | 44 | 4.05 | .71 | .02 | -.18 | .10 | -.17 | .04 | .30 |
| 14. Perceived usefulness | 44 | 3.49 | .72 | .11 | -.19 | .26 | -.13 | .08 | .23 |
| 15. Word-of-mouth | 44 | 3.88 | .69 | -.07 | -.07 | .01 | -.06 | .04 | .19 |
| 16. Involvement | 44 | 3.65 | .85 | -.06 | -.10 | .27 | .04 | .14 | .13 |
| 17. Future participation | 44 | 3.94 | .83 | -.08 | .14 | -.10 | -.02 | .07 | .05 |
| 18. Satisfaction | 44 | 3.89 | .69 | .05 | -.20 | .10 | .06 | .17 | .15 |

Note. *p < .05, **p < .01, ***p < .001. Leadership style is coded as 1 transactional, 2 transformational. Climate is coded as 1 competitive, 2 cooperative.

| | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 |
|----------------------------|-------|------|--------|------|-------|------|--------|--------|--------|--------|-------|
| 1. Leadership | | | | | | | | | | | |
| 2. Climate | | | | | | | | | | | |
| 3. Creativity | | | | | | | | | | | |
| 4. Customer benefit | | | | | | | | | | | |
| 5. Number of beneficiaries | | | | | | | | | | | |
| 6. Company Benefit | | | | | | | | | | | |
| 7. Elaboration | | | | | | | | | | | |
| 8. Quantity of ideas | -.31* | | | | | | | | | | |
| 9. Meaning | .38* | .12 | | | | | | | | | |
| 10. Competence | .11 | .09 | .50** | | | | | | | | |
| 11. Self-determination | .09 | -.15 | .04 | -.24 | | | | | | | |
| 12. Impact | .16 | -.18 | -.14 | -.18 | .49** | | | | | | |
| 13. Attitudes | .03 | .14 | .47** | .36* | .31* | .18 | | | | | |
| 14. Perceived usefulness | .28 | .13 | .47** | .26 | .38* | .30* | .62*** | | | | |
| 15. Word-of-mouth | .08 | .20 | .43** | .15 | .38* | .22 | .68*** | .60*** | | | |
| 16. Involvement | .12 | .28 | .51*** | .28 | .21 | .18 | .66*** | .63*** | .78*** | | |
| 17. Future participation | .01 | -.02 | .33* | .13 | .35* | .14 | .37* | .25 | .53*** | .43** | |
| 18. Satisfaction | -.09 | .29 | .26 | .11 | .32* | .29 | .65*** | .41** | .74*** | .65*** | .44** |

Appendix C: Measures and Results for Study 1c

Manipulation checks

The same manipulation checks from the previous studies were used. Cronbach's alpha was .91. for TFL, .85 for TAL, and .75 for climate.

Psychological empowerment.

The Cronbachs' alphas for the four dimensions of empowerment were .92 for meaning, .89 for competence, .90 for self-determination, and .88 for impact.

Attitudes.

Cronbach's alpha for the semantic differential was .94.

Perceived usefulness.

Cronbach's alpha for the four items for perceived usefulness was .89.

Word-of-mouth.

For the eight items for word-of-mouth Cronbach's alpha was .85.

Involvement.

The six semantic differentials had a Cronbach's alpha of .95.

Future participation.

Cronbach's alpha was .79 for participants' intentions to take part in future idea contests.

Satisfaction.

The four semantic differential scales for the overall satisfaction with the idea contest experience had a Cronbach's alpha of .93.

Quality of the submitted ideas.

One of the previous judges again rated the quality of all individual ideas submitted by the participants on the five dimensions creativity, customer benefit, number of beneficiaries, company benefit and elaboration. As before, we use the respective means per participant as scores for the analyses.

Quantity of the submitted ideas.

We counted participants individual ideas to determine the amount of ideas submitted by a specific person.

Controls.

We also collected participants' age, gender, and the importance personally attributed to sustainability.

Results

The means, standard deviations, and bivariate correlations for the variables in Study 1c are shown in Table 4.

Manipulation checks.

Participants scored higher on the TFL scale in the TFL condition ($M = 3.77$, $SD = .80$) than participants in the TAL condition ($M = 3.61$, $SD = .99$) ($t(1,103) = -.88$, *ns.*). On the TAL scale, scores of the TAL ($M = 3.13$, $SD = 1.02$) and TFL conditions ($M = 3.13$, $SD = .74$) were very

similar ($t(1,103) = .01, ns.$). Participants rated the climate to be more competitive ($M = 2.02, SD = .71$) in the competition condition than in the cooperative condition ($M = 1.88, SD = .62$) ($t(1,103) = .88, ns.$). Although the mean differences for all manipulation checks were not significant, the pattern largely matches our expectations and we continued with our analyses.

Ratings of idea quality and quantity.

We again conducted ANOVAs with leadership and climate as independent variables and age and gender as control variables. Creativity was rated significantly higher in the TFL condition ($M = 1.01, SD = .64$) compared to the TAL condition ($M = .76, SD = .64$) ($F(1,100) = 4.81, p < .05, \eta^2 = .05$). We found a marginally significant effect of climate ($F(1,100) = 3.04, p < .1, \eta^2 = .03$) for customer benefit with a higher mean in the cooperative ($M = 4.71, SD = .49$) than in the competitive condition ($M = 4.48, SD = .99$). The number of expected beneficiaries was also rated significantly higher in the TFL ($M = 3.75, SD = .78$) than in the TAL condition ($M = 3.57, SD = .99$) ($F(1,100) = 4.51, p < .05, \eta^2 = .05$).

Participant perceptions and intentions.

We replaced the control variables with the more relevant importance of sustainability when considering dependent variables from the questionnaire. We found a significant climate X leadership interaction for the perceived usefulness of the idea contest ($F(1,103) = 5.46, p < .05, \eta^2 = .05$) and a marginally significant interaction effect for satisfaction ($F(1,103) = 3.89, p < .1, \eta^2 = .04$). Simple contrasts indicated that within a cooperative climate transactional leadership led to a significantly higher perceived usefulness and a higher satisfaction than transformational leadership while the means in the competitive climate indicate opposite effects, which though failed to reach significance. In addition, the dimension meaning from psychological empowerment was rated marginally higher in the cooperative ($M = 3.95, SD = .80$) compared to the competitive condition ($M = 3.57, SD = 1.07$) ($F(1,103) = 2.97, p < .1, \eta^2 = .03$).

Table 4

Overall means, standard deviations, and correlations in Study 1c

| | N | M | SD | 1 | 2 | 3 | 4 | 5 | 6 |
|----------------------------|-----|------|------|-------|------|--------|--------|------|------|
| 1. Leadership | 103 | 1.48 | .50 | | | | | | |
| 2. Climate | 103 | 1.49 | .50 | .09 | | | | | |
| 3. Creativity | 103 | .88 | .64 | .20* | -.06 | | | | |
| 4. Customer benefit | 103 | 4.59 | .79 | .03 | .13 | .14 | | | |
| 5. Number of beneficiaries | 103 | 3.66 | .88 | -.20* | .10 | -.33** | .68*** | | |
| 6. Company Benefit | 103 | 4.04 | .86 | .05 | .06 | .43** | .51*** | .21* | |
| 7. Elaboration | 103 | 2.37 | 1.55 | -.05 | -.13 | .25* | -.21* | -.14 | -.01 |
| 8. Quantity of ideas | 103 | 4.65 | 2.96 | .02 | -.04 | -.09 | .20* | .10 | .03 |
| 9. Meaning | 103 | 3.75 | .97 | -.07 | .20* | .11 | .13 | -.02 | .16 |
| 10. Competence | 103 | 3.91 | .88 | -.01 | .09 | .12 | .12 | .02 | .14 |
| 11. Self-determination | 103 | 4.50 | .76 | -.08 | .13 | -.02 | -.12 | -.11 | -.03 |
| 12. Impact | 103 | 4.04 | .90 | -.08 | .01 | .02 | -.12 | -.10 | -.07 |
| 13. Attitudes | 103 | 4.20 | .77 | -.05 | .07 | .13 | .03 | -.08 | .15 |
| 14. Perceived usefulness | 103 | 3.22 | 1.08 | -.10 | .05 | .07 | .09 | .01 | .08 |
| 15. Word-of-mouth | 103 | 3.92 | .72 | .04 | .12 | .05 | -.02 | -.15 | .02 |
| 16. Involvement | 103 | 3.95 | .90 | -.03 | .18 | .08 | .06 | -.04 | .08 |
| 17. Future participation | 103 | 4.08 | .79 | -.04 | .02 | .16 | -.03 | -.09 | .01 |
| 18. Satisfaction | 103 | 4.09 | .78 | -.11 | .11 | .15 | .10 | -.01 | .17 |

Note. *p < .05, **p < .01, ***p < .001. Leadership style is coded as 1 transactional, 2 transformational. Climate is coded as 1 competitive, 2 cooperative.

| | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 |
|----------------------------|---------|------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 1. Leadership | | | | | | | | | | | |
| 2. Climate | | | | | | | | | | | |
| 3. Creativity | | | | | | | | | | | |
| 4. Customer benefit | | | | | | | | | | | |
| 5. Number of beneficiaries | | | | | | | | | | | |
| 6. Company Benefit | | | | | | | | | | | |
| 7. Elaboration | | | | | | | | | | | |
| 8. Quantity of ideas | -.52*** | | | | | | | | | | |
| 9. Meaning | .07 | .13 | | | | | | | | | |
| 10. Competence | -.04 | .20* | .74*** | | | | | | | | |
| 11. Self-determination | .09 | .00 | .45*** | .56*** | | | | | | | |
| 12. Impact | .10 | .09 | .49*** | .62*** | .75*** | | | | | | |
| 13. Attitudes | .08 | .13 | .72*** | .66*** | .45*** | .53*** | | | | | |
| 14. Perceived usefulness | .05 | -.04 | .70*** | .53*** | .19 | .34** | .64*** | | | | |
| 15. Word-of-mouth | .05 | .08 | .67*** | .57*** | .39*** | .45*** | .74*** | .69*** | | | |
| 16. Involvement | .02 | .01 | .75*** | .59*** | .27** | .42*** | .74*** | .79*** | .76*** | | |
| 17. Future participation | .04 | .04 | .53*** | .46*** | .29** | .47*** | .55*** | .54*** | .66*** | .62*** | |
| 18. Satisfaction | .02 | .04 | .68*** | .56*** | .20* | .43*** | .72*** | .80*** | .75*** | .82*** | .66*** |

Appendix D: Measures and Results for Study 2

Manipulation checks

We used the same three items each as van Dierendonck, Stam, Boersma, Windt, and Alkema (2014) from Podsakoff et al. (1990) and Rafferty and Griffin (2004) as manipulation check for TFL and TAL adding a fourth item for TFL from the same sources. The German translation was based on Krause and Kobald (2013). A sample item for TFL is “My supervisor has a clear understanding of where the company is going.” and Cronbach’s alpha was .72. For TAL, a sample item is “My supervisor always gives me feedback when I perform well.” and Cronbach’s alpha was .84. The likert scale ranged from 1 (strongly disagree) to 5 (strongly agree).

The manipulation check for the participation consisted of three items that measured the degree of involvement of the participants in the selection of the idea to be implemented. The items were created for this study and rated on a likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Cronbach’s alpha was .78 and a sample item is “I could participate in the selection of the idea.” In addition, at the very end of the questionnaire participants were asked whether they were allowed to choose one out of three ideas.

For the anonymity of the idea submitter, the manipulation check consisted of three items that assessed what participants knew about the origin of the selected idea. The items were also created for this study and rated on a likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Cronbach’s alpha was .89 and a sample item is “I know who submitted the selected idea.”

In addition, at the very end of the questionnaire participants were asked whether they were allowed to choose one out of three ideas and whether the inventor of the selected idea was introduced to them to check their diligence.

Psychological empowerment.

To measure psychological empowerment we adapted the scale from Spreitzer (1995) and the German translation from Szenassy (2009). Each of the four dimensions meaning, competence, self-determination, and impact was measured with 3 items. Sample items are “My task in the idea contest was very important to me.” for meaning, “I was confident about my ability to do my task in the idea contest.” for competence, “I had significant autonomy in determining how I do my task in the idea contest.” for self-determination, and “I had a great deal of control over what happened in the idea contest.” for impact. All items were assessed on a likert scale ranging from 1 (strongly disagree) to 5 (strongly agree) and Cronbach’s alpha was .87 for meaning, .92 for competence, .86 for self-determination, and .89 for impact, respectively.

Psychological safety.

We adapted the 7-item scale of Edmondson (1999) to our Green Bike context to measure psychological safety on a scale ranging from 1 (strongly disagree) to 5 (strongly agree). Cronbach’s alpha was .91 and a sample item is “It is safe to take a risk at Green Bike.”

Commitment to the idea.

To assess participants’ commitment to the selected idea, we adapted the 6 items measuring affective commitment from Herscovitch and Meyer’s (2002) commitment to change scale. A sample item is “I believe in the value of this idea.” and Cronbach’s alpha was .86.

Identification with the idea.

We used two measures to assess participants' identification with the selected idea. First we employed Shamir and Kark's (2004) graphic single-item identification scale asking participants to indicate which of the 7 configurations of overlapping circles of the venn-diagram most represented their identification with the idea. We then also used 4 items adapted from the German version (Borkowski, 2011) of Mael and Ashforth's (1992) leader identification scale as a second way of capturing participants' identification with the idea. Cronbach's alpha was .67 and a sample item is "I am very interested in what other people think about my idea."

Implementation intention.

We adapted the two items from Bagozzi, Dholakia, and Basuroy (2003) to assess participants' intentions to implement the selected idea. The items are "The strength of my actual intention to implement the selected innovative idea can best be described as: 'no intention at all,' 'very weak intention,' 'weak intention,' 'moderately strong intention,' 'strong intention,' 'very strong intention.'" and "I intend to perform the actions necessary to implement the selected innovative idea: 'no chance at all,' 'highly unlikely,' 'neither unlikely nor likely,' 'likely,' 'highly likely,' 'one hundred percent likely.'" with a Cronbach's alpha of .82.

Engagement.

To measure participants' engagement towards the idea we adapted Lee and Allen's (2002) organizational citizenship behavior scale. We adjusted the scale to refer to the selected innovative idea. A sample item is "I would defend the idea when other employees criticize it." and Cronbach's alpha was .83.

Performance ratings on the flyer task.

We created three otherwise identical versions of a flyer advertising the three ideas. Participants received the flyer matching their scenario or selection and were told in the written instructions that an intern had created this flyer and it was their task as responsible person for the project to revise it before it would be distributed to both customers and colleagues at Green Bike. The flyer always contained eight typing, four punctuation, four font, five formatting, two layout, and one content error. In addition, participants provided ideas for improvement that were categorized as content, wording, or design improvements. Two judges independently assessed participants' performance in both finding errors and providing improvement ideas. The identified errors were then summed up to create a score for deficit correction while the improvements were added to create a score for improvement ideas. The expert judgments were positively correlated (deficit correction: $r = .99$, $p < .001$; improvement ideas: $r = .92$, $p < .001$) and the interrater reliability computed as intraclass correlation (Shrout & Fleiss, 1979) was .99, $p < .001$ for deficit correction and .96, $p < .001$ for improvement ideas.

Controls.

We also collected participants' gender and employment status as control variables.

Results

Table 5 shows the means, standard deviations, and bivariate correlations for the variables in Study 2.

Manipulation checks.

In the TFL condition, participants scored higher on the TFL scale ($M = 3.65$, $SD = .70$) than participants in the TAL condition ($M = 2.86$, $SD = .68$) ($t(1,160) = 7.24$, $p < .001$). However,

participants in the TFL condition also scored higher on the TAL scale ($M = 4.11$, $SD = .66$) compared to participants in the TAL condition ($M = 3.67$, $SD = .78$) ($t(1,160) = 3.85$, $p < .001$). The leadership condition did not significantly affect the manipulation checks for participation in the selection and presentation of the idea inventor.

Participants rated their ability to participate in the selection of the idea significantly higher in the participative condition ($M = 4.05$, $SD = .69$) than in the non-participative condition ($M = 2.27$, $SD = .97$) ($t(1,160) = 13.27$, $p < .001$). The participation manipulation did not influence the other manipulation checks.

When shown information about the user, participants rated their knowledge about the inventor as source of the idea to be higher ($M = 4.48$, $SD = .82$) than in the anonymity condition with general information about the idea contest ($M = 2.46$, $SD = 1.10$) ($t(1,160) = 13.09$, $p < .001$). Again, the other manipulation checks were not significantly influenced.

Performance ratings.

We included the leadership, participation, and inventor information manipulations and their interactions as independent variables in a series of ANOVAs and controlled for participants' gender and employment status. Participants corrected marginally significantly more errors in the participative condition ($M = 6.86$, $SD = 3.96$) than in the non-participative condition ($M = 5.96$, $SD = 4.03$) ($F(1,158) = 3.75$, $p < .1$, $\eta^2 = .03$). In addition, both the leadership X participation ($F(1,158) = 5.19$, $p < .05$, $\eta^2 = .03$) and the leadership X anonymity ($F(1,158) = 4.17$, $p < .05$, $\eta^2 = .03$) interactions significantly influenced participants performance in error correction. Furthermore, the 3-way interaction leadership X participation X anonymity was significant for improvement ideas ($F(1,158) = 5.16$, $p < .05$, $\eta^2 = .03$).

We conducted post-hoc tests (Fisher's LSD) to probe the significant 3-way interaction (due to methodological reasons without controls). In the presence of transactional leadership and participation participants gave significantly more suggestions for improvement when they had information about the user who submitted the idea than without such information. Still in the transactional leadership condition, under anonymity, having the possibility to participate in decision-making led to a significantly lower amount of improvement ideas than without the participation opportunity. Table 6 shows the means for each condition.

Participant perceptions and intentions.

We also conducted ANOVAs for the dimensions of empowerment, psychological safety, commitment to the idea, identification with the idea, implementation intentions, and engagement and added importance of sustainability to the already included control variables gender and employment status. Participants perceived a marginally significantly lower meaning in the non-participative condition ($M = 4.47$, $SD = .65$) than in the participative condition ($M = 4.23$, $SD = .77$) ($F(1,156) = 2.95$, $p < .1$, $\eta^2 = .02$). The main effect of leadership on self-determination was highly significant ($F(1,118) = 15.39$, $p < .001$, $\eta^2 = .10$) with higher ratings for the TFL ($M = 3.88$, $SD = .74$) compared to the TAL condition ($M = 3.40$, $SD = .89$). Participants also rated impact significantly higher in the TFL ($M = 3.58$, $SD = .73$) than the TAL condition ($M = 3.30$, $SD = .96$) ($F(1,156) = 5.19$, $p < .05$, $\eta^2 = .04$) and psychological safety higher in the TFL ($M = 3.83$, $SD = .51$) than the TAL condition ($M = 3.21$, $SD = .70$) ($F(1,156) = 44.07$, $p < .001$, $\eta^2 = .23$).

We found a significant effect of participation ($F(1,156) = 10.13$, $p < .01$, $\eta^2 = .07$) for commitment with a higher mean in the participative ($M = 4.14$, $SD = .62$) than in the non-participative condition ($M = 3.81$, $SD = .76$). The identification scale was also rated

significantly higher in the participative ($M = 3.37$, $SD = .76$) than in the non-participative condition ($M = 3.15$, $SD = .68$) ($F(1,156) = 4.05$, $p < .05$, $\eta^2 = .03$). The same applies when using the venn-diagram as measure of identification (participative condition: $M = 4.59$, $SD = 1.17$; non-participative condition: $M = 4.16$, $SD = 1.28$; $F(1,156) = 7.05$, $p < .01$, $\eta^2 = .05$). Engagement was rated marginally higher in the participative condition ($M = 4.01$, $SD = .59$) than in the non-participative condition ($M = 3.86$, $SD = .59$) ($F(1,156) = 3.91$, $p < .01$, $\eta^2 = .03$).

Moreover, the 3-way interaction leadership X participation X anonymity was significant for engagement ($F(1,156) = 6.68$, $p < .05$, $\eta^2 = .04$). In addition, the 3-way interaction was also significant for meaning ($F(1,156) = 4.17$, $p < .05$, $\eta^2 = .03$) and marginally significant for implementation ($F(1,156) = 3.58$, $p < .1$, $\eta^2 = .02$) as well.

Exploratory analyses using post-hoc tests (Fisher's LSD; conducted without controls) showed that under transformational leadership the combination of participation and information about the user led to significantly lower meaning than having only participation or only user information, while the other combinations did not differ significantly among each other. Under transactional leadership, there were no significant differences in means with regard to the presence of both participation and/or anonymity. Transactional leadership led to a higher meaning than transformational leadership when participation opportunity and user information were present and the latter also differed from a transactional leadership condition with no participation or user information.

The post-hoc tests also show that being able to participate greatly increased engagement when user information was present within a transactional leadership context. With the presence of transformational leadership, participation with anonymity created significantly more engagement than the other combinations that did not differ significantly among themselves. Within the participative condition, transformational leadership led to more engagement than transactional leadership in the absence of user information, while its presence led to the opposite result. Finally, transformational leadership without the opportunity to participate or user information led to significantly less engagement than transactional leadership with both.

In the presence of participation and user information transactional leadership also led to higher implementation intentions than transformational leadership. In the absence of the user information, implementation intentions increased under participation and transformational leadership compared to transactional leadership without participation, as well as with participation when transactional leadership was fixed. Compared to a situation with transactional leadership and participation or transformational leadership and participation but with anonymity, not being able to participate in the decision in a transactional setting with user information led to lower implementation intentions.

Table 5

Overall means, standard deviations, and correlations in Study 2

| | N | M | SD | 1 | 2 | 3 | 4 | 5 |
|------------------------------|-----|------|------|--------|------|---------|-------|------|
| 1. Participation | 160 | 1.48 | .50 | | | | | |
| 2. User information | 160 | 1.46 | .50 | -.02 | | | | |
| 3. Leadership | 160 | 1.52 | .50 | -.02 | .04 | | | |
| 4. Error correction | 160 | 6.48 | 4.09 | .10 | .01 | .02 | | |
| 5. Improvement ideas | 160 | 2.54 | 1.68 | .06 | -.04 | .05 | -.13 | |
| 6. Meaning | 160 | 4.21 | .73 | .06 | .08 | .05 | .04 | -.01 |
| 7. Competence | 160 | 4.33 | .72 | .17* | .05 | -.01 | .04 | .09 |
| 8. Self-determination | 160 | 3.63 | .85 | -.05 | .03 | -.30*** | -.07 | -.02 |
| 9. Impact | 160 | 3.43 | .87 | .01 | -.01 | -.16* | -.12 | -.02 |
| 10. Psychological safety | 160 | 3.51 | .68 | -.02 | .03 | -.47*** | -.14 | .03 |
| 11. Commitment | 160 | 3.97 | .71 | -.22** | -.02 | .04 | -.17* | .07 |
| 12. Identification | 160 | 3.24 | .74 | -.15 | .02 | -.03 | -.13 | .00 |
| 13. Implementation intention | 160 | 4.37 | .92 | -.09 | .06 | -.00 | -.10 | .08 |
| 14. Engagement | 160 | 3.93 | .60 | -.12 | .04 | .06 | -.09 | .12 |

Note. *p < .05, **p < .01, ***p < .001. Participation is coded as 1 participation, 2 no participation. User information is coded as 1 user information, 2 no user information. Leadership style is coded as 1 transformational, 2 transactional.

| | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
|------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|
| 1. Participation | | | | | | | | |
| 2. User information | | | | | | | | |
| 3. Leadership | | | | | | | | |
| 4. Error correction | | | | | | | | |
| 5. Improvement ideas | | | | | | | | |
| 6. Meaning | | | | | | | | |
| 7. Competence | .34*** | | | | | | | |
| 8. Self-determination | .29*** | .41*** | | | | | | |
| 9. Impact | .36*** | .32*** | .61*** | | | | | |
| 10. Psychological safety | .14 | .13 | .48*** | .39*** | | | | |
| 11. Commitment | .42*** | .17* | .22** | .30*** | .26** | | | |
| 12. Identification | .31*** | .00 | .09 | .17* | .09 | .37*** | | |
| 13. Implementation intention | .31*** | .19* | .19* | .17* | .23** | .51*** | .35*** | |
| 14. Engagement | .40*** | .28*** | .23** | .29*** | .29*** | .70*** | .49*** | .64*** |

Table 6

Means for each condition in Study 2

| | Participation | | | | No participation | | | |
|--------------------------|------------------|-------------|---------------------|-------------|------------------|-------------|---------------------|-------------|
| | User information | | No user information | | User Information | | No user information | |
| | TFL | TAL | TFL | TAL | TFL | TAL | TFL | TAL |
| Error correction | 5.07 (3.53) | 7.54 (4.94) | 5.56 (4.21) | 6.02 (3.83) | 6.39 (3.52) | 6.68 (4.58) | 9.03 (4.34) | 5.89 (2.78) |
| Improvement ideas | 2.21 (1.46) | 2.85 (1.86) | 2.69 (1.72) | 1.98 (1.73) | 2.66 (2.11) | 2.63 (1.17) | 2.19 (1.63) | 3.05 (1.54) |
| Meaning | 3.84 (1.03) | 4.30 (.63) | 4.30 (.75) | 4.22 (.76) | 4.36 (.51) | 4.08 (.62) | 4.21 (.86) | 4.34 (.59) |
| Competence | 4.11 (.90) | 4.32 (.76) | 4.37 (.79) | 4.08 (.64) | 4.36 (.67) | 4.40 (.65) | 4.56 (.61) | 4.54 (.67) |
| Self-determination | 3.81 (.99) | 3.45 (.93) | 4.15 (.63) | 3.37 (.93) | 3.82 (.51) | 3.33 (.77) | 3.79 (.68) | 3.39 (.96) |
| Impact | 3.58 (1.01) | 3.31 (1.03) | 3.57 (.68) | 3.24 (.75) | 3.57 (.65) | 3.27 (.91) | 3.54 (.54) | 3.37 (1.18) |
| Psychological safety | 3.66 (.49) | 3.40 (.57) | 3.97 (.54) | 3.16 (.65) | 3.85 (.38) | 3.05 (.78) | 3.94 (.62) | 3.21 (.75) |
| Commitment | 3.98 (.62) | 4.16 (.70) | 4.18 (.75) | 4.15 (.44) | 3.98 (.49) | 3.78 (.75) | 3.55 (1.07) | 3.86 (.67) |
| Identification | 3.32 (.77) | 3.42 (.89) | 3.49 (.70) | 3.15 (.70) | 3.14 (.70) | 3.00 (.79) | 3.11 (.63) | 3.28 (.63) |
| Implementation intention | 3.95 (1.01) | 4.70 (.89) | 4.75 (.65) | 4.40 (.78) | 4.45 (.74) | 4.10 (1.18) | 4.38 (.83) | 4.21 (1.03) |
| Engagement | 3.69 (.68) | 4.18 (.52) | 4.22 (.68) | 3.90 (.39) | 3.91 (.41) | 3.81 (.69) | 3.77 (.71) | 3.92 (.53) |

Note. Ratings were given on 5-point scales (1 to 5) for the reactions and intentions except a 6-point scale (1 to 6) for implementation intention while error corrections and improvement ideas were counted.