Money changes everything: When do users perceive firms' commercialization of their innovation as unfair?

Abstract:

User innovators have become an important input source for firms' open innovation performance. Theoretically, the objectives, roles, and resources of users and firms are complementary and the transition of the innovations' property rights hence smooth and trouble-free. However, in reality they are often not. Research has documented several cases in which user innovators felt treated unfairly when firms commercialized user innovations. In some cases, this leads to severe conflicts. Using social exchange theory, we depict user innovation activities as social exchanges and firms' commercialization of user innovations as economic exchanges. Building up, we develop a conceptual model that helps understanding when the encounter of the sphere of social exchange and that of economic exchange results in the perception of fairness violations.

Keywords: user innovation, fairness, user-firm interaction

Introduction

The purpose of this article is to understand user innovators' fairness perceptions when their user innovations are commercialized by firms. The commercialization of user innovations is becoming more and more important (Franke & Lüthje, 2020) for two major reasons. First, there are ample commercially attractive user innovations awaiting their commercial distribution (de Jong et al., 2015, 2018). This is so because users are primarily interested in innovating to solve their own problems. They do not have strong incentives to invest in diffusion, as for them the possible benefits that their innovations can bring to other users are an externality that brings not much pay-off (de Jong et al., 2015). Moreover, commercial distribution is costly and user innovators often lack both direct marketing links and access to broader communication channels (von Hippel et al., 2017). This leads to a diffusion shortfall of user innovations. However, despite the lack of commercial distribution, it has been frequently observed that most user innovations are not protected, but freely revealed and thus turned into a public good, so others can adopt them. Second, the major business trend of open innovation endorses firms to make use of innovation resources beyond their company boundaries (Chesbrough, 2003; Laursen & Salter, 2006) – and users are one of the richest resources (Baldwin et al., 2006; Franke & Shah, 2003; Jeppesen & Frederiksen, 2006; Lettl et al., 2006). Together, this means that actually many firms strive for searching and identifying attractive and freely revealed user innovations, in order to produce and diffuse them, and in return gain financial benefits.

Extant research portrays commercialization of user innovations through firms as smooth and mutually beneficial (e.g. Baldwin & von Hippel, 2011; Harhoff et al., 2003; Jeppesen & Frederiksen, 2006; von Hippel & von Krogh, 2003). Theoretically, the objectives, roles, and resources of users and firms are complementary (fig. 1). User innovators have the objective of solving a problem for their specific needs and firms want to stay competitive, therefore are constantly in search for innovations. In a joint commercialization process user innovators would take over the role of ideators, contributing their innovations, while firms act as commercializers, using their resources to if necessary produce and diffuse the innovation. Commercialization is beneficial for both stakeholders, as user innovators might get access to improved innovations that better suit their needs and firms gain financial profits by selling these innovations. Thus, the private-collective innovation (PCI) model argues that user innovators are neutral or positive, if firms commercialize their freely revealed user innovations (von Hippel & von Krogh, 2003). After all, they were not interested in commercializing the innovation themselves. This view implies the assumption that user innovators are rational individuals, who do not compare their own benefits to those of others.

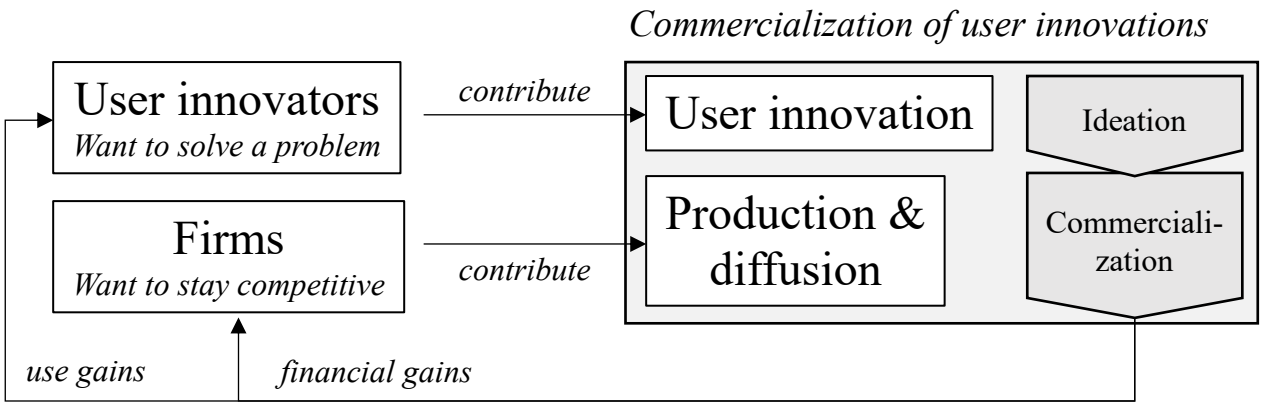


Fig. 1: Complementarity of user innovators and firms

However, a number of cases and some initial studies show that user innovators actually may develop perceptions of unfairness and exploitation when companies reap the fruit of their labor (Faullant et al., 2017; Franke et al., 2013; Gächter et al., 2010; Garriga et al., 2012; Gebauer et al., 2013; Lettl et al., 2016). These perceptions may lead to conflicts, ranging from negative word of mouth to boycotts of the commercializing firm and a decrease of user innovators' willingness to contribute (Benchoff, 2012; Biggs, 2016; Driggers, 2016; Evanalmighty, 2014; Průša, 2012). In the field of Open Source Software (OSS), firm involvement even led to the introduction of new licenses to prevent parties to commercialize code that has been freely revealed and other fields are following (O'Mahony, 2003). From a societal perspective, these frictions are highly problematic as they may be detrimental to the social welfare enhancing commercialization of user innovations (Gambardella et al., 2017).

This article gives answers to the question under which circumstances user innovators perceive commercialization as fair, and which circumstances could result in the perception of fairness violations. The first part of this work, analyses the commercialization process of user innovations through the lens of social exchange theory. We depict the commercialization process as an encounter of the world of *social* exchange and that of *economic* exchange; two worlds governed by different norms. By this, we highlight that this process is prone to violations of fairness and conflicts. The second part of this work entails our main contribution. Drawing on organizational justice research, we present a conceptual model, with factors influencing user innovators' fairness perceptions of commercialization by firms. This model summarizes a set of propositions that may guide firms in making their open innovation commercialization efforts more sustainable. They also may be the starting point for ample empirical studies.

Therefore, this article provides new insights mainly into (1) social exchange theory and (2) organizational justice research. First, the phenomenon of commercialization of user innovations

proves to be an interesting type of exchange caught between its social and economic nature. Second, we contribute to the "fifth wave of organizational justice research" (Brockner et al., 2015) by examining fairness as a dependent variable. Moreover, organizational justice theory focuses on employer-employee relationships within firms, in which the primary relationship between both is of economic nature (Greenberg & Colquitt, 2005). We introduce user innovators as a new type of actor in a firm's innovation ecosystem: they have no contract and no formal obligations, thus, their relationship is primary of social nature. This allows us to extend organizational justice research as well.

We proceed as follows: First, a brief introduction to social exchange theory is given. Second, we outline the (stylized) commercialization process when firms commercialize user innovations, linking the process to social exchange theory. Third, we present the model of factors influencing user innovators' fairness perceptions of commercialization. We examine all propositions derived. Finally, we discuss theoretical and managerial contributions.

Theoretical background: Social exchange theory

Social Exchange Theory (SET) is not a single theory but rather an umbrella for a number of theoretical frameworks. All of them build on the assumption that human interactions can be framed as interdependent exchanges between two or several parties that generate obligations among them. If one party offers a valuable benefit to another party, the latter will reciprocate by returning a benefit in exchange (P. M. Blau, 1964; Mitchell et al., 2012). Exchanges differ in their types of exchange, the types of resources that are exchanged and finally the type of exchange relationship that emerges from multiple exchanges (Cropanzano & Mitchell, 2005). Blau (1964) set the course by differentiating between social and economic exchange – two types of exchange that bring different rules or norms. Social exchange entails unspecified obligations, e.g., "the nature of the return cannot be bargained" (Blau 1964, p. 93). These exchanges are non-contractual and non-binding; instead, the dominant rule of exchange is reciprocity (Cropanzano & Mitchell, 2005). In comparison, economic exchange "rests on a formal contract that stipulates the exact quantities to be exchanged" (Blau 1964, p. 93). These exchanges are direct and defined, as the dominant rule of exchange is negotiated exchange (Cropanzano & Mitchell, 2005).

Foa and Foa (1974, 1980) expanded Blau's concept by introducing six types of resources that can be exchanged: Love, Status, Information, Money, Goods and Service. These resources differ in their degree of particularism (compared to universality) and concreteness (compared to symbolic resources). Money, for example, is a universalistic and concrete resource – it is

tangible and its worth is not dependent on who gives it. Love, on the other hand, is a particular, symbolic resource, as it is intangible and its perceived value is tied to the givers. Symbolic and particular resources are more affiliated with social exchanges, while concrete universalistic resources tend to be exchanged in economic exchanges. Generally, individuals tend to exchange resources that are most similar to each other (E. B. Foa & Foa, 1980, 2012; U. G. Foa & Foa, 1974).

Continuous social exchanges lead to social exchange relationships, in which exchange partners have developed a relationship of trust, gratitude and the feeling personal obligations and affective commitment (Blau 1964, Molm 2003). This is in line with empirical evidence that strong social exchange relationships foster beneficial and productive behaviors among exchange parties (Mitchell et al., 2012). Social exchange relationships are characterized by their open-ended and less time specific nature, and the focus of building a relationship with the other party. In contrast, in economic exchange relationships the interpersonal attachments tend to be weaker as these relationships are motivated by personal self-interest and are often limited to a certain time period (Cropanzano & Mitchell, 2005). Once exchange relationships are established, they also change the rules and resources, by which exchanges are conducted. In social exchange relationships, exchange parties prefer to exchange symbolic resources in social exchanges, while economic exchange relationships lead to economic exchanges of concrete resources (Mitchell et al., 2012). We will now apply SET to the process of commercializing user innovations.

The commercialization process of user innovations: an encounter of two worlds

The commercialization of user innovations by firms starts with the user innovators themselves. User innovators encounter a problem for which no solution is currently offered. In their free time and with their own resources they start to tinker and work on solutions. While doing so, user innovators typically involve peers within user communities to get help and feedback on their innovations (Franke & Lüthje, 2020; Franke & Shah, 2003). Thereby, these user innovations are freely revealed for everyone to use and collaboratively improve it (Harhoff et al., 2003; Morrison et al., 2000). Free revealing makes these innovations accessible for everyone, also firms. Firms search and identify attractive and freely revealed user innovations, e.g. by applying the lead user method (Globocnik & Faullant, 2020; Lüthje & Herstatt, 2004; Urban & von Hippel, 1988). The firm than improves and commercializes the innovations to sell them on the market.

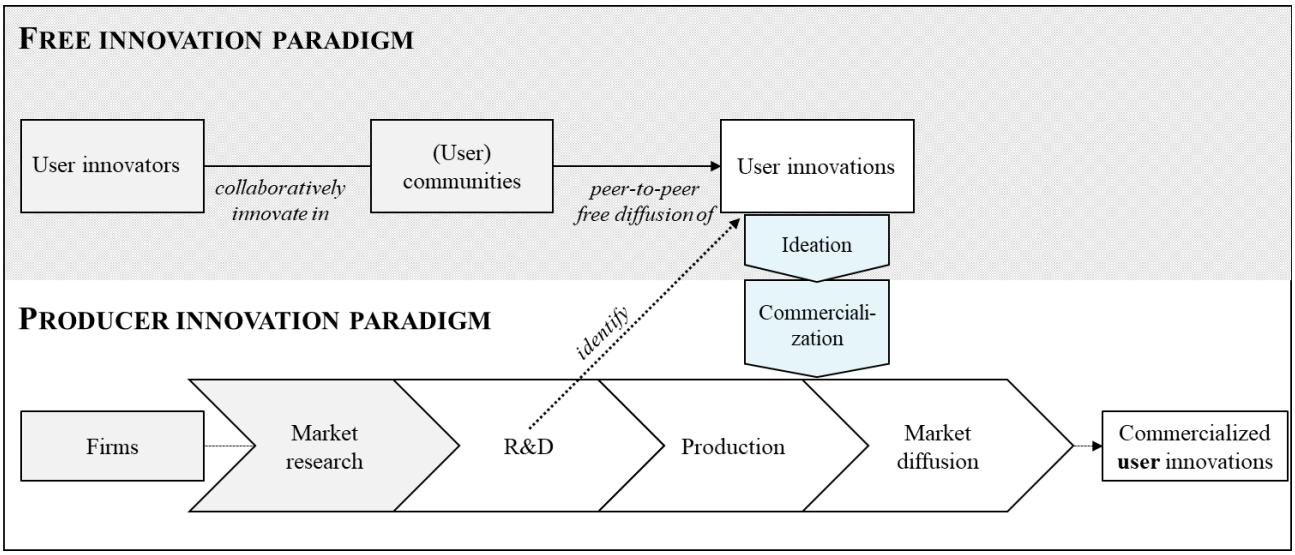


Fig. 2: The commercialization process of user innovations (adapted from von Hippel 2017)

The phenomenon of user innovations follows mechanisms, different from the innovation processes in the traditional producer innovation paradigm. Therefore, Eric von Hippel introduced the "*free innovation paradigm*" as an addition (von Hippel, 2017).

Referring to SET, innovation activities in the free innovation paradigm are mainly social exchanges in social exchange relationships. User innovators and the community engage in unspecific exchanges of mainly symbolic resources. User innovators provide information about their innovations. In doing so, they are rewarded mostly with information (e.g. feedback), love (e.g. encouragement, sense of belonging) and status (e.g. reputation). The dominant rule of exchange is reciprocity. There are no contracts and the exchanges are nonbinding. This is in particular reflected in the fact that free riders, individuals who benefit without giving, are often accepted in such user communities (von Hippel & von Krogh, 2003).

The opposite applies for innovation activities in the producer innovation paradigm. When firms innovate, they mainly exchange concrete resources such as money, goods and services. These economic exchanges take place based on negotiated rules, which often result in binding contracts that ends once both parties fulfilled their obligations.

Thus, when firms commercialize user innovations, two worlds collide. User innovators freely reveal their innovations (or the information of it) with the initial intention of contributing to a *social exchange relationship*, which "is fundamentally not about money" (von Hippel, 2017). This changes with firm involvement, as commercialization turns the symbolic resource of information into a conrete one: *money*. By this an initally social exchange turns into an economic one. The commercialization of user innovations is therefore an economic exchange

of symbolic and concrete resources (information that leads to money) within a social exchange relationship. This "mismatch" of type of exchange and type of relationship is bound to cause frictions (Cropanzano & Mitchell, 2005). It causes uncertainties of how the exchange party, in this case the firm, should dissolve its obligation towards the user innovator. If the firm fails to apply the appropriate rules of exchange or to respond with the appropriate type of resources, user innovators might feel betrayed and consequently develop unfairness perceptions. Table 1 compares the differences of the three forms of innovation activities.

Type of…	***Free innovation***	***Producer innovation***	***Joint innovation***
…exchange	Social	Economic	Economic
…exchanged resources	Symbolic (information, love, status)	Concrete resources (money, goods, services)	Exchange of symbolic resources (information) that are then turned concrete (money)
…exchange relationship	Social	Economic	Social

Table 1: Differences between free, producer and joint innovation activities

We will now take a closer look on when the encounter of the sphere of social exchange and that of economic exchange results in the perception of fairness violations.

User innovators' fairness perceptions when user innovations are commercialized

Our model is based on findings organizational justice research. Organizational justice research deals with fairness perceptions and cohesively the quality of exchange relationships in the context of the workplace. Fairness is defined as "a global perception of appropriateness" (Colquitt & Rodell, 2015). From the perspective of SET, there are several rules that reflect appropriateness in the context of exchange. If parties adhere to these rules, exchanges are perceived as fair, which leads to a higher quality of these exchange relationships. On the contrary, there is rich research on how unfairness perceptions lead to negative consequences like workplace conflict and destructive behavior (Cropanzano & Mitchell, 2005; Mitchell et al., 2012).

Organizational justice research has identified several context-independent rules or factors that influence exchange parties' perceptions of fairness. Parties care about the distribution of outcome, the process of distribution and the interaction during the process. A fair outcome can be distributed equally, equitable or according to need – depending on the situation. Equal

distribution means that all parties receive the same share, regardless of their contribution. Equity takes this contribution into account and distributes the outcome according to each parties' contribution. Need considers each parties' circumstances and gives those who need most a bigger share (Colquitt & Rodell, 2015). Regarding the distribution process, rules like voice and transparency affect fairness perceptions. Pioneer work of Thibaut and Walker (1975) showed that if accused individuals had the opportunity to lay out their point of view, court decisions were perceived as more fair, independent from the final sentence. Thibaut and Walker generalized that providing opportunity for voice, this means enabling individuals to either influence the decision process (decision control) or offer input (process control), leads to fairer perceptions of the procedures (Thibaut & Walker, 1975). Interactional fairness draws on the interpersonal treatment, when procedures are enacted (Bies & Moag, 1986). A fair treatment involves respect and sensitivity and thorough and honest explanations. In our context of interest, these three factors can be influenced by the commercializing firm, thus, in our model they are referred to as firm-related factors.

In addition to the context-independent factors, there are context-dependent factors: in the context of commercialization of user innovations, we distinguish between user innovation-related factors and factors regarding the context in which commercialization takes place in general. The nature of the innovation can differ in its value and its need for complementary assets – these differences change the impact of commercialization and consequently influence fairness perceptions. Depending on the context, the circumstances of commercialization can vary; consequently, context influences fairness perceptions, too.

Finally, as fairness perceptions are a subjective assessment, what is fair is clearly dependent also on individual factors. Individuals differ in personality, attitudes and motivations; all levels influence their fairness perceptions. These three factors can be influenced by the user innovator only, thus, in our model they are referred to as user innovator-related factors.

Summing up, we distinguish four entities that influence user innovators' fairness judgements: (1) The firm, (2) the user innovator, (3) the user innovation and (4) the context of commercialization. In the following, all four entities will be further examined.

Firm-related factors

The commercializing firm has control over the distribution of outcome, the process and the interactions within the commercialization process. These three factors are relevant for user innovators' fairness judgement of the commercialization.

Outcome (use benefits). When firms commercialize user innovations there are three types of resources that can be distributed: use, social and economic benefits (Harhoff et al., 2003; Ihl et al., 2019; Shah, 2006). Use benefits are generated from the innovation itself. These benefits are very important to user innovators' as their primary motivation to innovate originates from their need to solve a problem (von Hippel, 2017). However, user innovators are open to share these benefits with others, who can benefit from using their innovation as well (von Hippel & von Krogh, 2003). OSS developers have the innate believe of providing access for others, in general contributing to society and altruism are prominent motives amongst user innovators (Ke & Zhang, 2008; Lakhani, 2003; von Krogh et al., 2012). In many cases, user innovators freely reveal their innovations in user communities.

When free revealing, user innovators offer others to use the innovation, while they expect to keep the right to use their innovation themselves. This is also valid for firms. Firms are allowed to use the revealed innovation; moreover, they are invited to improve it, as long as access is granted and remains open for everyone. Open access must not necessarily be free. If firms ask for a reasonable price to grant access for a commercialized version, this is accepted as long as it does not exclude community members to use the innovation. In contrast to this, in the context of OSS communities, it is quite important that access is not only open, but free, as this fosters community-based innovation. Openness increases user innovators' feelings of involvement and serves as a proxy for fairness or credibility of firms (Balka et al., 2010, 2014). Private ownership of source code by firms leads to decreasing overall activity and contributions (Shah, 2006). When Oracle acquired the formerly open database management system MySQL, the OSS community around MySQL forked, as they feared that Oracle would change the code from open to closed for commercialization and thus, would take away access and use benefits (Widenius, 2009). Oracle now offers a proprietary version with additional services, while simultaneously keeping the free open version of MySQL. We therefore argue:

> *Proposition 1a: Commercialization processes in which firms decide to keep access to user innovations open are more likely to be perceived as fair. Commercialization processes in which firms decide to protect access to user innovations are more likely to be perceived as unfair.*

Outcome (social benefits). When free revealing their innovations, user innovators may gain social benefits such as fun, learning, enjoyment and a sense of belonging (von Hippel & von

Krogh, 2003). These benefits are non-rivalry and are available to all members of the community within interactions.

Thereby, research observed that community members give their innovations without the expectation of immediate or direct return. Instead, community members act by the rule of generalized reciprocity in these interactions. Members mutually reveal their innovations and reward each other with social benefits such as feedback for improvement and fun. As long as reciprocity takes place at a certain level, free riders – individuals who enjoy use benefit without contributing themselves – are accepted (von Hippel & von Krogh, 2003).

Reciprocity is central in the free innovation paradigm. According to Social Exchange Theory, the reciprocal exchange of social benefits builds trust in relationships (P. Blau, 2017), thus, reciprocity contributes to community building. When a firm intervenes, it is also part of the "social exchange network". Therefore, it is expected that firms take part in social exchange processes as well, e.g. by providing social benefits such as feedback or by fostering community building by providing resources that facilitate community-based innovations. Firms that adhere to the norm of reciprocity create trust and thus, positively influence user innovators' willingness to contribute (Shah, 2006). Dahlander and Magnussen (2008) propose a symbiotic relationship between community and firms to build legitimacy in the community. Such a relationship can be found in the LEGO community, in which the firm takes over the role of the facilitator for multiple user-to-user and user-to-producer interactions. LEGO reciprocates community members contributions by providing innovation support (Hienerth, 2006) and is therefore seen as a trusted member of the community.

> *Proposition 1b: Commercialization processes in which firms show reciprocal behavior within user communities (by providing non-rival social benefits) are more likely to be perceived as fair. Commercialization processes in which firms do not show reciprocal behavior within user communities (free riders) are more likely to be perceived as unfair.*

Outcome (rival social benefits). However, some social benefits from free revealing are rivalry. This especially applies to reputation from others (von Hippel & von Krogh, 2003). Research in user communities has shown that online communities have established user-organized norms, e.g. that credits must be given to the original user innovator (Bauer et al., 2016). Franke et al. (2013) confirm these findings. In their experiment, the value distribution of reputation and especially of IP ownership had a significant impact on crowdsourcing participant's perception of distributive fairness. Participants' evaluated the outcome as more fair, if the participants'

names were visibly printed on the commercialized product, as well as if IP rights were transferred back to the originator after a limited time. Several other studies and cases show that acknowledgement is an important incentive in OSS communities and that IP infringement leads to conflicts (Bauer et al., 2016; Gebauer et al., 2013; von Krogh et al., 2012). We therefore propose:

> *Proposition 1c: Commercialization processes in which firms acknowledge the originator (providing rival social benefits) are more likely to be perceived as fair. Commercialization processes in which firms deny the originator (seizing rival social benefits) are more likely to be perceived as unfair.*

Outcome (economic benefits). Once a firm commercializes a user innovation, economic benefits and the new role of a commercializer are introduced. Without commercialization, user innovators perceive firms as fellow community members, with whom they are in a social exchange relationship. With commercialization, the social exchange relationship is confronted with an economic exchange (Shah, 2006). Even though money might not have been an initial incentive for user innovators, this can change with commercialization (Shah, 2006). If third-parties make profit, inequality aversion leads user innovators to expect a fair share of it (Garriga et al., 2012). In economic relationships, economic benefits are predominantly shared equitably, according to everyone's input (Deutsch, 1975). Thus, we argue:

> *Proposition 1d: Commercialization processes in which firms reward user innovators with a share of the financial benefits are more likely to be perceived as fair. Commercialization processes in which firms do not reward user innovators with a share of the financial benefits are more likely to be perceived as unfair.*

Process (voice). Individuals do not only care about the distribution of outcomes, but they are also concerned with the procedures used to decide over distributions. Commercializing firms can equip user innovators with voice by (1) asking them for permission to commercialize, and thereby giving user innovators decision control, and by (2) involving them into the commercialization process, and thereby giving them process control.

Franke et al. (2013) findings show that involving the community into the outcome decision process of a crowdsourcing contest, increased perceptions of procedural fairness. Shah (2006)

observed that strict control of firms over open source code, decreases individuals' willingness to contribute, as they feel restricted in their voice. We therefore argue:

Proposition 1e: Commercialization processes in which firms involve user innovators into the commercialization process (opportunity for voice) are more likely to be perceived as fair. Commercialization processes in which firms exclude user innovators from the commercialization process are more likely to be perceived as unfair.

Interaction (respect). Shah (2006) confirmed that individuals, who feel uncomfortable in a community, would choose to not contribute, highlighting the importance of respectful and sensitive interactions. Dahlander and Magnusson (2008) suggest that being transparent and explicit with commercialization intentions is necessary to build trust, underlining the role of thorough and honest explanations. This view is reflected in the field of OSS communities, where openness is attributed with fairness or credibility of firms, while selective openness of firms may be regarded as manipulative or exploitative (Balka et al., 2014). We therefore propose:

Proposition 1f: Commercialization processes in which firms treat user innovators with respect and honest explanations about commercialization intentions are more likely to be perceived as fair. Commercialization processes in which firms fail to treat user innovators with respect and honest explanations about commercialization intentions are more likely to be perceived as unfair.

User innovator-related factors

As fairness is a subjective concept, individuals perceive fairness differently. We therefore propose three user innovator-related factors determining if commercialization is perceived as fair or unfair: (1) User innovators' personality, (2) user innovators' attitude towards commercialization and (3) user innovators' motivation to innovate.

Personality. . In regards to personality, research has shown that individuals vary in their level of exchange orientation. Exchange orientation is understood as the degree individuals endorse reciprocity (Clark & Mills, 19800101; Murstein et al., 1977). Individuals with high exchange orientation, are cautiously concerned about what they get in return, while individuals with low exchange orientation are less likely to care (Cropanzano & Mitchell, 2005). Individuals with a

strong exchange ideology expect an equitable reward for their input. Individuals with a weak exchange ideology give without the expectation to receive.

> *Proposition 2a: User innovators with a weak exchange ideology are more likely to perceive commercialization as fair. User innovators with a strong exchange ideology are more likely to perceive commercialization as unfair.*

Attitude towards commercialization. User innovators might already have an attitude towards commercialization in general, based on prior experiences. Some might be open towards commercialization and see it as neutral or positive, while others might perceive an aversion towards commercialization.

> *Proposition 2b: User innovators with a positive attitude towards commercialization are more likely to perceive commercialization as fair. User innovators with negative attitude towards commercialization are more likely to perceive commercialization as unfair.*

Motivation. User innovators contribute to the free innovation paradigm out of different motivations that can be roughly categorized into need, hedonistic, help and selling motives (de Jong, 2016). Depending on the motivation, commercialization is perceived differently.

User innovators who innovate out of need reasons might benefit from commercialization, as commercialization might contribute to solving their needs. This is because firms improve these innovations or even produce them at a lower price through economies of scale. User innovators who innovate mainly out of enjoyment and learning reasons, do not care about commercialization, as long as they can keep on tinkering. Commercialization can contribute to broader diffusion, e.g. firms commercializing a freely revealed recipe for hand disinfectant lead to a broad diffusion of the innovation, which saved many lives. However, if commercialization hinders diffusion, e.g. because of patents, commercialization is more likely to be perceived as unfair. Some user innovators are user entrepreneurs and innovate to make money from either their innovation or complementary products. In this case, commercializing firms are perceived as competition, as these user innovators want to commercialize it by themselves.

Proposition 2c: User innovators who innovate out of need, fun or help reasons are more likely to perceive commercialization as fair. User innovators who innovate out of sell reasons are more likely to perceive commercialization as unfair.

User innovation-related factors

If commercialization is perceived as fair or unfair is also depending on the user innovation that is being commercialized.

Expected value. User innovations with a low value are easy to copy and costly to protect. Most of these kind of innovations are freely revealed, as the probability that someone else will do it is high and through free revealing, user innovators can obtain social benefits. User innovations with a high value are more prone to create conflicts. Protection is still costly and most user innovators lack the resources and incentives to do so. However, the commercialization of high value innovations creates higher expectations of rewards.

Proposition 3a: Commercialization processes of user innovations with low expected value are more likely to be perceived as fair. Commercialization processes of user innovations with high expected value are more likely to be perceived as unfair.

Need for complementary products. According to Emerson's (1972) power-dependence theory, the more dependent parties are on each other, the more frequently they exchange. Moreover, the more imbalanced (unequal) their power dependencies are the more unequal the exchange, with the less dependent party getting more benefits (Emerson, 1972). Some user innovations have a high need for complementary products. If user innovators themselves lack the resources to provide these products, firms can take over and create value through commercialization. In these cases, users are somewhat dependent on firms. If user innovations have a low need for complementary products, commercialization does not bring extra value and the firm loses its "power"-position.

Proposition 3b: Commercialization processes of user innovations with high need for complementary products are more likely to be perceived as fair. Commercialization processes of user innovations with low need for complementary products are more likely to be perceived as unfair.

Context-related factors

Lastly, we argue that fairness perceptions are also depending on context-related factors, as commercialization can take place in different settings with different circumstances.

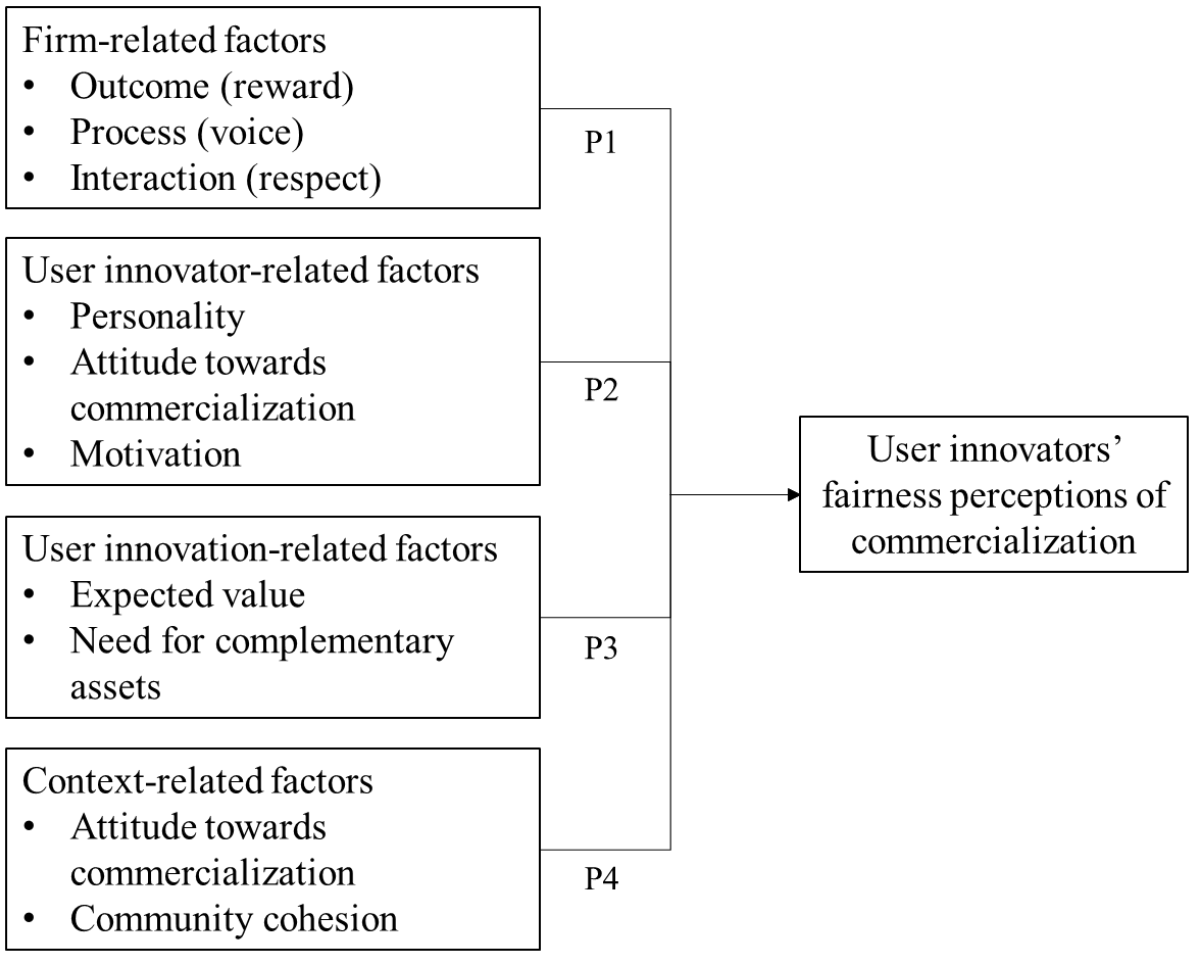
Openness/aversion towards commercialization. As described before, user innovators are often members of a community. These communities have certain norms that influence user innovators' individual norms as well. In the end, they self-select into these communities (which community is sharing my norms?) and adapt to the groups' rules. Depending on the norms and the history of the community, communities might be open or averse towards commercialization. For example, a community around a crowdsourcing contest tends to be very open towards commercialization, as it is part of the deal. OSS communities on the other hand, are rather averse towards commercialization, as OSS started as a movement with commercial firms being seen as antagonists.

> *Proposition 4a: User innovators, who are part of a community open towards commercialization, are more likely to perceive commercialization as fair. User innovators, who are part of a community averse towards commercialization, are more likely to perceive commercialization as unfair.*

Community cohesion. In a community with high community cohesion, user innovation is understood as a shared good. Therefore, user innovators' fairness judgements will consider the consequences of commercialization for the group. Moreover, third-party fairness perceptions by the community will be stronger, as everyone is affected. In communities with low community cohesion, user innovators act as individuals, so fairness is judged on a rather individual level. Simultaneously, third-party fairness perceptions will be less strong. For example, brand communities understand themselves as an entity and individual members highly identify themselves with the group. Thus, if one user innovator is treated unfairly, other individuals will perceive commercialization as unfair, too. In contrast, help communities, where individuals only participate when necessary, or communities, where competition is high (e.g. crowdsourcing contests), have low cohesion. In these communities fairness is only important in regard to one's own interest (if someone else is treated unfairly, the probability that I will be treated unfair is higher).

> *Proposition 4b: User innovators, who are part of a community with low community cohesion, are more likely to perceive commercialization as fair. User innovators, who*

are part of a community with high community cohesion, are more likely to perceive commercialization as unfair.



A model of factors influencing user innovators' fairness perceptions of commercialization

Discussion

In this article, we set out to understand user innovators' fairness perceptions when firms commercialize user innovations. User innovators' perception of fairness is a precondition for collaborative behavior towards the commercializing firm (Gächter et al., 2010; Lettl et al., 2016). User innovators, who perceive the commercialization process as unfair and thus, something negative, will probably no longer contribute to the free revealing process (Franke et al., 2013; Shah, 2006). If commercializing firms trigger negative reactions in user innovators, the number of freely revealed user innovations will decrease and so will social welfare. Especially, as unfairness perceptions of one user innovator can spillover to other members or even the whole community.

Our model proposes factors influencing user innovators' fairness perceptions when firms commercialize their innovations. By proposing a holistic model, we open new avenues for empirical research.

Theoretical contributions

This article mainly contributes to two different research fields: Open and User Innovation and organizational justice theory. The field of Open and User Innovation has done extensive research on understanding the phenomenon of user innovation and especially user innovators' motivations to contribute to firms' innovation processes (Harhoff et al., 2003; Kosonen et al., 2014; von Krogh et al., 2012). However, in the majority of prior studies, the aspect of fairness was often neglected. Initial studies in the field highlight that user innovators' care about fairness. In the context of crowdsourcing, fairness has implications on the level of contribution (Franke et al., 2013) and user innovators' future behavioral and attitudinal intentions, such as loyalty intentions towards the firm (Faullant et al., 2017). Ihl et al. (2019) just recently examined what type of rewards participants of innovation contests perceive as fair and how they influence the type of contribution (Ihl et al., 2019). In user communities, fairness is a norm within user-organized intellectual property regulations (Bauer et al., 2016). Moreover, fairness is a pre-requisite for knowledge sharing, be it in user communities (Garriga et al., 2012), or lead-user workshops (Lettl et al., 2016). These findings are in alignment with fairness heuristic theory, which proposes that individuals' fairness judgement are a proxy for trust in others and a heuristic for decisions about cooperation (van den Bos et al., 1997). These studies illustrate the role of fairness in different contexts and with different focusses. The proposed model integrates all prior findings.

Regarding organizational justice theory, this article builds on established models of fairness within organizations (Colquitt et al., 2001; Greenberg & Colquitt, 2005). However, these models are restricted to situations and relationships solely within an organization. The growing number of firms following open innovation strategies means that more and more firms integrate users into their innovation processes. Even though these user innovators are actors outside of firm boundaries, they do take part in organizational processes. So far, these actors are not included into organizational justice considerations. This article therefore expands organizational research to the context of open and user innovation.

Managerial contributions

Understanding user innovators' fairness perceptions when firms commercialize their innovations has implications for society and firms. From the perspective of a society, a greater diffusion of user innovations would enhance social welfare. If user innovations do not diffuse, multiple users with very similar needs will have to invest to (re)develop very similar innovations, which would be a poor use of resources from the social welfare point of view (von Hippel, 2005). As user innovators lack the incentive to invest into diffusion, firms can take over the role of the commercializer and thus promote a broader access to the innovation. This allocation of roles – users as innovators and firms as commercializers – works well, as long as all parties involved perceive the situation as fair. Unfairness can lead to a change of behavior: in this case, user innovators might change their free revealing behavior, so that the number of free revealed innovations will decrease.

On a firm level, user involvement will become even more important for new product development than it already is. Two reasons: first involving users into the innovation process can be very beneficial for firms. User innovation is a rich external source of innovation "more and more companies are attempting to build deep, meaningful, long-term relationships with their customers" (Bhattacharya & Sen, 2003), also (Harhoff & Mayrhofer, 2010). Therefore, it is important to understand the determinants of user innovators' fairness perception to win over and hold the best users (Antorini & Muñiz, 2013; Harhoff & Mayrhofer, 2010). Second, the advent of the internet led to a rise of user communities. Through these communities, consumers gain a louder voice, while as a firm it is important to have a positive reputation to avoid shitstorms and negative word-of-mouth (Shah & Nagle, 2019). Companies that understand how to collaborate with their customers have a clear advantage to their competitors. This article can serve as a guideline for firms to build strong innovation-relationships with their users.

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