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Social capital and the digital crowd: Involving backers to promote new product innovativeness

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ABSTRACT

Involving customers is often considered a method to develop products in line with market needs. However, we still need to obtain more insights into the respective drivers and outcomes in the context of (a) the involvement of customers by entrepreneurial ventures and (b) business-to-consumer (B2C) relationships. This study suggests that reward-based crowdfunding can provide a digital opportunity for both areas. We explore how community-derived social capital influences ventures' approach to engaging backers in new product development and how this, in turn, advances product innovativeness. Using structural equation modeling, we test a unique dataset that combines primary survey and secondary platform data from 710 crowdfunding ventures. Our results provide a nuanced picture of how social capital dimensions are associated with backers as an information source and as co-developers and, indirectly, with new product innovativeness. This study underscores that crowdfunding serves as a digital platform for market-oriented innovation. It contributes empirical insights into how nascent teams can engage the digital crowd in product development via crowdfunding. We also add to social capital literature by illuminating web-mediated mechanisms that transform knowledge into tangible innovation outcomes.

1. Introduction

A recent analysis found that the main reason for entrepreneurial failure is a lack of knowledge about market needs (CB Insights, 2018). Hence, both scholars and practitioners propose that involving market participants in product development may help firms understand the needs of their potential clients and lead to a joint creation of innovative products that meet market demands (Chang and Taylor, 2016; Tams, 2018). However, our understanding of third-party engagement in firms' innovation efforts is insufficient in several ways.

First, scholars agree that established companies can substantially improve new product success by including customers in their innovation activities (Foss et al., 2011; Gruner and Homburg, 2000; Lynch et al., 2016). Yet, little attention has been paid to the perspective of new entrants (Coviello and Joseph, 2012). Traditional open innovation paradigms do not clarify whether nascent organizations benefit from such interactions since they do not yet possess the knowledge stocks to absorb and organize the information extracted from a large group of individuals effectively (Cohen and Levinthal, 1990; Lüthje and Herstatt, 2004).

Second, many studies focus on external party involvement in new product development in business-to-business (B2B) settings (Gemser

and Perks, 2015). Research on consumer involvement in business-to-consumer (B2C) relationships, however, is still in its infancy and the contingencies of beneficial consumer engagement are still being debated. Identifying, recruiting, and motivating non-professional individuals for innovation activities is considered challenging (Lüthje and Herstatt, 2004; Mahr et al., 2014). Furthermore, the diverse ideas of a large number of parties might complicate product development (Fang, 2008). Hence, positions diverge on the effectiveness and facilitators of consumer involvement (Hoyer et al., 2010).

Third, prior works rarely separate the different forms of involvement (Cui and Wu, 2016). Target individuals can play two main roles—as information sources or as co-developers (Cui and Wu, 2017; Fang, 2008). Both types are also likely to occur when non-professional individuals are engaged in development. Yet, we still need to understand whether they are effective in realizing innovative products and which antecedents drive their use.

To shed light on these research gaps, we focus on the crowdfunding phenomenon, a recent and growing form of digital infrastructure (Nambisan, 2017). With crowdfunding, ventures aim to raise financial means from a large group of individuals, their backers, for specific projects such as product development (Bruton et al., 2015). In the dominant form of reward-based crowdfunding, backers

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characteristically order future products in advance as compensation for their financial contribution, which makes them the first consumers of the venture (Cholakova and Clarysse, 2015). Crowdfunding project teams “more traditionally resemble entrepreneurial ventures” (Mollick, 2014, p. 3), are usually young, rely on few members, and offer only one or few products, which are often not yet available to the public (Stanko and Henard, 2017). We refer to them as entrepreneurial ventures. Considering that reward-based crowdfunding offers access to a large number of market participants via a digital platform before market entry (Roma et al., 2017), crowdfunding may represent a game changer that allows consumer involvement for entrepreneurial ventures.

A vital resource in crowdfunding is the platform-internal social capital (Colombo et al., 2015), which may entice ventures to request the crowd’s support. Established social ties facilitate communication since ventures know who to ask and how (Nahapiet and Ghoshal, 1998). Ventures identifying as part of a community or speaking a group’s language may be more likely to request support (Zheng et al., 2014). We investigate whether these mechanisms also apply to backers’ support in product development. Hence, we inquire: Is the pre-campaign social capital of crowdfunding ventures related to the involvement of backers as information sources and co-developers? Does backer involvement, in turn, translate into increased new product innovativeness?

To answer these questions, we conduct an empirical study with a dataset of 710 crowdfunding ventures that we obtained from the reward-based crowdfunding platform Startnext. We combine primary survey data and secondary platform data to examine whether crowdfunding ventures leverage their social resources to understand market needs and drive innovation.

This study offers three main contributions. First, we add to research on digital platforms as venues for innovation and entrepreneurship by substantiating that crowdfunding provides an online infrastructure for initiating de-centralized knowledge creation (Nambisan, 2017; Nambisan et al., 2017). We show that advances in digital technologies result in new forms of organizing innovation, which overcome past challenges regarding the involvement of market participants and result in increased product innovativeness—even before market entry. We thus add to the ongoing debate on the effectiveness of co-creation in young and resource-constrained firms (Chang and Taylor, 2016; Gemser and Perks, 2015) and illustrate how digital platforms can democratize entrepreneurial experimentation (Mollick and Robb, 2016). Second, we extend the literature by offering initial empirical research dedicated to digital consumer involvement by entrepreneurial ventures and its impact on the product level. We provide new insights by revealing how ventures can concretely engage online communities in their innovation processes based on two mechanisms. Responding to scholars’ calls to differentiate these types of participation (Cui and Wu, 2017; Fang, 2008), we show that backer involvement as information sources or co-developers can play different roles in the digital chain of effects. Third, we reinforce the imperative to embed Nahapiet and Ghoshal’s (1998) social capital theory as a major conceptual foundation to explain knowledge creation in digital environments. There is limited evidence on how precisely knowledge is exchanged and re-combined within a digital social network to create actual products. Drawing on Nahapiet and Ghoshal’s (1998) three dimensions, this study opens the “black box” regarding intellectual capital formation in the digital era based on social capital originating from web-mediated exchanges.

2. Theoretical background and hypotheses

2.1. Backer involvement in new product development

The joint creation of value with customers—customer co-creation—is a central, but in recent years waning theme in open innovation research. This research stream explores distributed innovation systems enabled through knowledge flows across organizational boundaries

(Randhawa et al., 2016; West et al., 2014). In customer co-creation, customers are viewed as co-producers of value; their involvement is perceived as essential to market success (Gemser and Perks, 2015).

Despite the considerable academic interest, our knowledge of customer involvement is still limited. Recent literature reviews find a major reason for this lack—namely that the outcomes of involvement are highly context-specific (Chang and Taylor, 2016; Gemser and Perks, 2015). Questions remain with regard to (a) entrepreneurial ventures and (b) B2C relationships. Under entrepreneurial ventures (a), we subsume entrepreneurial efforts from the pre-start-up phase to nascent firms with initial organizational boundaries (Korunka et al., 2003). One of the main questions is whether entrepreneurial ventures possess sufficient resources and are hence capable of effectively pursuing joint development efforts. Views diverge. Some researchers purport that higher levels of prior knowledge entail greater absorptive capacity, which facilitates the processing of external information (Cohen and Levinthal, 1990), something more common among mature firms. In their meta-analysis, Chang and Taylor (2016) find that small firms efficiently involve customers to compensate for their relative lack of resources. We cannot fully transfer this insight to young organizations; small firms may be older and draw on knowledge established over time. Criscuolo et al. (2012) find that young firms often lack sufficient networks they can utilize for joint creation; however, they can better extract knowledge because they are more flexible. This raises the question whether nascent organizations can leverage knowledge once they gain access to a larger group of interested individuals via a digital platform.

Regarding (b), research on the involvement of consumers rather than business customers is still at an early stage (Gemser and Perks, 2015). B2B co-creation is characterized by reciprocal knowledge creation in supply chains and strategic alliances among firms and there is rich literature on both domains (Roser et al., 2013). Co-creation in B2C relationships, in contrast, needs to cater to a large group of diverse individuals. Even for established firms, it is a challenge to identify and motivate suitable early adopters (Lüthje and Herstatt, 2004). Consumers are comparably less interested in knowledge exchange than business partners are. The resulting products are usually not as important to their overall situation and not as customized as in a B2B setting, and there is empirical evidence that this may lead to a weaker impact on new product performance (Chang and Taylor, 2016). Some studies argue that consumers possess less relevant knowledge, and accessing this knowledge is difficult given that they think differently and use other terminology than product developers (Chang and Taylor, 2016; Mahr et al., 2014). However, a novel platform-based interaction easing the identification of lead consumers and increasing their motivation may potentially heighten the value of their participation. Hence, our research aims to illuminate the role of consumer involvement for entrepreneurial ventures in a digital setting.

Customer involvement in an organization’s new product development can range from information sourcing to co-developing (Fang, 2008). Predominantly, customers represent an *information source* (Cui and Wu, 2017): Firms collect information on the needs and preferences of target groups through interviews, focus groups, or surveys to design the desired products (Griffin and Hauser, 1993). The responsibility for development and related learning remains with the firm (Cui and Wu, 2016). In this context, firms face three challenges—finding appropriate target individuals and the related cost, setting effective incentives for participation, and eventually capturing participants’ knowledge (Nambisan, 2002). In crowdfunding, backers can easily offer information to crowdfunding projects via e-mail, social media, project walls, and the platform’s messaging system. To give an example: The Austrian crowdfunding venture Nuapua (they produce drinking water flavor systems) successfully ran a crowdfunding campaign on Startnext and asked their backers for ideas and feedback on their campaign page (Haudum et al., 2015). During and after the funding campaign, backers provided input on what they additionally required; for instance, regarding drinking flavors or options to generate sparkling water

(Haudum et al., 2015). Typical for customer involvement as an information source, Nuapua kept control over product design; their backers served as passive providers of information on their needs.

As another form of involvement, organizations engage their customers as *co-developers* regarding collaborative problem-solving and product design activities (Cui and Wu, 2017). Here, target audiences are significantly involved in a substantial proportion of the development and act as (virtual) members of the development team (Fang, 2008). Cui and Wu (2017) distinguish involvement as co-developers (from involvement as an information source) as follows: co-development requires active customer statements (vs. passive information sharing on request), collaborative problem-solving (vs. an isolated information application by the inquirer), continuous interaction (vs. one-time inquiries), and customers sharing information on needs and related solutions (vs. only providing information on needs). To realize co-development and active collaboration, crowdfunding ventures and backers both need to engage in mutual interaction through private messaging, wall discussions and votes, (video) chats, voice calls, and personal meetings. An example for this approach is Karma Classics, a German Startnext-funded apparel venture interacting with its backers; the venture explicitly promotes co-development as its business model and asks its backers for their own product-related solutions (Hoffmann et al., 2017). Karma Classics lets backers frequently decide on production partnerships, product features, and designs (Bittner, 2016); hence, their backer involvement is active, collaborative, recurrent as well as both needs- and solutions-orientated, which is characteristic of involvement as co-developers. However, co-development may entail additional challenges: organizations may need new mechanisms for coordinating and monitoring likely more complex and uncertain development processes; customers may need to be equipped with domain know-how; firms need to set up integrated teams (Nambisan, 2002). Coviello and Joseph (2012) observe in their qualitative study that some young B2B firms with successful innovations employ professionals from customer firms as co-developers. Entrepreneurial ventures and particularly B2C endeavors may also want to benefit from a deeper involvement—yet current literature still lacks an answer how this can be facilitated.

2.2. Crowdfunding and social capital

Crowdfunding may represent a new way of organizing innovation for entrepreneurial ventures (Mollick and Robb, 2016) and potentially also addresses the traditional challenges of consumer involvement. Crowdfunding is usually understood as a financing instrument: Ventures seek monetary resources from a large group of individuals for projects such as developing a product (Bruton et al., 2015). Digital platforms intermediate between crowdfunding ventures and backers, that is individuals willing to provide funding. In reward-based crowdfunding, backers usually receive the pre-ordered product or service in return for their financial pledge, making them the crowdfunding venture's first customers (Cholakova and Clarysse, 2015). Hence, reward-based crowdfunding offers direct and close interaction with many market participants before the project's development is completed.

The crowdfunding community enables ventures to develop a social capital base which may be leveraged to co-create potentially valuable knowledge (Lehner, 2014). Social capital represents the value and resources contained in and made available through an individual's or an organization's network of relationships (Nahapiet and Ghoshal, 1998). Nahapiet and Ghoshal (1998) define social capital as a multi-dimensional construct consisting of structural, relational, and cognitive dimensions. The structural dimension comprises the system of ties among all social units involved; the relational dimension describes the quality of these ties—often operationalized by trust in others, a norm of general reciprocity, and identification with others. The cognitive dimension focuses on a common understanding of a network's members, which manifests in shared language and meaning (Bolino et al., 2002).

Nahapiet and Ghoshal (1998) argue that social capital acts as an antecedent to knowledge sharing and, eventually, intellectual capital formation.

Crowdfunding scholars distinguish between external social capital (i.e., from platform-external ties) and internal social capital (i.e., from platform-internal ties) (Colombo et al., 2015). Social capital is not an invariant resource, but its levels vary over time. Crowdfunding studies differentiate between three phases of resource accumulation (e.g., Risterucci, 2016): pre-campaign resources accumulated through interactions before the launch, intra-campaign resources derived from interactions during a campaign; post-campaign resources established through interactions after closing. Our study assesses the impact of pre-campaign internal social capital.

The majority of empirical studies on the interface between social capital and knowledge creation focuses on offline B2B settings; they investigate firm-level outcomes rather than product innovation. Related research primarily explores how knowledge is gathered in personal meetings with selected professionals (Subramaniam and Youndt, 2005). It remains unclear whether ventures' web-mediated interactions with a large number of individuals also contribute to tangible knowledge outcomes. Accumulating social capital in online settings is highly dynamic, which may complicate ventures' effective transfer of social resources into product innovation.

Crowdfunding literature acknowledges the importance of social capital for funding success (Butticè et al., 2017; Colombo et al., 2015; Lehner, 2014; Skirnevskiy et al., 2017; Zheng et al., 2014). However, it has not yet shed much light onto the exchange of knowledge with backers and its potential implications for products. Stanko and Henard (2017) offer initial empirical evidence in this vein by showing that the number of backers affects later product market performance. The current lack of research is surprising as crowdfunding platforms present plenty of opportunities to increase venture knowledge with digital social connections (Butticè et al., 2017), i.e., with backers, other entrepreneurs, or platform employees. Ventures may thus benefit from the infrastructure provided by crowdfunding platforms, enhance their social capital, and use it as a basis for the involvement of market participants (Nambisan, 2017). Social media functionalities render it easy for backers to exchange information among themselves and with the venture (Butticè et al., 2017).

Reward-based crowdfunding, in particular, offers involvement opportunities as backers frequently turn into "avid fans" (Ryu and Kim, 2016: 50). Consequently, reward-based crowdfunding may help entrepreneurial ventures overcome major hurdles associated with consumer involvement. First, backers make a financial pledge, typically in return for the end product (Mollick, 2014). As a result, backers likely have sufficient incentives to participate even in time-consuming innovation activities, such as co-development (Roma et al., 2017). Second, backers often seek interesting ventures and desire close ties with projects. This may help reduce the costs otherwise related to selecting and recruiting suitable market participants (Mahr et al., 2014). Third, the strong engagement of backers in certain projects may also increase the knowledge quality because backers also possess technical know-how; this reduces costs associated with information transfer (Lüthje and Herstatt, 2004). Fourth, crowdfunding platforms are social online networks, which allow instant information exchange with backers (Bruton et al., 2015; Butticè et al., 2017).

2.3. The association between social capital and backer involvement

We investigate the pre-campaign platform-internal social capital of crowdfunding ventures and how it influences backer involvement and, indirectly, new product innovativeness. We assess all three dimensions of social capital by Nahapiet and Ghoshal (1998) and explore the roles of backers, both as sources of information and as co-developers (Cui and Wu, 2017; Fang, 2008).

Fig. 1 presents our research model.

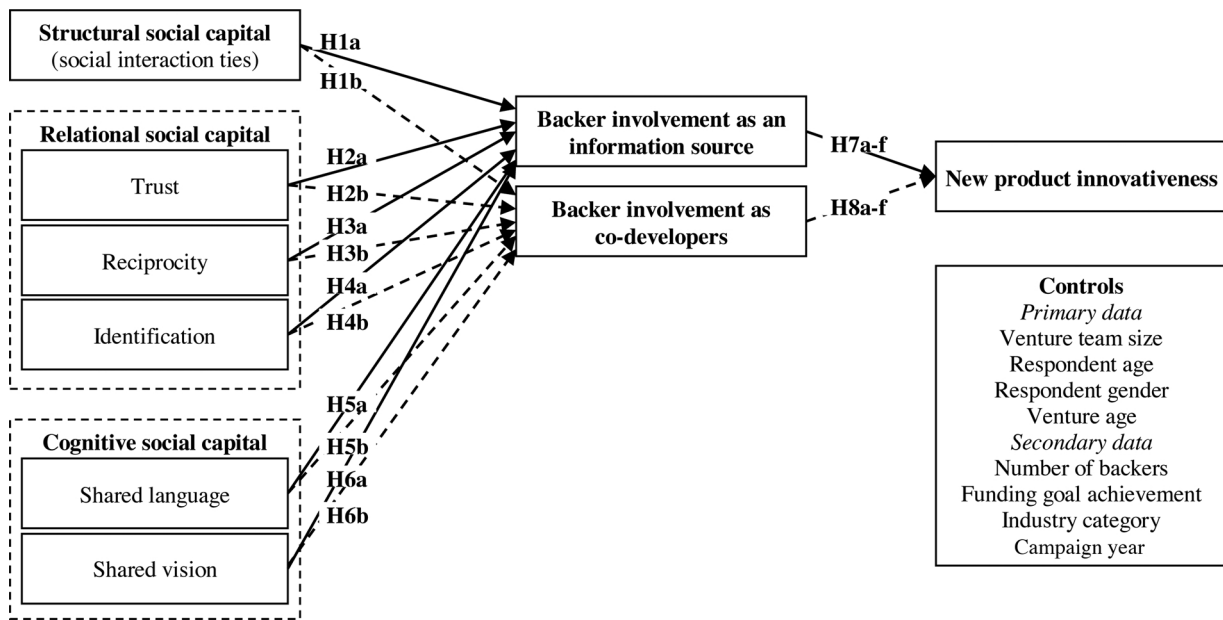


Fig. 1. Research model.

2.3.1. Structural social capital

First, we argue that structural social capital is related to backer involvement in product development. The structural dimension of social capital describes one's overall social network configuration: "who you reach and how you reach them" (Nahapiet and Ghoshal, 1998: 244). More specifically, we focus on social interaction ties, a central facet of structural social capital: Network ties serve as information channels and hence allow access to knowledge (Nahapiet and Ghoshal, 1998). We thus propose that backer involvement is unlikely without the considerable density of social interaction ties between ventures and backers. Social interaction ties between venture teams and other community members can emerge as a result of a venture team's engagement in platform-internal discussions, support of other campaigns, and other forms of active participation in the platform community before initiating their own campaign (Colombo et al., 2015).

Involving backers as an *information source* likely requires strong interaction ties with the backer community. Entrepreneurial ventures with strong ties quickly realize that a dense backer network allows the transfer of information. This may unlock knowledge residing in several target groups that might have been hidden from the venture's perspective. Theoretical and empirical studies on traditional B2B settings underscore that buyer-seller relationships become conduits of information sourcing and processing (Carbonell et al., 2009; Inkpen and Tsang, 2005; Landeros and Monczka, 1989). Wasko and Faraj (2005) observe in an online context that individuals with stronger network links contribute more responses on a professional online platform. Accordingly, we propose that ventures establishing strong ties with their backers are more likely to draw on backer information and encourage related knowledge sharing.

When engaging backers as *co-developers*, a dense structural network might be even more crucial than for pure information sourcing. Ventures may need close contact with individuals to consider co-development a relevant option. If a firm has few ties to a potential target audience, it is difficult to find a sufficient group for joint problem-solving as co-development can be time-consuming (Cui and Wu, 2016). Social capital theorists argue that structural links are predictors of collective engagement (Burt, 1992). If backers have strong ties with a venture, they are more likely open to pro-active cooperation, such as co-development. If ventures are in turn more centrally embedded in a collective, they are more likely to display a habit of cooperation as well and rely on backers as co-developers (Wasko and Faraj, 2005).

The need for network links between ventures and target audiences for involvement in product development may seem trivial, but extant literature shows that its realization is not (Chang and Taylor, 2016; Lüthje and Herstatt, 2004). Convincing individuals requires substantial financial as well as human efforts, and firms regularly fail to identify potential adopters and communicate with them (Mahr et al., 2014). Crowdfunding platforms offer ventures the opportunity to establish contact with backers and thus to build social ties which they can leverage to engage market participants. Social ties from crowdfunding may hence help reduce the transaction costs of involvement, thereby overcoming one of the major challenges in joint product development (Baldwin and von Hippel, 2011). Thus, we propose:

Hypothesis 1. Ventures' social interaction ties with members of the platform community are positively associated with backer involvement (a) as an information source and (b) as co-developers.

2.3.2. Relational social capital

The relational dimension of social capital captures the quality facet of a network. We follow Chiu et al. (2006) and focus on the sub-dimensions trust, norms of reciprocity, and identification.

First, we posit that trust drives backer involvement. Trust describes "a willingness to rely on an exchange partner in whom one has confidence" (Moorman et al., 1992: 315). Trust can drive knowledge sharing and transaction behavior in digital environments (Chiu et al., 2006; Pavlou et al., 2007; Ridings et al., 2002). We argue that discussing and supporting other campaigns allows venture teams who are active platform community members to familiarize themselves with their peer members' behaviors and to observe whether these behaviors are consistent and reliable. Teams thus can develop trust in the community even before launching their own campaign. For two reasons, we hypothesize this to be a trigger for backer involvement.

First, entrepreneurial ventures may not be able to assess whether the information shared by backers is accurate and valuable, which may prevent them from involving backers as an information source (Chang and Taylor, 2016). Prior research shows that online collaboration is more likely if one accepts one's own vulnerability and assumes that expectations towards a transaction will be met (Pavlou and Gefen, 2004). If venture teams feel confident that their backers are honest and capable enough to provide valuable input, they are more likely to draw on and believe in the information conveyed (Gerber and Hui, 2013).

Second, B2B literature has revealed that firms fear data privacy and opportunistic behavior when engaging target audiences (Capaldo, 2007; Fang, 2008). A venture considering backer involvement is likely also concerned about such risks. Co-developers gain deep insights into product attributes before market release, which makes ventures particularly vulnerable to competition. If a venture team trusts that its backers will not misuse such information, it is more likely to accept potential vulnerability and to include backers as co-developers.

Yli-Renko et al. (2001), however, find adverse effects for 180 young firms—in their study, trust in customers negatively relates to knowledge acquisition from them. Teams' high trust in their backers may result in the wrong expectation that backers will share knowledge when required (Yli-Renko et al., 2001). In contrast, Pérez-Luño et al. (2011) empirically confirm that trust-based ties serve as informal governance mechanisms and reduce a firm's transaction costs, which fosters collaborative innovation in B2B firms. Trust may facilitate a more efficient knowledge transfer as it lowers concerns regarding data quality and improper use, thereby increasing a venture's incentive to engage backers. Stanko and Henard (2017) argue in a crowdfunding context that trust enhances the quantity and complexity of exchanged knowledge. We follow these arguments and expect:

Hypothesis 2. Ventures' trust in members of the platform community is positively associated with backer involvement (a) as an information source and (b) as co-developers.

We also argue that a perceived norm of reciprocity regarding the platform community increases the likelihood that entrepreneurial ventures involve backers in product development. A norm of reciprocity is defined as the general expectation that individuals are willing to give as they assume they will receive something in return (Adler and Kwon, 2002).

Collaboration through online platforms seemingly occurs among strangers with only a few prior interactions. Research, however, has shown that virtual communities exhibit a pronounced norm of reciprocity that leads to intensified knowledge exchange (Chiu et al., 2006; Wasko and Faraj, 2005). Colombo et al. (2015) posit that reciprocity in crowdfunding platforms emerges based on two accounts: First, a norm of generalized reciprocity materializes due to the visibility of support. Many crowdfunding platforms promote such an implied social obligation with wall postings showing member endorsements or funding pledges to other projects. Second, members having received (financial) support from other community members might be of the opinion that they have to give something back—or they expect to need support in the future. Assuming that sharing one's input will generally be reciprocated, community members are more willing to make and request contributions (Chang and Chuang, 2011). Again, we posit that venture teams can recognize a pronounced norm of reciprocity when being active community members before launching their own campaign. We argue that a perceived feeling of mutual obligation can be crucial to induce ventures to involve backers as an information source and as co-developers. If venture teams believe in strong platform-based customs of mutual support, they probably expect they can ask backers for input on their own product (Pérez-Luño et al., 2011). Ventures are likely aware that co-development entails dedicated time by backers, so they may be more inclined to request this favor if they assume that all parties perceive the exchange as fair (Lehner, 2014). This is even more likely if a venture has supported other projects in the past—it can expect that the community will reciprocate (Colombo et al., 2015).

Crowdfunding scholars offer empirical evidence that reciprocity is crucial for funding success (Colombo et al., 2015; Zheng et al., 2014). We hypothesize that ventures drawing on this collective logic are more likely to consider backer involvement in product development:

Hypothesis 3. Ventures' sense of reciprocity regarding members of the platform community is positively associated with backer involvement (a) as an information source and (b) as co-developers.

We further expect that identification fosters backer involvement. Identification denotes the feeling of seeing oneself as one with a group of others (Nahapiet and Ghoshal, 1998). When a venture has a strong sense of belonging and positive expectancies towards the crowdfunding community, it is more likely to engage backers in its product development.

Ventures perceiving platform members as companions should perceive a lower barrier to ask for feedback. Some backers in reward-based crowdfunding share their interest in “experimenting with early prototypes and in gaining early access to new products” (Roma et al., 2018, p. 680). Guided by a feeling of togetherness, entrepreneurs who strongly identify with a group will likewise assume that their perceived peers will recognize and accept an offer of exchange (Nahapiet and Ghoshal, 1998). Chen et al. (2016) confirm that identifying with the collective of Facebook users increases members' motivation to contribute to the prosperity of the community and to add own contents. Chiu et al. (2006) find that distinct or even contradictory identities within virtual groups impede knowledge sharing and learning. If a venture is aware that it is different from the community, it may expect less collaboration by the collective.

Lehner (2014) observes that individuals indeed identify with the crowdfunding community. We propose that a venture's perceived legitimization as part of the community also relates to its use of backers as an information source and co-developers:

Hypothesis 4. Ventures' identification with the platform community is positively associated with backer involvement (a) as an information source and (b) as co-developers.

2.3.3. Cognitive social capital

Cognitive social capital describes the shared meanings and representations within a community (Nahapiet and Ghoshal, 1998). Although these authors note social capital literature's lack of focus on the cognitive dimension, many scholars still do not consider it a stand-alone factor; hence, many related research calls are unanswered (e.g., Cuevas-Rodriguez et al., 2014; Moran, 2005). Therefore, we explore how shared language and shared vision affect backer involvement.

We posit that a social language shared with the crowdfunding platform community likely increases a venture team's tendency to involve backers in product development. Language is a central facilitator of social interactions since “it is the means by which people discuss and exchange information” (Nahapiet and Ghoshal, 1998, p. 253). Beyond mere English, common codes, interpretations, and subtleties can be seen as a prerequisite for meaningful communication and may grant access to valuable information (Chiu et al., 2006; Zheng et al., 2014). Venture teams should be aware that shared interpretations of words help fully exploit backer information (Wasko and Faraj, 2005). Diverse language codes separate social groups and, consequently, also their knowledge. Chang and Taylor (2016) state that involvement in the B2B context is subject to less friction than in the B2C context due to common language among professionals. If a venture team uses the same social language as the crowdfunding community, this likely eases communication and helps overcome the hurdle to engage backers as co-developers.

Chiu et al. (2006) find empirical evidence that shared language enhances the quality of knowledge exchanged in virtual communities. They argue that shared codes allow to evaluate the benefits of the exchange and thus motivate active engagement in knowledge transfer (Chiu et al., 2006). In crowdfunding, a common language may also be vital for meaningful discussions between venture teams and backers and mitigate redundancies (Lehner, 2014). We hypothesize:

Hypothesis 5. Shared language among the platform community members is positively associated with backer involvement (a) as an information source and (b) as co-developers.

We further suggest that a shared vision also increases the use of

backers as an information source and as co-developers. A shared vision describes the collective goals and aspirations of a community's members (Tsai and Ghoshal, 1998). A collective goal may represent the glue holding together a loose online community such as in crowdfunding. In their interviews, Gerber and Hui (2013, p. 16) find that backers participate in crowdfunding because they desire “to interact with and contribute to a like-minded group of people.” Therefore, venture teams and backers with high-value congruence are more likely to recognize the benefits of product-related discussions. Buttice et al. (2017, p. 187) highlight that the related incentives “to keep the community alive and peer pressure to proactively participate” are unique to crowdfunding and hardly exist in traditional venture financing. Ventures with a collective mindset are likely aware of these benefits and may plan to use backer information to improve their products. In addition, striving for the same goal may encourage both sides to engage in the intense collaboration needed for co-development. Joint product iteration may be perceived as tedious and thus needs a positive disposition toward cooperative learning (Cui and Wu, 2016). Individuals believing in sharing are more likely to seek self-satisfaction by engaging in co-development (Hsu and Chang, 2014).

Empirical insights into the impact of a shared vision are ambiguous. Tsai and Ghoshal (1998) cannot confirm their hypothesis that a shared vision among organizational members increases intra-firm resource exchange. Hsu and Chang (2014) observe that a joint knowledge-sharing vision can facilitate knowledge exchange in telecommunications firms. Zheng et al. (2014) argue that a shared meaning is pivotal for co-production in crowdfunding and empirically confirm its importance for funding success. Following their rationale, we propose:

Hypothesis 6. Shared vision among the platform community members is positively associated with backer involvement (a) as an information source and (b) as co-developers.

2.4. Backer involvement as a mediating mechanism for new product innovativeness

One of the main reasons for firms to involve potential customers in product development is to increase new product innovativeness (Fang, 2008). This reflects the discontinuity in new products' attributes compared to existing ones (Moorman, 1995). New product innovativeness describes the degree of creativity and novelty of a new product, a major driver for its market success (Im and Workman, 2004). Backer involvement may be key to translating the value embedded in social capital into concrete innovation. Backers can actively participate in crowdfunding ventures' product development and contribute valuable feedback (Buttice et al., 2017). Indirectly, this may drive a venture's new product innovativeness.

Involving backers as an information source should provide the basis for exploiting the knowledge residing in the platform-internal network. Crowdfunding communities can be seen as exchange platforms facilitating knowledge diffusion (Kang et al., 2017). However, only entrepreneurial ventures with strong structural ties, positive relationships, or shared systems of meanings with community members may gain access to their knowledge. This knowledge is needed for new product innovativeness since the latter is a result of recombining acquired information (Moorman, 1995). High levels of platform-internal social capital indirectly influence product novelty as they establish the conditions required for learning. Accessing backer knowledge likely yields insights into their needs (Chatterji and Fabrizio, 2014). This helps create products that better meet future market preferences (Agrawal et al., 2014).

Research has demonstrated that knowledge acquisition in professional relationships bridges the association between structural network ties and knowledge exploitation (Shu et al., 2005; Tsai and Ghoshal,

1998; Yli-Renko et al., 2001). Di Pietro et al. (2018) find qualitative evidence that ventures exploit crowd inputs in equity crowdfunding. Empirical evidence on the remaining dimensions of social capital is less clear. While Tsai and Ghoshal (1998) confirm trust as an antecedent of intra-firm resource exchange and ultimately product innovation, Yli-Renko et al. (2001) observe that a B2B relationship with high levels of trust negatively relates to knowledge acquisition. This indicates that the impact of relational social capital differs depending on the context. Empirical insights into cognitive social capital are sparse. Since value congruence seems to motivate backers to foster a venture's crowdfunding success (Zheng et al., 2014), we conjecture that shared values and related representations also facilitate the exchange of information and subsequent knowledge exploitation. Several crowdfunding scholars emphasize the value of backer relationships as conduits of valuable information (Roma et al., 2017; Zheng et al., 2014). Thus, we postulate an indirect relationship between social capital and product innovativeness, which is mediated through the involvement of backers as an information source:

Hypothesis 7. The involvement of backers as an information source mediates the positive relationship between ventures' social capital and new product innovativeness. Specifically, it mediates the relationship between (a) social interaction ties, (b) trust, (c) sense of reciprocity, (d) identification, (e) shared language, and (f) shared vision and new product innovativeness.

Relationships established through the platform may also foster the direct participation of backers as co-developers in the development process, which can indirectly increase new product innovativeness. Strong relational ties between backers and ventures form the basis for discovering new information and transforming knowledge in an active exchange (Subramaniam and Youndt, 2005). Market participants engaging as co-developers closely interact with venture teams in joint problem-solving (Cui and Wu, 2016). Such interactions are unlikely if a relationship is characterized by mutual distrust and perceived egoism. Backers are usually less exposed to a product than the venture; integrating backers' fresh explicit and tacit knowledge should promote the venture team's learning progress. The joint project setup stimulates experiments with a product's specifications, which fosters creative solutions to meet market needs (Moorman, 1995). Zhu et al. (2017) find that the complementary capabilities of professionals and co-creators improve joint development in online communities. A virtual co-development team with backers and entrepreneurs using a shared language may exhibit enhanced information processing capabilities and hence also the ability to find complementarities to solve complex tasks (Fang, 2008; Wasko and Faraj, 2005).

Nucciarelli et al. (2017) reveal in their case study analysis that gaming software crowdfunding campaigns can grow into joint co-development efforts between backers and venture teams. The observed collaborative value creation can shape a constructive learning environment, which allows for simultaneous market testing and immediate product adaptation. Such a setting enables entrepreneurial ventures to experiment and iterate with new information, a prerequisite for discontinuous innovation (Cuevas-Rodriguez et al., 2014). In summary, we expect that a venture's social capital is positively related to the involvement of backers as co-developers and that the joint problem-solving efforts finally translate into increased product innovativeness. We propose:

Hypothesis 8. The involvement of backers as co-developers mediates the positive relationship between ventures' social capital and new product innovativeness. Specifically, it mediates the relationship between (a) social interaction ties, (b) trust, (c) sense of reciprocity, (d) identification, (e) shared language, and (f) shared vision and new product innovativeness.

3. Methodology

3.1. Study setting and data

We tested our hypotheses based on both primary and secondary data collected from Startnext. With more than Euro 60 million funding volume and more than 1,000,000 users by 2018, Startnext is the largest reward-based crowdfunding platform in Germany, Austria, and Switzerland (Bartelt and Kreßner, 2018). We chose Startnext for our study for two reasons. First, the platform team supported our study with dedicated communication within their community. While we preserved full academic independence, this enabled us to achieve a response rate of 19.3%. This is comparable to other studies on reward-based crowdfunding (e.g., Stanko and Henard, 2017). Second, using Startnext enriches the crowdfunding literature by broadening the data sources relied upon. Most studies use Kickstarter data and only few Startnext (e.g., Crosetto and Regner, 2018).

We gathered primary data with a comprehensive online survey among crowdfunding venture teams in the period from March to June 2017. We reached out to all ventures that published their e-mail address. This allowed us to contact 51% of all current and past ventures on Startnext. We did not set a project age limit as this would introduce a selection bias. Web-based distribution mitigates potential social desirability bias. At the beginning of the survey, we emphasized that we guarantee full anonymity and that there are no right or wrong answers. We contacted venture teams by e-mail and asked them to access and fill out our online survey. We sent two reminders. After accounting for missing values and limiting our sample to ventures that had ended their funding in the period between 2014 and 2017, we arrived at a final sample of 710 ventures with both successful and failed campaigns. On Startnext, crowdfunding campaigns succeed if they achieve or surpass their funding goal (or an optional, slightly lower first funding threshold). If not, a campaign has failed. 212 campaigns, 30% of our sample, failed. Thus, our results should not suffer from survivorship bias.

We enriched our survey data with secondary data such as funding target and amount achieved, funding period, or number of backers that we web-scraped from Startnext.com. Combining primary and secondary data helps increase our study's validity. Table 1 gives an overview of our sample. Table 2 displays the communication frequency per channel as reported by the respondents. The majority of venture teams communicate with backers several times per month by e-mail, Facebook, and through Startnext's project wall. Nearly 70% of ventures also engage with backers offline in person at least once during the campaign.

3.2. Variables and measurement

We draw on established scales and adapted them to the crowdfunding context. We conducted interviews and pre-tests with crowdfunding entrepreneurs, platform operator employees, and researchers to develop the questionnaire. Measurement scales were translated from English into German by native speakers and then back-translated. The key items are listed in Appendix A. For all items, we used a seven-point Likert scale from *strongly disagree* (1) to *strongly agree* (7).

We adapted the items compiled by Chiu et al. (2006) to measure social interaction ties (structural social capital) as well as trust, the norm of reciprocity, and identification (all relational social capital) as well as shared language and shared vision (both cognitive social capital) within the platform community. The items for backer involvement were adapted from constructs for customer involvement as an information source and as co-developers by Fang (2008) and Cui and Wu (2016, 2017), which originate in the work of Nambisan (2002). We asked crowdfunding ventures about the involvement of their backers in the development of their venture's main purpose, such as launching a product, and set different temporal foci. We asked respondents to recall the time of their decision to conduct the campaign on Startnext and

Table 1
Sample characteristics (n = 710).

Campaign outcome	#
Successfully financed	498
Not financed	212
Number of backers	%
0 - 24	28
25 - 49	18
50 - 99	25
100 - 149	11
150 - 199	5
≥ 200	13
Venture age	Yrs.
Average	2.8
10th percentile	1.0
50th percentile	2.0
90th percentile	5.5
Campaign funding achieved (Euro)	#
0 - 4,999	394
5,000 - 14,999	203
15,000 - 24,999	65
25,000 - 34,999	21
≥ 35,000	27
Venture team size ^a	%
< 3	62
3	17
> 3	21

^a Number of ventures' founding members prior to the campaign.

answer the items related to social capital (to capture their level of social capital before the funding campaign). We furthermore asked them about their involvement of backers in product development after their decision to collect funding through Startnext. The items to assess new product innovativeness were adapted from Moorman (1995) and Cui and Wu (2017). From the web-scraped secondary data, we used funding goal achievement (%) and the number of backers as controls (Giudici et al., 2017; Mollick, 2014). We also included venture team size, respondent age, respondent gender, and venture age as control variables. We also controlled for campaign year and industry category (results are not reported to conserve space).

3.3. Measurement model and model tests

Our confirmatory factor analysis (CFA) showed high and significant factor loadings for all items. The measurement model exhibited good fit: Chi-Square/df = 2.258; p = 0.000; CFI = 0.964; RMSEA = 0.042; SRMR = 0.037 (Hair et al., 2010). In addition, composite reliabilities (CR) exceeded common thresholds (Bagozzi et al., 1991) and underlined the convergent validity and reliability of our measures. Furthermore, discriminant validity was confirmed as all latent variables' squared average variances extracted (AVEs) exceeded 0.5 and were larger than the variables' respective correlations with all other constructs (Fornell and Larcker, 1981). Table 3 comprises the summary statistics and the correlation matrix.

To assess whether our measurements were subject to common method bias, we ran a CFA with and without a common latent factor onto which all latent constructs' items were allowed to load (Podsakoff et al., 2012). We did not find any considerable differences in factor

Table 2
Use of communication channels during campaign (n = 710).

Communication frequency	Not applied		Once during the campaign		1 - 3 times per month		1 - 3 times per week		4 - 5 times per week		Daily	
E-mail	42	(5.92%)	115	(16.20%)	354	(49.86%)	150	(21.13%)	27	(3.80%)	22	(3.10%)
Facebook	58	(8.17%)	43	(6.06%)	182	(25.63%)	267	(37.61%)	101	(14.23%)	59	(8.31%)
Twitter	372	(52.39%)	176	(24.79%)	61	(8.59%)	63	(8.87%)	21	(2.96%)	17	(2.39%)
Instagram	405	(57.04%)	162	(22.82%)	49	(6.90%)	68	(9.58%)	17	(2.39%)	9	(1.27%)
Personal meeting	218	(30.70%)	200	(28.17%)	184	(25.92%)	70	(9.86%)	29	(4.08%)	9	(1.27%)
Project wall posting	133	(18.73%)	141	(19.86%)	274	(38.59%)	132	(18.59%)	20	(2.82%)	10	(1.41%)

loadings between the two models. To ensure with a second test that our results are not biased regarding social desirability, we conducted Harman's single-factor test (cf. Malhotra et al., 2006, for the test's limitations). No single factor accounted for more than half of the variance (Podsakoff and Organ, 1986). Thus, we concluded that common method variance and resulting biases are not an issue in our data (Podsakoff et al., 2012). Multicollinearity does not present an issue as variance inflation factors (VIFs) are consistently below critical thresholds (Kleinbaum et al., 1988), the largest being 1.97 for the construct identification.

4. Results and discussion

4.1. Main analyses and results

To test our hypotheses, we built a covariance-based structural equation model (SEM) following Preacher and Hayes (2004) and Zhao, Lynch Jr., and Chen (2010). Our SEM showed a good model fit: Chi-Square/df = 2.045; $p = 0.000$; CFI = 0.952; RMSEA = 0.038; SRMR = 0.067. Table 4 presents the corresponding results.

H1a/b purports that social interaction ties (structural social capital) are positively related to backer involvement as an information source (BIS) and backer involvement as co-developers (BIC). H1a/b are confirmed by significant and positive effects (BIS: $\beta = 0.145$, $p < 0.01$; BIC: $\beta = 0.217$, $p < 0.01$). Furthermore, we expected that the sub-dimensions of relational social capital—trust in H2a/b, reciprocity in H3a/b, and identification in H4a/b—are positively associated with both backer involvement forms. A norm of reciprocity (H3a/b) is significantly positively related to both forms of involvement (BIS: $\beta = 0.200$, $p < 0.01$; BIC: $\beta = 0.139$, $p < 0.01$). A sense of identification is significantly linked to involvement as an information source (H4a) (BIS: $\beta = 0.139$, $p < 0.05$). Contrary to expectations,

identification is not significantly associated with involvement as co-developers (H4b) (BIC: $\beta = 0.098$, $p = 0.10$). Neither is trust with either form of backer involvement (BIS: $\beta = -0.030$, $p = 0.53$; BIC: $\beta = -0.068$, $p = 0.15$). We also hypothesized that cognitive social capital is positively associated with backer involvement in both forms. Our results partially confirm this. Shared language (H5b) is significantly positively related to involvement as co-developers (BIC: $\beta = 0.092$, $p < 0.10$), but not to involvement as an information source (H5a) (BIS: $\beta = -0.043$, $p = 0.40$). Our results also do not support H6a/b (shared vision) (BIS: $\beta = 0.012$, $p = 0.83$; BIC: $\beta = -0.035$, $p = 0.54$).

We further expected both forms of backer involvement to translate internal social capital into new product innovativeness. Accordingly, we assessed whether backer involvement as an information source and as co-developers mediate internal social capital's effect on innovativeness. We follow the recommendations of Zhao et al. (2010) and Preacher and Hayes (2004) and utilize the bias-corrected bootstrapping percentile method to test for the existence of indirect effects. We processed 2,000 sample replications; confidence intervals for the indirect effect were computed at a 90%-level.

The results in Table 5 show that social interaction ties (H7a/H8a) have positive and significant indirect effects on new product innovativeness through backer involvement both as an information source and as co-developers (BIS: $b_{\text{indirect}} = 0.030$, $p < 0.01$; BIC: $b_{\text{indirect}} = 0.018$, $p < 0.10$). As expected, reciprocity (H7c/H8c) is significantly and positively indirectly related to new product innovativeness through backer involvement (BIS: $b_{\text{indirect}} = 0.062$, $p < 0.01$; BIC: $b_{\text{indirect}} = 0.017$, $p < 0.10$). Our hypothesis on identification's indirect effect was also confirmed regarding its relationship with involvement as an information source (BIS: $b_{\text{indirect}} = 0.030$, $p < 0.05$) (H7d). The indirect effect regarding involvement as co-developers (H8d) is not significant. Trust also does not exhibit any significant indirect effects (H7b/H8b). Lastly, the hypothesized indirect effects of

Table 3
Descriptive statistics and correlations.

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
(1) New product innovativeness	1.00														
(2) Backer inv. as an information source	0.35*	1.00													
(3) Backer involvement as co-developers	0.28*	0.64*	1.00												
(4) Social interaction ties	0.16*	0.23*	0.26*	1.00											
(5) Trust	0.11*	0.13*	0.10*	0.27*	1.00										
(6) Reciprocity	0.15*	0.25*	0.20*	0.27*	0.33*	1.00									
(7) Identification	0.18*	0.27*	0.25*	0.44*	0.46*	0.46*	1.00								
(8) Shared language	0.11*	0.15*	0.18*	0.26*	0.42*	0.32*	0.50*	1.00							
(9) Shared vision	0.11*	0.17*	0.14*	0.29*	0.48*	0.35*	0.54*	0.58*	1.00						
(10) Number of backers	0.07	0.11*	0.11*	0.11*	0.02	0.04	0.13*	0.08*	0.05	1.00					
(11) Funding goal achievement	-0.11*	0.02	0.00	0.10*	0.12*	-0.01	0.15*	0.09*	0.11*	0.58*	1.00				
(12) Venture team size	-0.10*	-0.02	-0.04	-0.02	-0.01	-0.01	0.00	-0.01	0.00	0.00	0.01	1.00			
(13) Respondent age	0.08*	0.03	0.05	0.03	-0.01	0.09*	0.06	0.05	-0.03	-0.04	-0.14*	-0.03	1.00		
(14) Venture age	-0.10*	-0.03	-0.05	-0.05	0.00	-0.08*	-0.04	0.01	-0.03	-0.01	0.01	0.00	-0.05	1.00	
(15) Respondent gender	0.13*	0.12*	-0.01	-0.01	0.03	0.01	0.06	0.07	0.13*	-0.03	0.00	0.01	-0.05	-0.03	1.00
<i>Statistics</i>															
Mean	4.82	3.98	2.89	3.54	5.22	4.60	3.79	4.60	5.03	117.67	0.86	2.98	39.15	2.81	1.37
SD	1.49	1.71	1.66	1.84	1.24	1.35	1.61	1.29	1.37	287.20	0.73	4.61	11.06	2.36	0.48

Note: Table exhibits Pearson correlation coefficients among sample variables. Respondent gender is coded 1 = male and 2 = female. * $p < 0.05$.

Table 4
The association of social capital with backer involvement (direct effects).

Hypotheses	Path	Expected effect	Path estimate
H1a	Social interaction ties → Backer inv. as an information source	+	0.145***
H1b	Social interaction ties → Backer inv. as co-developers	+	0.217***
H2a	Trust → Backer inv. as an information source	+	−0.030
H2b	Trust → Backer inv. as co-developers	+	−0.068
H3a	Reciprocity → Backer inv. as an information source	+	0.200***
H3b	Reciprocity → Backer inv. as co-developers	+	0.139***
H4a	Identification → Backer inv. as an information source	+	0.139**
H4b	Identification → Backer inv. as co-developers	+	0.098
H5a	Shared language → Backer inv. as an information source	+	−0.043
H5b	Shared language → Backer inv. as co-developers	+	0.092*
H6a	Shared vision → Backer inv. as an information source	+	0.012
H6b	Shared vision → Backer inv. as co-developers	+	−0.035
	Backer inv. as an information source → New product innovativeness		0.246***
	Backer inv. as co-developers → New product innovativeness		0.095**
	Number of backers → Backer inv. as an information source		0.126***
	Funding goal achievement → Backer inv. as an information source		− 0.081*
	Venture team size → Backer inv. as an information source		−0.003
	Venture age → Backer inv. as an information source		0.012
	Respondent age → Backer inv. as an information source		−0.008
	Respondent gender → Backer inv. as an information source		0.125***
	Number of backers → Backer inv. as co-developers		0.120***
	Funding goal achievement → Backer inv. as co-developers		− 0.099**
	Venture team size → Backer inv. as co-developers		−0.034
	Venture age → Backer inv. as co-developers		−0.019
	Respondent age → Backer inv. as co-developers		0.011
	Respondent gender → Backer inv. as co-developers		−0.006
	Number of backers → New product innovativeness		0.133***
	Funding goal achievement → New product innovativeness		− 0.192***
	Venture team size → New product innovativeness		− 0.106***
	Venture age → New product innovativeness		− 0.072*
	Respondent age → New product innovativeness		0.044
	Respondent gender → New product innovativeness		0.103***
	Social interaction ties → New product innovativeness		0.057
	Trust → New product innovativeness		0.071
	Reciprocity → New product innovativeness		−0.005
	Identification → New product innovativeness		0.026
	Shared language → New product innovativeness		0.021
	Shared vision → New product innovativeness		−0.009

Note: n = 710. Standardized coefficients are reported. Bold numbers are significant. *** p < 0.01; ** p < 0.05; * p < 0.10.

cognitive social capital on new product innovativeness through backer involvement were only partly confirmed. Shared language (H8e) has a significant positive indirect effect through involvement as co-developers (BIC: $b_{indirect} = 0.010$, $p < 0.10$). The other cognitive social capital relationships in H7e/f and H8f are not supported. No significant

direct effects on new product innovativeness were found for social capital sub-dimensions that show significant indirect effects via backer involvement. Hence, the mediation effects discovered are considered indirect-only mediations, underlining that the mediators identified are consistent with our theoretical model (Zhao et al., 2010).

Table 5
The indirect effects of social capital on new product innovativeness through backer involvement.

Hypotheses	Path	Indirect effect	p-value	90% confidence interval	
				Lower	Upper
H7a	Social interaction ties → Backer inv. as an inform. source → New product innovativeness	0.030	0.002	0.014	0.058
H7b	Trust → Backer inv. as an inform. source → New product innovativeness	−0.010	0.502	−0.044	0.017
H7c	Reciprocity → Backer inv. as an inform. source → New product innovativeness	0.062	0.001	0.025	0.112
H7d	Identification → Backer inv. as an inform. source → New product innovativeness	0.030	0.044	0.007	0.065
H7e	Shared language → Backer inv. as an inform. source → New product innovativeness	−0.012	0.414	−0.042	0.012
H7f	Shared vision → Backer inv. as an inform. source → New product innovativeness	0.003	0.836	−0.025	0.036
H8a	Social interaction ties → Backer inv. as co-developers → New product innovativeness	0.018	0.063	0.002	0.039
H8b	Trust → Backer inv. as co-developers → New product innovativeness	−0.009	0.162	−0.032	0.001
H8c	Reciprocity → Backer inv. as co-developers → New product innovativeness	0.017	0.088	0.000	0.044
H8d	Identification → Backer inv. as co-developers → New product innovativeness	0.008	0.109	0.000	0.031
H8e	Shared language → Backer inv. as co-developers → New product innovativeness	0.010	0.078	0.000	0.031
H8f	Shared vision → Backer inv. as co-developers → New product innovativeness	−0.004	0.373	−0.021	0.005

Note: n = 710. Unstandardized coefficients are reported. Confidence intervals are bias-corrected based on 2,000 bootstrap samples. Effects in bold print are significant at least at $p < 0.10$.

Table 6
Predictors of number of backer comments, new product innovativeness, and funding success.

Dependent variable	Number of backer comments		New product innovativeness				Funding success							
	Model 1		Model 2		Model 3		Model 4		Model 5					
	Estimate	p-value	Estimate	p-value	Estimate	p-value	Estimate	p-value	Estimate	p-value				
Controls														
Venture team size	−0.116	(−0.579)	−0.032	(−0.006)	***	−0.029	(−0.008)	***	0.024	(−0.344)	0.029	(−0.255)		
Respondent age	0.071	(−0.420)	0.010	(−0.051)	*	0.008	(−0.086)	*	−0.035	(0.000)	***	−0.040	(0.000)	***
Respondent gender	1.640	(−0.412)	0.335	(−0.003)	***	0.265	(−0.014)	**	0.289	(−0.130)	0.222	(−0.224)		
Venture age	0.000	(−0.971)	−0.002	(−0.034)	**	−0.001	(−0.045)	**	0.002	(−0.712)	0.002	(−0.740)		
Variables of interest														
Number of fans	0.066	(0.000)	***						0.012	(0.000)	***			
Number of backer comments				0.003	(−0.038)	**						0.027	(0.000)	***
BIS						0.203	(0.000)	***						
BIC						0.096	(−0.019)	**						
Constant	−2.639	(−0.778)		3.810	(0.000)	***	2.927	(0.000)	***	0.716	(−0.443)	1.461	(−0.102)	
N	710			710			710			707 ^a		707 ^a		
R ² / Pseudo-R ²	0.397			0.101			0.189			0.171		0.093		

Note: *** $p < 0.01$; ** $p < 0.05$; * $p < 0.10$. Category and year dummies are included but not reported. Unstandardized coefficients are reported. a: 3 observations omitted by Stata due to perfect prediction.

4.2. Additional analyses

To provide additional insights into the importance of social capital for new product innovativeness, we conducted supplementary analyses. First, one could argue that new product innovativeness is subjective and hard to evaluate by ventures themselves. We thus resorted to ventures' learning outcomes as an additional measure of the effectiveness of backer involvement in innovation activities. This can mainly be assessed by the team itself. Venture teams may benefit from backer involvement by increased learning regarding product innovation. Hence, we replaced new product innovativeness with a construct for innovation learning (Blazevic and Lievens, 2004; Mahr et al., 2014) as a dependent variable and re-estimated our main model in an unreported SEM. Learning for innovation captures whether a project contributes to a venture team's general new product development expertise (Mahr et al., 2014). The significant direct and indirect effects found in our main SEM are confirmed regarding direction and significance when we replace new product innovativeness with innovation learning.

Second, some crowdfunding studies also use secondary data to measure social capital, backer interaction, and campaign success (e.g., Zheng et al., 2014). To increase comparability, we followed their approach and recalculated our main relationships with regressions based on platform data. Table 6 displays the results. Similar to social network platforms such as Facebook, Startnext allows individuals to connect with a project by becoming a fan. Fans are connected with the project team and can be contacted via blog articles, e-mails, and project updates. Crowdfunding scholars consider the fan base a proxy for social capital (Colombo et al., 2015). In addition, backer comments on campaign pages are often used to measure backer interaction (Courtney et al., 2017; Stanko and Henard, 2017). To assess the relationship between internal social capital and backer involvement, we regress the number of backer comments on the number of fans in an OLS model. Model 1 in Table 6 shows that the association is positive and significant ($b = 0.066$, $p < 0.01$), confirming our prediction that internal social capital relates to backer involvement. Backer involvement in turn is related to new product innovativeness in OLS models, whether measured with backer comments in Model 2 (number of backer comments: $b = 0.003$, $p < 0.05$) or with survey constructs in Model 3 (BIS: $b = 0.203$, $p < 0.01$; BIC: $b = 0.096$, $p < 0.05$). Measuring innovation based on secondary data is challenging for nascent initiatives. (Incremental) product innovativeness can lead to funding success (Chan and Parhankangas, 2017), and funding success is also seen as a positive

market test for a new product (Roma et al., 2017). Based on this, we used a binary variable, with funding success as an alternative measure (Courtney et al., 2017). The estimates from logit regressions in Table 6 indicate that the number of fans in Model 4 ($b = 0.012$, $p < 0.01$) as well as the number of backer comments in Model 5 ($b = 0.027$, $p < 0.01$) have a positive and significant relationship with funding success.

Third, a more fine-grained classification of the type of communication may offer a nuanced view on its role for new product innovativeness and funding success.¹ Model 1 in Table 7 exhibits the results of an OLS regression assessing how the communication frequency per channel relates to new product innovativeness. The results indicate that frequent communication by e-mail, in person, and on the project wall is positively and significantly associated with new product innovativeness. When looking at funding success, the results of a logit model in Model 2 in Table 7 show that social media channels have significant relationships. While frequent communication via Facebook and Instagram has a positive and significant relationship with funding success, frequent Twitter communication relates negatively to funding success. Overall, the additional analyses corroborate our main results.

4.3. Discussion of results

Three empirical findings deserve a discussion in particular. First, the results confirm that our digital crowdfunding platform setting indeed acts as a venue for member-based innovation. We find that the social capital embedded in ventures' crowdfunding community networks promotes the involvement of backers in new product development and, ultimately, new product innovativeness. Both social interaction ties and reciprocity indirectly result in more innovative products when involving backers in both forms. This is in line with theoretical predictions that the exchange of knowledge and resources within a social network ultimately builds up intellectual capital (Gedajlovic et al., 2013).

Second, the analyses point to different dynamics when comparing involvement types. While involvement as an information source shows a beta of 0.246 in the relationship with new product innovativeness, involvement as co-developers only is at a beta of 0.095 (both standardized estimates). The mediation results further corroborate the diverging dynamics. Identification with the crowdfunding community only indirectly affects innovativeness through involvement as an

¹ We thank an anonymous reviewer for this suggestion.

Table 7
The influence of communication type frequency on new product innovativeness and funding success.

Dependent variable	New product innovativeness		Funding success	
	Model 1		Model 2	
	Estimate	p-value	Estimate	p-value
Controls				
Venture team size	-0.032	(-0.006)***	0.031	(-0.240)
Respondent age	0.011	(-0.038)**	-0.031	(0.000)***
Respondent gender	0.301	(-0.007)***	0.184	(-0.319)
Venture age	-0.001	(-0.068)*	0.002	(-0.720)
Communication frequency				
E-mail	0.102	(-0.088)*	0.101	(-0.313)
Facebook	0.037	(-0.454)	0.281	(0.000)***
Twitter	-0.054	(-0.250)	-0.246	(-0.002)***
Instagram	0.006	(-0.898)	0.179	(-0.047)**
Personal meeting	0.125	(-0.007)***	0.017	(-0.830)
Project wall posting	0.127	(-0.012)**	0.113	(-0.186)
Constant	3.243	(0.000)***	0.163	(-0.864)
N	710		707 ^a	
R ² / Pseudo-R ²	0.133		0.107	

Note: *** $p < 0.01$; ** $p < 0.05$; * $p < 0.10$. Category and year dummies are included but not reported. Unstandardized coefficients are reported.

a: 3 observations omitted by Stata due to perfect prediction.

information source. Shared language, in contrast, only has an indirect effect on innovativeness through involvement as co-developers.

Third, we find that the structural and relational dimensions of social capital matter for both forms of backer involvement. Specifically, the strength and intensity of social interaction ties (structural dimension), a sense of reciprocity as well as identification (relational dimension) with the crowdfunding community affect a venture's interactions with its backers. This is in line with prior research demonstrating how social capital is related to knowledge sharing and acquisition in community contexts and customer relationships (Chiu et al., 2006; Yli-Renko et al., 2001). We also find that identification is only significantly related to the involvement as an information source. Trust, a key manifestation of relational social capital, does not enhance either type of backer involvement. Although unexpected, this reflects the mixed prior findings described earlier (Ridings et al., 2002; Yli-Renko et al., 2001). Shared language, a sub-dimension of cognitive social capital, shows only a significant link with involvement as co-developers. This emphasizes how important it is to differentiate the social capital dimensions and their respective interaction with the two types of involvement.

5. Conclusions

Our research examines backer involvement in product development by entrepreneurial ventures and the innovation potential of crowdfunding as a digital user community. Our results show that backer involvement is an effective mechanism for entrepreneurial ventures to capture innovation value from the pre-campaign social capital embedded in the crowdfunding community. The findings have implications for theory, policy, and practice.

5.1. Implications for theory

This study makes three main contributions to scholarship. First, it adds to the recent notion that crowdfunding is more than access to monetary resources, but rather a digital opportunity for interaction with target audiences heretofore inconceivable (Mollick and Robb, 2016; Nambisan, 2017). We corroborate that crowdfunding represents an open innovation paradigm (Stanko and Henard, 2017), which offers early-stage ventures a digital venue for entrepreneurial

experimentation with access to a large community of motivated market participants. Extant customer involvement literature thus far has concentrated on B2B perspectives and incumbent enterprises in offline settings (Coviello and Joseph, 2012; Gemser and Perks, 2015; Hoyer et al., 2010). We observe that entrepreneurial ventures in the launch stage also aim for collaborative development in B2C settings and, if implemented in a strong network, can realize superior learning outcomes with a large online community of individuals. We find that crowdfunding embodies a digital environment for de-centralized innovation processes, which is able to dissolve formerly stable boundaries between entrepreneurs and market participants (Nambisan, 2017; Nambisan et al., 2017).

Second, our work offers quantitative evidence on how entrepreneurs concretely involve consumers in product innovation processes in a digital ecosystem. We differentiate between involvement as an information source and as co-developers and thus respond to researchers calling for a more nuanced view of involvement (Cui and Wu, 2017). Digitization scholars underscore that even weak forms of distributed innovation are challenging for well-equipped incumbents due to heterogeneous knowledge sources and hardly controllable processes (Yoo et al., 2012). We show that emerging ventures can effectively involve consumers despite these obstacles and find that the digitized world also allows market entrants to realize deep co-creation. Our findings also illustrate that the chain of effects can differ depending on the type of collaboration (Cui and Wu, 2016; Fang, 2008). For instance, a strong sense of identification with the crowdfunding community is central to sourcing information from backers and achieving new product innovativeness. Shared vocabulary is a pivotal prerequisite for joint problem-solving in co-development. Remarkably, our additional analyses show that although the relationships between crowdfunding ventures and backers are initially established through online infrastructure, later personal meetings and closer contact are not out of the question. This underscores the potential of involving target audiences via digital platforms.

Third, we substantiate that social capital theory (Nahapiet and Ghoshal, 1998) is a pivotal theoretical lens for understanding digital innovation dynamics. "The link between open innovation and social capital is underdeveloped" in general (West et al., 2014, p. 809), and we lack insights into how social capital is transformed via digital technology. Our research model offers a novel explanation of how precisely knowledge is exchanged and recombined in an online social network to create new intellectual capital and translate it into tangible product outcomes. Digital infrastructure helps entrepreneurial ventures to organize innovation effectively among highly dynamic human collectives and even allows collective learning via co-development for them (Nambisan et al., 2017). We also extend prior research emphasizing the importance of multidimensional social capital for online communities (Chiu et al., 2006; Zheng et al., 2014) and offer the first holistic examination of how Nahapiet and Ghoshal's (1998) three dimensions influence non-financial outcomes in crowdfunding. We provide insights into the cognitive facet and find clues why it has been neglected by many empirical social capital studies (Cuevas-Rodriguez et al., 2014; Moran, 2005). We show that the uniting potential of a shared interpretation of words may become mainly decisive when individuals are deeply involved in joint problem-solving (i.e., as co-developers) and not in every knowledge exchange.

5.2. Implications for policy

This research may raise awareness among policymakers for how reward-based crowdfunding can create value by helping young ventures understand market preferences. Since its go-to-market strategy can make or break a nascent venture (CB Insights, 2018), public startup support programs should focus not only on financing but concurrently on the involvement of prospective consumers. As this study underscores, crowdfunding can be a particularly effective mechanism for

interacting with target audiences in the case of B2C business models and that the related interaction can increase new product innovativeness. Policymakers may couple existing public funding schemes for innovation with reward-based crowdfunding to incentivize startups to use crowdfunding campaigns as smoke tests for product validation. Denmark, for instance, recently piloted such a collaboration; its market development fund co-finances ventures if they successfully complete a crowdfunding campaign (Danish Ministry of Business and Growth, 2015). Similar collaborations between public agencies and private crowdfunding platforms might spur innovativeness in small and young businesses, thereby increasing the likelihood of meeting market demand and ultimately startup survival.

In addition, policymakers may foster de-centralized innovation through crowdfunding beyond startups. Tax benefits for reward-based crowdfunding investments could also incentivize incumbent firms to test crowdfunding. By experimenting with the crowd, established players can also experience what our results reveal—that crowdfunding can be a tool to obtain the hard-to-access market insights. Furthermore, government projects can also benefit by using crowdfunding for public problem-solving. Our study demonstrates that crowdfunding can (a) support ideas that are important to a community, (b) help shape creative solutions, and (c) foster relationships between crowdfunding entrepreneurs and backers. Initiating crowdfunding projects can help governments to nurture civic participation and find creative solutions for infrastructure weaknesses. For instance, crowdfunding helped design and realize the Luchtsingel in the Netherlands, a pedestrian bridge connecting three previously disconnected city areas of Rotterdam (European Union, 2017).

5.3. Implications for practice

Our findings provide guidance for practitioners interested in crowdfunding. We encourage entrepreneurs to involve their backers when product innovativeness is vital. In one of our pre-survey interviews, an entrepreneur said, “We learned a whole lot from our backers during the product development phase. Involving backers is very worthwhile.” Crowdfunding allows entrepreneurial ventures instant and cost-efficient interaction with a motivated crowd of potential consumers. To manage the crowd’s creativity, venture teams may want to document the information early on and prepare profound questions to get the most out of the discussions. Furthermore, fruitful innovation interactions require an appropriate infrastructure. Crowdfunding platform operators may consider extending their platforms’ features to facilitate co-development with the crowd and hence increase the value

Appendix A. Measurement items

Constructs (source), Items	Cronbach's alpha	CR	AVE
New product innovativeness (Moorman, 1995; Cui and Wu, 2017) Please rate the degree to which your product was challenging existing ideas in your industry. ^a ... very novel for your industry. ... capable of generating ideas for other products. ... offering new ideas to your industry. ... encouraging fresh thinking.	0.83	0.83	0.55
Backer involvement (Fang, 2008; Cui and Wu, 2016, 2017) Backer involvement as an information source During the development of our product after the decision for Startnext as well as during and post the campaign we used backers as a key information source. ... we actively transferred information gathered from our backers to our team members responsible for development. ... the transfer of information about backers' needs and preferences took place frequently. ... we used information about our backers' needs in the development of our product.	0.94	0.90	0.70
Backer involvement as co-developers During the development of our product after the decision for Startnext as well as during and post the campaign our backers' involvement as co-developers of the product was significant. ... our backers were actively involved in a variety of product design and development activities. ... our backers frequently interacted with our development team.	0.95	0.93	0.72

they add as intermediaries. For instance, they could incorporate Scrum software elements into an optional toolkit to enable collaboration.

5.4. Limitations and future research

Our study is subject to limitations, which offer avenues for future research. First, we collected data from only one reward-based crowdfunding platform. Additional research could draw on several platforms to avoid platform-specifics. Second, we relied mainly on the responses of venture teams, which may lead to socially desirable answers. Understanding the backers’ perspective could yield valuable insights—thus far, there is little research surveying backers. It may also prove worthwhile to assess how traditional financiers’ resources—like venture capitalists or angels—can aid crowdfunding ventures in continuing the creation momentum after the campaign (Schmidt et al., 2018). Third, future research might also investigate other potential mechanisms explaining the role trust plays for innovation in the crowdfunding context.

Our study sheds light on the innovation implications of reward-based crowdfunding. We emphasize how crowdfunding platforms provide digital B2C interaction venues for entrepreneurial ventures. We hope to provide useful insights for parties interested in the organization of innovation in the era of digitization.

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Conflict of interests

The authors declare that they have no conflict of interests regarding the publication of this paper.

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