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ARTICLE

The right kind of people: Characteristics of successful ideators' online behaviour

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Open online idea calls are an increasingly popular way to crowdsource ideas. Such calls tend to attract a diverse crowd who suggest a variety of ideas. To detect the most promising from this mass of ideas, we identify online behavioural characteristics of successful ideators, i.e. those who suggest ideas that are implemented. Our study is based on binary logistic regression analyses of a dataset from a call for ideas crowdsourced by the city of Munich. We found that characteristics linked to suggesting possible solutions and to showing positive attention towards other ideas are key features of how successful ideators behave online. We also found that the first is a characteristic of ideators who are likely to suggest an idea that is implemented but not novel. The latter is a characteristic of ideators who are likely to suggest an idea that is implemented and novel. Paying attention to other ideas before suggesting one's own and providing constructive input to other ideas are not found to be characteristic for successful ideators. The findings contribute to a better understanding of successful ideators' online behaviour and thereby open up new opportunities for the detection of ideas that the idea-seeker wants to implement.

1 | INTRODUCTION

A growing number of companies and organisations use online idea calls not only to generate ideas for new goods or services but also to find solutions to societal needs or ecological problems. Current examples are calls for product ideas launched by companies like Dell, Starbucks and Muji, as well as calls targeting societal or governmental topics by the Office of the United Nations High Commissioner for Refugees (UNHCR), the European Commission or numerous municipalities or governments worldwide.[1] Unlike online idea contests, these online idea calls are not searching for one single, or very few, winning idea(s) or solution(s). Instead, organisations using such calls aim to generate—and eventually implement—a wide variety of valuable ideas, taking advantage of external knowledge and creative input for innovation and product development purposes. Calls for ideas can last a few weeks or even several years and tend to attract a diverse crowd of ideators to suggest their ideas. Consequently, calls typically result in a broad variety and often large numbers of ideas, and detecting the most promising ones can be an issue for the idea-seeker and require tremendous effort (Poetz & Schreier, 2012; van den Ende, Frederiksen, & Prencipe, 2015).

From research on user innovation and user involvement in new product development, we know that some people are more capable of coming up with innovative ideas than others (Lüthje, 2004; Schweitzer, Gassmann, & Rau, 2014; von Hippel, 1986). This difference has also been identified by studies on online idea generation (often referred to as idea crowdsourcing). Looking at an idea contest for new online services, Schuhmacher and Kuester (2012) found that ideators with a lot of use experience and who are dissatisfied with existing services provide ideas of higher quality, as assessed based on expert ratings on idea novelty, feasibility and relevance. Focusing on an online design contest, Füller, Hutter, and Faullant (2011) showed that ideators with a positive co-creation experience, which is based on a feeling of autonomy, competence and task enjoyment as well as on a feeling of being part of the community, are more likely to deliver high-quality designs based on expert ratings. However, at least when it comes to the ideators' ability to come up with original or novel ideas, then it is not that easy to explain why some ideators suggest better ideas than others. Franke, Lettl, Roiser, and Tuertscher (2013) assessed (among other factors) the influence of a range of different ideator-related characteristics, such as expertise, creativity, motivation or outsiderness, on the degree to which the ideas suggested by the ideator differ from existing paradigms and involve new functions. They found these ideator-related characteristics not to be important for the outcome.

The analysis of ideators' behaviour during the idea generation (or ideation) process provides another perspective on the question why some ideators come up with better ideas than others. Bullinger, Neyer, Rass, and Moeslein (2010) focused on the cooperative behaviour shown by teams of ideators in the competitive setting of an online community-based innovation contest. They found that teams that

show very high as well as very low cooperative behaviour towards other teams tend to suggest ideas that received high ratings for their novelty and usefulness. While Bullinger et al. (2010) as well as the studies mentioned in the previous paragraph used survey data or focus groups to gain insight into the behaviour of ideators, the following research mentioned in this paragraph used data that became available during an online ideation process. Also in the competitive setting of a contest—in this case an online design contest—Kathan, Hutter, Füller, and Hautz (2015) used data from online commenting and found that those ideators who show direct or indirect reciprocal cooperative behaviour by assisting other ideators through commenting on their ideas are likely to suggest design ideas of highest quality. Using data from the non-competitive Dell IdeaStorm platform, Chan, Li, and Zhu (2015) also used data concerning the ideators' online commenting behaviour to explain how this influences the ideation outcome, in this case the likelihood of subsequent idea postings. They found that ideators who comment intensively on a range of different ideators' ideas are likely to subsequently suggest ideas. This, however, is weakened by a high level of past ideation participation. Also using data from the Dell IdeaStorm platform, Bayus (2013), in turn, found that for serial ideators, past success is negatively related to the diversity of any future suggestions and so negatively influences the likelihood of them suggesting additional ideas that will be implemented. By looking at the commenting behaviour, he found that this effect is somewhat mitigated for ideators who commented on a wide set of others' ideas.

Although not within the context of online idea calls or contests, the importance of interaction behaviour during the ideation process for the ideation outcome is also reflected by some literature that focuses on company-internal innovation. In line with the insight that within the idea initiation phase of company-internal innovation processes the structure and content of social networks among colleagues are important for idea acceptance (Kijkuit & van den Ende, 2010), some studies have analysed the influence of an employee's networks on this employee's innovative performance: they found that while more connections within the network result in a higher proportion of high-quality ideas (Björk, Di Vincenzo, Magnusson, & Mascia, 2011; Björk & Magnusson, 2009), larger numbers of structural holes in such a network lead to lower-quality ideas (Björk et al., 2011), with both high and low quality being based on the novelty and usefulness of the idea. However, it is not only the size and structure of the networks that matters. Again not focusing on online idea calls or contests, but this time looking at innovators outside companies, research on innovating users revealed that these innovators show a certain interaction behaviour: Franke and Shah (2003) found that innovators in voluntary special-interest sports communities often share innovation-related information during the ideation process, and Lüthje (2004) showed that innovating users of outdoor sport products can be identified by their intensive search for information about new products.

Taking these insights into account and also knowing that creative behaviour is based on particular traits, such as being more open to new experiences, more self-confident and ambitious (Feist, 1998, 2010), we deem it important to pay attention to the online behaviour of ideators in idea calls when trying to understand the ideation outcome. While the studies mentioned before focus on explaining why some ideators do better with regard to suggesting more ideas or ideas of better quality—based on either expert or peer ratings that assess idea novelty, feasibility, relevance or usefulness—they do not explain why some ideators are more likely to come up with ideas that are actually later taken up and implemented. Only the study by Bayus (2013) contributes to this question, but with a special focus on serial ideators. However, following Levitt's statement 'Ideas are useless unless used. The proof of their value is their implementation' (1963, p. 79), it is especially important to pay attention to those ideators who are likely to suggest ideas that the idea-seekers will implement. Despite the already emphasised importance of different ideator behaviour, it still remains unexplored whether the ideators' online behaviour can be used to detect those ideas that are likely to be implemented, thus, to identify online behavioural characteristics of ideators who are likely to be successful. Interestingly, though, the impact of online interaction, such as votes and comments in online idea generation, has mainly been analysed in relation to the idea or ideator being commented on (e.g. Dahlander & Piezunka, 2014; Di Gangi & Wasko, 2009). To our knowledge, the online behaviour of ideators (e.g. voting or commenting) and how this online behaviour relates to their likelihood of being successful (which we define as suggesting ideas that are implemented after being proposed[2]) in the setting of an idea call has received little academic attention so far. Addressing this gap in the research, this article focuses on the following question: which characteristics of ideators' online behaviour influence their success in open idea calls?

To shed light on this question, we carried out binary logistic regression analyses using a dataset that we composed on the basis of an open online idea call administered by the city of Munich. Running from December 2010 to February 2011, the call invited citizens to propose ideas for new digital services in Munich.

The relevance of our study is confirmed by the increasing popularity of, and academic attention paid to, the generation of ideas online over the past 10 years. Given the crucial role of successful ideators within this process, it is particularly important to learn more about their online behaviour. This is even more relevant, because idea calls typically guarantee the anonymity of ideators. Therefore hardly any information about their demographics or expertise is available. At the same time, such idea calls produce rich data on ideators' online behaviour. Analyses of these data thus seem important in singling out successful ideators.

Our contributions to the field are twofold. First, by identifying important online behavioural characteristics of successful ideators, we contribute to filling a gap in the idea crowdsourcing literature (Zhao & Zhu, 2014) and towards a better understanding of how the online behaviour of ideators, who succeed in suggesting an idea that is implemented, reflects the findings from (offline) user innovation and creativity research. Second, beyond these theoretical insights, our results also contain managerial implications for those organisations that are interested in using online idea calls to generate ideas for new goods or services: by providing a better understanding of the characteristics of successful ideators' online behaviour, it will be possible to pay special attention to the ideas of those ideators. Our insights therefore contribute to finding answers to the problem of effective idea detection and selection within the 'fuzzy' front end of innovation (van den Ende et al., 2015). Moreover, they can be useful for the design of future idea calls to especially attract those ideators

or to stimulate behaviour that leads to the suggestion of ideas that the idea-seeker wants to implement.

The remainder of the paper is structured as follows: first, we provide an overview of the literature and the theoretical framework used, from which we derive the hypotheses to be tested. Thereafter, we explain our methodological approach and then report the results obtained. Finally, we discuss the findings and conclude by highlighting the managerial implications and limitations of our research, as well as areas for future study.

2 | LITERATURE FRAMEWORK AND HYPOTHESES

The theoretical framework of this study is based on knowledge derived from creativity research as well as from research on user innovation and online idea crowdsourcing. We aim to understand which characteristics of ideators' online behaviour influence their success in open idea calls, which we define as the likelihood of suggesting an idea that is implemented after being proposed. Therefore, we look at two groups of online behaviour that are discussed in detail in the following two subsections. The first group leads to hypotheses regarding the ideators' *ideation capacity* and is based on the insight that lead users and innovating users intentionally invest time and effort into the development of ideas. The second group leads to hypotheses regarding the ideators' *attention to other ideas* and is based on the insight that creative individuals and innovating users are curious and open to new ideas or experiences and pay specific attention towards other ideators' ideas.

2.1 | Ideators' ideation capacity

The first group of hypotheses is based on insights from research on user innovation, which over the last 40 years has found evidence that (certain) users or consumers can be a useful source of innovation (for an overview, see Bogers, Afuah, & Bastian, 2010). One cornerstone of this research area is von Hippel's lead user concept, which states that such innovating users, so-called lead users (von Hippel, 1988), have needs that foreshadow general demand in the marketplace. They are therefore likely to develop new products that are commercially attractive (von Hippel, 1986). Important for the context of our research is that such innovating users have been described as possessing special traits and displaying distinct types of behaviour. Eric von Hippel (2005) found, for example, that the motivation of lead users is particularly high, because they expect to obtain high benefits from the solution to their needs. Therefore, they often voluntarily interact with other innovating users or even innovate collaboratively in special-interest communities (Franke & Shah, 2003) or open-source software communities (Lakhani & Wolf, 2005). Importantly, users who innovate display a different behaviour from those who do not. Users with ideas for innovations, for example, more often seek information about new products than non-innovating users and have also been found to exchange information with other users who share similar interests (Lüthje, 2004).

Given that online idea calls do often not offer any monetary rewards to successful ideators, it can be assumed that one of the major motives to participate by suggesting ideas for new goods or services is the desire to use these products eventually. Ideators therefore suggest ideas which they would like to see implemented. From user innovation research we also know that innovating users have not only been found to experience and articulate a need for products that do not yet exist (Herstatt & von Hippel, 1992), but they are also likely to actually develop new goods and services, ranging from industrial products to sporting equipment as well as retail banking services and computerised information search systems used by libraries (Morrison, Roberts, & von Hippel, 2000; Oliveira & von Hippel, 2011; Shah, 2000; Urban & von Hippel, 1988). This more solution-oriented rather than need-related behaviour has also been witnessed online. An analysis of online contributions by lead users to mobile service innovation projects showed that 'the value of their contributions stems from their ability to suggest solutions instead of simply describing problems or stating customer needs' (Mahr & Lievens, 2012, p. 167).

We can therefore expect that successful ideators will not only communicate their requirements for new products but will also make suggestions about how their ideas can be implemented. From the perspective of the idea-seeking organisations, the ideas of such ideators should also be more attractive as they are more developed and concrete. This increases the likelihood that the ideator will be successful in terms of suggesting an idea that is implemented.

> **H1a**: *Ideators who develop their own idea(s) by making suggestions about how their idea(s) can be implemented are more likely to be successful than ideators who only phrase their idea(s) in the form of a wish or requirement.*

Bilgram, Brem, and Voigt (2008) point out that a great advantage of less competitive offline or online user communities is the mutual assistance and free revealing of information that can be witnessed among their members. Unlike idea contests that only search for a (few) winning idea(s), online idea calls are looking for a wide variety of ideas that can be implemented. It can thus be assumed that this environment also leads to cooperative behaviour or merely friendly rivalry.

Given that lead users possess relevant solution-oriented knowledge, they are also more likely to contribute knowledge to online communities (Jeppesen & Laursen, 2009). Jeppesen and Laursen (2009) found that users with a high degree of lead-user characteristics tend to enjoy sharing their knowledge by giving assistance and advice to other users in the online community. They found peer recognition to be one of the key drivers of sharing knowledge and assisting others. This is supported by Mahr and Lievens (2012), who found that the reasons to contribute to virtual lead-user communities include both extrinsic motives, such as peer recognition, and intrinsic motives, such as curiosity or supporting others.

Interestingly, sharing ideas and assisting others are equally important for the development of user innovations in an offline context (Franke & Shah, 2003). Accordingly, Franke and Shah (2003) found in voluntary special-interest communities that innovators can be differentiated from non-innovators by the duration and intensity of their interaction with other community members. They found that innovators are more likely to give assistance and advice to other innovators

within the community. It can therefore be assumed that the ideation capacity of successful ideators is reflected in the amount of constructive input they provide to other ideators' ideas.

> **H1b**: *An increase in the amount of constructive input provided on other ideators' ideas is positively related to the likelihood of ideator success.*

2.2 | Ideators' attention to other ideas

The second group of hypotheses is based on the insight that creative individuals as well as innovating users are open to new ideas and experiences and pay specific attention towards the ideas of other ideators. Ocasio (1997) defines attention to encompass among other things the focusing of time and effort by individuals on certain issues or possible solutions. Consequently, research on attention often points out that attention is a scarce resource and deals with the question why people, mostly in an organisational setting, pay attention 'to particular events or phenomena, given the almost infinite set of targets toward which it could be directed' (Dane, 2013, p. 46). This question of attention allocation is also important when trying to understand people's behaviour online: in the context of an intra-organisational online discussion forum, Haas, Criscuolo, and George (2015), for example, found that a match between the expertise possessed by a provider and the expertise needed to solve the problem increases the likelihood of attention allocation. As research on online idea calls or contests has shown that ideators often pay attention to other ideators' ideas (e.g. Bullinger et al., 2010; Chan et al., 2015; Kathan et al., 2015; Schemmann, Herrmann, Chappin, & Heimeriks, 2016), we find it important to also consider this attention behaviour of ideators and to analyse how it relates to the likelihood of being successful.

Insights from creativity research can be useful to understand this online attention behaviour of successful ideators. For two reasons we consider results of creativity research to be relevant for our study. First, idea generation is one of the critical processing activities involved in creative thought (Vessey & Mumford, 2012), and second, the numerous definitions of creativity (for an overview, see Batey, 2012) all stress that the outcome of creative behaviour (e.g. an idea) needs to be both useful as well as novel. The crowdsourced ideas for new goods, services or processes that are implemented by the idea seeker do at least clearly fulfil the usefulness constraint, and we already know from research on online idea crowdsourcing that ideators are also highly capable of coming up with novel ideas (Poetz & Schreier, 2012).

As successful ideation is part of the creative process, we therefore argue that ideators who are successful in online idea calls will also show some behaviour typical of creative individuals. Creative individuals have been described as possessing particular traits and tendencies: based on a meta-study of personality and creative achievement in the arts and sciences, Feist (1998, p. 304) concluded that, 'empirical research over the past 45 years makes a rather convincing case that creative people behave consistently over time and situation and in ways that distinguish them from others'. This has delivered insights into the kind of personality traits that make creative thought, behaviour and achievement more likely. For instance, certain cognitive traits (such as openness) and motivational-affective traits (such as drive and intrinsic motivation) were found to be important (Feist, 2010). Of the 'Big Five' personality traits combined in the Five Factor Model of personality, 'openness to experience' has been identified as a crucial characteristic of creative individuals (Dollinger, Urban, & James, 2004; McCrae, 1987). People who score high on the openness factor are curious and often look for unfamiliar situations to gain new experiences and perspectives (McCrae & Costa, 1997). They therefore tend to appreciate new things which, combined with a greater sensitivity to a range of different experience, may cause them to create novel solutions or creative ideas (George & Zhou, 2001). Extraversion and openness to experience were consequently found to improve creative performance (Sung & Choi, 2009). Moreover, being open to other ideas was identified as an important (social) skill displayed by creative R&D scientists (Amabile & Gryskiewicz, 1987). Salter, Wal, Criscuolo, and Alexy (2015) support this by showing that by being open, R&D scientists and engineers benefit from variety and alertness, making them better prepared to develop new and valuable ideas. We therefore argue that this openness and curiosity of creative individuals will not only be displayed in higher levels of attention towards other ideas, but that this attention will be positive and appreciating this other input.

Consequently, and important for our context, positive effects of openness have also been determined for idea generation by users or in an online innovation contest. While Stock, von Hippel, and Gillert (2016) showed in a recent study on innovating and non-innovating users that a higher score of openness to experience is positively related to the likelihood of coming up with new product ideas, Bullinger et al. (2010) found for online community-based innovation contests that ideators' curiosity about and support for other ideas result in a high degree of innovativeness. We consequently assume that ideators who are positively attracted to new ideas and therefore show positive attention to other ideators' ideas are more likely to be successful.

> **H2a**: *An increase in the amount of positive attention paid towards other ideators' ideas is positively related to the likelihood of ideator success.*

If attention is paid to other ideators' ideas while coming up with an idea, then this can influence the quality of the idea that will be suggested: research on idea generation in groups shows, for example, that sharing ideas and the exposure to other creative ideas can enhance one's own creativity, which eventually leads to the production of more creative ideas (Nijstad & Stroebe, 2006; Paulus & Yang, 2000). This is also supported by Garfield, Taylor, Dennis, and Satzinger (2001) who found that the likelihood of coming up with a paradigm-modifying idea increases if the ideator is exposed to other paradigm-modifying ideas during the ideation process, and by Shalley and Perry-Smith (2001) who showed that ideators who have been given a creative example of a solution displayed more creativity than those who have not. We therefore argue that ideators' pre-ideation attention to other ideas also needs to be taken into account when trying to understand ideator success.

Online ideation processes often provide the opportunity to observe ideators' pre-ideation attention to other ideas by looking at the commenting and voting behaviour. Consequently, we also find support for our argument in some studies that focus on ideator and

idea success in open idea calls. There are two studies based on the idea call by the company Dell that indicate that ideators who pay major attention to other ideators' ideas—meaning that they show a diverse commenting activity on other ideas—are more likely to be successful (Bayus, 2013; Martínez-Torres, 2013). And recently a study on an idea call for new product development in the food and beverages sector showed that idea implementation was positively related to the ideator's intensive commenting behaviour shown during the call (Schemmann et al., 2016). Based on these insights we consequently assume that paying attention to the ideas of other ideators' before suggesting an idea is important for successful ideation and that successful ideators are therefore likely to do so.

> **H2b**: *Ideators who pay attention to other ideators' ideas prior to suggesting their own first ideas are more likely to be successful than ideators who do not pay any attention prior to suggesting their own first ideas.*

3 | METHODOLOGY

In order to study the relationship between ideators' behaviour online and their success in an open idea call, we use a cross-sectional research design, in which the unit of analysis is the ideator.

3.1 | The data

To answer our research question we used data from an online idea call organised by the municipality of Munich. It took place from December 2010 to February 2011. The call for ideas, named MOGDy, was run on the adhocracy.de platform, a non-profit platform which allows public organisations and communities to organise e-participation projects free of charge. MOGDy asked citizens to suggest new '*ideas for digital Munich*', i.e. new or improved digital services that can be offered to the people in Munich. The initiative was among the first of its kind in Germany and received public attention as well as two international awards[3] (Dapp & Seeger, 2011).

To participate, citizens only had to register on the platform by giving themselves a unique user name. Then they were able to suggest ideas or comment on ideas and to vote whether they liked or disliked any of the ideas suggested in this call. Neither voting nor commenting was mandatory. All users of the platform were able to read all ideas and comments and to see how many positive or negative votes an idea had received. All registered users were allowed to use a fictitious user name and so did not need to reveal their real identity nor provide personal information to the organisers or the audience. A publicly visible individual 'profile' page that was automatically created for each registered user allowed to keep track of all the ideas suggested as well as all the comments made and votes provided by each individual user.

The idea call organisers asked for ideas for innovations and improvements linked to (new) digital services, including those enabling new forms of e-participation to be provided for the citizens of Munich (see Dapp & Geiger, 2011). The organisers aimed to generate a wide variety of ideas related to 'digital Munich' and to encourage broad citizen participation (Viola, 2010), and registered users were allowed to post any idea they liked or found suitable in this context. As a result, the ideas suggested ranged from the introduction of free wireless Internet access across the city and the request for online voting in political elections to a new mobile service enabling drivers to pay for parking tickets online and an online service to help parents find day care for their children. Besides these ideas that are new to the city or beyond, the ideators also suggested improvements to existing services, for example changes or enhancements to the city's official website (www.muenchen.de) or to other existing (online) services delivered by the city's service providers. Some moderators were active on the platform. They provide answers to questions concerning the idea call, calmed down unsuitable discussions or asked questions if ideas or comments were unclear.

The city's idea evaluation and selection process officially started in early 2011 after the organisers of the idea call handed a list containing all ideas suggested on the platform to the city's IT management responsible for the city's digital and online strategy and control. The following idea evaluation process involved a variety of people working within the city's IT management, different units of the municipality and different providers of public services, and led to discussions to what extent the ideas can provide (strategic) input to the city's e-government strategy and roadmap or can be put directly into practice to improve existing online services, such as the city's official website. Based on our analyses of different sources of information that are available online, such as the municipality's IT Blog, project reports or the records of meetings involving different entities, we can state that this process often involved extensive discussions involving, as mentioned before, a range of different people from different entities. The process formally ended in 2013 with the adoption of the e-government strategy and roadmap.

This online idea call is particularly suitable for our research as it offers rich and publicly available information about the ideation and interaction behaviour of each ideator. Given that we are looking at the success of ideators (i.e. whether or not they suggested an idea that is later (partially) implemented), we also needed to assess the implementation of ideas. It is therefore important that the call was completed sufficiently long ago to be able to assess whether or not the respective ideas have been taken up somehow. After removing double entries and ideas suggested outside the realm of the call, the dataset contained 72 ideators who suggested 128 ideas, voted 859 times and wrote 307 comments on other ideators' ideas.

3.2 | Measurement

The **dependent variable** *ideator success* is operationalised as follows.

Given that online idea calls are looking for as many ideas that can be implemented as possible, we first measured the ideator's success in its basic form: the ideator's general ability to suggest at least one idea that is later (partially) implemented. In order to assess whether an idea or a suggested service has been, or is, in the process of being implemented, we carried out an extensive online search. We consider this to be a suitable process as consultation with members of the team that organised the idea call showed that—due to the evaluation and selection process mentioned before—there is no single unit in the

municipality that would be able to provide us with this necessary information concerning all ideas suggested. For 48 of the 128 ideas[4] used in the analyses, we found information or signs that the ideas were in some way taken up and implemented, or were in the process of being implemented. For the other 80 ideas, we either found information that the ideas were rejected, that the services already existed at the time of suggestion, or that there were no signs of the ideas being taken up or such services being implemented. Based on this information, we coded ideator success as a dichotomous variable, whereby successful ideators (i.e. ideators who suggested at least one idea that was (partially) implemented or in the process of implementation) are coded as 1. Ideators who were not successful are coded as 0.

For further in-depth analyses and robustness checks, we also operationalised the dependent variable in two alternative ways, namely by combining idea implementation with two other important measures of creativity: idea novelty and idea originality. To do so, we carried out an Internet search with the aim of assessing whether an idea that was (in the process of being) implemented was also novel, i.e. new to Munich. This version of the dependent variable (*implemented* ∩ *novel*) is also dichotomous. Here successful ideators, who suggested at least one idea that is considered to be creative (namely implemented and new to Munich), are coded as 1. All other ideators are coded as 0. In addition, we analysed whether ideators suggested ideas that were (in the process of being) implemented but not novel to Munich (e.g. an improvement). For this version of the dependent variable (*implemented* ∩ *not novel*), ideators who suggested at least one idea that was implemented but not novel are coded as 1. All other ideators are coded as 0. Given that some ideators suggested ideas similar to those suggested by other ideators, we also analysed whether ideators were successful in coming up with ideas that were implemented and unique among the ideas suggested in this call. This version of the dependent variable (*implemented* ∩ *original*) is therefore again dichotomous: successful ideators, i.e. ideators who suggested at least one idea that was implemented and unique among the ideas suggested, are coded as 1 and all other ideators as 0.

The **independent variables** used in this study are operationalised as follows.

The independent variable *idea development* (hypothesis H1a) is measured according to whether an ideator always made suggestions about how his/her idea(s) could be implemented. We therefore analysed the content of all ideas suggested and created the following dichotomous variable: ideators who always made some kind of suggestion as to how their ideas could be implemented are coded as 1, ideators who did not are coded as 0.

The independent variable *input to other ideas* (hypothesis H1b) is operationalised according to the number of times that an ideator provided constructive input to other ideators' ideas. We therefore analysed the content of all comments made and looked for comments that developed other ideas, for example by providing arguments why the idea should be implemented or how this idea could be further developed. The resulting variable is continuous: for each constructive comment made, the commenting ideator receives 1 point. In order to correct for the skewed distribution of values, the variable is then log-transformed.

The independent variable *positive attention to other ideas* (hypothesis H2a) is measured by the number of times that an ideator voted positively on other ideators' ideas. We use the voting and not the commenting behaviour to operationalise this variable as we observed that ideators who comment on other ideas do almost always also vote on the idea they commented upon. In contrast, voting on other ideas does not always go hand in hand with also commenting upon these ideas. Moreover, comments do not always contain a definite statement concerning the overall perception of the idea commented upon. We consequently consider the ideator's positive voting behaviour to be the precise measure for this independent variable. Any 'self-votes' by the ideator on his/her own idea as well as any multiple votes by the same ideator on the same idea were omitted. Consequently, the variable is continuous: for each positive vote on other ideas, the voting ideator receives 1 point. In order to correct for the skewed distribution of values, this variable is then also log-transformed.

The independent variable *pre-ideation attention* (hypothesis H2b) is operationalised according to whether or not an ideator commented or (positively or negatively) voted on other ideators' ideas before suggesting his/her own first idea. The variable is dichotomous: ideators who voted or commented on other ideators' ideas before suggesting their own first idea are coded as 1, ideators who did not are coded as 0.

We also included three **control variables** in the analysis.

First, we controlled for the *technical knowledge* displayed by ideators. The call looked for all types of ideas for 'digital Munich'. No particular (technical) expertise was needed to suggest an idea. Nevertheless, in some cases ideas or comments show that their writers possess some technical knowledge. Such technical knowledge could enable ideators to suggest ideas that were better developed and therefore more likely to get implemented. At the same time, such ideators could be more capable of commenting. Accordingly, we analysed all ideas suggested and comments made to assess whether the respective ideator demonstrated technical knowledge. We considered this to be the case when technical terminology[5] was used. The resulting dichotomous variable takes the value of 1 for those ideators showing technical knowledge and the value of 0 for those ideators who do not.

Second, we controlled for the point in time at which the ideator decided to participate in the call. The idea call was communicated to the citizens of Munich through a campaign using online and offline media. This campaign took place in different waves throughout the duration of the call. Depending on the media used, ideators with specific backgrounds could have been motivated to participate in the call at different points in time. If motivations to join the idea call differed systematically throughout the call, this could influence the ideation behaviour. To control for systematic variations over time, we include the *ideator's registration day* as a continuous control variable. The value of 1 is given if the ideator registered on the first day of the call, the value of 2 for those who registered on day two, and so forth.

Third, we controlled for the fact that ideators who suggested many ideas had a higher chance that at least one idea was implemented. The descriptive statistics in Table 1 show that this is the case in our study: serial ideators who suggested two or more ideas were more successful than single ideators. Furthermore, ideators who came up with more ideas may also have been more active commenters and voters. We therefore control for *idea frequency* in the form of a

TABLE 1 Descriptive statistics of ideator success measured against number of ideas suggested

72 ideators 47% successful	**25 serial ideators** 72 % successful	**12 ideators suggested 2 ideas** 67 % successful
		13 ideators suggested more than 2 ideas 92 % successful
	47 single ideators 36% successful	

continuous variable: for each idea suggested, the ideator receives 1 point. In order to correct for the skewed distribution of values, the variable is transformed using a reciprocal transformation.

The coding for the independent variables *idea development* and *input to other ideas* and for the control variable *technical knowledge* was conducted by one author only. To determine whether the coding scheme is clearly defined and enables accurate assignment of codes, we used a method suggested by Poole, van de Ven, Dooley, and Holmes (2000, p. 167). Therefore, we chose a random subsample of the dataset. Based on the coding scheme, this subsample was then coded by an academic who was not involved in the research project. Using the Cohen's kappa statistic[6] we found substantial agreement among raters. Discrepancies between raters were analysed and discussed to be sure that there were no systematic problems with the coding scheme.

3.3 | Analyses

Given that the dependent variable *ideator success* is dichotomous, we conducted binary logistic regression analyses. Overall, we report seven models. In model 1, we only included the three control variables. In model 2, the control variables are included together with the two independent variables related to the ideator's *ideation capacity*. In model 3, the control variables are assessed together with the two independent variables related to the ideator's *attention to other ideas*. Finally, in model 4, we included the control variables and all independent variables.

For further in-depth analysis we ran three additional models, also including all control and independent variables. The models differ from each other in their dependent variable. In model 5 successful ideators suggested an idea that was not only implemented but at the same time novel (*implemented ∩ novel*). By contrast to model 5, in model 6 successful ideators suggested an idea that was implemented but not novel (*implemented ∩ not novel*). Finally, in model 7 successful ideators suggested an idea that was implemented and at the same time unique among the ideas suggested in the call (*implemented ∩ original*).

4 | RESULTS

In this section we first provide some descriptive statistics of the variables used in the analyses. We then present the results of the binary logistic regression analyses carried out showing support for hypotheses H1a and H2a. No support was found for hypotheses H1b and H2b. Some additional analyses using different versions of the dependent variable by including idea novelty and idea originality help to better understand how these findings relate to being successful at suggesting different types of ideas that are implemented.

Table 2 shows that almost half of the ideators were successful in suggesting at least one idea that was (partially) implemented. Furthermore, almost half the ideators always made suggestions about how their ideas could be implemented or paid attention to other ideas before suggesting their own first idea. Only a few ideators displayed technical knowledge in their ideas or comments.

The results of the binary logistic regression assessing the impact of *ideation capacity* and *attention to other ideas* on *ideator success* are shown in Table 3. The tests of all models against the respective constant-only model are statistically significant, indicating that the predictors together reliably distinguish between an ideator being successful or not. Accordingly, Nagelkerke's R^2 is .192 for model 1, .332 for model 2, .280 for model 3 and .378 for model 4.

In an assessment of the predictive power of each independent variable for model 4, the Wald criterion shows that the independent variables *idea development*, *positive attention to other ideas* and the control variable *idea frequency* are significant predictors. By contrast, *input to other ideas* and *pre-ideation attention* are not statistically significant. These findings are robust across models 1–4 as the same independent variables are revealed to be statistically significant or insignificant. The independent variables *input to other ideas* and *pre-ideation attention* and the control variables *technical knowledge* and *registration day* are not statistically significant.

The results regarding the control variable *idea frequency* remain largely unchanged and significant at a .01 or a .05 significance level for all four models. In all models, a positive relationship is observed. In line with our expectations, ideators who suggested two or even more ideas were more likely to be successful in this idea call. It is therefore important to control for *idea frequency*.

Hypotheses H1a and H1b lead to the expectation that ideators showing a greater *ideation capacity* are more likely to be successful. To be precise, we expect that ideators who always make suggestions on how their ideas could be implemented (H1a) and ideators who provide more constructive input to other ideators' ideas (H1b) are more likely to be successful than ideators who do not. The results show empirical support for hypothesis H1a at a .05 significance level. Net of other effects, model 4 illustrates that the odds of an ideator being successful are 6.14 (= Exp of 1.815) times higher for ideators who make some suggestions about idea implementation compared with ideators who do not do this. While H1a is empirically supported, the models do not lend empirical support to hypothesis H1b at a .1 significance level. The results highlight that ideators are more likely to be successful when they display their ideation capacity by always making suggestions on how their ideas could be put into practice; showing their ideation capacity by the extent to which they develop the ideas of others has no significant impact on their success.

Following hypotheses H2a and H2b, we would expect that ideators who *pay attention to other ideas* are more likely to be successful. To be precise, we expect that ideators who show more positive attention to other ideators' ideas (H2a) and ideators who pay attention to other ideas before suggesting their own first idea (H2b) are more likely to be successful than ideators who do not show this behaviour. While the results lend support to hypothesis H2a, the

TABLE 2 Descriptive statistics of dependent, independent and control variables

	N	Min	Max	Mean	Std. dev.	Pearson correlation					
						1	2	3	4	5	6
Dependent variable											
Ideator success	72	0	1	.47	.503						
Implemented ∩ novel	72	0	1	.36	.484						
Implemented ∩ not novel	72	0	1	.15	.362						
Implemented ∩ original	72	0	1	.29	.458						
Control variables											
1 Tech. knowledge	72	0	1	.17	.375						
2 Registration day	72	1	79	14.81	18.548	−.131					
3 Idea frequency[a]	72	0	.92	.22	.314	.114	−.159				
Independent variables											
4 Idea development	72	0	1	.46	.502	.262**	.169	−.379***			
5 Input to other ideas[b]	72	0	1.20	.34	.375	.156	−.348***	.431***	.020		
6 Positive attention[b]	72	0	1.85	.66	.570	.040	−.272**	.330***	.031	.638***	
7 Pre-ideation attention	72	0	1	.42	.496	.076	−.247**	.035	.071	.455***	.573***

[a]Variable was transformed using a reciprocal transformation

[b]Variables were transformed using a log10 transformation

***p-value < .01; **p-value < .05; *p-value < .10

TABLE 3 Binary logistic regression analyses of ideator success in suggesting ideas that are implemented

0 = ideator not successful 1 = ideator successful	Model 1 Only controls *b* (S.E.)	Model 2 Ideation capacity + controls *b* (S.E.)	Model 3 Attention to other ideas + controls *b* (S.E.)	Model 4 Full model *b* (S.E.)
Constant	−.653 (.402)	−1.904 (.684)***	−1.252 (.563)**	−2.082 (.754)***
Control variables				
Tech. knowledge	.356 (.706)	−.336 (.743)	.463 (.717)	−.179 (.754)
Registration day	−.004 (.014)	−.009 (.017)	.000 (.015)	−.010 (.017)
Idea frequency	2.605 (.885)***	3.943 (1.257)***	2.094 (.931)**	3.653 (1.298)***
Ideation capacity				
Idea development		1.865 (.746)**		1.815 (.774)**
Input to other ideas		.703 (.878)		.453 (1.126)
Attention to other ideas				
Positive attention			1.573 (.702)**	1.244 (.747)*
Pre-ideation attention			−.960 (.751)	−1.059 (.808)
R^2 Nagelkerke	.192	.332	.280	.378
N	72	72	72	72

***p-value < .01; **p-value < .05; *p-value < .10

Model 1: chi-square = 11.180, p = .011 with df = 3

Model 2: chi-square = 20.580, p = .001 with df = 5

Model 3: chi-square = 16.926, p = .005 with df = 5

Model 4: chi-square = 23.960, p = .001 with df = 7

results for hypothesis H2b are not statistically significant at a .1 significance level across all models. Net of other variables, the results show that the odds of an ideator being successful are 3.469 (= Exp of 1.244) times higher with a one-unit increase in positive attention to other ideas. We thus find that the amount of positive attention an ideator pays to other ideas influences whether the ideator is successful. The results highlight that ideators are more likely to be successful when they show that they are open to other ideas by paying more positive attention to other ideas. However, paying attention to other ideas prior to suggesting their own first idea has no significant impact on their success.

The three additional binary logistic regression analyses we conducted provide further insights into how ideators' behaviour influences their capacity to suggest ideas that are implemented and novel (model 5), implemented and not novel (model 6) or implemented and original (model 7). Interestingly, the results obtained (see Table 4) do not fundamentally differ from those of the first four models but provide further insights concerning the different influence of the variables

TABLE 4 Binary logistic regression analyses of ideator success in suggesting ideas that are implemented as well as novel, not novel or original

0 = ideator not successful 1 = ideator successful	Model 5 DV: Implemented ∩ novel Full model *b* (S.E.)	Model 6 DV: Implemented ∩ not novel Full model *b* (S.E.)	Model 7 DV: Implemented ∩ original Full model *b* (S.E.)
Constant	−2.422 (.738)***	−3.262 (1.145)***	−3.116 (.941)***
Control variables			
Tech. knowledge	.861 (.765)	−21.619 (10181.592)[a]	−.528 (.883)
Registration day	−.001 (.017)	−.035 (.026)	−.020 (.020)
Idea frequency	2.803 (1.245)**	4.490 (1.977)**	4.842 (1.641)***
Ideation capacity			
Idea development	.976 (.783)	2.335 (1.266)*	2.357 (1.039)**
Input to other ideas	−.210 (1.080)	−.186 (1.373)	−1.015 (1.254)
Attention to other ideas			
Positive attention	1.320 (.752)*	.124 (.885)	1.448 (.833)*
Pre-ideation attention	−.676 (.763)	−.277 (.865)	−1.335 (.875)
R^2 Nagelkerke	.316	.348	.431
N	72	72	72

[a]Large values are due to the fact that all successful ideators did not show any technical knowledge.

***p-value < .01; **p-value < .05; *p-value < .10

Model 5: chi-square = 18.887, p = .009 with df = 7

Model 6: chi-square = 16.062, p = .025 with df = 7

Model 7: chi-square = 24.612, p = .001 with df = 7

linked to *ideation capacity* and the ones linked to *attention to other ideas*.

The tests of all models—each using a different version of the dependent variable—against the respective constant-only model are statistically significant, indicating that the predictors together reliably distinguish between an ideator being successful or not. Accordingly, Nagelkerke's R^2 is .316 for model 5, .348 for model 6 and .431 for model 7.

In line with models 1–4, models 5–7 reveal a positive effect of the control variable *idea frequency*: ideators who suggested two or even more ideas are also more likely to be successful in terms of the respective dependent variables used in the models.

Also in line with models 1–4, models 5–7 indicate that only the variables *idea development* and *positive attention to other ideas* significantly contribute to the models' predictive power at a .05 or a .1 significance level. However, only in model 7 do both variables turn out as significant predictors of whether an ideator is likely to suggest an idea that was implemented as well as original among the ideas suggested. For ideators' success in terms of suggesting an idea that was implemented and new to Munich (model 5), their displayed *positive attention to other ideas* is the only significant predictor, while for ideators' success in terms of suggesting an idea that was implemented, but not novel (model 6), their *idea development* behaviour is the only significant predictor.[7] The results therefore indicate that the influence of ideators' *idea development* behaviour and displayed *positive attention to other ideas* on the ideators' success is different for novel and not-novel ideas. Table 5 summarises the results of the analyses carried out.

In addition to these core analyses, we also conducted the following robustness checks in order to assess the sensitivity of the results to changes in model specifications.

First, given that creativity is the capability to come up with ideas that are not only useful but also novel, we checked the contributions of all variables on a subset of those ideators (n = 60), who suggested at least one idea that contained at least one dimension of novelty according to the six dimensions of service innovations developed by den Hertog, van der Aa, and de Jong (2010). The results remained the same as in models 1–4 for this subset of ideators.

Second, we also ran a logistic regression on the idea level (with robust standard errors clustered by ideator), including the *technical knowledge* shown in the idea, the *day of idea suggestion*, and the *number of ideas suggested* by the respective ideator as control variables. The results for the independent variables *idea development* (in this case of the respective idea), the ideator's *input to other ideas*, *positive attention to other ideas* and *pre-ideation attention* before idea suggestion were similar to what we found in the regression models 1–4 at the ideator level. Accordingly, the regression at the idea level also revealed that the *idea development* and the ideator's *positive attention to other ideas* are significantly related to the likelihood of the idea being implemented. Similarly, the ideator's constructive *input to other ideas* and *pre-ideation attention* turned out to have a negative, but not significant, influence.

Third, we also assessed whether the *negative attention paid to other ideas*, operationalised as the number of times an ideator votes negatively on other ideas, has an influence on the likelihood of being successful. Here the Wald criterion shows that the independent variable *negative attention* made no significant contribution to the prediction at a .1 significance level. In addition, the relationship for this variable was negative if both *positive attention* and *negative attention to other ideas* were included in the same model. The results for all other variables remained the same.

TABLE 5 Summary of the findings

Hypothesis	Relationship tested	Ideator success = suggesting an idea that is implemented Hypothesis supported?	Ideator success = suggesting an idea that is implemented and novel Hypothesis supported?	Ideator success = suggesting an idea that is implemented but not novel (e.g. improvements) Hypothesis supported?	Ideator success = suggesting an idea that is implemented and original in the idea call Hypothesis supported?
H1a	Development of own idea(s) –> higher likelihood of ideator success	**Yes**	No	Yes	Yes
H1b	Amount of constructive input on other ideators' ideas –> higher likelihood of ideator success	**No**	No	No	No
H2a	Amount of positive attention to other ideators' ideas –> higher likelihood of ideator success	**Yes**	Yes	No	Yes
H2b	Pre-ideation attention to other ideators' ideas –> higher likelihood of ideator success	**No**	No	No	No

5 | DISCUSSION

Our paper shows that the online behaviour of ideators can be utilised to discern whether they are likely to be successful in an online idea call. The data support our assumption that both the online behaviour related to the *ideation capacity* of ideators as well as to the way they *pay attention to other ideas* can be useful to distinguish ideators who are likely to be successful from those who are not likely to be successful.

First, we assessed two key characteristics related to the *ideation capacity* of ideators. To begin with, we find in line with hypothesis H1a that ideators who suggest ideas that not only ask for the introduction or improvement of (new) digital services but also offer some advice on how to implement them are more likely to be successful. In other words, successful ideators are those who point to possible avenues for solutions as well as to unmet needs. In line with the findings of Mahr and Lievens (2012), we can therefore state that the value of successful ideators' contributions lies in their solution-oriented behaviour that goes beyond a mere statement of their needs. Interestingly, though, we also find that these ideators do not necessarily suggest creative ideas, i.e. ideas that are implemented and also new to the unit of adoption. When looking at the likelihood of suggesting creative ideas, ideators who always make suggestions on how to implement their ideas are not more likely to be successful. Unlike the solution-oriented behaviour of lead users (e.g. Morrison et al., 2000; Oliveira & von Hippel, 2011; Shah, 2000; von Hippel, 1988) that we discussed in the literature section, this kind of solution-oriented behaviour observed in online idea calls seems to be more related to suggesting improvements of existing services than to suggesting ideas for innovative goods or services. Despite the solution-oriented behaviour shown, we must therefore question that successful ideators in online idea calls in this regard show the behaviour of lead users.

Interestingly, and contrary to what we expected from the knowledge sharing behaviour observed for user innovators in offline and online contexts (Franke & Shah, 2003; Jeppesen & Laursen, 2009), the amount of constructive input provided to other ideators' ideas has not proven to determine ideator success. An explanation for this discrepancy and therefore the lack of support for hypothesis H1b could be that knowledge-sharing and giving assistance and advice to others in the (online) community can sometimes absorb valuable time that the ideators otherwise could have used to suggest and develop their own ideas. Another explanation could be that at least some successful ideators feel that their ideas do compete with the ideas of other ideators. In this case they might show less the behaviour of lead users or what Hutter, Hautz, Füller, Mueller, and Matzler (2011) in the context of an idea design contest describe as 'communitors' (i.e. those ideators who come up with attractive ideas and make many cooperative comments) and instead show the behaviour of 'competitors' (i.e. ideators who also come up with attractive ideas but only make few or competitive comments). A possible explanation for this can be found in the previously mentioned study by Kathan et al. (2015) who showed —also looking at the competitive setting of an idea design contest— that free-riding behaviour can also be beneficial as it allows the ideator to benefit from the comments received without investing any time or effort in developing the ideas of other ideators.

Second, we then assessed two key characteristics related to ideators' *attention to other ideas*. Here we find in line with hypothesis H2a that ideators, who tend to be curious and open to new or other ideas as they pay a lot of positive attention to other ideators' ideas, are more likely to be successful. This shows that the important trait and tendency of creative individuals to be open towards new experiences and ideas (Dollinger et al., 2004; McCrae, 1987; Sung & Choi, 2009) also reflect in the online behaviour of successful ideators. Moreover, this is emphasised by the fact that we not only find the amount of positive attention shown towards other ideas to be positively related to the likelihood to come up with an idea that is implemented, but that this behaviour is also positively related to the likelihood of suggesting an idea that is implemented as well as novel to the unit of adoption. Consistent with a recent user innovation study that explored links between the 'Big Five' personality traits and the successful accomplishment of different stages in the innovation process (Stock et al.,

2016), we find some indication that being open and paying positive attention to ideas is an important trait of those ideators who are successful in coming up with an idea for a novel service product that is implemented. However, it is not an important trait of those ideators who tend to successfully suggest improvements of already existing services. We also assessed whether the converse behaviour, namely negative attention to other ideas, is related to ideators' success. We do not observe any effects. Therefore, our findings are in some contrast to the results of Martínez-Torres (2013) who found some indication that successful ideators in an online idea call are likely to respond critically to other ideas.

Different to our initial expectations and to findings from research on offline idea generation in groups (Nijstad & Stroebe, 2006; Paulus & Yang, 2000), we do not observe in our online context that those ideators who are paying attention to other ideators' ideas before suggesting their own first idea are more likely to be successful. There are two possible explanations for this discrepancy and therefore for the lack of support for hypothesis H2b. First, findings from creativity research suggest that the positive effect of pre-ideation attention to other ideas only occurs when the ideator was exposed to examples of creative or even paradigm-modifying ideas (Garfield et al., 2001; Shalley & Perry-Smith, 2001). As online idea calls contain both creative as well as not-creative ideas, ideators who pay attention to other ideas before suggesting their own are likely to be exposed to both types of ideas. The effects of both could thus be balanced. Second, different to previous studies on online idea calls indicating that an ideator's attention to other ideas—based on the ideator's general commenting behaviour—has a positive effect on the likelihood of idea implementation (Bayus, 2013; Martínez-Torres, 2013; Schemmann et al., 2016), our study focuses on the ideator's pre-ideation attention that is reflected in both votes and comments on other ideas before suggesting their own. When trying to explain the effect of ideators' pre-ideation attention and therefore their exposure to other ideas, we argue that one needs to take into account comments as well as votes that were made or distributed before idea suggestion. Whereas general commenting behaviour can have a positive effect, the behaviour of showing pre-ideation attention towards other ideas has not proven to be a characteristic of successful ideators' online behaviour.

6 | MANAGERIAL IMPLICATIONS

Our findings bear practical as well as managerial implications for organisations that consider using online calls to generate ideas for new goods or services.

The idea generation phase as part of the front end of innovation is often considered to be 'fuzzy', as it is highly informal and often erratic with the outcome of the ideation process being highly uncertain (van den Ende et al., 2015). One of the issues in this early phase of innovation is how to quickly detect promising ideas and to screen out less useful ones (van den Ende et al., 2015). As idea crowdsourcing can lead to large numbers and a broad variety of ideas, identifying promising ideas can be problematic and often requires a lot of effort from the idea-seeker (Poetz & Schreier, 2012; van den Ende et al., 2015). One way to reduce this effort is to focus on the ideas suggested by those ideators who are likely to come up with ideas that are likely to be implemented. Our findings show that paying attention to the online behaviour during the idea call can help to identify those ideators. Therefore, organisations should consider the online ideation behaviour as well as the attention paid to other ideas as this can provide valuable information regarding which ideators are likely to suggest useful ideas. More concretely, our findings indicate that organisations should look for those ideators who not only phrase their ideas by articulating a wish or requirement but also make some suggestion on how their ideas can be implemented. Moreover, organisations should especially observe those ideators who show positive attention to other ideators' ideas.

Our findings can be useful not only to identify ideas that the idea-seeker wants to implement, but they can also be useful for idea-seekers to improve the design of future idea calls. Ideators should be encouraged to make suggestions how their ideas could be implemented. This increases the likelihood that they come up with ideas that are perceived as useful. Moreover, asking ideators to suggest possible solutions or designs might even attract those ideators who like to show solution-oriented behaviour online. In contrast, the pre-ideation attention to other ideas should not necessarily be encouraged as it does not have a positive effect on ideators' creativity or success.

7 | LIMITATIONS, FUTURE RESEARCH AND CONCLUSION

Like all research, our study has its limitations and raises suggestions for further research.

First, our study is based solely on data generated from a single call for ideas—for new digital services in Munich. Despite the soundness of the data available on the online behaviour of ideators during this call, a constraint lies in the fact that the study is based on one particular case that generated ideas for new digital services in a not-for-profit environment. Therefore, our findings may not be applicable to online idea calls in different contexts. As mentioned previously, our findings concerning the ideators' *positive attention to other ideas* do, for example, differ slightly from those of Martínez-Torres (2013) based on a long-term call for new commercial products in the IT sector. But, with respect to similar open idea calls in comparable contexts, we consider our results to be applicable. Taking into account the work of Whitley (2000), we consider those open idea calls to be similar that are comparable regarding: the expected outcome of the ideation task that the crowd has been given, the kind of crowd involved, the degree to which individual crowd members depend upon each other to fulfil this task, and the benefits a successful ideator can expect. Analyses of data from other idea calls in comparable contexts will therefore be useful to verify our claims. Furthermore, future research might also attempt to confirm the characteristics of successful ideators' online behaviour found in this study in different contexts and environments.

Second, given that ideators in open calls for ideas are usually allowed to remain anonymous, data on the personal characteristics of ideators—such as their age, gender or location—were not available to us. It would certainly be valuable to assess how such additional control variables impact on the results obtained.

Third, the number of cases used in the analysis is relatively small. Despite the fact that we extensively crosschecked the robustness of all our models, analysis of a larger dataset would be useful.

Fourth, we are interested in the influence of ideator behaviour, and operationalised ideator success as the ability to suggest at least one idea that is (partially) implemented. Consequently, our unit of analysis is the ideator. Importantly, though, some ideators suggest numerous ideas that are implemented. Consequently, one could argue that success varies more importantly at the level of the idea rather than that of the ideator. As mentioned in the results section, we tried to take this into consideration by running similar analyses at the idea level. These showed similar results. Nevertheless, future analyses focusing on 'idea' as the core unit of analysis would be desirable to crosscheck our findings.

Despite these limitations, our findings contribute to better understand the online behaviour shown by successful ideators in open idea calls and thereby to fill a gap in the idea crowdsourcing literature. We also show that results from research on (offline) creativity and innovating users are—to some extent—applicable to the context of online idea calls. Concretely, our findings can be summed up as follows: First, we found the positive attention towards other ideators' ideas and the behaviour to not only state needs or identify problems but also suggest solutions to be key characteristics of successful ideators. Second, while the suggestion of possible solutions is an important characteristic of ideators who are likely to suggest an idea that is useful but only an improvement, paying positive attention to other ideas is an important characteristic of ideators likely to suggest an idea that is useful and at the same time novel. Third, neither paying attention to other ideators' ideas before suggesting one's own nor providing constructive input to other ideas were found to be characteristic for successful ideators. Our findings therefore illustrate that an analysis of ideators' online behaviour can be useful to identify those ideators who will potentially succeed in suggesting an idea that will be implemented. This can also open up new opportunities for the detection of ideas that the idea-seeker wants to implement and as a result contribute to finding answers to the problem of effective idea selection within the 'fuzzy' front end of innovation.

ENDNOTES

[1] The respective idea calls mentioned are: Dell IdeaStorm (ideastorm.com), My Starbucks Idea (mystarbucksidea.force.com), Muji Idea Park (idea.muji.net), UNHCR Ideas (unhcr.org/innovation/unhcr-ideas), European Commission FUTURIUM eIDEAS Observatory (ec.europa.eu/futurium/en/eidas-observatory); for some examples of idea calls by municipalities or governments, visit www.citizensourcing.de/citizen-ideation-innovation.html or opengov.ideascale.com.

[2] From now on referred to as 'idea(s) that is/are implemented'.

[3] Best-practice award given by the European Public Sector Awards 2011 and third place for the most innovative e-government project awarded by the 11th eGovernment-Wettbewerb.

[4] Many of the ideas that were in some way taken up and implemented were simply improvements of existing services or ideas for very incremental innovations, and so could be implemented without much effort or any risk. This explains why the implementation rate in our study is much higher than the implementation rate that is common in R&D projects that search for more radical innovations and are therefore associated with a high level of (financial) risk, as the outcome is often uncertain (Jones, 2013).

[5] The idea call asked the crowd to suggest ideas for new digital services in Munich. Technical terminology was therefore defined as any IT-related terminology that exceeds the basic terminology needed for the non-professional, everyday use of such digital services.

[6] Cohen's kappa statistics: for the independent variable *idea development*, Kappa is .800 ($p < .001$), for the independent variable *input to other ideas*, Kappa is .814 ($p < .001$), and for the control variable *technical knowledge*, Kappa is .737 ($p = .001$).

[7] Given that the number of cases is relatively small, we also tested all three models by entering the control variables and the *ideation capacity* and *attention to other ideas* variables separately into the analyses. Overall, the same variables made a significant contribution to the prediction of ideator success.

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