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The Wisdom of the Crowd vs. Expert Evaluation: A Conceptualization of Evaluation Validity

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Abstract

Due to various influences, companies face increasing numbers of ideas and more and more challenges arise in their environment while capacity to evaluate the out-comes is limited. The evaluation of these ideas, concepts, and problem solutions used to be the exclusive task of company internal experts such as managers, engi-neers, and scientists. Recently, crowds have been recognized as an alternative to provide valid evaluations. We offer a first assessment of whether crowds can be used for valid evaluations for evaluation challenges in different phases of devel-opment. We draw on research on new product development (NPD), entrepreneur-ship, and the more recent research on open innovation and user innovation to pro-vide a summary of literature, a conceptual framework, and hypotheses of im-portant factors that influence the validity of evaluations in phases of idea-, con-cept-, and solution development. The identified key factors are 1) number of ide-as, 2) strategic importance, 3) time to outcome/ to verification of evaluation, and 4) degree of expertise. Based on these factors, it can be argued that companies can influence the validity of evaluations by crowds through either increasing the num-ber of individuals within the crowd or by targeting crowds with higher degrees of appropriate expertise.

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THE WISDOM OF THE CROWD VS. EXPERT EVALUATION: A CONCEPTUALIZATION OF EVALUATION VALIDTY

ABSTRACT

Due to various influences, companies face increasing numbers of ideas and more and more challenges arise in their environment while capacity to evaluate the outcomes is limited. The evaluation of these ideas, concepts, and problem solutions used to be the exclusive task of company internal experts such as managers, engineers, and scientists. Recently, crowds have been recognized as an alternative to provide valid evaluations. We offer a first assessment of whether crowds can be used for valid evaluations for evaluation challenges in different phases of development. We draw on research on new product development (NPD), entrepreneurship, and the more recent research on open innovation and user innovation to provide a summary of literature, a conceptual framework, and hypotheses of important factors that influence the validity of evaluations in phases of idea-, concept-, and solution development. The identified key factors are 1) number of ideas, 2) strategic importance, 3) time to outcome/ to verification of evaluation, and 4) degree of expertise. Based on these factors, it can be argued that companies can influence the validity of evaluations by crowds through either increasing the number of individuals within the crowd or by targeting crowds with higher degrees of appropriate expertise.

INTRODUCTION

Nearly every innovation process includes the generation and selection of concepts and ideas (Girotra, Terwiesch, and Ulrich, 2010). Several tools for concept and idea generation have been introduced in the past (e. g. brainstorming (Osborn, 1957), lateral thinking (De Bono, 1970), synectics (Gordon, 1969; Prince, 1970), six thinking hats (De Bono, 1985), electronic brainstorming (Nunamakerb et al., 1987; Gallupe et. al., 1991, 1992; Dennis and Valacich, 1993; Valacich et al., 1994), ideation templates (Goldenberg et al., 1999a, b; Goldenberg and Mazursky, 2002), and incentives-based idea generation (Toubia, 2006)). Digitalization, social media and other novel technologies enable nearly everyone, to actively participate in innovation (Hutter, Hautz, Fueller, Mueller, and Matzler, 2011). Applications such as web-based toolkits (Thomke and von Hippel, 2002; Piller and Walcher, 2006), virtual concept testing (Dahan and Hauser, 2002), and virtual worlds (Hemp, 2006; Kohler, Matzler and Fueller, 2009), or concepts such as open innovation (Chesbrough, 2003), co-creation (Prahalad and Venkatram, 2000; Winsor, 2005), and crowdsourcing (Kozinets, Hemetsberger and Schau, 2008) enhance collaborative innovation. The emphasis of these concepts has been on the benefits of external knowledge and technologies in internal development processes of innovations.

Successful idea generation usually results in plenty of ideas and company analysis may reveal new problems. Literature highlights the challenge that companies face increasing numbers of ideas and problems while capacity to evaluate these ideas, concepts and problem solutions is limited. Consequently, experts have to focus their resources well-thought-out on the evaluation of ideas, concepts, and solutions with the highest potential. The challenge is to efficiently select the most valuable evaluation objectives and at the same time receive reliable outcomes. Traditionally, one or a couple of experts go over the scripts of ideas and evaluate

them (Urban and Hauser, 1993). However, experts´ judgments do not always reflect the only appropriate or valid solution. Due to the development of internet-based tools, companies increasingly consider crowd participation in idea generation, idea evaluation, and problem solving processes. However, literature has so far not looked at the validity of crowd-based evaluation for different phases of development. Hence, we propose the following research question that will conceptually be addressed and discussed in this paper:

Which factors influence the validity of evaluation by crowds as compared to expert evaluation for evaluation challenges in the different phases of idea-, concept-, and solution development?

How valid are evaluations made by the crowd compared to evaluations made by experts? This question seems to be novel and relevant regarding the literature and empirical studies stated above, as companies are under increasing pressure to decide whether or not to involve the crowd for evaluations in the different situations. Thus, we will compare the concept of expert evaluation (e.g. by professionals such as R&D internal or venture capitalists) and crowd evaluation (e.g. by online users). We mainly focus on factors that influence evaluation validity. The paper is structured as follows. We start with the review of literature about idea generation, evaluation, new product development, and problem solving. Then, we describe the influencing factors on validity. Next, a framework, a research model, and hypotheses are developed. Finally, we discuss different modes of evaluation within the different phases of development and the related issues for validity. We conclude with implications for theory and managerial practice as well as limitations of this conceptual approach and future research.

LITERATURE REVIEW

Companies face increasing numbers of ideas, concepts, and potential solutions while their capacity to evaluate is limited (Jeppesen and Lakhani, 2010). Furthermore, due to increased competition, companies have to accelerate time to market for the most promising ideas, and concepts (Cooper and Kleinschmidt, 1994). These trends put companies under pressure to evaluate efficiently but also provide valid solutions, and lead to the rising importance of valid evaluation among different resource constraints and market dynamics. The importance of valid evaluations applies to almost every type of company: from young start-ups to well-established large multinational corporations, all ventures are confronted with the phenomenon to handle growing numbers of ideas, concepts, and solutions along with their individual resource limitations for evaluations. Companies face the trade-off between the input of resources and the efficient selection and evaluation of "homeruns". They simply cannot afford to put too many resources on too many bets at once to screen all incoming ideas, concepts, or problem solutions. Thus, companies are under pressure to find alternative options for valid evaluations in order to identify clear winners (Morris, Kuratko, and Covin, 2011).

The central concept of evaluation validity used here refers to the degree of how much an anticipated or predicted outcome (e.g. success or failure of a product or business idea) corresponds to the true (future) outcome. In general, the earlier in the development stage, the less information on the evaluation challenge (e.g. idea, concept, or solution), its components, and characteristics are available and thus, the harder it is to predict outcomes such as purchase intentions, market potential, or new venture survival (Crawford and Di Benedetto, 2006).

Traditionally, evaluations are performed by companies' internal experts usually managers, engineers, or designers (Urban and Hauser, 1993). However, a large body of literature is documenting growing importance of crowds and illustrates various modes whereby more and more people can participate, and contribute. Literature has analyzed different types of

interactions and crowd activities, as for instance communities (McLureWasko and Faraj, 2000, 2005; Ardichvili, Page and Wentling, 2003; Sharatt and Usoro, 2003; Daugherty et al., 2005; Ardichvili, 2008), virtual consumer integration (Hemetsberger, 2002; Franke and Shah, 2003; Fueller, 2006), idea contests (Terwiesch and Xu, 2008; Morgan and Wang, 2010; Hutter et al., 2011), crowdfunding (Ley and Weaven, 2011; Ordanini, Miceli, Pizzetti, Parasuraman, 2011; Castelluccio, 2012), toolkits (Thomke and von Hippel, 2002; Piller and Walcher, 2006), and open-source (Hars and Ou, 2002; Hertel, Niedner and Herrmann, 2003; Lakhani and Wolf, 2005; Nov, 2007; David and Shapiro, 2008; Oreg and Nov, 2008; Schroer and Hertel, 2009). These different types of crowd activities also reflect different phases of development in which the crowd can be involved. So far, internal experts have been seen as idea, concept, or solution providers and evaluators. However, in all types of crowd activities mentioned above, also the crowd can basically function as both: as idea, concept, solution provider and evaluator. In order to be able to compare the different types of evaluators (i.e. experts and the crowd) and evaluation challenges, the following phases are introduced:

One can first distinguish between very early and fuzzy phases of new product development (NPD) in which many ideas are generated. In NPD, a well-established tool for idea generation is for instance idea contests. Idea contests are competitions in which interested individuals present their generated ideas in order to compete with each other for given prizes or rewards for their submitted ideas. Such contests increasingly being promoted on virtual platforms usually organized by companies, governments, or non-profit organizations (Morgan and Wang, 2010) to create novel, and innovative products, e.g. digital television or military aircraft (Fullerton et al., 1999).

Additionally, evaluation validity is of interest in phases in which idea and business concepts are fully described and need initial funding. This is for instance known from corporate entrepreneurship and crowdfunding platforms. Crowdfunding is the process of raising

money from many contributors (Belleflamme, Lambert, Schwienbacher, 2011). The concept has been used for a variety of activities as for instance for the funding of movies, books, or charity projects. However, crowdfunding is increasingly being promoted for the financing of business ideas. Crowdfunding platforms can basically be seen as online communities along social networking that have evolved into an innovative concept for venture capitalism (Castelluccio, 2012).

Finally, evaluation validity is important for the evaluation of solutions resulting from very specific problem solving activities, i.e. solutions that are developed for challenges faced by well-established large companies or public organizations (Terwiesch and Xu, 2008). Sometimes the needed expert knowledge can be acquired inside the company to solve and evaluate a solution. However, companies sometimes need external sources of expert knowledge to find and evaluate a solution. A frequently cited example is InnoCentive, a company that attracts solvers (e.g. scientists) on the behalf of seekers (e.g. R&D departments large companies) to contests involving very specific technical or scientific problem solving (Jeppesen and Lakhani, 2010; Terwiesch and Xu, 2008). At InnoCentive, these problems and solutions are accessible to a pool of more than 270,000 registered solvers from nearly 200 countries, which can also function as evaluators. Through strategic partners such as Nature Publishing Group, The Economist, etc. even more than 12 million solvers (or evaluators) can be reached (InnoCentive, 2012).

In all three phases outlined above, the majority of evaluation challenges have so far been performed by company internal experts (e.g. managers, engineers, or designers) in NPD and venture capitalists or personnel of incubators for start-ups. Though, it seems that the crowd is gaining importance for the evaluation of ideas, concepts, and solutions. This is due to general reasons and trends such as the increased speed and number of available ideas, concepts, and solutions, electronic communication technologies, network effects in online com-

munities, and social media, but also due to specific characteristics of the different evaluation challenges and development phases. Hence, the validity of evaluation is dependent on 1) the general trend (i.e. more and external ideas are harder to evaluate and can challenge expert based evaluation systems due to resource constraints and the specific knowledge required), 2) the characteristics of the phase (e.g. evaluation will be different for first ideas as compared to fully developed business proposals or solutions of very specific problems), 3) the characteristics of the evaluator (i.e. crowd versus expert), and 4) the characteristics of the evaluation challenge (e.g. complex vs. simple).

In order to identify important influencing factors for the validity of evaluation we have extracted literature dealing with the different evaluation challenges, development phases, roles, activities, and tasks of the crowd compared to expert evaluation. The goal of this comparison is to isolate the different phases in which both actors (expert and crowd) can perform evaluations. In the table below we have listed the phases and the group of evaluator (expert and crowd), as well as the influencing key factors for evaluations, which have been identified in literature. We will follow up by describing the different phases, the activities of crowds and experts, and the key influencing factors across these phases, and discuss the potential, and shortcomings of evaluations. The development of a more general framework results in hypotheses linking the validity of evaluation to the identified key factors across the different phases, and characteristics of the evaluators.

TABLE 1

Literature Overview and Influencing Key Factors

	Idea generation	**Business model/ concept development**	**Solution development**
Experts (internal)	Bennett and Cooper, 1981; Leonard and Rayport, 1997; Cooper, 2001; Crawford and Di Benedetto, 2006; Ulrich, 2007; Schulze and Hoegl, 2008; Ulrich and Eppinger, 2008; Martinsuo and Poskela, 2011	Shocker and Srinivasan, 1979; Timmons and Bygrave, 1986; Scherer and McDonald, 1988; Shepherd and Zacharakis, 2002; Cumming, 2006; Bottazzi et al., 2008; Gambardella and McGahan, 2010; Wirtz et al., 2010	Larkin et al., 1980; Chi et al., 1981; Sweller, 1988; Hardiman et al., 1989; Anderson, 1993; Jeppesen and Lakhani, 2010; Poetz and Schreier, 2012; Boudreau et al., 2012
Crowd (external)	Von Hippel, 2005; Lüthje et al., 2005; Jeppesen and Frederiksen, 2006; Hienerth, 2006; Baldwin et al., 2006; Boudreau and Lakhani, 2009; Girotra et al., 2010; Boudreau et al., 2011; Hutter et al., 2011	Holohan and Garg, 2005; Gruber and Henkel, 2006; Shah and Tripsas, 2007; Boyd and Ellison, 2008; Ley and Weaven, 2011; Fauchart and Gruber, 2011; Hienerth et al., 2013	Surowiecki, 2004; Bagozzi and Dholaki, 2006; Hargadon and Bechky, 2006; Lakhani and Jeppesen, 2007; Brabham, 2008; Jeppesen and Lakhani, 2010; Poetz and Schreier, 2012
Factor 1: Number of Ideas	Many or even infinite number	Few/limited number	One or very few solutions Many potential solvers
Factor 2: Time to outcome/ to verification of evaluation	Far in the future	Mid-term (2-5 years)	Immediate (solution solves problem)
Factor 3: Strategic importance	Early and fuzzy front end. Importance of one idea out of many rather low. However, possible strategic trajectory.	Strategic importance depending on level of investment and topic.	Highest strategic importance due to: problem/challenge that must be solved.
Factor 4: Expertise needed for evaluation	Evaluation based on opinions, assumptions and preferences.	Topic based and/or financial expertise and skills needed.	Specific technological, technical, and/or scientific expertise and skills needed.

Evaluation challenge I: Early idea generation

A first phase in which evaluation is critical for companies is early idea generation. Idea generation is critical to a company's ultimate success, especially as this initial step often results in trajectories that companies follow (Teece, Pisano, and Shuen, 1997.). Furthermore, it has been shown that large proportions of NPD costs can be related to core decisions in early phases (Cooper and Kleinschmidt, 1994). Hence, idea generation is of high relevance in research and in practice (Schulze and Hoegel, 2008; Poetz and Schreier, 2012).

Traditionally, it is the companies' experts (e.g. designers) who take on the responsibility for generating ideas or solutions that solve current or future problems. Bennett and Cooper (1981) believe that truly creative ideas are not in scope of consumers' or crowds` experience. The crowd usually provides ideas that solve present problems, thus blocking the focus on idea generation for future ones (Leonard and Rayport, 1997). In similar, Schulze and Hoegl (2008) argued that big leaps to novel ideas are less likely when asking the crowd about (future) products. A main argument is that the crowd does not have the same expertise and experience as company experts. The logic conclusion with respect to valid evaluations would be to prefer experts to the crowd. However, there is another line of literature, which argues that individuals within the crowd, at least some, have the necessary expertise to create promising ideas (Jeppesen and Frederiksen, 2006). This assumption is supported by studies that indicate that users can come up with innovations that are highly attractive to the market (von Hippel, 2005). An example is open-source software such as Linux which is developed by the crowd rather than by internal software engineers (Bagozzi and Dholakia, 2006; Lakhani and von Hippel, 2003; Lerner and Tirole, 2002, and, 2005; Pitt, Watson, Berhon, Wynn, and Zinkhan, 2006). Thus, the crowd might actually be able to generate truly novel ideas, and has necessary expertise also for the evaluation of ideas.

Evaluation challenge II: Business Model/ concept development

The second phase is characterized by further developed ideas and business concepts (e.g. an action plan or business model is available). Evaluation in this phase is often linked to financing a start-up (independently, through an incubator, or venture capitalist) as well as to further developments of corporate entrepreneurship projects (Baron and Shane, 2007). In concept development phases fewer projects have to be evaluated as described in the prior phase but the resources involved are much higher (both capital and human resources invested). Consequently, the validity of evaluation in this phase is important to both: the project owner (idea or concept provider) and the investor (idea or concept evaluator).

Traditionally, it is the venture capital industry and corporate investors evaluating business ideas and providing equity for new venture creation (Cumming, 2006; Bottazzi et al., 2008; Timmons and Bygrave, 1986). The financing and evaluation is necessary for young start-ups to operate and develop their business (Cassar, 2004). Several authors highlight that venture capitalists (i.e. experts) have limited resources to evaluate and fund every single concept or idea. Moreover, there is evidence that the focus of venture capitalists is moving from early stage to later stage investments, indicating that evaluation in this phase is critical and needs deeper understanding of the project or concept (Bivell, 2008; Osnabrugge, 2000). However, at this stage of new business or concept development, alternative forms actively utilize the crowd as funders and evaluators. As mentioned before, this happens in crowdfunding where many individuals can contribute to a concept or an idea. Crowdfunding is derived from the phenomenon of crowdsourcing (Agerfalk and Fritzgerald, 2008; Howe, 2006). Such crowdfunding platforms represent potential sources for equity and expert knowledge for the evaluation of ideas. Prior research suggests that social networking websites, such as crowdfunding platforms, may provide access to embedded resources within the community (Boyd and Ellison, 2008). Therefore, we understand crowdfunding in line with Ley and Weaven

(2011) as a source of equity and expertise from collaborating individual supporters. Thus, crowdfunding can be used as a vehicle for accessing resources beyond capital (i.e. needed expertise for evaluations).

Evaluation challenge III: Solution development

A third phase in which evaluation is of importance concerns the area and activities connected to very specific problem solving. In contrast to the prior two phases, in this phase solution based information and validity is of major interest. Thus, evaluation does not relate so much to future outcomes and further development of an idea or concept but rather to the fit of a yet existing solution to the challenge or problem addressed.

Basically, every company has accumulated certain knowledge in different fields of expertise (e.g. technology, science, markets, etc.) and developed routines in solving challenges and problems (Afuah and Tucci, 2012). Nevertheless, companies sometimes cannot solve problems by themselves, because the needed knowledge is too novel or simply not available in-house. Furthermore, challenges or problems can be of different nature: First, problems can be very specific, and thus, it can be solved by one precise solution within a particular field of expertise. Second, the solving of problems or challenges can depend on many sub-segments of knowledge, and thus, be solved by many solvers (e.g. different parts of codes to an overall body of software). Therefore, one can distinguish between two different types of solution validity. First, a solution will be considered to be valid if a precise solution is developed that clearly meets the problem (as for instance the solving of an algorithm). In this case, the best or most precise solution is valid. For example, rather than developing an algorithm for its movie recommendation system by itself, Netflix outsourced this task to the crowd in form of an open call, offering $1 million to the solver who could improve Netflix´s existing system by 10 percent (Villarroel, Taylor, & Tucci, 2011). Second, a solution can be dependent on the

emergence of a large body of solvers. In this manner, self-selected solvers collaborate to solve a problem. A valid solution then is deduced from aggregating many solutions. For instance, when Facebook decided to translate its website from English into other languages, it out-sourced the translation tasks to the crowd. By aggregating the sub-translations from many users, the translation e.g. from English to French was completed within a few days (Facebook, 2009; Afuah and Tucci, 2012). But how can companies control for the validity of solutions? In the first type of problem we outlined, a working solution for a very specific challenge will be valid by default, as it solves the problem right away. In this case the challenge will be to attract the right solver rather than the right evaluator since the validity of the solution is seen on the spot. In the second type of problem outlined above, it will probably take collaboration between internal experts and external solvers to fully judge the validity of the joint solution.

FACTORS INFLUENCING THE VALIDITY OF EVALUATIONS AND DEVELOPMENT OF HYPOTHESES

The literature summarized in table 1 enables us to present important key factors influencing the validity of evaluations by crowds and experts.

Factor 1: Number of ideas

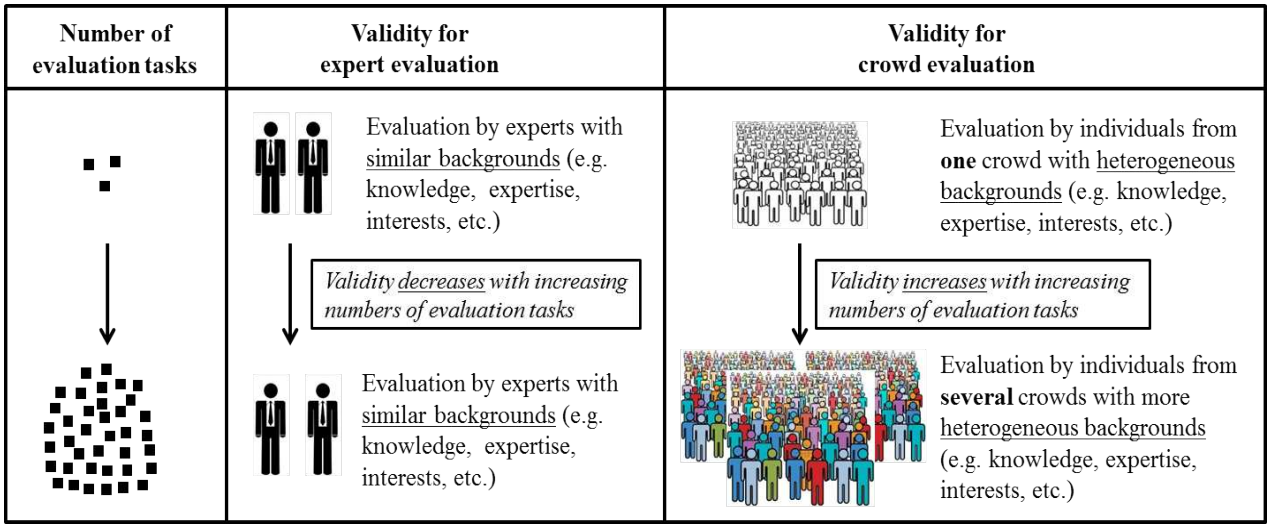
Successful idea generation usually results in plenty of ideas, crowdfunding allows infinite concept pitching, and problems arise nonstop in companies' environments. All these ideas and problem solutions have to be evaluated at some point, before pursuing them. Traditionally, it is the experts who go over the scripts of ideas, concepts, and solutions to evaluate them. Of course, companies have limited resources and cannot evaluate all incoming ideas by themselves. Thus, this resource problem enforces internal experts (e.g. members of R&D) to focus their resources on evaluation tasks to those ideas (or concepts, or solutions) with the

highest expected potential. This selective approach might bear the risk that some promising ideas, concepts, or solutions will not be considered or evaluated and future income streams are missed out. The challenge is to handle all or at least as much evaluation challenges as possible, and at the same time receive valid solutions. However, one can assume that evaluation based validity is suffering from increased numbers of evaluation challenges under given resource restrictions inside companies. Consequently, and as discussed earlier, companies increasingly consider crowd participation in their evaluation processes. Using the crowd for evaluations can enable companies to handle many evaluation challenges with little input of internal resources and at the same time ensuring valid solutions.

There is a key difference between the crowd as evaluators and company experts as evaluators concerning the increasing number of ideas, concepts, or solutions: While the number of experts that a company can use for evaluation tasks is rather fixed, the number of crowd evaluators is rising proportionally with the number of evaluation tasks. This is due to the following argumentation: The increased number of ideas, concepts, and available solutions for specific problems originate from individuals that are active within specific communities (e.g. high tech communities). A rise of, e.g. external ideas indicates that the number of active individuals within the crowd has been rising. Thus, also the number of potential solvers has been rising. Hence, while the increase of ideas, concepts, and solutions means a severe resource challenge for expert evaluation inside companies, the validity of crowd evaluation actually rises, as higher numbers of individuals within the crowd indicate that more individuals (with different skills, backgrounds, etc.) can evaluate.

FIGURE 1

Increasing numbers of evaluations and its effect on validity



Therefore, the first hypothesis is formulated as follows:

Hypothesis 1a: The validity of evaluation by the crowd is positively related to the increase in numbers of ideas, concepts, and potential solutions.

Hypothesis 1b: The validity of evaluation by experts is negatively related to the increase in numbers of ideas, concepts, and potential solutions

Factor 2: Time to outcome/ to verification of evaluation

As apparent from literature on NPD (Crawford and Di Benedetto, 2006) time has an important impact on the anticipation of success or failure for idea and concept development. The further one looks into the future, the greater the uncertainty and the less likely precise evaluation outcomes will result. Thus, evaluation validity is expected to be low due to missing information and uncertainty. Similarly, one can assume that evaluation validity is generally higher for the evaluation of ideas, concepts, and solutions that are near in time. This aspect of time as a critical issue for evaluation validity is true for both: crowd and experts evaluation. However, there is a difference between crowds and experts regarding more long-term oriented

evaluations. Experts have built up extensive knowledge and experience in their fields of activity (Schulze and Hoegel, 2008). They also have good overview of current trends and developments that enables them to evaluate future development more clearly then individuals from the crowd. The crowd tends to mainly reflect its current needs and preferences (as e.g. in Leonard and Rayport, 1997). Thus, validity of evaluations from the crowd might suffer for events that are far in the future. However, crowds can be considered strong in providing contemporary valid evaluations aggregated from many individual evaluators. Therefore and to underline the difference between experts and the crowd for the factor time, we propose hypotheses 2a and 2b:

Hypothesis 2a. The validity of evaluation is negatively related to the duration of time until the actual outcome can be observed.

Hypothesis 2b. The validity of evaluation for outcomes that are distant in time will be lower for the crowd than for experts.

Factor 3: Strategic importance

The degree of strategic importance of an idea, a concept, or a solution that has to be evaluated will influence validity: For instance, companies are likely to invest little in the evaluation of ideas generated by everyday brainstorming, while in contrast the due diligence of a business concept will consume considerable resources. Hence, a general opinion of the crowd (as for instance expressed by "likes") might not be valid enough when ideas, concepts, or solutions are classified as strategic important. Rather, a more precise evaluation is required. Several considerations have to be taken into account before ideas, concepts, or solutions are released for crowd evaluation. Companies basically have the choice between a rational (analytic), an empirical (numbers) based approach, and a combination of both. In the rational ap-

proach the evaluation is derived from expert knowledge mainly. This approach should be applied for very specific and complex ideas, concepts, and solutions with high strategic importance, for instance if intellectual property is at stake. The empirical based approach calls for crowd participation with many individual contributions or evaluations from various sources. This approach might be suitable for expressions of interest as for instance market opinions or product preferences. Ideally, companies utilize a mix of both approaches. However, as outlined above, resource constraints will probably force companies to efficiently identify the expert knowledge needed to evaluate strategically important ideas or concepts. Hence, it seems to be of interest under what conditions the crowd can provide valid evaluations for strategic important objectives.

One can first assume that evaluation tasks with high strategic importance attract predominantly self-selected evaluators or solvers in both groups (internal experts and external experts from the crowd) that are serious about the evaluation task and possess appropriate skills and knowledge in the particular field of expertise. The self-selection is due to the amount of information and resources necessary to be invested in the evaluation process. Further, one can assume that if evaluators are bonded by contractual agreement, and the higher their monetary investment, the more likely valid evaluations will arise. Personal interest in a valid evaluation increases proportionally with the degree of contractual binding and the amount of investment.

Summarizing, it can be argued that the crowd can be used for valid evaluations for strategically important ideas, concepts, or solutions as long as a deeper involvement of the individual solvers from the crowd can be achieved. Such involvement can come from personal interest, contractual binding, and the amount of money invested from the individual evaluator. Thus, hypothesis 3 is formulated as follows:

Hypothesis 3. The validity of evaluation for strategically important ideas, concepts, and solutions by the crowd is positively related to the degree of involvement (through interest, contractual binding, and invested resources) of individual evaluators from the crowd.

Factor 4: Need of expert knowledge

Obviously, for different evaluation challenges, various kinds, and different levels of knowledge are needed. In early phases e.g. idea generation, expressions of interest (e.g. "likes") can be a rough indication for later market success or failure. A valid and therefore reliable solution in early phases can be achieved by aggregating the evaluation outcomes of many individuals from the crowd. A crowdfunding pledge may be an expression of confidence by the crowd or even a preorder. Consider the case of Pebbles, a project posted in 2012 on Kickstarter to fund the production of the idea for a smartwatch which connects to a smartphone via Bluetooth to provide a range of functions (such as messaging notifications, music control, and distance display for runners etc.). With an initial fundraising goal of $100,000, the project raised more than $10.2 million from almost 69,000 contributors (Kickstarter.com, 2012). This outcome could be an indicator for later market success, or in respect of our discussion a valid evaluation through the aggregation of all contributions. Interestingly, the Pebble team went to crowdfunding after they have failed to get equity from venture capitalists, even though they had a prototype, a business plan, and sample apps (Gobble, 2012). In this case, the crowdfunding pitch essentially worked as a preorder mechanism, allowing to gauge market, and to gather funding.

However, for very specific problem solving activities, very often technical or technological expertise is needed to solve and evaluate a challenge that a company cannot not solve or evaluate internally. Crowds have already been identified as valuable pools of external ex-

perts for companies that announce their problems and challenges (e.g. at InnoCentive). It seems that one can find experts that are able to provide valid evaluations inside (e.g. in R&D divisions) and outside (e.g. in crowds) companies. Both, companies and crowds will differ in structure and heterogeneity of their individual members. However, while experts in companies usually have specific status (e.g. member of the R&D department, sales person with market knowledge, etc.) the challenge in crowds is to find the one person with the specific expertise to provide a valid evaluation. The higher the number of experts and degree of expertise in crowds, the more likely the right evaluator(s) will be found. This logic has already been applied in many topic specific communities. Such communities (e.g. cooking communities or car communities) solve problems and discuss solutions on a regular basis and have frequent interaction with companies. Further, solver communities have emerged and unite individuals who like the solving of general and technical problems, and the evaluation of possible solutions. These communities seem to attract people with specific interests, skills, and expertise. Hence, we propose the fourth hypothesis that links the level of expertise in the crowd to the validity of evaluation.

Hypothesis 4. The validity of evaluation by the crowd is positively related to the level of expertise in the respective crowd.

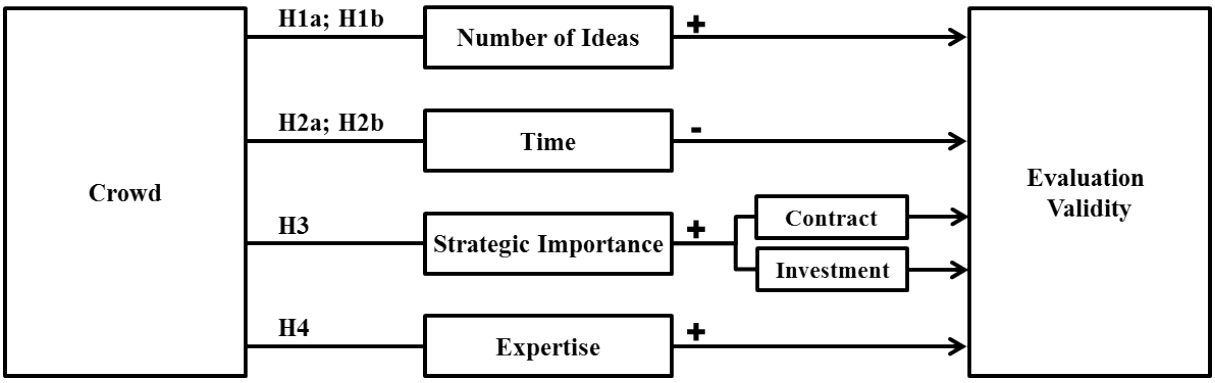
DISCUSSION

In this paper we have highlighted the rising importance of crowds as evaluators for ideas, concepts, and problem solutions. The literature indicates that both, experts and crowds can evaluate outcomes in different phases of development. The relevance of this approach is high, as some leading companies already utilize the crowd. However, so far there is little theoretical and empirical work on factors that influence the validity of evaluations by crowds. Rising numbers of ideas, concepts, and challenges force companies to consider crowds as an

alternative to internal experts regarding the limited resources that companies can invest to evaluate. Based on literature, we have identified central factors for the validity of evaluation by crowds, and developed four key hypotheses. The following figure illustrates the interrelationship of key variables important for the validity of evaluation by crowds.

FIGURE 2

Factors Influencing the Validity of Evaluations



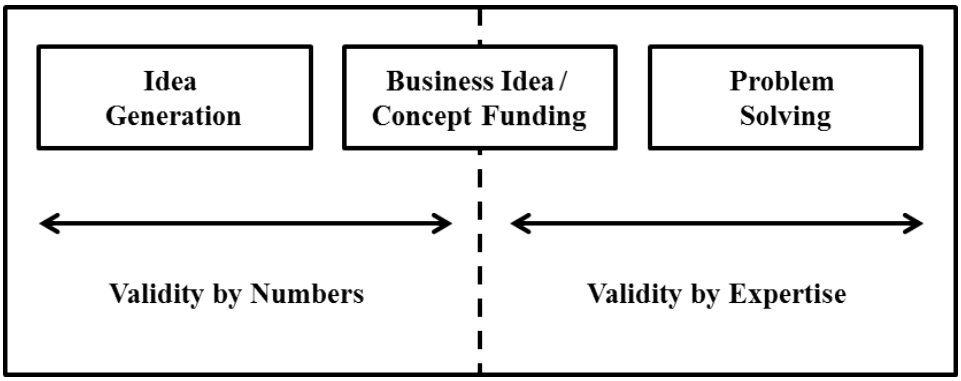
As argued and outlined in the section before, the validity of evaluation by the crowd is influenced by the number of ideas (or concepts, or solutions), the strategic importance, the time to outcome/ to verification of evaluation, and degree of expertise. First, we have argued that larger numbers of ideas (indicating larger numbers of potential solvers from the crowd) will positively influence validity. Second, we proposed that a higher involvement (via interest, contractual binding, and invested resources) of individuals positively influences the validity of evaluations by crowds. In contrast, time has a negative effect on the validity of crowd evaluation. We argued that validity of crowd evaluation is highest when the outcomes related to the evaluation process are near in time as compared to further distant. Experts, using their specific knowledge, experience, and information about future trends might be better suited to evaluate ideas, concepts, or solutions that have a longer life-span. Finally, we have discussed that also crowds contain individuals with expert knowledge, and that some crowds might have a higher degree of expertise, or accumulation of individual experts as potential evaluators than

others. For evaluation tasks that require specific expert knowledge, crowds with higher degrees of expertise will most likely provide valid results.

However, analyzing the literature along the different types of evaluation challenges, phases of idea-, concept-, and solution development, and key influencing factors, as well as the development of hypotheses have lead us to important insights worth discussing. It can be argued that validity of evaluation from crowds can be increased by two fundamentally different approaches: As illustrated in figure 3, validity can be increased by quantity of evaluators (numbers) or by expertise and, of course, by a combination of both. The choice of approach is dependent on the phase of development, and on the characteristics of the evaluation challenge.

FIGURE 3

Different Modes for Enhancing Validity



In early stages of development, there will be little, or limited information, and description of the idea, and in most of the times the purpose, or goal of these ideas is fuzzy. For example, early phases of new products or services can be very fuzzy and contain less detail on technical feasibility, or prognosis of market potential. Thus, evaluations in this stage can only relate to preferences, and loosely predicted buying, or using behavior. As the evaluation in such phases is not build on hard facts, and analytic correctness (which would require expertise, and specific skills), validity can only be increased by increasing the number of evaluators that “feel” the same, i.e. that have the same loose assumption about the potential develop-

ments that might follow. In this case, a multitude of evaluators will deliver a more valid evaluation as compared to few evaluators based on two arguments: First, a statistical argument is that the increase in number of evaluations will decrease the likelihood of errors, and related distortion from outliers. Second, the group of evaluators involved from the crowd represents a certain population of the market. As such, their evaluation is a first step in a long process towards final buying decisions. Again, the higher the number of evaluators, the more likely the expressed preferences will also result in concrete market figures, even if some of them will never buy the product or service. Regarding larger numbers in the case of crowdfunding, the same logic applies. In addition, larger numbers of funders also provide a higher investment amount, decreasing the likelihood that the potential start-up will have too little finance to achieve all its development stages. This is a self-fulfilling effect, again adding validity through numbers.

For further developed ideas, concepts, and specific problem solutions a different logic relates to increase the validity of evaluation: From a certain stage on, enough information on the idea or project will be available and success or failure is less influenced by anticipated preferences from the market but rather by very specific technological or technical aspects and challenges. The validity of evaluation is also linked to more long-term results or outcomes. For both aspects, specific knowledge and expertise is needed to make an accurate judgment of the idea, concept, or solution at hand. Thus, simply increasing the number of opinions by random individuals cannot improve the validity of evaluation. As discussed above, the needed expertise, and skills cannot only be found inside the company, which is facing the challenge, but also in the crowd by identifying the right individuals with the appropriate expert knowledge. The advantage of using the crowd as compared to using internal experts only is that by crowdsourcing the evaluation, experts from different fields and analogous markets can contribute as compared to rather limited perspectives of internal experts. However, there are

more challenges that have to be met in order to receive valid evaluations: First, it will be important to define the evaluation task, or challenge in a way that external solvers will be attracted, and additionally to provide the right mix of incentives for proper evaluation. Second, it will be important to contact the right crowds in order to identify the right individuals. Finally, company internal experts might be used to co-evaluate, and thus further improve validity. This will be specifically important for evaluation challenges that are very complex, and cannot be evaluated by one single aspect, or judgment alone.

Summarizing, the aspects discussed for an increase in validity of evaluation by expertise suggest a specific process: First, the proper formulation of the evaluation task, second, the proper identification of crowd evaluators, and last, a possible joint evaluation for cases in which many small segments, or tasks have to be mutually evaluated.

CONCLUSION

The purpose of this paper has been to provide a first attempt of conceptualizing the phenomenon of the validity of evaluations, differentiating between expert evaluation and evaluations from crowds. We have discussed and proposed how crowds can provide valid evaluations for tasks that for some reason could not be performed successful within a company's network of experts. The conceptual discussion in this paper yields to important theoretical and managerial implications.

Theoretical Implications

Although there is a rising trend of crowds being involved in companies' internal processes of evaluation, and problem solving tasks, literature provides little theoretical or empirical insights on the validity of evaluations performed by crowds. We provide a first summary of related literature, a conceptual framework, and hypotheses of important factors. Our results

relate to literature on NPD, entrepreneurship, and the more recent literature on open innovation and user innovation. One theoretical implication is that more research on the crowd as an own body of expertise is needed. Understanding the construct of crowds in terms of composition, specific characteristics, and expertise enables to better study the influence crowds on NPD and entrepreneurship. As hybrid forms of selection and evaluation (companies are using their internal experts and evaluators from the crowd for different evaluation challenges in different phases of development processes or also overlapping) emerge, it is important to understand the potential but also the limits of the crowd as decisive body for important strategic decisions. Our results also have implications for the more specific literature about crowds: It will be important for future research to understand how to identify and leverage the right knowledge for the right moment of activity or decision. Furthermore, it will be important to understand different types of crowds, and their respective potentials for specific tasks better.

Managerial Implications

A central contribution of this paper is to offer a first assessment of whether crowds can be used for valid evaluations for different evaluation challenges faced by companies in different phases of development. Depending on the nature and characteristics of the evaluation challenge and phase of development, companies need to select the most appropriate approach to receive valid evaluation outcomes (i.e. validity by numbers vs. validity by expertise). We can see more and more companies (from small start-ups to large MNCs) facing those strategic choices of whether to evaluate ideas, concepts, and solutions internally versus involving the crowd.

Limitations and Future Research

We note several limitations in this conceptualization of the validity of evaluation by experts and crowds. Obviously, the hypotheses stated above need empirical support. Thus,

future research is encouraged to test these hypotheses and assumptions regarding crowds' evaluation abilities. The developed hypotheses, the proposed framework, and the evaluation ability of crowds in various industries and settings, might be valuable to study in more depth in future research.

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