Getting Users Involved in Idea Crowdsourcing Initiatives: An Experimental Approach to Stimulate Intrinsic Motivation and Intention to Submit

Christian Garaus, Marion Garaus, and Udo M. Wagner

***Abstract*—Existing crowdsourcing research largely agrees that intrinsic motivation is essential for users' intention to submit ideas to company-hosted crowdsourcing initiatives. However, enhancing intrinsic motivation is particularly difficult in crowdsourcing settings, given the limited potential for personal exchange with others. Therefore, identifying effective interventions to stimulate intrinsic motivation is an important gap. In this article, we draw on research in analogous contexts characterized by selection-in decisions (e.g., creative artwork, sports, and self-directed learning). Using the self-determination theory as a theoretical foundation, we theorize that organizers can use monetary incentives (offering small rewards) and nonmonetary rewards (increasing task complexity and using autonomy-supportive linguistic cues) to stimulate intrinsic motivation. In three lab-in-the-field experiments, we test our predictions. Quite counterintuitively, we find that small rewards (rather than no or large rewards) are an effective mechanism to intrinsically motivate users and increase their intention to submit their ideas to company-hosted idea crowdsourcing initiatives. Also, our findings reveal that increasing rather than lowering task complexity and using noncontrolling rather than controlling linguistic cues can stimulate intrinsic motivation and submission intention. Our article sheds light on interventions stimulating intrinsic motivation in idea crowdsourcing. More generally, it also adds to the discussion of the small rewards effect.**

***Index Terms*—Idea crowdsourcing, intrinsic motivation, lab-in-the-field experiments, linguistic cues, rewards, task complexity.**

I. Introduction

"If you have a problem, ask everyone" is the new mantra that leading companies, such as IBM, Heineken, or Procter and Gamble, follow to tap into the creativity of the crowd. Over the past decade, idea crowdsourcing (i.e., companies soliciting an open call to submit ideas on how to innovate the product and service offerings) has become a widely used practice adopted by organizations to stretch beyond their boundaries [1], [2], [3]. For instance, on the platform "Element14.com," users can participate in various idea competitions and collaborative projects related to electronics, engineering, and technology.

Idea crowdsourcing is not only an interesting phenomenon propelled by the Internet but has attracted significant research as it represents a new form of organizing the search for ideas. First, idea crowdsourcing involves "unusual" individuals engaging in the organizational search effort: users. They frequently do not only hold knowledge about their own needs and problems but also about how to solve them [3], [4]. This knowledge often stems from using existing products and services of the organization to which they submit the ideas [5]. Second, users are not simply assigned to the task of generating ideas as their traditional counterparts (i.e., internal and external experts). The task-allocation mechanism in crowdsourcing is fundamentally different. Individuals self-select into the task (i.e., choose whether to submit their idea) and help the company construct the idea set when they are motivated [6]. Third, and as a result of the points above, idea crowdsourcing requires new ways of incentivizing. The monetary and nonmonetary incentive systems for the distant search were designed for employees or contractually bound designated knowledge suppliers, not users. Extending crowdsourcing research that has mainly surveyed users who had already made the choice to participate in corporate innovation [7], we will address one of the most central but still unresolved questions: Which mechanisms are causally effective in motivating users to submit their ideas in idea crowdsourcing?

We will rely on the self-determination theory [8] to develop a theoretical framework for our research and put the stimulation of inner motivational resources on center stage. We aim to infuse crowdsourcing literature with insights on human motivation from analogous settings characterized by self-selection, such as creative artwork, sports, and education. We will theorize how offering small completion-contingent rewards, increasing task complexity, and using autonomy-supportive linguistic cues may increase intrinsic motivation in the "early stages" of an idea crowdsourcing initiative (i.e., the mental formation of the intention to submit) [9], [10].

To test the theoretical framework, we employ a series of three lab-in-the-field experiments. The outcomes of the three

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Christian Garaus is with the Department of Economics and Social Sciences, Institute of Marketing and Innovation, University of Natural Resources and Life Sciences, 1180 Vienna, Austria (e-mail: christian.garaus@boku.ac.at).

Marion Garaus is with the Department of International Business, MODUL University Vienna, 1190 Vienna, Austria (e-mail: marion.garaus@modul.ac.at).

Udo M. Wagner is with the Department of International Business, MODUL University Vienna, 1190 Vienna, Austria, and also with the Department of Marketing and International Business, University of Vienna, 1090 Vienna, Austria (e-mail: udo.wagner@univie.ac.at).

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experiments support our core argument that companies can foster users' intrinsic motivation, which is found to be key in users' self-selection decisions. Our results have implications for the literature on idea crowdsourcing and motivation.

With respect to idea crowdsourcing, our study contributes to the debate on ways to stimulate users' motivation to participate in firm innovation [11]. Our study is the first to demonstrate how organizations can influence users' intrinsic motivation in the early stages of an idea crowdsourcing contest (i.e., before users self-select into the crowd) by choosing the optimal completion-contingent reward size, the ideal level of task complexity, and the right linguistic cues in the call formulation. In addition, it reveals how intrinsic motivation, in turn, mediates the effect of these triggers on users' decision to self-select into the ideation task. In doing so, we offer an in-depth investigation of intrinsic motivation as a driver of self-selection. Our results challenge prevailing practices (e.g., relying on large extrinsic rewards and reducing task complexity) and offer new perspectives on the way calls for participants should be worded.

With respect to motivation, our research adds to the body of literature that asks when (rather than whether) monetary incentives may or may not trigger intrinsic motivation [12], [13]. Our research contributes to a more nuanced perspective on the effect of completion-contingent rewards on intrinsic motivation [14], [15].

II. Theoretical Background

A. Idea Crowdsourcing and Motivation

Crowdsourcing refers to the act of outsourcing a task to "an undefined, generally large group of people in the form of an open call," typically via the Internet [16]. Crowdsourcing can be applied to a wide array of tasks related to innovation management [17], including solving R&D problems, financing entrepreneurial ventures, and generating new ideas—which is the focus of this study. This idea-generation task frequently involves users, which provides a novel opportunity for interaction and cocreation with users [4].

Idea crowdsourcing is particularly important since the ideas for new products or services users generate are the "lifeblood" of organizations [18]. Theoretical and empirical work found that users can produce large quantities of ideas, particularly novel ones that can compete with or even outperform those generated internally or by outside professionals [6], [19].

While the reasons to engage in crowdsourcing are apparent for organizations, the users' motivations to contribute their ideas were less evident to early crowdsourcing researchers. Why would anyone develop an idea or other intellectual property just to give it to a company that will either dump it or make a profit? As a result, early phenomenological research surveyed participants in existing crowds for their motivations to participate in idea crowdsourcing. Several extrinsic and intrinsic motivations were documented, ranging from money to career benefits, learning, and enjoyment [20], [21], [22]. However, a number of these studies may suffer from a limitation: the main focus was on samples of users in existing crowds [23], [24], [25]. In other words, only participants who submitted their ideas were included, while those who did not self-select have been widely missing in extant research, which may have led to biased samples [7], [10]. The following example will illustrate the potential problem arising from this self-selection bias. If individuals decide not to submit their ideas to a crowdsourcing initiative because of specific linguistic cues in the call for ideas, they will never show up (i.e., nonparticipants). Researchers that include only those individuals who submitted their ideas nonetheless (i.e., participants) will likely survey those who are agnostic to the linguistic cues and, thus, may wrongly find no effect of linguistic cues. Hence, the intention to submit is the better choice to investigate design factors (such as linguistic cues) in crowdsourcing as it includes all users (i.e., participants and nonparticipants) and is less prone to self-selection biases [7], [26].

Those studies that surveyed all users (i.e., participants and nonparticipants) found intrinsic motivation to be of significantly higher importance than extrinsic motivation for users' positive participation decisions [10], [27], [28]. Extrinsic motivation seems to complement intrinsic motivation and raise participants' overall effort only in later phases of the crowdsourcing process [28], [29], [30]. Those findings correspond to research on other new forms of organizing, such as the related research stream on user communities [31], [32]. Although surveying crowd members and identifying the importance of intrinsic motivation were the first essential steps, crowdsourcing scholars emphasize the need for intervention studies to investigate practices that stimulate users' intention to submit [4], [6]. Finding ways to enhance intrinsic motivation to increase users' intention to submit is vital from a theoretical and a practitioner's perspective, given the challenge of attracting contributors [2], [33]. To identify causal relationships and truly understand whether users decided to participate (or not) because of an intervention, crowdsourcing researchers must challenge their reliance on survey research and naturally occurring data. Instead, they need to conduct research in more controlled settings, such as laboratory and field experiments, to test such treatment effects [34].

While the literature on crowdsourcing does not provide answers on how to stimulate intrinsic motivation, the first insights might be derived from related contexts studied by motivational scholars, whose works will be reviewed in Section II B.

B. Stimulating Intrinsic Motivation

The self-determination theory [8] has been most influential in understanding the initiation of autonomous and volitional actions (such as creative artwork, sports, and self-directed learning) that are structurally related to the "selection-in decision" in idea crowdsourcing. The core tenet of the theory is that intrinsic motivation is critical for selection-in decisions in these contexts [35], [36]. As a broad framework for studying human motivation, it assumes that individuals are, by nature, inherently active, curious, and interested [37]. These natural tendencies do not unfold automatically but must be nurtured [8]. Doing so leads to intrinsic motivation, which is linked to enhanced engagement and the achievement of advantageous outcomes, such as deep information processing, creativity, and well-being [38], [39].

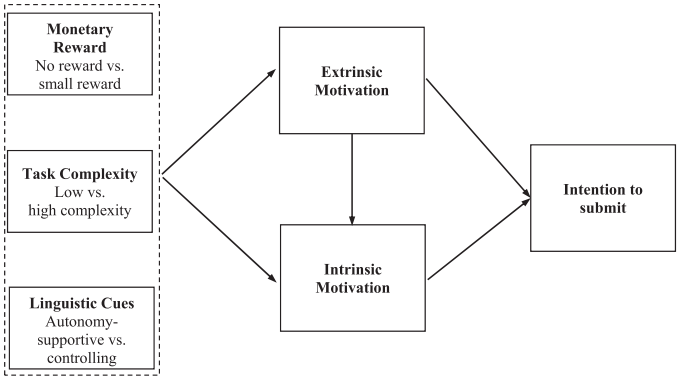

Fig. 1. Theoretical framework.

However, undermining individuals' motivation is easier than maintaining or even enhancing it [40]. Most works that have established ways to stimulate intrinsic motivation are based on involving "significant others," such as parents, teachers, friends, and managers [38]. These individuals are essential for establishing the right interpersonal climate and may be critical to the formation of intrinsic pursuit [41].

It is problematic that these practices of relying on the interpersonal climate or social contexts are largely unavailable in crowdsourcing, particularly in the early stages, as users are separated in time and space. Hence, users are often unaware that they are a part of a crowd [42].

Other go-to options, such as providing choice [43] or giving meaningful feedback [40], are also impossible. The former is because the task (submitting ideas) is fully volitional, and the latter is because feedback can only be given in the latest stage after completion. Therefore, motivating users to submit their ideas to crowdsourcing initiatives of companies is particularly difficult. It needs other ways to kindle the inner motivational resources.

Reviewing the literature on creative artwork, sports, and self-directed learning, we found three options for stimulating inner resources. First and counterintuitively, small rewards—just large enough to trigger the thought to participate in the crowdsourcing initiative but too small to fully justify the effort of engaging in the task—have been found to be an effective way of increasing intrinsic motivation in distant learning [44]. Second, increasing task complexity to provide users with an optimal challenge may stimulate users' natural desire to feel competent and is a lever that was found to be particularly powerful for initiating student activity [45]. Third, autonomy-supportive linguistic cues in the call formulations may serve as an invitation to make progress on an intrinsic goal [46].

Fig. 1 summarizes the hypothesized effects of rewards, task complexity, and linguistic cues on intrinsic motivation, increasing the intention to submit, as outlined above. Although not hypothesized, we also include extrinsic motivation as a potential mediating construct [47] in our framework to depict a comprehensive picture of users' motivation and rule it out as a potential alternative explanation. In the following sections, we will derive the formal hypotheses in greater detail and test them in three experiments.

III. Experiment 1: Completion-Contingent Rewards

Offering money to potential contributors appeals to many organizations hosting idea crowdsourcing initiatives [11], but existing idea crowdsourcing research is inconclusive on whether participation can be bought [1], [10]. The ways rewards are used to incentivize individual performance are multifold [49] and might result in different outcomes.

On the one hand, recent literature considering the size of rewards suggests that small, low-powered rewards may have a crowding-in rather than a crowding-out effect on intrinsic motivation [44], [47]. When individuals consider engaging in an initially rather uninspiring task in the presence of a small reward, their intrinsic motivation increases as the smallness of the reward is insufficient to justify the effort it takes to perform the task fully [50]. Therefore, in the face of this lack of justification, individuals will seek other motives, which are most likely intrinsic and self-persuasive, in the absence of other external motivators [51], [52].

Small rewards are particularly relevant in the context of completion-contingent rewards (i.e., every participant receives a reward) [40]. However, it needs to be noted that the previously discussed literature concentrates on performance-contingent rewards (i.e., only the best participants receive the reward). Studies in the context of completion-contingent rewards are limited. However, initial evidence suggests that completion-contingent rewards reduce drop-out rates in online surveys [53] and stimulate participation rates in online tasks [54]. Based on these results, the question remains if small rewards can stimulate intrinsic motivation and, consequently, increase participation intention. Thus, small completion-contingent rewards need to be large enough to trigger motivation and ensure that users engage in idea generation but still small enough to be insufficient to justify their behavior fully. Therefore, we hypothesize the following.

> *H1a:* A small reward increases a user's intrinsic motivation (versus no reward).

> *H2a:* Intrinsic motivation positively mediates the influence of a small reward on a user's intention to submit.

On the other hand, incentives might backfire under certain circumstances or be ineffective [12]. A substantial body of prior motivational research suggests that rewarding individuals to participate in voluntary actions may backfire [40]. When activities are rewarded, individuals attribute their reasons for potentially engaging in the task to the reward rather than to intrinsic reasons [39]. As a result, tangible rewards tend to crowd-out the intrinsic motivation that is required for initiating voluntary actions, such as creative artwork, sports, and self-directed learning [48]. This reasoning results in a set of competing hypotheses.

> *H1b:* A small reward increases a user's extrinsic motivation (versus no reward).

> *H2b:* Extrinsic motivation reduces the influence of a small reward on a user's intrinsic motivation and intention to submit.

A. Experiment 1: Design and Participants

A lab-in-the-field experiment with a one-factor, two-level, between-subject design was performed. We decided on this

approach to combine the advantages of laboratory and field experiments; we targeted the users in their naturalistic environment but still under-controlled, lab-like conditions [55]. As no central register of potential participants in idea crowdsourcing initiatives exists, we gathered participants of different ages, genders, and educational backgrounds. To qualify for participation in the experiment, respondents were also required to have sufficient computer skills and be generally inclined to participate in online activities.

As a result of this screening procedure and after eliminating respondents who failed the awareness check (see Supplementary Material), a total of 127 qualified subjects remained (evenly distributed across experimental groups). Of these qualified subjects, 47% were female with an average age of 29, and 53% held at least a bachelor's degree. Our sample closely approximated the demographics of crowds on online platforms [56].

B. Experiment 1: Procedure

To establish a standardized lab paradigm in the field [55], each respondent was personally visited by a research assistant (blind to the study hypotheses) overseeing the data collection process. We trained 85 research assistants who volunteered to contribute to this research project. They were introduced to the importance of research integrity, research ethics, and the data collection method. The research assistants were responsible for selecting respondents from their personal networks. The high number of research assistants ensured that the questionnaire was distributed to people with different backgrounds and educational knowledge. We further instructed the research assistants to distribute the questionnaire to respondents who would be, in principle, interested in crowdsourcing contests. The research assistants handed over an envelope containing all further instructions, the stimulus (see Supplementary Material), and a post-task questionnaire. These envelopes had the additional purpose of randomly assigning the participants to one of two conditions: no rewards versus small rewards. Research assistants were available for any questions, while respondents filled in the questionnaire.

Once they started, the subjects were exposed to a scenario featuring an adapted version of a real-world idea crowdsourcing initiative of the company Stiegl (the strongest beer brand in the focal country [57]). The invitation to participate in the initiative was only slightly amended to guarantee external validity. It consisted of the following elements. The small-reward condition contained the stimulus, which read, "All participants receive a cash prize of EUR 5."

The size of the reward (EUR 5) was previously determined in a pilot study with 80 participants exposed to a scenario similar to the ones used in the main studies Participants were asked to indicate which reward size they considered very small. All respondents considered EUR 5 as very small (see Supplementary Material). By contrast, this information was absent in the control condition.

After reading the description of the idea-generation initiative and (when indicated) the stimulus, the participants filled in the questionnaire. We imposed no time limit, although participants were not allowed to move back once they started the questionnaire. The procedure took about 15 min to complete. At the end, the respondents received a debriefing.

C. Experiment 1: Measurement

Subjects responded to items measuring the dependent variable, intention to submit, the mediating variables, extrinsic and intrinsic motivation, as well as control variables. Two items operationalized the intention to submit [58]. We slightly adapted the work preference inventory [59] to measure intrinsic motivation (12 items) and extrinsic motivation (14 items) on a seven-point Likert scale. Finally, participants answered questions about the control variables: domain-specific skills [58], perceived innovativeness [58], and attitude toward the brand reflecting the positivity (e.g., preidentification) or negativity of a user's prior relationship with the organization's products or services [60]. All constructs exhibited satisfactory reliability, which allowed the calculation of composite scores for further analyses (see Supplementary Material).

D. Experiment 1: Analysis and Results: The Influence of Small Rewards on Intrinsic Motivation

An analysis of covariance (ANCOVA) was performed with the experimental condition as the independent variable, intrinsic motivation as the dependent variable to examine the influence of small rewards on intrinsic motivation, and the above-mentioned control variables. In line with our theoretical reasoning, the ANCOVA revealed that the respondents in the small-reward condition reported higher levels of intrinsic motivation ($M = 4.55$ and $S.D. = 1.07$) compared with the participants in the no-reward condition ($M = 4.25$, $S.D. = 0.91$, $F_{1,122} = 3.80$, and $p = 0.05$). This result supports Hypothesis 1a that small rewards increase intrinsic motivation.

E. Experiment 1: Analysis and Results: The Mediating Effect of Intrinsic Motivation on the Influence of Small Rewards on Intention to Submit

Hypothesis 2a suggests that intrinsic motivation mediates the influence of small rewards on the intention to submit. To examine this mediation effect, we estimated Model 6 in the PROCESS macro with 5000 bootstrap samples for a type I error of 5% [61] with the experimental condition "no reward versus small reward" as the independent variable, extrinsic and intrinsic motivation as the mediating variables, and intention to submit as the dependent variable (see Fig. 1). The same control variables were considered as in the ANCOVA. The control group represents the reference category (dummy variable coded as 0); thus, the effects of the small rewards (dummy variable coded as 1) could be interpreted. Table I summarizes the results of the mediation analysis. As predicted, intrinsic motivation mediates the influence of small rewards on the intention to submit ($a_2\, b_2 = 0.11$ and $CI\ [0.00,\ 0.28]$).

The results did not support the competing hypotheses H1b and H2b. Neither did they reveal the significant effects of small rewards on extrinsic motivation ($a_1 = -0.09$ and $p = 0.48$) nor of extrinsic motivation on intrinsic motivation ($a_3 = 0.02$ and $p = 0.87$). We further did not observe any indirect effect on intrinsic motivation through extrinsic motivation ($a_1\, b_1 = 0.01$ and $CI\ [-0.05,\ 0.09]$). The absence of a significant direct effect of small rewards on the intention to submit and the lack of

TABLE I
DIRECT AND INDIRECT EFFECTS AND MODEL SUMMARY INFORMATION (EXPERIMENT 1)

		M_1 extrinsic motivation			M_2 intrinsic motivation			Y_1 Intention to submit	
Condition		Coeff.	p		Coeff.	p		Coeff.	p
Direct effects									
X (small reward) [1]	a_1	−0.09	0.48	a_2	0.31*	0.05	c'_1	−0.46	0.09
M_1 (ext. mot)				a_3	0.02	0.87	b_1	−0.14	0.45
M_2 (int. mot)							b_2	0.37*	0.01
Skills (control)	f_1	−0.02	0.65	g_1	0.03	0.46	h_1	0.22*	0.00
Innovativeness (control)	f_2	0.04	0.43	g_2	0.30*	00	h_2	0.26*	0.02
Attitude (control)	f_3	0.06	0.22	g_3	0.14*	0.02	h_3	0.33*	0.00
Constant	i_{M1}	3.96*	0.00	i_{M2}	1.84*	0.00	i_{Y1}	−0.80	0.44
		R^2=0.02			R^2=0.27			R^2=0.35	
		$F_{4,122}$=0.72, p=0.58			$F_{5,121}$=9.04*, p<0.01			$F_{6,120}$=10.82*, p<0.01	
Indirect effects									
Small reward → Extrinsic motivation → Intention to submit							a_1b_1	0.01	[-0.05, 0.09]
Small reward → Intrinsic motivation → Intention to submit							a_2b_2	0.11*	[0.00,0.28]

Note: [1] reference category = no reward condition; confidence intervals are based on 5000 bootstrap samples; * = significant at $p \leq 0.05$.
The entries in bold are only the headings.

mediation through extrinsic motivation point to a full mediation through intrinsic motivation.

F. Experiment 1: Discussion

The results of Experiment 1 provide initial support for our conceptual model. As predicted, we found that small rewards increase intrinsic motivation (Hypothesis 1a) and that intrinsic motivation mediates the effect of small rewards on users' intention to participate in an idea crowdsourcing initiative (Hypothesis 2a). Thus, the findings establish the importance of intrinsic motivation for crowd members' self-selection in distant search tasks.

Our first experiment adds empirical support to the "power of small rewards" [44]. However, like most prior research, it studied the effect in isolation and did not consider contextual effects, a long-known problem [62]. Experiments 2 and 3 address this issue by testing the effect of small rewards on intrinsic motivation in different contexts.

IV. Experiment 2: Task Complexity

Idea crowdsourcing initiatives vary in their task complexity [63]. Interestingly, task complexity—although theorized as a central parameter determining the suitability of a task to be crowdsourced [6]—and its relationship to intrinsic motivation has only attracted limited attention by crowdsourcing scholars so far.

In general, motivational psychologists and organizational design scholars agree that highly complex tasks enhance individuals' motivation and propensity to engage in them [64], [65]. The reason why task complexity can foster intrinsic motivation lies in the constitution of the task itself. Task complexity is defined as the variety of elements that need attention and the degree to which these elements are dissimilar [66]. Individuals need to consider many interrelated elements for highly complex tasks, which explains why complex tasks are perceived as difficult [64]. This difficulty paradoxically allows for the rise of intrinsic motivation [39]. The cognitive challenge that engagement with a complex task promises increases excitement, interest, and, thus, the intrinsic motivation for the task [67]. In addition, individuals are willing to accept the lower probability of success as the resulting pride is significantly higher when they master a difficult task[1] [68].

Education research found that enriching learning activities by challenging learners increases their intrinsic motivation and the likelihood to start working on them [45]. Similar results are reported in sports [71] and health behavior [41].

Transferring these findings to a crowdsourcing context suggests that task complexity has the potential to stimulate users' intrinsic motivation to participate in an idea crowdsourcing initiative. Therefore, we propose the following.

> *H3a:* A highly complex (versus a low complex) task increases a user's intrinsic motivation.

> *H3b:* Intrinsic motivation positively mediates the influence of a highly complex task on a user's intention to submit.

Next, Experiment 2 aims to expand Experiment 1 by exploring the limits of the power of small rewards in the context of low- and high-complexity tasks. Given the subtle nature of the effect (i.e., insufficient external rewards trigger the search for more internal justifications), it is crucial to theorize further about the boundary conditions of the crowding-in effect and other influencers on intrinsic motivation. As outlined, low-complexity tasks provide fewer intrinsic justifications to start working on a task from the outset compared with high-complexity ones. Small rewards may trigger an additional search for intrinsic reasons to perform a low-complexity task, given that they are insufficient for externally justifying the behavior [50]. This assumption was already tested in Experiment 1, which featured a low-complexity setting in the experimental setup. Small rewards cannot trigger intrinsic justifications for more complex tasks, such as challenge and enjoyment, as they are already present from the beginning [62]. Hence, while we do not expect a crowding-out effect because of the smallness of the rewards, we also do not anticipate a crowding-in effect from the high-complexity condition compared with the control group.

A. Experiment 2: Design and Participants

To test Hypotheses 3a and 3b, we manipulated the idea-generation task in another lab-in-the-field experiment to create different levels of task complexity. We further included a small-reward in the highly complex task condition to test our prediction that small rewards do not have a crowding-in effect in the presence of intrinsically motivating stimuli. That is, Experiment 2 used a between-subject fractional factorial design with three experimental conditions:

1) low complexity, no reward;
2) high complexity, no reward;
3) high complexity, small reward.

As in Experiment 1, research assistants helped identify qualified participants. After eliminating respondents who failed the

[1]The positive relationship between task complexity and intrinsic motivation may turn negative for very high complex tasks [24]. Whether the relationship is linear or curvilinear is debated [25], [69], [70]. However, the debate is relatively inconsequential in the context of crowdsourcing, as the method is unsuitable for very highly complex tasks [6] and, thus, the descending branch of a potential inverted U-shaped curve is unlikely to be reached.

awareness check (see Supplementary Material), the final sample consisted of 199 participants. They were evenly distributed across experimental groups. Among the respondents, 64% were female, 59% held at least a bachelor's degree, and the overall mean age was 28 years.

B. Experiment 2: Procedure and Measurement

The second experiment followed a procedure similar to the first. Research assistants set up the labs-in-the-field, and the same "envelope technique" was used to establish standardized conditions and to randomly allocate the subjects to one of the three experimental groups. The scenario was analogous to Experiment 1, although we used a different real-world idea-generation campaign by Starbucks as the template to further substantiate external validity. Again, respondents in the small-reward condition were informed that all respondents would receive a reward. The complexity manipulation was achieved by encouraging participants in the low-complexity task condition to submit "little ideas" compared with "detailed business concepts" in the high-complexity condition (see Supplementary Material). We used the same stimulus as before to manipulate the no- versus small-reward conditions. Subjects subsequently responded to the same items as in Experiment 1. In addition, one item asked participants to indicate their expectations regarding the effort necessary to comply with their submission; this information assessed the manipulation of the task complexity (see Supplementary Material). Again, no time limit was imposed, and the participants received a debriefing at the end.

C. Experiment 2: Analysis and Results: The Influence of Task Complexity on Intrinsic Motivation

Task complexity had a significant influence on intrinsic motivation. An ANCOVA with the control variables mentioned above, task complexity as the independent variable, and intrinsic motivation as the dependent variable revealed a significant model ($F_{1,194} = 7.42$ and $p = 0.01$). The analysis confirmed that respondents in the high-complexity task condition without reward reported significantly higher levels of intrinsic motivation ($M = 4.75$ and $S.D. = 1.03$) compared with the participants in the low-complexity, no-reward condition ($M = 4.34$ and $S.D. = 1.03$). The result supports Hypothesis 3a, which predicts that high-complexity tasks induce higher levels of intrinsic motivation than low-complexity tasks.

D. Experiment 2: Analysis and Results: The Mediating Effect of Intrinsic Motivation on the Influence of Task Complexity on Intention to Submit

To establish whether users' intention to submit is mediated by intrinsic motivation as postulated by Hypothesis 3b, we estimated Model 6 using the PROCESS macro [61]; the experimental conditions were the multicategorical independent variable, extrinsic and intrinsic motivation were the mediating variables, and intention to submit was the dependent variable. We controlled for the same variables as before.

TABLE II
DIRECT AND INDIRECT EFFECTS AND MODEL SUMMARY INFORMATION (EXPERIMENT 2)

Condition/construct		M_1 extrinsic motivation Coeff.	p		M_2 intrinsic motivation Coeff.	p		Y_1 Intention to submit Coeff.	p
Direct effects									
Complex, no reward [1]	a_1	0.07	0.58	a_2	0.38*	0.03	c'_1	0.12	0.62
Complex, small reward [1]	a_3	0.02	0.87	a_4	0.39*	0.02	c'_3	0.04	0.87
M_1 (ext. mot)				a_5	0.09	0.36	b_1	−0.01	0.93
M_2 (int. mot)							b_2	0.38*	0.00
Skills (control)	f_1	0.05	0.10	g_1	0.02	0.64	h_1	0.27*	0.00
Innovativeness (control)	f_2	−0.08*	0.04	g_2	0.28*	0.00	h_2	0.12	0.15
Attitude (control)	f_3	0.08*	0.03	g_3	0.13*	0.02	h_3	0.45*	0.00
Constant	i_{M1}	4.24*	0.00	i_{M2}	1.87*	0.00	i_{Y1}	−2.00*	0.02
		R^2=0.06 $F_{5,193}$=2.62*, p=0.03			R^2=0.20 $F_{6,192}$=7.93*, p<0.01			R^2=0.40 $F_{7,191}$=18.37*, p<0.01	
Indirect effects									
Complexity → Extrinsic motivation → Intention to submit									
Complex, no reward							a_1b_1	−0.00	[−0.05,0.06]
Complex, small reward							a_3b_1	−0.00	[−0.06,0.03]
Complexity → Intrinsic motivation → Intention to submit									
Complex, no reward							a_2b_2	0.15*	[0.02,0.33]
Complex, small reward							a_4b_2	0.15*	[0.02,0.34]

Note: [1] reference category = low complexity, no reward; confidence intervals are based on 5000 bootstrap samples; * = significant at $p \leq 0.05$.
The entries in bold are only the headings.

The analysis confirmed the results of the ANCOVA and H3a: compared with the low task complexity condition, the high task complexity one significantly increased intrinsic motivation ($a_2 = 0.38$ and $p = 0.03$). As predicted in Hypothesis 3b, intrinsic motivation mediated the effect of high levels of task complexity on the intention to submit ($a_2b_2 = 0.15$ and $CI\ [0.02,\ 0.33]$) (see Table II).

E. Experiment 2: Analysis and Results: The Small-Reward Effect in the Context of Task Complexity

In accordance with our theorizing, the results of an ANCOVA with the experimental conditions as the independent variable, intrinsic motivation as the dependent one, and the control variables mentioned above confirm that small rewards cannot trigger intrinsic motivation when a certain level of intrinsic motivation is already present as caused by other contextual factors (i.e., high task complexity) ($F_{1,139} = 0.01$ and $p = 0.94$). Respondents' level of intrinsic motivation did not differ between the high complexity, no-reward condition ($M = 4.75$ and $S.D. = 1.03$) and the high complexity, small-reward condition ($M = 4.81$ and $S.D. = 1.05$). In corroboration of H1b and H2b, the mediation analysis did not reveal a direct effect of small rewards on extrinsic motivation ($a_3 = 0.02$ and $p = 0.87$) and no effect of extrinsic motivation on intrinsic motivation ($a_5 = 0.09$ and $p = 0.36$). Small rewards did not indirectly impact on intention to submit through extrinsic motivation ($a_3\ b_1 = -0.00$ and $CI\ [-0.06,\ 0.03]$).

F. Experiment 2: Discussion

The findings of Experiment 2 support Hypothesis 3a: task complexity increases intrinsic motivation in idea crowdsourcing initiatives. These results also offer additional support for the predicted mediating role of intrinsic motivation on the intention to submit in idea crowdsourcing (Hypotheses 2a and 3b). As in Experiment 1, extrinsic motivation did not influence the intention to submit, which highlights the importance of intrinsic motivation on users' intention to participate in company-hosted idea crowdsourcing initiatives.

Another important aspect of this experiment was the contextualization of the small-reward effect. Our experiment did not detect a difference between the high-complexity, no-reward and high-complexity, small-reward conditions. As predicted, small rewards had no positive influence on intrinsic motivation as inner motivational resources (e.g., curiosity and the desire to master the task) are already leveraged by the more challenging task. Therefore, we can conclude that intrinsic motivation can hardly be further increased by small rewards when intrinsic motivation is already stimulated. We also did not find a crowding-out effect for intrinsic motivation caused by small rewards, which is interesting since prior research suggests that monetary rewards have a particularly strong undermining effect on intrinsic motivation in complex tasks [40], [48]. In addition, this finding contradicts the extant research reporting that monetary rewards diminish cognitive flexibility in a problem-solving context and the performance of complex tasks [72] or lessen individuals' preference to choose easier tasks in the presence of rewards [73].

While we demonstrated the absence of any crowding-out effect caused by small rewards, our theorizing regarding the insufficient justification for extrinsic motivation caused by small rewards would be strengthened if a crowding-out effect occurred for large rewards. To account for this consideration, we designed Experiment 3 to include both a small- and a large-reward condition.

V. Experiment 3: Linguistic Cues

Real-world idea crowdsourcing initiatives indicate that the calls for participants vary in the way they are worded. While some include controlling cues, others are more autonomy supportive. For instance, PepsiCo's "Change the Game Competition" tries to motivate consumers to submit ideas by emphasizing the presence of a significant monetary reward. By contrast, Lego promoted an initiative in collaboration with Harley Davidson with the statement "Build an epic ride for the future" on its idea crowdsourcing platform and refrained from mentioning the significant monetary incentive they were offering.

These two examples illustrate the controlling versus autonomy-supportive linguistic cues in call formulations, respectively. The content and nature of controlling cues focus on external and instrumental concerns [72] to align the interests of individuals with those of organizations. In contrast, autonomy-supportive cues focus on developing skills and competence and encourage individuals to initiate and explore new activities and interests [41].

Autonomy-supportive linguistic cues (spoken or written) have proven to be positively associated with more self-determined forms of motivation in various settings. For instance, studies in the education context have demonstrated that written instructional sets formulated in an autonomy-supportive way are associated with higher intrinsic motivation compared with controlling instructions [74], [75]. Similarly, Lepper [76] recognized the direct stimulation of inner motivational resources, such as challenge and curiosity in task instruction, as an essential design principle suitable to promote students' intrinsic motivation in the learning context. Furthermore, instructions highlighting challenge, fantasy, and curiosity have been identified as important factors in increasing intrinsic motivation in the context of computer games [77].

In line with this literature, we propose that autonomy-supportive cues—compared with controlling cues—can foster the intrinsic motivation to participate in a crowdsourcing initiative. Hence, we postulate the following.

H4a. An autonomy-supportive linguistic cue increases a user's intrinsic motivation (versus a controlling linguistic cue).

H4b. Intrinsic motivation positively mediates the influence of an autonomy-supportive linguistic cue on a user's intention to submit.

Drawing and expanding on the theoretical arguments and empirical evidence of Experiments 1 and 2, we further propose that the positive effect of autonomy-supportive linguistic cues in call formulation on users' intrinsic motivation and, in turn, their intention to submit is preserved in the presence of small rewards but will not further increase intrinsic motivation. This proposition is based on the reasoning that the relative salience of the reward ultimately determines its effect on intrinsic motivation [48]. Small rewards are, by definition, nonsalient [78]. As a result, the autonomy-supportive cues will be the more prominent stimulus and provide a compelling intrinsic justification for the task [79]. Thus, similar to Experiments 1 and 2, the lack of a profound justification for a small reward is assumed to maintain (not crowd out) intrinsic motivation. However, we expect its increase to be driven by the autonomy-supportive cues.

On the contrary, large rewards might have a crowding-out effect and reduce intrinsic motivation [44], [47]. Indeed, recent research observed that intrinsic motivation and task effort decrease with increasing extrinsic rewards [80]. Hence, to provide further empirical evidence on the effectiveness of small rewards compared with a no-reward condition, as in Experiment 1, we also included a large-reward manipulation in Experiment 3.

A. Experiment 3: Design and Participants

Like Experiments 1 and 2, Experiment 3 follows a lab-in-the-field approach to investigate the effect of two different linguistic cues in the call formulations (controlling versus autonomy supportive). We further included rewards as a second design factor to test our predictions that small rewards do not diminish intrinsic motivation, while their larger counterparts do so even in autonomy-supportive conditions. Hence, Experiment 3 used a between-subject fractional factorial design with four experimental conditions:

1) controlling cues, no reward;
2) autonomy-supportive cues, no reward;
3) autonomy-supportive cues, small reward;
4) autonomy-supportive cues, large award.

As for Experiments 1 and 2, research assistants recruited participants for the lab-in-the-field experiment, of which 239 qualified for the final analysis (see Supplementary Material). They were evenly distributed across experimental groups. The sample demographics were the following: 54% were female, the mean age was 29 years, and 50% had a bachelor's degree or higher.

B. Experiment 3: Procedure and Measurement

Experiment 3 followed the same approach as Experiments 1 and 2 (i.e., labs-in-the-field, envelope technique, real-world idea crowdsourcing initiative to create a scenario, and all respondents received a reward in the reward conditions). For Experiment 3, we adapted Lego's crowdsourcing campaign, asking users to create a new logo for "Lego Ideas" (see Supplementary Material) and manipulated the linguistic cue.

We used the same scales as in Experiments 1 and 2 to measure the variables of interest. Additionally, we included one item to check whether the manipulation of controlling versus autonomy-supportive linguistic cues in the call formulations worked out as intended (see Supplementary Material). A debriefing concluded the procedure.

C. Experiment 3: Analysis and Results: The Influence of Linguistic Cues on Intrinsic Motivation

Similar to Experiments 1 and 2, we first estimated an ANCOVA; the type of linguistic cues (autonomy supportive versus controlling) was the independent variable, intrinsic motivation was the dependent variable, and we used the same control variables as above. The results revealed a significant model with intrinsic motivation as the dependent variable ($F_{3,231} = 4.83$ and $p < 0.01$). Intrinsic motivation was significantly higher in the autonomy-supportive condition ($M = 4.98$ and $S.D. = 0.88$) compared with the controlling condition ($M = 4.60$ and $S.D. = 1.02$) (no reward in both groups) lending support for Hypothesis 4a.

D. Experiment 3: Analysis and Results: The Mediating Effect of Intrinsic Motivation on the Influence of Linguistic Cues on Intention to Submit

We conducted a mediation analysis (Model 6 in the PROCESS macro, 5000 bootstrapping samples [61]). The combination of linguistic cues and the reward size served as the independent multicategorical variable, extrinsic and intrinsic motivation were the mediating variables, and intention to submit the dependent one (see Table III). We further considered the same control variables as in the ANCOVA above. The indirect effect of autonomy-supportive cues (no reward) on the intention to submit through intrinsic motivation was significant ($a_2\ b_2 = 0.13$ and $CI\ [0.02,\ 0.32]$), confirming Hypothesis 4b.

E. Experiment 3: Analysis and Results: The Small-Reward Effect in the Context of the Linguistic Cues

The experimental conditions were subjected to an ANCOVA with the same control variables as in Experiments 1 and 2 and intrinsic motivation as the dependent variable ($F_{3,231} = 6.26$ and $p < 0.01$). As expected, small rewards in the autonomy-supportive condition did not stimulate additional intrinsic motivation ($M = 4.97$ and $S.D. = 0.90$) when compared with the absence of small rewards in the autonomy-supportive condition ($M = 4.98$ and $S.D. = 0.88$). In agreement with our postulated crowding-out effect of large rewards, contrasts revealed that participants in the autonomy-supportive, large-reward condition ($M = 4.40$ and $S.D. = 0.96$) indicated significantly lower levels of intrinsic motivation than the respondents in the autonomy-supportive, small-reward condition ($M = 4.97$ and $S.D. = 0.90$). The mediation analysis provided further evidence for H2a and H4b. Surprisingly, in this study, small rewards decreased extrinsic motivation ($a_3 = -0.35$ and $p = 0.01$). One possible explanation for this result is autonomous language's enormous power on intrinsic motivation. This effect seems so strong that extrinsic motivation is reduced even in the presence of small rewards. In contrast, in the other experiments, small rewards did not impact extrinsic motivation. Replicating the results of Experiments 1 and 2, no indirect effect of small rewards on intrinsic motivation through extrinsic motivation was revealed ($a_3\ b_1 = -0.02$ and $CI\ [-0.15,\ 0.07]$).

TABLE III
DIRECT AND INDIRECT EFFECTS AND MODEL SUMMARY INFORMATION (EXPERIMENT 3)

		M_1 extrinsic motivation			M_2 intrinsic motivation			Y_1 Intention to submit	
Condition/construct		Coeff.	p		Coeff.	p		Coeff.	p
Direct effects									
Auto.-supp., no reward [1]	a_1	−0.24	0.08	a_2	0.39*	0.01	c'_1	−0.15	0.57
Auto.-supp., small reward [1]	a_3	−0.35*	0.01	a_4	0.38*	0.02	c'_3	−0.42	0.12
Auto.-supp., large reward [1]	a_5	0.09	0.52	a_6	−0.05	0.77	c'_5	0.10	0.71
M_1 (ext. mot)				a_7	−0.23*	0.00	b_1	0.05	0.67
M_2 (int. mot)							b_2	0.33*	0.00
Skills (control)	f_1	0.05	0.11	g_1	0.03	0.34	h_1	0.28*	0.00
Innovativeness (control)	f_2	−0.02	0.53	g_2	0.22*	0.00	h_2	0.25*	0.00
Attitude (control)	f_3	−0.01	0.84	g_3	0.19*	0.01	h_3	0.39*	0.00
Constant	i_{M1}	4.58*	0.00	i_{M2}	3.17*	0.00	i_{Y1}	-2.20*	0.03
		R^2=0.06			R^2=0.25			R^2=0.33	
		$F_{6,231}$=2.39*, p=0.03			$F_{7,230}$=11.24*, p<0.01			$F_{8,229}$=13.96*, p<0.01	
Indirect effects									
Linguistic Cues → Extrinsic motivation → Intention to submit									
Auto.-supp., no reward							(a_1b_1)	−0.01	[−0.10,0.06]
Auto.-supp., small reward							(a_3b_1)	−0.02	[−0.15,0.07]
Auto.-supp., large reward							(a_5b_1)	0.00	[−0.04,0.06]
Linguistic Cues → Intrinsic motivation → Intention to submit									
Auto.-supp., no reward							(a_2b_2)	0.13*	[0.02,0.32]
Auto.-supp., small reward							(a_4b_2)	0.13*	[0.02,0.34]
Auto.-supp., large reward							(a_6b_2)	−0.02	[−0.14,0.10]

Note: [1] reference category = controlling cues, no reward; confidence intervals are based on 5000 bootstrap samples; * = significant at $p \leq .05$.

The entries in bold are only the headings.

F. Experiment 3: Discussion

Experiment 3 replicated the findings from Experiments 1 and 2 concerning the mediating effect of intrinsic motivation on intention to submit. As hypothesized (Hypothesis 4b), our data support once more that intrinsic motivation is key for the self-selection decision of users into organizational search tasks broadcasted via an open call.

In Experiment 3, we identified another promising practice to stimulate intrinsic motivation in idea crowdsourcing initiatives: autonomy-supportive linguistic cues in the call formulation. While prior research on crowdsourcing call formulations has mainly focused on their cognitive aspect, we theorized and empirically validated that autonomy-supportive cues stimulate the higher levels of intrinsic motivation than controlling ones (Hypothesis 4a).

Experiment 3 also offered more in-depth insights into the contextual factors influencing the "power of the small rewards." Adding a small reward to the autonomy-supportive cues condition did not further increase intrinsic motivation. Neither did it result in a crowding-out effect. As expected, large rewards offer sufficient justification for transforming intrinsic into extrinsic

motivation, undermining intrinsic motivation. This result is in line with prior research on the decreasing effect of tangible rewards on intrinsic motivation [13], [40], [48], [81].

VI. General Discussion

A. Theoretical Implications

Our primary contribution with respect to crowdsourcing is to the debate on ways to enhance users' motivation to participate in idea generation. Several scholars called for carrying out studies that include nonparticipants, a necessary next step in overcoming the selection bias prior studies may suffer from and fully understanding which practices are causally effective in stimulating users' intrinsic motivation to participate [6], [7], [34]. Our focus on the early stages of the idea crowdsourcing process before individuals self-select establishes the importance of intrinsic (rather than extrinsic) motivation as the primary determinant of their intention to submit. While most prior crowdsourcing research after the self-selection decision found a mix of intrinsic and extrinsic motivation among existing crowd members, our findings support those papers that suggest intrinsic motivation to be the main driver of the intention to submit in the early stages of crowdsourcing, while extrinsic motivation may play a supplementary role in determining effort as soon as the selection-in decision was made [10], [31].

The three identified practices—small rewards, task complexity, and an autonomy-supportive cue—add new knowledge to the phenomenon-driven crowdsourcing literature. For instance, regarding the specifications of the task, the nature, and wording of the call formulations, our findings on the positive influence of task complexity and autonomy-supportive linguistic cues on intrinsic motivation shift the attention from the cognitive aspects—which have been central in prior research—to the motivational ones [82].

Our primary contribution to motivation literature is to the debate on incentives and motivation in general and to the stream of research on the role of the size of rewards in particular. While most organization scientists, managerial economists, and psychologists have debated over the existence of a crowding-out effect for several decades [13], [40], [48], [81], the discussion has recently shifted from whether to when monetary rewards undermine intrinsic motivation [12]. A particularly interesting perspective is that small rewards can crowd in rather than crowd out intrinsic motivation. However, only a few studies have explored the power of small rewards [44], [51].

In this article, we have investigated the "small rewards effect" in different contextual conditions to understand the limits of its applicability. We provide theoretical explanations and empirical evidence for the presence and—maybe even more interestingly—the absence of the crowding-in effect. Our findings extend existing motivational research by demonstrating that small rewards do not increase intrinsic motivation when the task itself is already highly intrinsically motivating (e.g., highly complex task) or when other forms of nurturing inner motivational resources (e.g., autonomy-supportive instructions) are used. In such settings, the subtle, self-persuasive mechanism [51], [52] of crowding-in intrinsic motivation vanishes. The relatively weak salience of small rewards [83] seems to be their greatest weakness but also their greatest strength. Across all our experiments, small rewards never crowded out intrinsic motivation. However, their larger counterparts were found to undermine intrinsic motivation reliably; even if the call was autonomy supportive, intrinsic motivation could not be protected from the detrimental effect of large rewards.

B. Managerial Contribution

Our research points out to the organizers of idea crowdsourcing initiatives how vital users' intrinsic motivation is for their participation in idea crowdsourcing initiatives. In addition, it demonstrates how organizers can stimulate it. If they wish to attract a large number of submissions, organizers do not necessarily need large budgets. Our results suggest that they should rather carefully look at three design elements of the crowdsourcing initiative's setup.

First, they could consider the level of reward for participation. Small (rather than no or large) financial rewards can increase intrinsic motivation and intention to submit. Second, they could change the level of task difficulty. Organizers can increase task difficulty to make the tasks more interesting for the users. As a result, they will perceive the task as more intrinsically motivating and more readily submit their ideas. Third, organizers can pay greater attention to the verbal framing of the call for submissions. Our study's results demonstrate that the way the call for ideas is worded influences users' intention to submit. If organizers use autonomy-supportive (rather than controlling) linguistic cues in the call, users' intrinsic motivation increases, again leading to a higher intention to submit.

The managerial takeaways of this article can be summarized as follows. According to our results, small rewards, moderate task complexity, and autonomy-supportive linguistic cues increase intrinsic motivation and, in turn, the submission intention of potential participants.

C. Limitations and Future Research

A particular strength of this approach is that it minimizes a potential self-selection bias [7] as we use the intention of users to submit their ideas rather than actual behavior as a dependent variable. While a potential intention-behavior gap seems neglectable in crowdsourcing contexts as intention and behavior highly correlate [25], [84], studying the quality effects of increased intrinsic motivation is interesting in its own right and is awaiting future research.

The finding that intrinsic motivation is of much higher importance in idea crowdsourcing may be related to the problem this form of crowdsourcing tries to solve. In this study, we refer to idea crowdsourcing as a solution to ideation problems with high market uncertainty but low technical uncertainty [85]. For other problems, such as expertise-based issues, trial-and-error projects (where market uncertainty is low but technical uncertainty is potentially higher), microtask crowdsourcing, which involves small human computing tasks [86], and crowdsourcing for solving grand challenges [87], the findings might not hold. Testing whether our findings are also applicable in these settings or other settings that rely on agents' volitional engagement in

other distributed, parallel search tasks, such as open-source software or including employees submitting their ideas to internal suggestion systems, may be interesting extensions of our work.

Our research design only allows us to make statements about the intrinsic-motivation-enhancing effects in one-off idea crowdsourcing initiatives. With organizations increasingly trying to build and constantly use a pool of users to generate new ideas for products and services, questions about how to repeatedly stimulate intrinsic motivation become critical [2], [34]. Thus, we encourage future research to examine potential wear-off, reverse, or ceiling effects that may occur over time and study our interventions in relation to community aspects (e.g., kinship, reciprocity, and reputation building) that frequently emerge on platforms, such as Lego Ideas, Dell Idea Storm, Threadless, or Element14.com. In this context, conducting a field study to collect real behavior as an outcome variable would be particularly fruitful, increasing the research's external validity.

Future research might consider additional important constructs for explaining users' intention to submit ideas to crowdsourcing contexts, such as the role of self-esteem. Self-esteem has been identified as an important predictor of competitive behavior among French students [88]. On an organizational level, several studies have confirmed that self-esteem represents an important source of employee motivation (see [89] for a comprehensive literature review). It would be interesting to explore how individuals' need for self-esteem drives participation intention and what incentives for enhancing self-esteem could look like.

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Christian Garaus received the master's degree in business administration from the WU Vienna University of Economics and Business, Vienna, Austria, in 2009, and the doctoral degree in management from Johannes Kepler University Linz, Linz, Austria, in 2014.

He has been an Assistant Professor with the Institute of Marketing and Innovation, University of Natural Resources and Life Science, Vienna, Austria, since 2020. From 2014 to 2016, he was an Assistant Professor with the Institute of Strategy, Technology, and Organization, WU Vienna University of Economics and Business, Austria. From 2010 to 2014, he was a Research Fellow with the Institute of Human Resource and Change Management, Johannes Kepler University Linz, Austria. He was also a Visiting Professor with Copenhagen Business School in 2016 and 2023. His work has been published in journals, such as *Long Range Planning*, IEEE TRANSACTIONS ON ENGINEERING MANAGEMENT, *Academy of Management Learning and Education*, and the *Harvard Business Review*. His research focuses on crowdsourcing and sustainable innovation.

Marion Garaus received the master's degree in business administration from the WU Vienna University of Economics and Business, Vienna, Austria, in 2009, and the Ph.D. degree in management in 2013, a venia docendi in 2018, and the second Ph.D. degree in psychology in 2023, all from the University of Vienna, Vienna, Austria.

Since 2018, she has been an Associate Professor with the School of International Management, Modul University Vienna, Vienna, Austria. Since 2019, she has been the Dean of Undergraduate Studies and, since 2023, the Vice-President of the Modul University Vienna, Austria. From 2013 to 2018, she was an Assistant Professor, and from 2009 to 2013, a Research Fellow with Marketing Department, University of Vienna, Austria. She was a Visiting Scholar with Copenhagen Business School in 2016 and 2023. Her research has been published in academic journals, including the *Journal of Business Research*, *Technological Forecasting and Social Change*, *Psychology and Marketing*, and the *Journal of Retailing and Consumer Services*. Additionally, she coauthored a book on store design, which is available in three different languages (English, German, and Portuguese). Her main area of research is consumer behavior, with a special focus on digitalization.

Dr. Garaus' doctoral thesis was honored with the Award of Excellence from the Austrian Government in 2013.

Udo M. Wagner received the master's degree in mathematics and the doctorate degree in econometrics from Technical University Vienna, Vienna, Austria, in 1976 and 1984, respectively, a venia docendi from the WU Vienna University of Economics and Business, Vienna, Austria, in 1991, and the honorary doctorate degree in business economics from Technical University Braunschweig, Braunschweig, Germany, in 2006.

From 1976 to 1988, he was an Assistant Professor with Management Institute, WU Vienna University of Economics and Business, Austria, and from 1989 to 1990, with the Marketing Department, Graduate School of Business, Purdue University, West Lafayette, IN, USA. From 1991 to 2020, he was a Full Professor with Marketing Department, University of Vienna, Austria. Since 2021, he has been a Full Professor with the Department of International Management, Modul University of Vienna, Austria. He is the author of two books and editor of 19 books, more than 200 articles having been published in academic journals, such as the *Journal of Marketing Research*, *Marketing Science*, *International Journal of Research in Marketing*, *Journal of Business Research*, and *Psychology and Marketing*. His research interests include market research, consumer behavior, marketing models, retail marketing, and pricing.

Prof. Wagner was a recipient of the Best Paper Award of the German Academic Association for Business Research (VHB) in 2009. From 2005 to 2019, he served as the Vice-President, Deputy-President, President, and Dean of Fellows for the European Marketing Academy.