

Online community's recognition and continued participation in idea competitions

Kai-Yu Hsieh¹  | Ping Xiao²  | Noshir Contractor³  | Li Wang⁴

¹ College of Commerce, National Chengchi University, Taipei, Taiwan

² Melbourne Business School, University of Melbourne, Carlton, Victoria, Australia

³ Departments of Industrial Engineering & Management Sciences, Management & Organizations, and Communication Studies, Northwestern University, Evanston, Illinois, U.S.A.

⁴ Anhui University of Finance and Economics, Anhui P.R., China

Correspondence

Kai-Yu Hsieh, College of Commerce, National Chengchi University, No. 64, Sec. 2, Zhinan Road, Taipei 11605, Taiwan.
Email: kaiyu@nccu.edu.tw

The first two authors (correspondence: kaiyu@nccu.edu.tw and p.xiao@mbs.edu) contributed equally and are listed in alphabetical order. Financial support from Taiwan's Ministry of Science and Technology (109-2410-H-004-074), University of Melbourne, and the U.S. National Science Foundation (IIS-1514427) is gratefully acknowledged.

Abstract

This study examines the effect of online community's recognition on continued participation in idea competitions, and how personal winning record moderates such an influence. We reason that the motivating role of community recognition might either be reinforced or substituted by personal winning record, depending upon whether relational motives (psychological and social bonding) or individualistic motives (personal benefits, such as status and career enhancement) are the primary behavior driver. Through an event history analysis of data obtained from a platform of creative design contests, we find that although community recognition exerts a positive effect on the rate of continued participation for designers who are yet to win any competitions, this effect increasingly turns negative for designers who have won. Such findings indicate that the motivating role of community recognition might be substituted instead of reinforced by personal winning record, lending support to the individualistic view while rejecting the relational view. Although virtual social spaces represent an important means for modern competition platforms to attract and motivate participants, our study informs practitioners about online community's limitation in retaining "star" participants.

KEYWORDS

continued participation, idea competitions, individualistic motives, online community, personal winning record, platform, relational motives

1 | INTRODUCTION

Idea competitions (also termed innovation contests) are target-setting events where idea seekers post tasks and extend monetary and other rewards in sourcing solutions from the crowd, while individuals compete with one another in these tasks to win the rewards (Lampel et al., 2012). As a long-standing practice to engage individuals with varied expertise, idea competitions have cracked some vexing innovation challenges in the old days (e.g., Sobel, 1995), but were often limited by the social and geographic fragmentation. In the modern age, the power of the Internet transcends the boundaries of diffused knowledge communities, enabling an idea seeker to leverage the collective intelligence of a vast number of distant individuals. The possibility of involving distant crowd in ideas generation has increasingly challenged the conventional approach to corporate innovation, where most product development activities were kept within the firm boundary (Lichtenthaler, 2011).

Although idea competitions in the past were structured as a one-time challenge with a finite time duration, modern platforms have evolved into portfolio programs consisting of repeated contests. From our conversations with practitioners and business experts, we identify two key success factors for such platforms and an under-researched issue derived from the combination of these two factors. The first success factor concerns platform operators' ability to cultivate a vibrant online community. Although idea competitions and community building were traditionally deemed as distinct platform models, modern competition platforms are increasingly embedded in virtual social spaces where individuals can meet, exchange views, and socialize with one another (Lakhani, 2016; Riedl & Seidel, 2018). When being asked to assess the potential threat of competition, an executive responded: "True, in the age of cloud computing, many out there might copy our user interface and technical infrastructure... Still, the hurdle is to build a community as large and diverse as ours. The opportunity to interact with many

like-minded others is one big reason why people come and stay.”

The second success factor concerns platform operators' ability to retain and motivate their “star” participants. In old times when idea competitions were structured as a one-time challenge, only a few winners were selected from a vast number of participants. This situation is amplified in modern platforms of repeated contests: over time, only a few participants emerge as frequent winners, whereas most others do not have a winning record. These few “star” participants—as “marquee users” of a platform (Eisenmann, 2008; Rochet & Tirole, 2003)—exert disproportional impact on the quality of winning ideas and community experiences. An executive explained the challenge following from this development: “We achieved critical mass through a long tail approach where anyone is invited to join and interact with whoever sharing a similar interest... Now, with less than a hundred [contest participants] accounting for like half of wins, it becomes crucial to keep this very small group of winners engaged... But this begs the question: is our community still appealing to them as to the long tail?”

Informed by these observations, we examine the following question: How would online community's recognition of one's ideas in the past affect individuals' propensity to participate in idea competitions again, especially for those with a personal winning record? By far, this question has been under-researched in the literature despite its practical relevance. Although the motivating role of online community has been a central topic in the information systems literature, most research on online community has focused on cooperative settings, where individuals pool their effort in support of common goals, such as open source software development (Carillo et al., 2017; Zhang et al., 2013), knowledge exchange (Chen et al., 2018; Song & Phang, 2016), or reviews and ratings (Dong et al., 2020; Ren, Harper, Drenner, Terveen, Kiesler, Riedl et al., 2012). Limited research has examined online communities in settings where individuals compete against one another with a personal objective of winning. On the other hand, prior studies on idea competitions have examined how contest design parameters, such as reward schemes (Stouras et al., 2022; Yan et al., 2022), contest duration (Chen et al., 2021), task attributes (Sun et al., 2012; Zheng et al., 2011), and the size of participant population (Boudreau et al., 2011; Terwiesch & Xu, 2008), affect participation behavior. While these studies have examined the interaction between contest sponsors and participants, the interaction between contest participants and the broader online community has received scant scholarly attention.

To address our research question, we first assess the overall influence of community recognition on continued participation behavior, and next consider personal winning record as a moderating factor. Drawing from online community research in cooperative settings, we expect that in general, community recognition can also encourage continued participation in competitive settings through eliciting relational motives (psychological and social bonding) and individualistic motives (personal benefits, such as status and

career enhancement). Beyond the extant research, we further reason that the motivating role of community recognition might either be reinforced or substituted by personal winning record, depending upon whether relational or individualistic motives are the primary behavior driver. This contrast leads to opposite predictions concerning the moderating effect of personal winning record. Testing these opposite predictions can help untangle the mechanisms linking online community's recognition to winners' continued participation behavior.

We conduct our empirical test using data obtained from an online platform of creative design contests. Our data contain over 144,000 designs submitted by over 46,000 individuals during a 6-year period. These submitted designs received a total of more than 129 million feedback evaluations from the online community, and we use the feedback evaluations that an individual had received in the past to capture community recognition. Our event history analysis reveals that although community recognition exerts a positive effect on the rate of continued participation for designers who are yet to win any competitions, this effect increasingly turns negative for designers who have won. Such findings indicate that the motivating role of community recognition might be substituted instead of reinforced by personal winning record, lending support to the individualistic view while rejecting the relational view.

Our analysis informs both research and practice. Although research on the motivating role of online community has focused on cooperative settings, research on participation behavior in idea competitions has largely overlooked community experiences. Extending both literature traditions, we examine the impact of community experience in a competitive setting and show that in such a setting, community recognition also encourages continued participation, but mainly through eliciting individualistic motives instead of relational motives. In terms of practice, although virtual social spaces represent an important means for modern competition platforms to attract and motivate participants, our study informs practitioners about online community's limitation in retaining star participants. Specifically, for winners who represent a small but critical fraction of contest participants, community recognition increasingly loses its appealing as people establish their personal winning records.

2 | RESEARCH MODEL AND HYPOTHESES DEVELOPMENT

2.1 | Literature review

Two streams of research in the information systems literature are most relevant to our research question. First, a sizeable body of research has examined how experiences in an online community can motivate its members to stay and contribute despite no or little material rewards. Because people can come and go at will, the long-term viability of any virtual social spaces relies on their members' continued

TABLE 1 Research on the motivating role of community experiences

Study	Empirical setting	Community-related motives
Carillo et al. (2017)	Open source software	<u>Relational</u> : social identification and interaction
Chen et al. (2018)	Knowledge sharing	<u>Relational</u> : reciprocity <u>Individualistic</u> : self-image
Chiu et al. (2006)	Virtual community of practice (IT)	<u>Relational</u> : ties, trust, reciprocity, identification, and shared vision/language
Dong et al. (2020)	Service reviews	<u>Relational</u> : ties (following others and being followed) <u>Individualistic</u> : peer recognition and status
Fang and Neufeld (2009)	Open source software	<u>Relational</u> : community identification
Goes et al. (2014)	Product reviews	<u>Individualistic</u> : reputation and expert status
Ma and Agarwal (2007)	Emotional support	<u>Relational</u> : perceived identity verification
Ray et al. (2014)	Knowledge sharing	<u>Relational</u> : self-identity verification and community identification
Ren et al. (2012)	Ratings and recommendations	<u>Relational</u> : identity-based and bond-based attachments
Song and Phang (2016)	Knowledge sharing; support/advocacy	<u>Relational</u> : cognitive and emotional social identities
Xu and Li (2015)	Wikipedia	<u>Relational</u> : reciprocity, altruism, and sense of belonging <u>Individualistic</u> : self-development
Zhang et al. (2013)	Open source software	<u>Individualistic</u> : informational benefits and user support
Current study	Idea competitions	Relational and individualistic motives are contrasted, leading to opposite predictions on the moderating effect of personal winning record.

participation (Bock et al., 2015; von Krogh et al., 2012). Table 1 summarizes prior research in this literature tradition. Although these studies differ in their conceptual focus, they shared the observation that continued participation is more likely when one's past contributions have been acknowledged and appreciated by other members of the virtual social space. We extend this insight by studying the motivating role of community experiences in an under-researched setting: although the extant online community research has focused on cooperative settings, where individuals pool their effort in support of common goals, our study examines settings where individuals compete against one another with a personal objective of winning.

The second relevant stream of research has focused on participation behavior in idea competitions, which represent a core practice of crowdsourcing (Brabham, 2013; Ghezzi et al., 2018). Table 2 presents a summary of this line of inquiry. As the table shows, extant research has examined a range of contest design parameters, including reward schemes, contest duration, task attributes, and the size of participant population. The motivating role of online community has received scant scholarly attention. One study, Riedl and Seidel (2018), did touch on online community in a competitive setting, but it was not included in Table 2 because it did not examine participation behavior and focused instead on how contest participants gradually earn community recognition over time as a result of observational learning from each other. We extend the literature on idea competitions through examining the influence of community recognition on continued participation behavior, with a special interest in those few but highly influential contest participants with a personal winning record.

We expect that community recognition—which reflects the extent to which one's past behavior enters the attention

space of a sizeable body of audience and is judged favorably (Aadland et al., 2019)—can motivate participation behavior in competitive settings as in cooperative settings. Informed by the extant literature, we associate community recognition with both relational motives (psychological and social bonding) and individualistic motives (personal benefits, such as status and career enhancement) in developing our hypotheses. We are particularly interested in the relative strength of the two types of motives in competitive settings. Figure 1 depicts our research model. As the figure illustrates, although personal winning record is expected to be a positive moderator when relational motives dominate, it is expected to be a negative moderator when individualistic motives dominate. Through such analysis, we seek to shed light on the practical question of whether virtual social spaces become more or less appealing to winners of idea competitions.

2.2 | Continued participation in idea competitions

Relational motives, such as emotional attachment and identification, become influential when individuals begin to see an online community as a place that offers social support and a sense of belonging. People often join a community to seek for others who share similar interests and perspectives. Being known and liked by numerous community members can foster the development of interpersonal bonds. When people believe that other members understand and value their participation, they tend to develop an emotional attachment with the community (Ren et al., 2012). Recognition by community members also increases people's confidence that their self-views match how others see them and that their role in the group is as what others expect (Swann et al., 2004). Such a

TABLE 2 Research on participation behavior in idea competitions

Study	Empirical setting	Factors influencing participation behavior
Boudreau et al. (2011)	TopCoder	Size of participant population and task uncertainty
Chen et al. (2021)	TaskCN	Contest duration
Huang et al. (2014)	IdeaStorm	Cost information and response timing from the contest organizer
Leimeister et al. (2009)	SAPiensi	Recognition from the contest organizer
Liu et al. (2014)	TaskCN	Level of task rewards
Stouras et al. (2022)	N/A (analytical modeling)	Number, size, and performance threshold of task rewards
Sun et al. (2012)	TaskCN	Task complexity
Terwiesch and Xu (2008)	N/A (analytical modeling)	Size of participant population
Wen and Lin (2016)	N/A (analytical modeling)	Level of task rewards and service fees
Yan et al. (2022)	N/A (analytical modeling)	Top-K and winner-takes-all reward schemes
Zheng et al. (2011)	TaskCN	Task autonomy, variety, analyzability, and tacitness
Current study	Threadless	Recognition by online community might motivate continued participation, contingent on personal winning record.

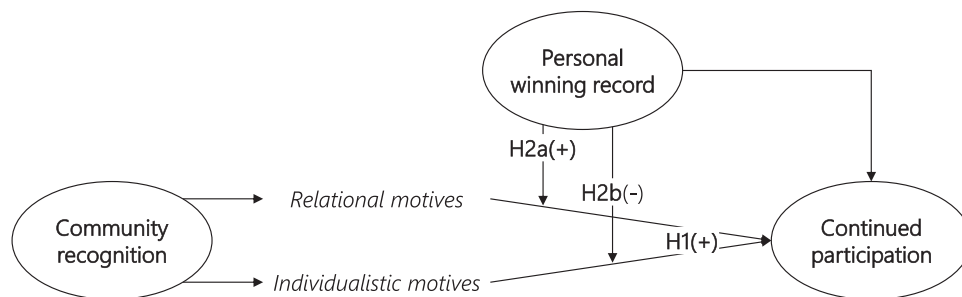


FIGURE 1 Research model

positive feedback prompts individuals to perceive a congruence between their personal identity and community values, leading them to identify more strongly with the community as a social group (Ray et al., 2014).

As a consequence of emotional attachment and identification, individuals develop desires to sustain and enhance their positive, self-defining relationship with the community (Ma & Agarwal, 2007). People with a sense of belonging are more apt to invest their time and effort in community activities that demonstrate their solidarity with other community members (Bateman et al., 2011). As emotional attachment and identification align personal goals and community values, individuals feel a stronger drive to intensify their effort accordingly (Ke & Zhang, 2010). To the extent that community recognition fosters individuals' psychological and social bonding with other community members, they might feel an obligation to remain in the community and to support its continuation through ongoing participation in community activities (Thies et al., 2016; Wasko & Faraj, 2005).

Besides the psychological and social processes discussed above, individuals might obtain personal gains from online communities, such as learning and recognition-based benefits (Lerner & Tirole, 2002). Participation in community

activities has been shown to provide access to peer insights, thereby conferring learning benefits (Riedl & Seidel, 2018), but given our research focus on community recognition, here, we concentrate only on recognition-based personal benefits. When people demonstrate their expertise in their participation in community activities, they might win public awareness and favorable judgment of their competence, establishing their expert status in the community (Hall & Graham, 2004). Since community recognition signals one's skills to potential clients, employers, and other business partners, it might bring new career opportunities (Hars & Ou, 2002). This possibility of converting community recognition to material gains further increases the private rewards derived from status enhancement (Lakhani & von Hippel, 2003).

Even for individuals who have been well-recognized, they might still be motivated by recognition-based gains and continue participating in community activities. Like many types of social capital, community recognition typically has limited durability, subject to decay in the lack of maintenance and passage of time (Thies et al., 2016). If individuals stop to participate in community activities for a prolonged period, the recognition they have established from their past contributions will increasingly decline and eventually disappear.

Worrying that inactivity will result in a loss of community recognition, people might feel particularly compelled to keep renewing their community standing through continued participation. Well-recognized individuals are particularly concerned about losing recognition as a valuable social capital after a period inactivity, and hence feel more compelled to participate again.

In summary, considerations of both relational and individualistic motives suggest that recognition by online community will exert a positive influence on continued participation. Although prior research linking community recognition to participation behavior has focused on cooperative settings, we expect that in general, community recognition can also encourage continued participation in competitive settings through eliciting relational and individualistic motives. Formally:

Hypothesis 1: *Online community's recognition of one's past participation exerts a positive influence on the person's likelihood of participating in a subsequent idea competition again.*

2.3 | Personal winning record

In comparison with cooperative settings, a distinct feature of idea competitions concerns the selection of winners. In typical idea competitions, only a few individuals who have participated in a contest would emerge as winners. For example, at TopCoder, where programmers compete to develop complex software solutions for clients, 5% of individuals who had participated in the contests claim as much as 80% of the prize pool (Stol et al., 2019). At Threadless, where individuals submit designs of t-shirts to participate in weekly contests, below 2% of participants were selected as winners in a typical round (Riedl & Seidel, 2018). We reason that in theory, the motivating role of community recognition might either be reinforced or substituted by personal winning record in past competitions, depending upon whether relational motives or individualistic motives are the primary behavior driver.

We first consider the scenario where relational motives are the primary behavior driver. Winning as a positive social experience might further deepen the sense of belonging and bonding engendered by being recognized by community members (Bateman et al., 2011; Ray et al., 2014). For individuals, winning in a highly competitive open contest is a strong indicator that their participation is highly valued. Feeling that their interests and perspectives are endorsed, winners are likely to deepen their emotional attachment to the community and its members (Ren et al., 2012). Also, winning as a strong positive feedback on participation prompts winners to perceive a congruence between their personal identity and community values, leading them to identify more strongly with the community as a social group (Ray et al., 2014). To the extent that winning, like community recognition, fosters emotional attachment and identification, the two factors are expected to complement and mutually reinforce each other.

The above considerations lead to the prediction that, in comparison with individuals who are yet to win a competition, those with a winning record will experience stronger relational motivation from online community's recognition of their past participation. For well-recognized winners, the combined, mutually reinforcing effect of community recognition and winning can drive them to continue investing their time and effort in community activities so that they can sustain their self-defining relationship with the community and their solidarity with community members (Bateman et al., 2011; Ke & Zhang, 2010; Ma & Agarwal, 2007). Indeed, these highly recognized individuals might feel a psychological and social obligation to support the community's continuation through their ongoing participation (Thies et al., 2016; Wasko & Faraj, 2005). Accordingly, in the scenario where relational motives are the primary behavior driver, personal winning record is expected to enhance the motivating role of community recognition on continued participation. Formally:

Hypothesis 2a: *Personal winning record positively moderates the influence of community recognition on subsequent contest participation likelihood.*

Next, we consider the opposite scenario where individualistic motives are the primary behavior driver. Winning as a salient personal achievement might reduce the added value of community recognition as a signal of professional status and personal competence (Tiwana & Bush, 2005; Wasko & Faraj, 2005) by serving as an alternative, potentially stronger signal by itself. Although participants whose ideas are not appreciated by community members are unlikely to win, winning in a highly competitive open contest often requires more than favorable community reception. Further assessments by other experts, clients, and contest sponsors also exert a decisive influence on winner selection, and hence, most popular ideas are not necessarily selected (Lampel et al., 2012). To the extent that a winning record is viewed as an effective indicator of personal achievement over and above obtaining favorable reception from the online community, winners' dependence on community's recognition as a signal of professional status and personal competence will decrease (Hall & Graham, 2004; Hars & Ou, 2002; Lerner & Tirole, 2002). For the purpose of signaling, winning record might constitute a functional substitute of community recognition.

The above considerations lead to the prediction that, in comparison with individuals who are yet to win a competition, those with a winning record will experience weaker individualistic motivating effect from online community's recognition of their past participation. This conjecture does not imply that winners are less inclined to participate in subsequent competitions. Indeed, a winning record in itself might encourage subsequent contest participation: As winners become more confident and seek to repeat their earlier success (Lampel et al., 2012), prior winning record might have a positive main effect on the likelihood of subsequent

participation, as depicted in Figure 1. Here, our focus is on the negative moderating effect of prior winning record. For winners, their success might substitute community recognition as a signal of status and competence (Lakhani & von Hippel, 2003), whereas for the majority aspiring individuals without a winning record, the recognition they have accumulated through their past participation constitutes a stronger source of individualistic motive. Accordingly, in the scenario where individualistic motives are the primary behavior driver, personal winning record is expected to weaken the motivating role of community recognition on continued participation. Formally:

Hypothesis 2b: *Personal winning record negatively moderates the influence of community recognition on subsequent contest participation likelihood.*

As summarized in Hypotheses 2a and 2b, the contrast between relational and individualistic motives leads to opposite predictions concerning whether the motivating role of community recognition is expected to be stronger or weaker for winners. While both predictions are possible in theory, we lean toward the individualistic view due to our field observations. In various occasions, practitioners expressed a concern that online community might lose its appeal, especially to those who have distinguished themselves through winning records, using phrases, such as “outgrowing” or “graduating from” the crowd to describe reduced attachment with the community. One relationship manager suggested that “individualism” outweighs “collectivism” and went on to highlight the importance of career-related leverage. Should such comments reflect a typical behavioral pattern, personal winning record is expected to weaken the motivating role of community recognition.

3 | METHODS

3.1 | Empirical setting

Our research setting is Threadless (www.threadless.com), founded by Jake Nickell and Jacob DeHar as a design t-shirt business in the year of 2000. We collected 6 years of proprietary data (January 2005–December 2010) from the company. Threadless does not have an internal team of designers, but operates a pioneer platform that combines weekly design competitions and an online community to involve the crowd in t-shirt design. Relying on the crowd for the generation and evaluation of new design ideas, the company can identify and meet customers' preferences without making significant investment in market research (Lampel et al., 2012). This crowdsourcing model contrasts with the traditional approach for new products development, where a firm's employees take the major responsibility.

Threadless operates an online community consisting of a vast number of members, who join the community for a vari-

ety of reasons. Some look for opportunities to interact with like-minded people. Some purchase t-shirts from the company's online store. Some engage in design competitions to improve their design skills through learning and obtaining feedback from community members. Those members who engaged in design competitions also seek to leverage the platform to demonstrate their design skills and build up their professional credentials.

Visitors to the Threadless website can sign up to become members after a simple registration process. Members can participate in a weekly competition by uploading the digital images of their t-shirt design. We label those members who had even participated in any design competitions during the sample period as “participants” or “designers” to distinguish them from common members who did not participate in design competitions. All members can score a submitted design on a numerical scale of 0–5, with 0 representing “I don't like this design” and 5 representing “I love this design.” (After our sample period, Threadless has changed the numerical scale to 1–5). When members evaluate designs submitted to a weekly competition, all designs are sorted randomly for each member. Also, when evaluating a submission, members would not see others' evaluation scores for that specific design.

The management team of Threadless would select winning designs to be produced and sold on their online store based on members' evaluation scores and other considerations, such as originality and timeless, potential copyright infringement, and contribution to the company's product portfolio. The outcome is revealed to the community after the selection decision is made. After learning the outcome of competition as well as online community members' feedback on their submitted designs, participants in a competition might or might not continue participating in subsequent contests. Figure 2 portrays the flow of (continued) participation in design competitions at Threadless.

Most produced designs were sold out and then retired from the active product catalog, leaving room for new designs. Threadless' cocreation business model was a commercial success. By 2007, the company had sold over 1.5 million t-shirts, generating over 92 million revenues (in USD) with a 30% profit margin. During our observation period, Threadless awarded \$100 cash to each winning design by the middle of 2007, and \$2000 cash (plus a \$500 gift certificate) afterward. In addition to the monetary reward, winning participants were also awarded a membership in the Threadless “alumni club”—a private forum for exchanging ideas.

3.2 | Data

Our data covered all members' activities on Threadless, including design submissions and evaluations for others' designs. We traced each design submitted by each participant and every score a participant received from other members for all his/her design submissions. During our

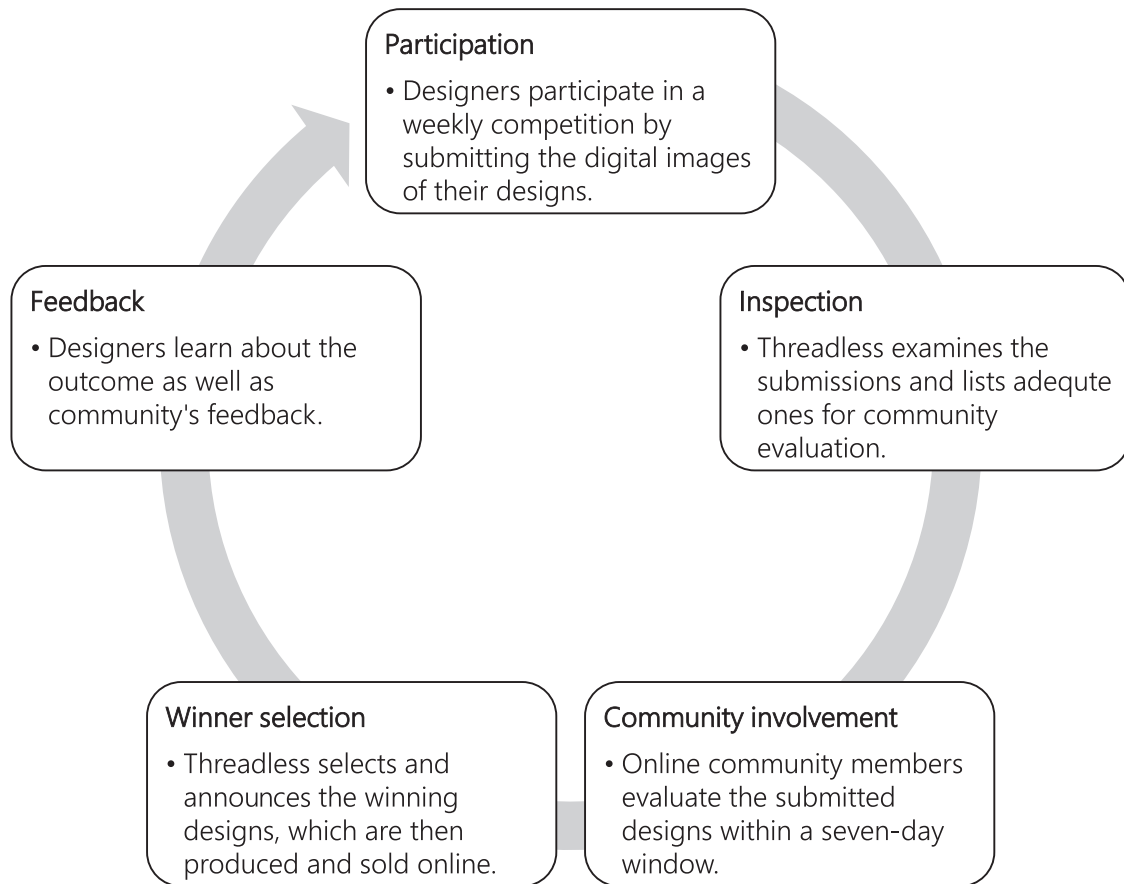


FIGURE 2 Creative design contests at Threadless

sample period (2005–2010), 46,736 participants submitted a total of 144,630 designs. As Threadless selected the winning designs weekly, we delineated time periods (rounds) by weeks. Table 3a summarizes the composition of participants, showing that 62% (28,998) of all participants submitted designs only once, and the rest (38%) submitted designs at least twice (i.e., participated in at least one more round after an initial experience). Among the 144,630 submissions, 1775 designs (1.22%) were selected as winners. Most winning designs (73%) were from repeating participants whose designs were selected at least twice, 24.5% were from repeating participants with only one submission being selected, and 2.5% of the winning designs were from one-time participants. Table 3b summarizes the distribution of the number of submissions from each participant. Overall, the mean number of design submissions is 3.10 for all participants and 6.20 for repeating participants.

Another key aspect of information concerns how members evaluated design submissions. Our data recorded 148,759,416 evaluation scores by 647,233 members. Those members who ever evaluated the designs greatly exceeded the number of participants reported above (46,736). Although most members did not participate in design competitions themselves, many were nevertheless active in evaluating the designs submitted by others. We traced the number of eval-

uations and the average evaluation score each participant received online. Table 3c summarizes the distribution of the number of scores and the average score received by each design. The number of scores received by a design ranges from 2 to 3791, with the mean being 893 and median being 655. The average score ranges from 0 to 4.528, with the mean being 1.90 and median being 1.87—these figures suggest that members were, in general, quite critical.

3.3 | Dependent variable and model

Our hypotheses pertain to the likelihood that a designer will participate in a subsequent competition again after his/her prior participation. To model such likelihood, we implemented the Cox proportional hazard rate model, where our dependent variable was operationalized as a prior participant's instantaneous probability (often termed “hazard rate”) of participating in another round of competition. A designer could participate in idea competitions for multiple times. To analyze repeating participation, we implemented the gap time model, in which a “spell” was captured as the time duration since a designer's latest participation event. Each spell started immediately after a designer's previous participation event. A spell ended in an event when a designer submitted his/her

TABLE 3a Composition of participants

		One-time participants	Repeating participants	Total
No. of participants		28,998	17,738	46,736
No. of submissions		34,663	109,967	144,630
Submission(s) selected as a winning design by a participant	No submission selected	28,953	17,024	45,977
	One submission selected	45	435	480
	Multiple submissions selected	0	279	279

TABLE 3b Number of submissions from each participant

	Mean	Median	Min	Max	S.D.
One-time participants	1.195	1	1	20	0.657
Repeating participants	6.200	3	2	347	11.724
All	3.095	1	1	347	7.638

TABLE 3c Evaluation scores received by each submission

	Mean	Median	Min	Max	S.D.
No. of evaluation scores received by a submission	893.328	655.000	2	3791	659.823
Average evaluation score for a submission	1.901	1.866	0	4.528	0.494

design to an ongoing competition; otherwise, the spell was right censored at the end of our sampling period. As design competitions in Threadless were held weekly, our data consisted of 6,950,622 participant-week observations associated with 46,736 participants during the sample period from 2005 to 2010.

As a semiparametric model, the Cox model allows researchers to examine the influence of covariates without specifying the functional form of the baseline hazard rate. This characteristic is particularly helpful when the statistical distribution underneath is unknown, while miss-specification bias is considered more consequential than the limitation of not knowing the baseline rate. In this study, we were mainly interested in the influence of community recognition on participation behavior, whereas the baseline rate was not our focus. We stratify the baseline rate by each weekly contest, which controls for unobserved heterogeneity associated with each round of contest. Let w be a given calendar week, t be the duration time since the latest participation (i.e., gap time in a spell), $Z_i(w)$ be the vector of time-varying covariates corresponding to designer i , and $h_i[t|Z_i(w)]$ be the participation rate of designer i at duration time t . Our Cox model can be expressed as the following:

$$h_i \left[t|Z_i(w) \right] = h_{0,w}(t) \exp \left[\beta' Z_i(w) \right].$$

In the above equation, $h_{0,w}(t)$ represents stratified baseline hazard rate. We fitted individualistic baseline for each contest held in week w . This stratified specification also controls for

unobserved temporal factors that might increase or decrease contest participation rate.

3.4 | Independent variables

Community recognition can be conceptualized as the extent to which one's past participation enters the attention space of a sizeable body of community audience and is judged favorably (Aadland et al., 2019). Accordingly, we use the valence and volume of community feedback that designers had received for their past design submissions to capture two constituents of community recognition. The *feedback volume* that a designer had received indicates community's attention to the person's past participation ("being known"). Specifically, it is measured as the accumulated number of evaluation scores that designer i received for all his/her prior submissions from other members up to a given point in time. Formally:

$$Feedback\ volume_{i,w} = \log \left(\sum_{s=1}^{N_{i,w}} num_score_{i,s} \right).$$

In the above equation, $num_score_{i,s}$ denotes the number of scores that designer i had received for design s by the end of week $w-1$. We applied (natural) log transformation to reduce skewness. A larger number of evaluations received indicates a designer's high publicity in the online

community, whereas a small number reveals limited public awareness.

On the other hand, *feedback valence* that a designer had received indicates community's positive judgment of one's past participation ("being praised"). Specifically, it is measured as the average of the evaluation scores that designer i received for all his/her prior submissions up to a given point in time. Formally:

$$Feedback\ valence_{i,w} = \frac{\sum_{s=1}^{N_{i,w}} sum_score_{i,s}}{\sum_{s=1}^{N_{i,w}} num_score_{i,s}}.$$

In the above equation, $sum_score_{i,s}$ denotes the summation of all scores that designer i had received for his/her prior design submission s , $num_score_{i,s}$ denotes the number of scores designer i had received for design s , and $N_{i,w}$ denotes the accumulated number of designer i 's prior submissions by the end of week $w-1$. A high average score indicates that the online community generally evaluated a designer's prior designs positively, whereas a low average score indicates a negative reflection from the community.

To measure a designer's personal *winning record*, we counted the number of a designer's prior winning submission(s) up to a given point in time. The variable takes the value of zero if none of a designer's past submission(s) had ever been selected as a winning design by the end of week $w-1$, and takes a positive integer value otherwise. Hypotheses 2a and 2b pertain to the moderating effect of personal winning record on the effect of community recognition on continued participation likelihood. Accordingly, we constructed two interaction terms corresponding to the two indicators of community recognition, *feedback volume* $\times$ *winning record* and *feedback valence* $\times$ *winning record*, as time-varying covariates in the Cox model.

Using the data from Threadless, we could construct two control variables. First, we calculated the total number of a designer's past submissions by the end of week $w-1$, and then applied log transformation to reduce skewness. This control variable accounts for the possibility that continued participation might represent a form of individualistic habitual behavior or the designer's experience with the platform. Second, since each designer also evaluated other designers' designs, we calculated the average of the evaluation scores that designer i gave to other designers' submissions by the end of week $w-1$. This control variable accounts for the possibility that continued participation might be influenced by one's positive/negative views toward others' designs. Table 4 lists all these variables.

Since our data were organized as participant-week observations, each participant was associated with repeating observations over time during the sample period. Observations on the same individual tend to be correlated, violating the common assumption of independent observations. Hence, in computing standard errors, we implemented cluster-robust variance estimates (Williams, 2000) to adjust for nonindependence between observations on the same partic-

ipant, with each participant defined a cluster of correlated observations.

4 | RESULTS

4.1 | Hypotheses testing

Table 5 presents the main results of Cox models. Model 1 only includes control variables. Model 2 adds the main effects of feedback volume, feedback valence, and winning record. Models 3 and 5 further add interaction terms. While we did not formally hypothesize about the main effect of winning record, this variable exhibits a significant positive effect in models 2–5, suggesting that, in general, personal winning record motivates subsequent participation. Number of prior submissions, a control variable, also displays a significant positive effect, indicating a habitual pattern of continued participation.

Hypothesis 1 predicts that community recognition exerts a positive influence on the likelihood of continued participation. Accordingly, both feedback volume and feedback valence, as two indicators of community recognition, are expected to exert a positive main effect. In model 2, both indicators display a significant positive effect. Such a result corroborates Hypothesis 1.

Hypotheses 2a and 2b present competing predictions concerning the moderating effect of winning record. Although Hypothesis 2a predicts a positive moderating effect with an emphasis on relational motives, Hypothesis 2b predicts a negative moderating effect with an emphasis on individualistic motives. In both models 3 and 5, the interaction between feedback volume and winning record displays a significant negative effect. Similarly, in both models 4 and 5, the interaction between feedback valence and winning record displays a significant negative effect. These results lend support to the individualistic view (Hypothesis 2b) as opposed to the relational view (Hypothesis 2a).

Drawing from the estimates of model 5, we calculated hazard rate multiplier to further assess the results of Cox regression. A multiplier greater (or less) than one indicates that the rate implied by a given level of an independent variable is increased (or decreased) relative to the estimate based on the minimum value of the independent variable by a factor equal to the value of the multiplier. Figure 3a presents the moderating effect of winning record on the relationship between feedback volume and continued participation rate, whereas Figure 3b presents the moderating effect of winning record on the relationship between feedback valence and continued participation rate. For participants who had never won, when the values of feedback volume and feedback valence increase to 12 and 3 (95th percentile), the participation rate multipliers reach 6.5 and 6.9, respectively. However, the effects of the two indicators increasingly turn negative after a designer has established a personal winning record, such that they might decrease (multiplier < 1) rather than increase continued participation rate.

TABLE 4 List of variables

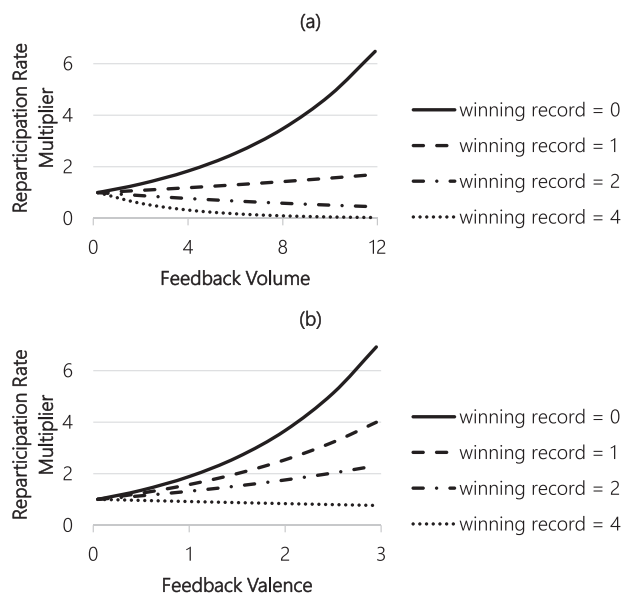
Variable	Definition	Mean	Median	S.D.	Min	Max
Feedback volume	Logarithm of the cumulative number of the evaluation scores that a designer had received from all his/her prior submission(s) up to a given point in time.	8.033	7.115	2.209	0.963	12.872
Feedback valence	The average of the evaluation scores that a designer had received from all his/her prior submission(s) up to a given point in time.	1.743	1.750	0.400	0.000	4.250
Winning record	The number of a designer's prior submissions that had been selected as a winning design up to a given point in time.	0.035	0.000	0.408	0.000	34.000
No. of prior submissions	Logarithm of the total number of a designer's prior submission(s) up to a given point in time.	1.071	0.693	1.821	0.000	5.849
Evaluating others	The average of the evaluation scores that a designer gave to other designers' submissions up to a given point in time.	2.427	2.357	1.367	0.000	5.000

TABLE 5 Cox models for continued participation rate

Variable	Model 1	Model 2	Model 3	Model 4	Model 5
No. of prior submissions	1.716*** (0.000)	1.420*** (0.000)	1.405*** (0.000)	1.420*** (0.000)	1.405*** (0.000)
Evaluating others	−0.011 (0.092)	−0.009 (0.156)	−0.006 (0.310)	−0.008 (0.200)	−0.005 (0.440)
Feedback volume		0.158*** (0.000)	0.174*** (0.000)	0.149*** (0.000)	0.160*** (0.000)
Feedback valence		0.752*** (0.000)	0.651*** (0.000)	0.768*** (0.000)	0.667*** (0.000)
Winning record		0.024** (0.046)	1.255*** (0.000)	0.394** (0.001)	1.849*** (0.000)
Feedback volume × winning record			−0.106*** (0.000)		−0.115*** (0.000)
Feedback valence × winning record				−0.142** (0.001)	−0.189*** (0.000)
Baseline rate stratified by each contest (weekly)	specified	specified	specified	specified	specified
S.E. estimates clustered by each individual	specified	specified	specified	specified	specified
Log pseudolikelihood	−251,375.88	−248,521.78	−248,063.29	−248,442.73	−247,914.83

Note: Robust standard errors are in parentheses.

[†] $p < 0.1$. $*p < 0.05$. $**p < 0.01$. $***p < 0.001$. All two-tailed tests.

**FIGURE 3** Continued participation rate multiplier

It is important to note that only a low percentage of our observations were subject to the reversed effect depicted in Figure 3. Many modern online platforms are built on a long-tail model with the objective to attract a large crowd over the internet, but then, most contributions are made by a small group of “marquee users” (Eisenmann, 2008; Rochet & Tirole, 2003). In data, the distribution of personal winning record is highly skewed since only a small fraction of contest participants could win. Despite the practical importance of these “star” participants, they are nevertheless outliers in our sample of a large crowd. Hence, the reversed effects reported in Figure 3 should be interpreted with caution, knowing that they apply only to a small elite group.

4.2 | Robustness analysis

We performed additional analysis to check the robustness of our results. First, following Dekimpe et al. (1998), we examined whether our results are sensitive to the specific data window in which we conducted our analysis. Specifically, we excluded the observations associated with the starting year

TABLE 6 Robustness checks

	Model 6 2005 excluded	Model 7 2007 excluded	Model 8 2010 excluded	Model 9 inactive obs. excl.	Model 10 winning or not (0/1)
No. of prior submissions	1.423*** (0.000)	1.464*** (0.000)	1.250*** (0.000)	1.091*** (0.000)	1.399*** (0.000)
Evaluating others	−0.002 (0.817)	−0.003 (0.664)	−0.008 (0.213)	−0.009 (0.207)	−0.002 (0.723)
Feedback volume	0.150*** (0.000)	0.112*** (0.000)	0.262*** (0.000)	0.375*** (0.000)	0.155*** (0.000)
Feedback valence	0.742*** (0.000)	0.720*** (0.000)	0.514*** (0.000)	0.311*** (0.000)	0.662*** (0.000)
Winning record	1.809*** (0.000)	1.798*** (0.000)	2.303*** (0.000)	2.505*** (0.000)	3.381*** (0.000)
Feedback volume × winning record	−0.112*** (0.000)	−0.108*** (0.000)	−0.140*** (0.000)	−0.161*** (0.000)	−0.180*** (0.000)
Feedback valence × winning record	−0.187*** (0.000)	−0.198*** (0.000)	−0.255*** (0.000)	−0.234*** (0.000)	−0.458*** (0.000)
Baseline rate stratified by each contest (weekly)	specified	specified	specified	specified	specified
S.E. estimates clustered by each individual	specified	specified	specified	specified	specified
Log pseudolikelihood	−21,7376.27	−21,2391.7	−188,677.92	−13,901.66	−24,7865.06

Note: Robust standard errors are in parentheses.

† $p < 0.1$. * $p < 0.05$. ** $p < 0.01$. *** $p < 0.001$. All two-tailed tests.

2005, the middle year 2007, and ending year 2010 to construct three reduced samples. Models 6–8 in Table 6 report the results based on these reduced samples, which are consistent with our main results. Second, although in our main analysis, those spells corresponding to inactive participants were censored at the end of our sample period, we also made an alternative assumption that after 4 years of inactivity, a designer would leave the platform and hence was no longer “at risk” for further participation. Accordingly, we removed a spell from the sample after 4 years of inactivity. The result based on this reduced sample is presented in model 9. Again, consistent results are found. Finally, participants with a record of many winnings were limited in number. Hence, we also constructed a dichotomized variable of personal winning record. This alternative variable takes the value of one if at least one past submission by a designer was selected as a winning design by the end of week $w-1$, and takes the value of zero otherwise. As reported in model 10, results based on this binary indicator are fully consistent with the results of our main analysis.

We also worried about unobserved heterogeneity of individual participants. For example, participants differ in their ability to win, and such an ability might gradually improve as a result of learning (Huang et al., 2014; Riedl & Seidel, 2018). Unobserved personal characteristics, such as intrinsic ability and learning, can affect participation decision, causing endogeneity biases. To assess the robustness of our findings against such potential biases, we specified fixed effects for individual participants as well as their interactions with year dummies. Individual fixed effects help to account for time-invariant unobserved personal characteristics. Also, we assumed that time-varying individual-level confounders can be reasonably captured by the interactions between individual fixed effects and year dummies: for instance, while individuals could learn and improve their abilities gradually over

a multiyear timespan, a person’s ability did not vary much within a short time span of less than a year.

With our massive full sample size, specifying over 46,000 fixed effects for all participants and their interactions with year dummies would incur dimensionality problem and would be infeasible. As a remedy, we randomly constructed four subsamples—two of which contain 1000 participants (subsamples 1 and 2), and the other two contain 2000 participants (subsamples 3 and 4)—from our full sample. One concern here is that subsampling was not truly random. To address this concern, we contrasted four subsamples against the full sample in terms of sample means and medians of all the variables. These examinations revealed no significant differences, suggesting that the subsamples and the full sample share similar distributional properties (summary statistics are available from the authors). Then, we estimated Cox models using each subsample with individual fixed effects and their interactions with year dummies being specified as covariates. We found consistent results from such robustness analysis, as reported in Table 7. These results suggest that even after we partial out substantial variation associated with such a large array of controls, our variables of interest still exert significant effects.

4.3 | Assessment of monetary-based mechanism

In analyzing the moderating effect of personal winning record, we have focused on recognition-based mechanism. Accordingly, the observed negative moderating effect is interpreted as evidence that winning, which represents a more salient form of recognition, can substitute and thereby weaken the motivating role of community recognition. On the other hand, when idea competitions offer monetary rewards,

TABLE 7 Robustness checks (cont.)

	Model 11 subsample 1	Model 12 subsample 2	Model 13 subsample 3	Model 14 subsample 4
No. of prior submissions	1.509*** (0.183)	1.583*** (0.193)	1.543*** (0.112)	1.610*** (0.112)
Evaluating others	−0.043 (0.032)	0.016 (0.036)	−0.053** (0.021)	−0.000 (0.022)
Feedback volume	0.252* (0.115)	0.163 (0.121)	0.191*** (0.073)	0.167* (0.076)
Feedback valence	0.326* (0.162)	0.599*** (0.168)	0.558*** (0.010)	0.663*** (0.105)
Winning record	19.410*** (6.917)	17.010*** (7.183)	21.359*** (4.875)	18.997*** (5.079)
Feedback volume × winning record	−3.479* (1.483)	−3.972† (2.077)	−4.158*** (1.172)	−4.333*** (1.470)
Feedback valence × winning record	−1.261* (0.523)	−0.886* (0.377)	−1.290*** (0.341)	−1.005*** (0.272)
Participant fixed effects	specified	specified	specified	specified
Participant fixed effects × year dummies	specified	specified	specified	specified
Baseline rate stratified by each contest (weekly)	specified	specified	specified	specified
S.E. estimates clustered by each individual	specified	specified	specified	specified
Log pseudolikelihood	−1100.10	−968.08	−3187.69	−2997.28

Note: Robust standard errors are in parentheses.
†*p* < 0.1. **p* < 0.05. ***p* < 0.01. ****p* < 0.001. All two-tailed tests.

such rewards, in theory, might also weaken the motivating role of community recognition through wealth effect. Specifically, through receiving monetary reward, winners who have accumulated substantial wealth might become increasingly detached from the community, reducing the motivating role of community recognition. We did not expect such a monetary-based mechanism to be a main driving force underneath the observed moderating effect of personal winning record. This is so because in our research setting, monetary reward was not substantial enough to significantly alter participants' wealth. During the observation period 2005–2010, each winning design was awarded only a symbolic \$100 cash award by the middle of 2007. Afterward, the amount was raised to \$2000 (plus a \$500 gift certificate)—but even this increased amount was unlikely to make winners so rich such that they become detached from the community.

Although these contextual conditions would suggest that the negative moderating effect of personal winning record is less likely to be driven by monetary-based mechanism, we still thought to assess the potential presence and strength of this alternative mechanism more rigorously. For this purpose, we utilized the raise in monetary reward from the middle of 2007 to formulate a statistical test. Specifically, if the observed negative moderating effect of personal winning record was mainly driven by monetary-based mechanism, this moderating effect should become *stronger* (more negative) when an individual won after the monetary reward was raised in the later period. We tested this prediction by adding the three-way interaction between community recognition, winning record, and a binary indicator of winning after the raise into the Cox model. The analysis showed that the negative moderating effect of winning record on the relationship between feedback volume and participation rate was significantly *weakened* (less negative) by winning

after the raise (positive three-way interaction; full results are available from the authors). This finding contradicts the prediction of monetary-based mechanism, but appears consistent with recognition-based mechanism: as the number of winners grew over time, each winner might receive comparably less attention and recognition in the later period, and hence, the moderating effect of winning became weaker. Together, contextual conditions and further empirical analysis both indicate that monetary-based mechanism was less likely to be a primary driving force than recognition-based mechanism in our research setting.

5 | DISCUSSION

5.1 | Research findings

This study examines the effect of online community's recognition on continued participation in idea competitions as well as how personal winning record moderates such an influence. We reason that the motivating role of community recognition might either be reinforced or substituted by personal winning record in past competitions, depending upon whether relational motives (psychological and social bonding) or individualistic motives (personal benefits, such as status and career enhancement) are the primary behavior driver. From a relational view, winning as a positive social experience further deepens the sense of belonging and bonding engendered by being recognized by community members. From an individualistic view, in contrast, winning as a salient personal achievement reduces the added value of community recognition as a signal of professional status and personal competence by serving as an alternative, potentially stronger signal by itself. Accordingly, examining winning record as a moderating factor can help untangle the mechanisms

linking online community's recognition to winners' continued participation behavior.

We conduct our empirical test using data obtained from a platform of creative design contests. The data contain over 144,000 designs submitted by over 46,000 individuals during a 6-year period. These submitted designs received a total of more than 129 million feedback evaluations from the online community, and we use the feedback evaluations that an individual had received in the past to capture community recognition. Our event history analysis reveals that although community recognition exerts a positive effect on the rate of continued participation for designers who are yet to win any competitions, this effect increasingly turns negative for designers who have won. Such findings indicate that the motivating role of community recognition might be substituted instead of reinforced by personal winning record, lending support to the individualistic view while rejecting the relational view.

5.2 | Implications for research and practice

Our analysis informs both research and practice. In terms of research, although a sizeable volume of research has investigated participation behavior in online communities, most studies have focused on platforms for cooperation and sharing, where individuals pool their knowledge and effort in support of common goals without receiving explicit compensations. Limited research has examined online communities in settings where individuals compete against one another with a personal objective of winning. On the other hand, prior studies on idea competitions have examined various contest design parameters through modeling the interaction between contest sponsors and participants. But the interaction between contest participants and the broader online community has received less attention, partly because idea competitions and community building were traditionally deemed as distinct platform models. Our research extends these two streams of research, showing that in competitive settings, individualistic motives associated with personal benefits, such as status and career enhancement, might be the primary behavior driver underneath community's influence on continued participation.

In terms of practice, although virtual social spaces represent an important means for modern competition platforms to attract and motivate participants, our study informs practitioners about online community's limitation in retaining star participants. Our multiplier analysis shows that the negative moderating effect of winning record might even reverse the behavioral influence of community recognition for a small group of designers who have won numerous times. This reversed effect points to the possibility that for these elites, the attention they have earned from their past participation might demotivate, rather than encourage, further participation. This is so perhaps because community recognition not only loses its added value as a signal of professional status and personal competence, but also becomes a heightened hur-

dle. The more recognized a person has become, the higher the expectation from the community, which increases the risk of being publicly criticized if one's subsequent performance falls short of the rising bar. Under a heightened risk of scrutiny, participating in competitions again can be discouraged.

Note that given the long-tail nature of idea competitions, winners represent only a small fraction of contest participants. Nevertheless, they exert disproportional impact on the quality of winning ideas and community experiences. Thus, it is crucial for idea competition platforms to retain and continuously motivate these star participants. As community recognition loses its appealing to "star" participants, platform operators need to offer more values to them. As an example, in recent years, Threadless began to create a new platform named Artist Shops, where top designers who outgrew competitions can set up their own online stores, create their personal brands, upload their arts, and start selling easily—with Threadless coordinating production and logistics activities for them. The company also assembled outreach teams to engage star designers on a one-on-one basis, helping them not only to establish personal brands online, but also to sell their brands through physical channels—effectively acting as their agents. Some of these top designers remain active in the original platform because participation in idea competitions might stimulate new inspirations and attract new customers to their own shops and personal brands.

5.3 | Limitations and future directions

The current study can be extended along several directions. First, our research setting, Threadless, concentrates on a single type of task, namely, graphic design. Still, idea competitions—and crowdsourcing in general—can be utilized to implement a wide range of tasks. For example, Brabham (2013) discussed a typology, including knowledge discovery (collecting and assembling information), distributed human intelligence tasking (processing and analyzing information possessed by a solution seeker), broadcast search (finding a solution to a problem with an objective right answer), and peer-vetted creative discussion (finding a solution to a problem whose answer is subjective or dependent on public support). Graphic design belongs to the fourth category. Future research might focus on other types of tasks and examine whether the roles of community recognition and personal winning record would differ by task types.

Second, although our data empower us to track the complete participation history of each individual over 6 years, the data set is nevertheless limited. When users register an account at Threadless, they are not required to provide their background information to the platform. Consequently, background information of most members is missing in our data set, and hence, we cannot examine the influence of personal idiosyncrasies. Indeed, in the crowdsourcing literature, scholars have paid relatively scant attention to the personal characteristics of contributing crowd, as the focus of

analysis typically resides in contest design parameters, not specific participants (Ghezzi et al., 2018; Zhao & Zhu, 2014). Such a literature gap warrants future investigation.

Third, the limited availability of individual-level information also prohibits us from implementing fine-grained analyses of different motivating factors. Our analysis is grounded on a generic distinction between relational and individualistic motives. Such a simplified dichotomy, however, confounds different psychological mechanisms. For instance, the self-determination theory (Ryan & Deci, 2000) makes subtle distinctions between external, introjected, identified, integrated, and intrinsic regulations. Also, competition and reference to peers has been found to cause escalation of commitment despite negative performance feedback, such as failing to win in idea competitions continuously (Hsieh et al., 2015). Future research with richer individual-level information might better disentangle different psychological mechanisms underneath community influence.

Finally, when an individual did not participate in a certain weekly contest, (s)he might consciously decide not to take part, simply ignore the given contest, or have already quit the idea competition platform altogether. Our data could not distinguish between these differences. Indeed, similar to the analytical approach adopted in this research, the extant literature has focused on a simplified conceptualization of participating or not. Future research can bring further nuances to varying forms of nonparticipating behavior, such as discontinuance or quitting, and explore whether these behavioral patterns are associated with unique antecedents and distinct consequences for online community and idea competition platform.

ORCID

Kai-Yu Hsieh  <https://orcid.org/0000-0003-2544-134X>

Ping Xiao  <https://orcid.org/0000-0003-3662-3616>

Noshir Contractor  <https://orcid.org/0000-0002-9989-3018>

REFERENCES

- Aadland, E., Cattani, G. & Ferriani, S. (2019) Friends, gifts, and cliques: social proximity and recognition in peer-based tournament rituals. *Academy of Management Journal*, 62(3), 883–917.
- Bateman, P.J., Gray, P.H. & Butler, B.S. (2011) The impact of community commitment on participation in online communities. *Information Systems Research*, 22(4), 841–854.
- Bock, G.-W., Ahuja, M., Suh, A. & Yap, L. (2015) Sustainability of a virtual community: integrating individual and structural dynamics. *Journal of the Association for Information Systems*, 16(6), 418–447.
- Boudreau, K.J., Lacetera, N. & Lakhani, K.R. (2011) Incentives and problem uncertainty in innovation contests: an empirical analysis. *Management Science*, 57(5), 843–863.
- Brabham, D.C. (2013) *Crowdsourcing*. Cambridge, MA: MIT Press.
- Carillo, K., Huff, S. & Chawner, B. (2017) What makes a good contributor? Understanding contributor behavior within large free/open source software projects – a socialization perspective. *Journal of Strategic Information Systems*, 26(4), 322–359.
- Chen, P.Y., Pavlou, P., Wu, S.Y. & Yang, Y. (2021) Attracting high-quality contestants to contest in the context of crowdsourcing contest platform. *Production and Operations Management*, 30(6), 1751–1771.
- Chen, W., Wei, X. & Zhu, X.K. (2018) Engaging voluntary contributions in online communities: a hidden Markov model. *MIS Quarterly*, 42(1), 83–100.
- Chiu, C.-M., Hsu, M.-H. & Wang, E.T.G. (2006) Understanding knowledge sharing in virtual communities: an integration of social capital and social cognitive theories. *Decision Support Systems*, 42(3), 1872–1888.
- Dekimpe, M.G., Parker, P.M. & Sarvary, M. (1998) Staged estimation of international diffusion models: an application to global cellular telephone adoption. *Technological Forecasting and Social Change*, 57(1), 105–132.
- Dong, L.F., Huang, L.Q., Hou, J.H. & Liu, Y. (2020) Continuous content contribution in virtual community: the role of status-standing on motivational mechanisms. *Decision Support Systems*, 132, 1–12.
- Eisenmann, T.R. (2008) Managing proprietary and shared platforms. *California Management Review*, 50(4), 31–53.
- Fang, Y. & Neufeld, D. (2009) Understanding sustained participation in open source software projects. *Journal of Management Information Systems*, 25(4), 9–50.
- Ghezzi, A., Gabelloni, D., Martini, A. & Natalicchio, A. (2018) Crowdsourcing: a review and suggestions for future research. *International Journal of Management Reviews*, 20(2), 343–363.
- Goes, P.B., Lin, M. & Au Yeung, C.-M. (2014) “Popularity effect” in user-generated contents: evidence from online product review. *Information Systems Research*, 25(2), 222–238.
- Hall, H. & Graham, D. (2004) Creation and recreation: motivating collaboration to generate knowledge capital in online communities. *International Journal of Information Management*, 24(3), 235–246.
- Hars, A. & Ou, S. (2002) Working for free? Motivations for participating in open-source projects. *International Journal of Electronic Commerce*, 6(3), 25–39.
- Hsieh, K.-Y., Tsai, W. & Chen, M.-J. (2015) If they can do it, why not us? Competitors as reference points for justifying escalation of commitment. *Academy of Management Journal*, 58(1), 38–58.
- Huang, Y., Singh, P.V. & Srinivasan, K. (2014) Crowdsourcing new product ideas under consumer learning. *Management Science*, 60(9), 2138–2159.
- Ke, W. & Zhang, P. (2010) The effects of extrinsic motivations and satisfaction in open source software development. *Journal of the Association for Information Systems*, 11(12), 784–808.
- Lakhani, K.R. (2016) Managing communities and contests to innovate with crowds. In: Dietmar, H. & Lakhani, K.R. (Eds.) *Revolutionizing innovation: users, communities, and open innovation*. Cambridge, MA: MIT Press, p. 109–134.
- Lakhani, K.R. & Von Hippel, E. (2003) How open source software works: “Free” user-to-user assistance. *Research Policy*, 32(6), 923–943.
- Lampel, J., Jha, P.P. & Bhalla, A. (2012) Test-driving the future: how design competitions are changing innovation. *Academy of Management Perspectives*, 26(2), 71–85.
- Leimeister, J.M., Huber, M., Bretschneider, U. & Krcmar, H. (2009) Leveraging crowdsourcing: activation-supporting components for IT-based ideas competition. *Journal of Management Information Systems*, 26(1), 197–224.
- Lerner, J. & Tirole, J. (2002) Some simple economics of open source. *Journal of Industrial Economics*, 50(2), 197–234.
- Lichtenthaler, U. (2011) Open innovation: past research, current debates, and future directions. *Academy of Management Perspectives*, 25(1), 75–93.
- Liu, T.X., Yang, J., Adamic, L.A. & Chen, Y. (2014) Crowdsourcing with all-pay auctions: a field experiment on Taskcn. *Management Science*, 60(8), 2020–2037.
- Ma, M. & Agarwal, R. (2007) Through a glass darkly: information technology design, identity verification, and knowledge contribution in online communities. *Information Systems Research*, 18(1), 42–67.
- Ray, S., Kim, S.S. & Morris, J.G. (2014) The central role of engagement in online communities. *Information Systems Research*, 25(3), 528–546.
- Ren, Y., Harper, F.M., Drenner, S., Terveen, L., Kiesler, S., Riedl, J., et al. (2012) Building member attachment in online communities: applying theories of group identity and interpersonal bonds. *MIS Quarterly*, 36(3), 841–864.
- Riedl, C. & Seidel, V.P. (2018) Learning from mixed signals in online innovation communities. *Organization Science*, 29(6), 1010–1032.
- Rochet, J.-C. & Tirole, J. (2003) Platform competition in two-sided markets. *Journal of the European Economic Association*, 1(4), 990–1029.

- Ryan, R.M. & Deci, E.L. (2000) Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, 55(1), 68–78.
- Sobel, D. (1995) *Longitude: the true story of a lone genius who solved the greatest scientific problem of his time*. New York: Walker.
- Song, P. & Phang, C.W. (2016) Promoting continuance through shaping members' social identity in knowledge-based versus support/advocacy virtual communities. *IEEE Transactions on Engineering Management*, 63(1), 16–26.
- Stol, K.-J., Caglayan, B. & Fitzgerald, B. (2019) Competition-based crowdsourcing software development: a multi-method study from a customer perspective. *IEEE Transactions on Software Engineering*, 45(3), 237–260.
- Stouras, K.I., Hutchison-Krupat, J. & Chao, R.O. (2022) The role of participation in innovation contests. *Management Science*, 68(6), 3975–4753.
- Sun, Y., Fang, Y. & Lim, K.H. (2012) Understanding sustained participation in transactional virtual communities. *Decision Support Systems*, 53(1), 12–22.
- Swann, W.B., Polzer, J.T., Seyle, D.C. & Ko, S.J. (2004) Finding value in diversity: verification of personal and social self-views in diverse groups. *Academy of Management Review*, 29(1), 9–27.
- Terwiesch, C. & Xu, Y. (2008) Innovation contests, open innovation, and multiagent problem solving. *Management Science*, 54(9), 1529–1543.
- Thies, F., Wessel, M. & Benlian, A. (2016) Effects of social interaction dynamics on platforms. *Journal of Management Information Systems*, 33(3), 843–873.
- Tiwana, A. & Bush, A.A. (2005) Continuance in expertise-sharing networks: a social perspective. *IEEE Transactions on Engineering Management*, 52(1), 85–101.
- von Krogh, G., Haefliger, S., Spaeth, S. & Wallin, M.W. (2012) Carrots and rainbows: motivation and social practice in open source software development. *MIS Quarterly*, 36(2), 649–676.
- Wasko, M.M. & Faraj, S. (2005) Why should I share? Examining social capital and knowledge contribution in electronic networks of practice. *MIS Quarterly*, 29(1), 35–57.
- Wen, Z. & Lin, L. (2016) Optimal fee structures of crowdsourcing platforms. *Decision Sciences*, 47(5), 820–850.
- Williams, R.L. (2000) A note on robust variance estimation for cluster-correlated data. *Biometrics*, 56(2), 645–646.
- Xu, B. & Li, D. (2015) An empirical study of the motivations for content contribution and community participation in Wikipedia. *Information & Management*, 52(3), 275–286.
- Yan, W., Letizia, P. & Zhou, W. (2022) Three cobblers worth the mastermind? The potential of ensemble in crowdsourced classification problems. *Decision Sciences*, Advance online publication, <https://doi.org/10.1111/dec.12516>.
- Zhang, C., Hahn, J. & De, P. (2013) Continued participation in online innovation communities: does community response matter equally for everyone? *Information Systems Research*, 24(4), 1112–1130.
- Zhao, Y. & Zhu, Q. (2014) Evaluation on crowdsourcing research: current status and future direction. *Information Systems Frontiers*, 16(3), 417–434.
- Zheng, H.C., Li, D.H. & Hou, W.H. (2011) Task design, motivation, and participation in crowdsourcing contests. *International Journal of Electronic Commerce*, 15(4), 57–88.

AUTHOR BIOGRAPHIES

Kai-Yu Hsieh is an associate professor of business administration in the College of Commerce, National Chengchi University. He received his Ph.D. from the London Business School. His research interests include

corporate strategy and governance, digital business strategy, and organization design and change. His works have appeared in leading journals, including *Academy of Management Journal*, *Decision Sciences*, and *Organization Science*, among others.

Ping Xiao is an associate professor of marketing in the Melbourne Business School, University of Melbourne. She received her Ph.D. from the Olin Business School, Washington University in Saint Louis. Her main research interests include strategic interactions in e-business expansion, social network and consumer analytics, and crowdsourcing. Her works have appeared in leading journals, including *Marketing Science*, *Management Science*, *Journal of Marketing Research*, *Journal of Econometrics*, and *Journal of Management Information Systems*, among others. She is a Finalist of 2015 John D.C. Little Best Paper Award given by INFORMS.

Noshir Contractor is the Jane S. & William J. White Professor of Behavioral Sciences in the McCormick School of Engineering, the School of Communication and the Kellogg School of Management at Northwestern University. He investigates how social and knowledge networks form and perform. He is the President-Elect of the International Communication Association. He is also a Distinguished Scholar of the National Communication Association and a Fellow of the American Association for the Advancement of Science, the Association for Computing Machinery and the International Communication Association. He received the Lifetime Service Award from the Organizational Communication & Information Systems Division of the Academy of Management. He received the Distinguished Alumnus Award from the Indian Institute of Technology, Madras where he received a Bachelor's degree in Electrical Engineering. He has a Ph.D. from the Annenberg School of Communication at the University of Southern California.

Li Wang is an associate professor of marketing in the Anhui University of Finance and Economics. He received his Ph.D. from the Olin Business School, Washington University in Saint Louis. His main research interests are in quantitative marketing, internet marketing, and crowdsourcing. His works have appeared in *International Economic Review*, among others.

How to cite this article: Hsieh, K.-Y., Xiao, P., Contractor, N., & Wang, L. (2022) Online community's recognition and continued participation in idea competitions. *Decision Sciences*, 1–15. <https://doi.org/10.1111/dec.12578>