Comparing Strategies for Winning Expert-rated and Crowd-rated Crowdsourcing Contests: First Findings

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ABSTRACT

Many studies have been done on expert-rated crowdsourcing contests but few have examined crowd-rated contests in which winners are determined by the voting of the crowd. Due to the different rating mechanisms, determinants for winning may be different under two types of contests. Based on previous studies, we identify three types of winning determinants: expertise, submission timing, and social capital. Our initial investigation, based on 91 entries of two contests in Zooppa, supports that those variables play different roles in winning crowd-rated contests than in winning expert-rated contests. Specifically, past winning experience in crowd-rated contests predicts future success in crowd-rated contests, while past winning experience in expert-rated contests predicts future success in expert-rated contests. We discover a U-shaped relationship between the submission time and winning in both types of contests. Social capital elevates the probability of winning a crowd-rated contest only if the social capital is sufficiently high.

Keywords

Crowdsourcing, crowdsourcing contest, open innovation, prize design, social capital, winning determinant

INTRODUCTION

Crowdsourcing contests (or tournaments or competitions), as an important type of co-creation activities, are becoming an important and efficient channel to spur innovation in product development and marketing, to acquire solutions for creative and uncomplicated problems, and to seek new ideas and concepts (Huang, Singh and Srinivasan, 2011; Morgan and Wang, 2010; Yang, Chen and Banker, 2010, 2011). In order to achieve best outcomes, contest sponsors or platforms use several ways to motivate participation, efforts, and performance. Among these motivators, monetary rewards (i.e., prizes) are found to be a major one (Archak, 2010; Brabham, 2010; DiPalantino and Vojnovic, 2009). Accordingly, some research focuses on prize design in crowdsourcing contests (e.g., Archak and Sundararajan, 2009; DiPalantino and Vojnovic, 2009; Morgan and Wang, 2010). In practice, crowdsourcing contests vary greatly in rating mechanisms. Some crowdsourcing sites such as Topcoder, Taskcn, and Wooshii only use expert ratings, i.e., winners are determined by a panel of expert judges or a rating system employed by the solution seeker. Other crowdsourcing sites such as Jovoto, and PimTim use crowd ratings, i.e., winners are determined by the voting of the crowd[1]. A few sites such as Zooppa use both crowd ratings and expert ratings. In some cases, Zooppa offers crowd-rated prizes and expert-rated prizes in the same contest.

However, most current empirical studies on crowdsourcing contests collected their data on expert-rated crowdsourcing sites including Taskcn (DiPalantino and Vojnovic, 2009; Yang, Adamic and Ackerman, 2008; Yanget al., 2010, 2011; Zheng, Li and Hou, 2011) and Topcoder (Archak, 2010; Archak and Ghose, 2010). Despite the diversity of rating mechanisms, few have examined crowd-rated contests, much less compared crowd-rated and expert-rated contests. This paper attempts to fill the gap by answering the following questions: What are the roles of winning determinants in winning expert-rated and crowd-rated crowdsourcing contests? Are they the same across two rating mechanisms? Based on prior studies, we summarize three groups of winning determinants: expertise, submission timing, and social capital. Our initial investigation is based on comparing 91 entries of two contests at Zooppa in terms of the relationship between winning determinants and the probability of winning a crowd-rated prize and an expert-rated prize. To our knowledge, our study is the first to compare winning determinants in expert-rated and crowd-rated contests.

[1] Some other cases such as 99designs allow the crowds to rate submissions, but the client (or the contest holder) selects the winner.

BACKGROUND

Crowdsourcing contests have experienced a rapid development since 2005. According Brabham (2010), "crowdsourcing companies operate by broadcasting problems or challenges to the crowd. In peer-vetted crowdsourcing approaches, ideal for ideation problems, the crowd assesses the solutions of its peers, often through a simple ranking or voting system, and the top solutions that emerge are then owned by the crowdsourcing company" (p.1123). Howe (2006) explains a crowdsourcing contest:

> *Artists submit their designs; users vote on them; the highest-rated designs are printed and sold back to the community. Simple. Brilliant.*

In crowdsourcing contests, the crowds (members in crowdsourcing sites) usually are allowed to rate peer submissions through a voting or ranking system and then those with the highest scores will win (Brabham, 2010; Howe, 2006). Typically, a crowdsourcing contest includes several stages (see Figure 2). In the contest design stage, the seeker sets the goal of the contest, writes a clear contest description, and then designs prizes. Later, the crowdsourcing website informs its members about the new contest so that they can submit their entries. After the contest is closed, winners will be selected and prizes given.

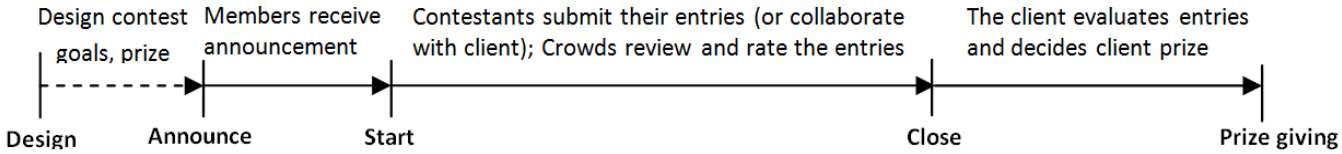

Figure 1. A Typical Crowdsourcing Contest

Crowdsourcing contests could be classified by task types and prize designs. Based on task types, Yang et al. (2010, 2011) divide contests into 13 categories including website building, translation, and logo design. Terwiesch and Yi (2008) classify crowdsourcing contests into expertise contests, ideation contests, and trial-and-error contests. For instance, programming contests are more expertise-based, so the winner might have the highest expertise. Prize design involves prize size (the amount of money), prize structure (the number of total prizes and the gaps between any two prizes), and rating mechanisms (whether the entries are rated by experts or crowd). According to Archak and Sundararajan (2009), in crowdsourcing contests, typical prizes vary from a million dollars for improving the performance of a movie recommender system (Bennett and Lanning, 2007) and thousands of dollars for minor pharmaceutical innovations (Lakhani and Panetta, 2007) to a few hundred dollars for designing a software component, and even to several dollars to name a product. Archak and Sundararajan (2009) and Morgan and Wang (2010) classify crowdsourcing contests as winner-take-all contests and multiple-prize contests. In addition, prize design also includes how to evaluate the contestants' performance. As indicated before, crowdsourcing sites use either expert-rated prizes or crowd-rated prizes. This study focuses on rating mechanisms and tests whether winner strategies are different under crowd-rated and expert-rated contests.

RESEARCH FRAMEWORK

Expert-rated Prizes and Crowd-rated Prizes

Because no prior studies have considered crowd-rated prizes, the relationship between winning a crowd-rated prize and an expert-rated prize is unclear. As explained above, however, the winners of the two types of prizes are generated in different ways. Therefore, it is reasonable to guess that the expert panel can give a more objective judgment on the quality of submissions, while crowds evaluate a submission based on their subjective feelings, which is more influenced by the popularity of the submission. Therefore, winners of expert-rated prizes and those of crowd-rated prizes are probably not the same contestants. Accordingly, we raise a null hypothesis:

Proposition 1: There is no correlation between winning an expert-rated prize and winning a crowd-rated prize in the same contests.

Prior studies on crowdsourcing contests have identified three categories of determinants for winning a prize: expertise, submission timing, and social capital.

Expertise

Expertise is context dependent, emerging from patterned interactions and practices in specific scenarios (Yang et al., 2010). A contestant's expertise is a critical determinant to win an expert-rated prize, either in a crowdsourcing contest or a traditional contest. A contestant could transfer her/his expertise to crowdsourcing site when s/he participates in some contests, and also could employ the expertise, which s/he has attained from crowdsourcing contests, in the offline scenarios. Expertise is usually measured by the past experience, skill, knowledge, and performance (Archak, 2010; Terwiesch and Xu, 2008**;** Yang et al., 2010, 2011).

Both modeling and empirical studies indicate that expertise variables are a good predictor for winning. Using the data drawn from Taskcn, Yang et al. (2010, 2011) find that the number of prior winnings has a very significant effect on the probability of winning in the current contest. Using the data drawn from Topcoder, Archak (2010) presents that those highly rated contestants, who obtain high performances in previous contests, move first in the registration phase to deter rivals. Doing so, they increase their winning probability and payoffs. Using a modeling approach, both Archak and Sundararajan (2009) and DiPalantino and Vojnovic (2009) find that contestants' skills are a critical indicator of their performance in crowdsourcing contests.

Therefore, contestants who won expert-rated contests before are more likely to win expert-rated contests in the future, and likewise contestants who won crowd-rated contests before are more likely to win crowd-rated prize in the future. However, as indicated in Proposition 1, the experts and the crowds may evaluate submissions in different ways, so past success with expert-rated contests may not predict the success in crowd-rated contests, and vice versa. Therefore, we anticipate:

Proposition 2a: Past winnings of expert-rated prizes are positively correlated to winning an expert-rated prize, but not a crowd-rated prize.

Proposition 2b: Past winnings of crowd-rated prizes are positively correlated to winning a crowd-rated prize, but not an expert-rated prize.

Submission Timing

All the contests have time retrictions. Contestants have to finish and submit their entries before the contest ends. Entry timing is very important for all contestants (DiPalantino and Vojnovic, 2009; Yang et al., 2010, 2011). Usually, a late entry in online auctions attracts a good deal of attention, and therefore many bidders just wait until "the last second." Yang et al. (2010, 2011) consider timing as a temporal strategy on crowdsourcing contests and they summarize three timing strategies, each having advantages and disadvantages. Timing variables usually include submission order and submission time (Yang et al., 2010, 2011).

Submission timing has been found to influence winning probability in the contests in which performance is rated by a panel. Yang, Adamic and Ackerman (2008) and Yang et al. (2010, 2011) indicate that winners are more likely to submit their solution late to increase their probability of winning. If collaboration between seeker and designer exists, some winners might prefer to submit their solution early to get more feedback from the seeker and thus to increase their winning chances (Yang et al., 2010). For crowd-rated contests, it is reasonable for contestants to submit their solution early to gain early recognition because popularity tends to build on itself. Thus, we put forward:

Proposition 3a: Early and late submissions are more likely to win an expert-rated prize than in-between submissions (U-Shaped).

Proposition 3b: Submission order is negatively correlated to winning a crowd-rated prize.

Social Capital

Few studies discuss the role of social capital in crowdsourcing contests. According to Peng and Zhang (2010), social capital in the crowdsourcing site could be defined as "the specific resources accumulated through the relationships among online participants" (p.1). Like attaining expertise, accumulation of social capital is also an intrinsic motivation for the participation in a crowdsourcing contest (Zheng et al., 2011). Participants may use crowdsourcing platforms to make more friends and interact with them by commenting on their submissions. Typically, social capital variables include the number of followers, following, and the comments-posted.

Social capital could increase the probability of winning a crowd-rated contest. Higher social capital could increase a contestant's self-marketing performance, leading to a higher probability of winning a crowd-rated prize. Using the data from Wikipedia, Nemoto, Gloor and Laubacher (2011) find the higher the social capital of editors, the sooner the articles edited by them will reach higher quality status such as featured articles. Like editors in Wikipedia, contestants in crowdsourcing contests could employ their social capital to market their entries to reach a high score, and thus to win a crowd-rated prize.

It is unclear whether social capital predicts the future success in winning an expert-rated contest. Although Mo, Zheng and Geng (2011) find that triadic structures in which a focal solver is embedded have significant effects on her or his chance of winning. It seems that higher social capital could increase an opportunity for knowledge exchange, which in turn could increase contestants' skills rapidly. However, Yang et al. (2008) observe that most users become inactive after only a few submissions, so it is difficult to attain knowledge from those inactive users. Moreover, knowledge sharing among members costs more time and effort than simply voting. Therefore, we think social capital may not predict probability of winning an expert-rated prize.

Accordingly, we raise the following propositions:

Proposition 4a: Social capital is not correlated to winning an expert-rated prize.

Proposition 4b: Social capital is positively correlated to winning a crowd-rated prize.

METHDOLOGY

Data Source

We collect contest data from Zooppa (www.Zooppa.com), which is a global social network of creative talents who help partner companies launch user-generated advertising campaigns. These ads can take various formats including video, print, banners, concepts, and radio. Zooppa was founded in Italy in 2007, and then launched in the U.S. in 2008. Its global headquarters is located in Seattle, Washington. Today Zooppa has over 109,000 members. Its clients include Google, Nike, Hershey's, General Mills, Microsoft, NBC Universal, Zinio, and Mini Cooper, among others. Figure 2 shows several crowdsourcing contests on Zooppa and Table 2 presents total submission number for each type of ad in Zooppa.

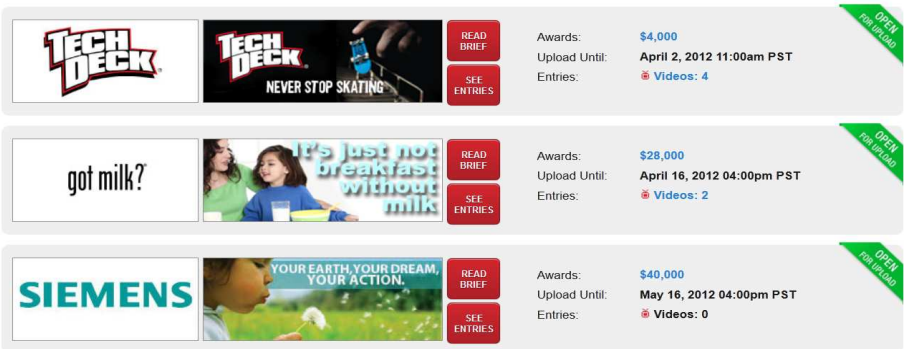

Figure 2. An Example of Crowdsourcing Contests from Zooppa

Ad Types	Entries	Inception
Video	4,954	11/12/07
Prints	10,706	10/12/07
Radio	80	12/11/07
Banner	548	04/29/08
Concept	1,145	12/11/07

Table 1. Submission Numbers for Each Type of Ad (as of Nov.18th, 2011)

From this website, we collect the following variables, some of which are normalized. For the expertise variables and timing strategies variables, we follow the definition given by Yang et al. (2010, 2011).

Type	Variable	Definition
Expertise	Past winnings - expert-rated prize	The number of a contestant's entries which won an expert-rated prize before
	Past winnings - crowd-rated prize	The number of past contests in which the contestant wins a crowd-rated prize
	Video submission experience	The number of video entries a contestant has submitted
	Non-video submission experience	The number of non-video entries (print, radio, etc.) a contestant has submitted
Social capital	Followers	The number of followers a contestant owns
	Following	The number of followings a contestant owns
	Comments-posted	The number of the comments posted by a contestant
	Membership	The membership status[2]: Novice (1), Intermediate (2), Junior (3), Senior (4)
Timing strategy	Submission time	The time when a solver submits the initial solution
	G_SubmitTime	Normalize submission time: (SubmitTime - StartTime)/Project Duration
	Submit Order	The number of existing entries at the time of submission (including the submission)
	G_ SubmitOrder	SubmitOrder/the total number of entries

Table 2. Variables and Their Definition

For our initial investigation, we collect entries of two contests, resulting in a total of 91 entries submitted by 81 unique contestants. Here, we will report preliminary results based on the data.

Sample Description

Both contests use both expert-rated prizes and crowd-rated prizes, resulting in a total 30 prizes. The two contests are chosen to mirror each other in industry, submission requirements, contest duration, target market, and length of specification. In this way, the task type and several other factors are controlled.

	Contest 1: Wholly Guacamole	Contest 2: Horizon
Industry	Food	Food
Ad type	Video	Video
Major requirements	• 90 seconds or less • Include a product shot	• 60 seconds or less • Contain product shots
Length of key rquirements (about contest, mission and requirement)	355 words	340 words
Starting date and closing date	June 2 - July 29, 2011	July 20 - September 12, 2011

[2] Zooppa uses the term "seniority" to show the membership status, which is calculated using a certain algorithm.

Contest duration	57 days	54 days
Total reward ($)	10,000	15,000
Total prize placements	16	14
Expert-rated prize (#, $)	8; $7,700	9; $14,000
Crowd-rated prize (#, $)	8; $2,300	5 ; $1,500
Entries submitted	46	45

Table 3. Basic Information about the Two Contests

Initial profiling suggests that the data do not display a normal distribution in either contest. Therefore, we prefer to use nonparametric tests to analyze our data.

	Contest 1		Contest 2	
Variables	Skewness	Kurtosis	Skewness	Kurtosis
Past winnings - expert-rated prize	2.189	4.173	3.503	13.215
Past winnings - crowd-rated prize	6.708	45.000	5.446	31.602
Video submission experience	2.803	8.449	4.406	23.297
Non-video submission experience	3.995	15.236	5.973	37.705
G_SubmitOrder	-.005	-1.198	-.042	-1.235
G_SubmitTime	-2.670	8.981	-1.546	1.305
Following	4.339	19.048	4.077	18.814
Follower	1.992	2.962	6.196	40.080
Comments-posted	4.183	19.041	6.638	44.592

Table 4. Data Distribution: Skewness and Kurtosis

PRELIMINARY FINDINGS

Due to a small sample size of 91 entries, we use correlation coefficients between winning and its determinants. Because our data display non-normal distribution and dependent variables are ranking numbers, we use Spearman's rho correlation, which is defined as the Pearson correlation coefficient between the ranked variables (Myers and Arnold, 2003) and is calculated as below:

$$\rho = \frac{\Sigma_i (x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\Sigma_i (x_i - \bar{x})^2 \Sigma_i (y_i - \bar{y})^2}} \quad (x_i \text{ and } y_i \text{ are ranking numbers}) \qquad \textbf{(1)}$$

First of all, we find winning expert-rated prizes and winning crowd-rated prizes are almost totally independent events because in both contests the Spearman's rho between winning an expert-rated prize and winning a crowd-rated prize is close to zero. The set of expert-rated winners and that of crowd-rated winners hardly intersect. Therefore, proposition 1 is supported. This result further indicates that findings derived from expert-rated contests may not apply to crowd-rated contests.

Variable group	Variable	Guacamole		Horizon	
		Winning an expert-rated prize	Winning a crowd-rated prize	Winning an expert-rated prize	Winning a crowd-rated prize
Focal variables	Winning an expert-rated prize	-	-.057	-	.006
	Winning a crowd-rated prize	-.057	-	.006	-
Expertise	Video submission experience	-.003	.109	.027	.081
	Non-video submission experience	-.208	.300**	.108	-.094
	Past winnings - expert-rated prize	.355**	.143	.077	.112
	Past winnings - crowd-rated prize	-.121	.594***	-.075	.447***
Timing	G_SubmitOrder	.076	-.218	-.259*	-.067
	G_SubmitTime	.108	-.197	-.194	-.064
Social capital	Membership	-.053	.421***	.252*	.249*
	Following	-.025	.318**	-.149	-.042
	Follower	.104	.513***	.207	.057
	Comments-posted	-.133	.337**	.071	-.003

*** denotes p <.01, ** denotes p <.05, * denotes p <.1.

Table 5. Spearman's rho

Expertise

Past winnings of expert-rated prizes have significantly positive correlation with winning an expert-rated prize in the first contest, while this correlation is not significant in the second contest. There is no significant relationship between past winnings of expert-rated prizes and winning a crowd-rated prize in either contest. Therefore, Proposition 2a is partially supported. Past winnings of crowd-rated prizes have significant and positive correlation with winning a crowd-rated prize in both contests. Moreover, the relationship between past winnings of crowd-rated prizes and winning an expert-rated prize is not significant. Therefore, Proposition 2b is supported.

Both contests show that past video submission experience has no significant correlation with winning either expert-rated or crowd-rated prizes. This finding is reasonable because some contestants may submit their entries just for fun or hobby, rather than for winning a prize. This further indicates that past video submission experience is not a good indicator of winning a prize. That is why Yang et al. (2010, 2011) do not consider past submission experience as a predictor of winning a prize. Non-video experience is found to have a positive correlation with winning a crowd-rated prize in one contest, but not in the other contest. The results above not only indicate that expertise is a good predictor of winning a prize, but also suggest that predictors of winning an expert-rated prize and winning a crowd-rated prize are different. Therefore, those results drawn from expert-rated contests may not be generalized to crowd-rated contests.

Submission Timing

Neither submission order nor submission time has a positive relation with winning expert-rated prizes or crowd-rated prizes at the 0.05 significance level, although submission order has negative correlation with winning an expert-rated prize in the second contest at the 0.1 significance level. This suggests that winning a prize may be either independent of submission timing or has a non-linear relationship with submission timing. To get a better idea, we use a figure to illustrate the relationship between winning probability and submission time. Interestingly, both contests indicate that the winners of expert-rated and crowd-rated prizes (bars in Figure 3), are mainly distributed at the two ends of submission time, evidently indicating a U-shaped distribution. Therefore, Proposition 3a is supported, while Proposition 3b is not supported.

This result of Proposition 3a is consistent with Yang et al. (2010, 2011), who find very early submissions and very late submissions have higher probability of winning an expert-rated prize than those in-between. At first, we may guess that only

those entries submitted very early have the highest chance of winning crowd-rated prizes because contestants have much more time to market their entries. However, those entries submitted relatively late also have a high chance of winning crowd-rated prizes. This finding seems surprising. One possible explanation is that many members may crowd at the end of the contest so that those late good submissions could attract many votes in a short time. Another possible explanation is that some members with a huge number of friends (followers or following) may also earn many votes quickly at the end of the contest.

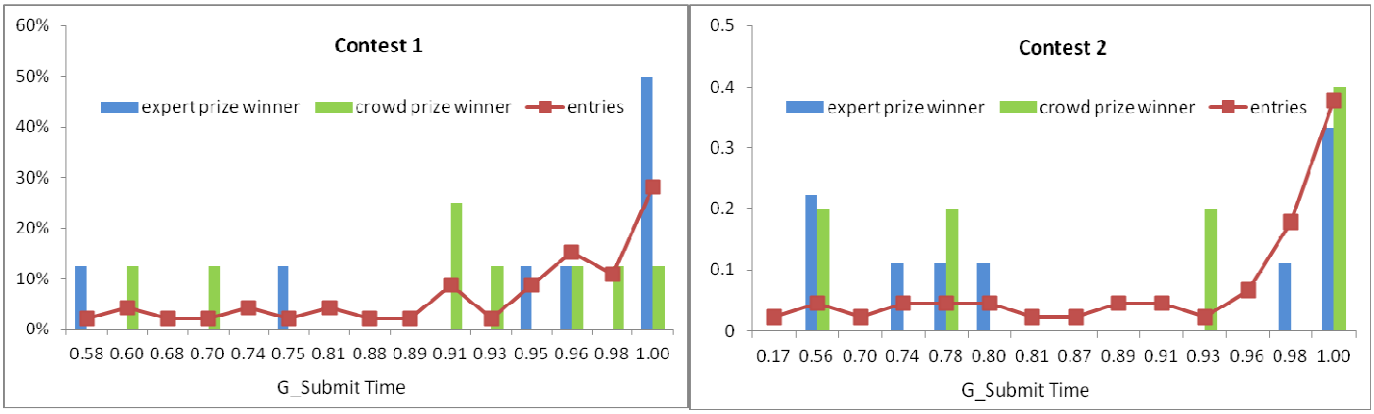

Figure 3. The Distribution of Winners and E along with Submission Time

Social Capital

None of four social capital variables is found to have a significant correlation with winning expert-rated prizes in the .05 level. This may indicate that contestants' social capital does not increase their expertise or quality of their submissions. Therefore, Proposition 4a is supported. All the social capital variables are found to positively correlate with winning crowd-rated prizes in contest 1, although only membership is significantly correlated with winning a crowd-rated prize in contest 2. Thus, Proposition 4b is partially supported.

These findings indicate that the influence of social capital on winning a crowd-rated prize may vary across contests. Comparing the means of the four social capital variables in the two contests, we find three of the four social capital variables are much higher in contest 1 than in contest 2 (see Table 6) and their correlations with winning a crowd-rated prize are also much higher in contest 1 than in contest 2. This result demonstrates that the magnitude (the absolute value) of social capital may moderate the relationship between contestants' social capital and winning crowd-rated prizes; that is, only when social capital reaches a high level, its influence on winning a crowd-rated prize is significant. Otherwise, social capital may not have much impact on a contestant's winning chance.

Variable	Contest 1: Mean (Std.)	Contest 2: Mean (Std.)	ANOVA Sig.	Mann-Whitney Test Sig.
Followers	19.15 (79.37)	2.42 (3.89)	.161	**.013**
Following	31.8 (101.2)	1.5 (4.86)	**.048**	**.081**
Comments	123 (681.1)	4.9 (12.9)	.252	.152
Membership	1.78 (1.05)	1.53 (.84)	.216	.270

Note: Std. denotes standard deviation.

Table 6. Social Capital Variables in Two Contests

Therefore, the relationship between social capital and promoting performance may be described using the following diagram.

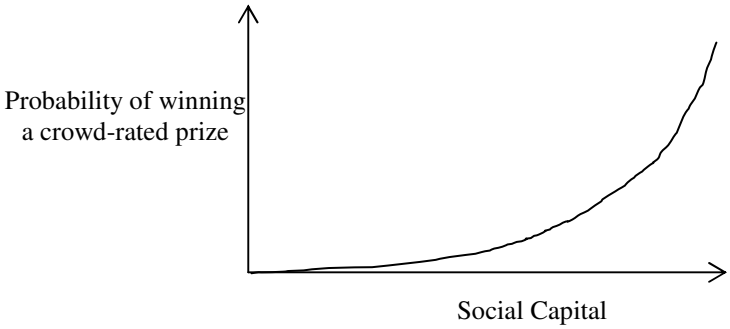

Figure 4. The Relationship between Social Capital and Winning a Crowd-rated Prize

Other Findings

After comparing the two contests above, we speculate that rating mechanisms (recall that task types have been controlled) moderate the association between winning determinants and winning probability for several reasons. First of all, the relationships of social capital variables with winning a crowd-rated prize are getting weaker from contest 1 to contest 2. Secondly, the past winnings in expert-rated contests have a weaker relationship with winning an expert-rated prize from contest 1 to contest 2. Thirdly, the past winnings in prior crowd-rated contests have a weaker relationship with winning a crowd-rated prize from contest 1 (.594) to contest 2 (.447).

In addition, we classify all contestants as three groups: inexperienced, low-experienced, and high-experienced. The inexperienced refers to those contestants without prior contest experience on this site; the low-experienced refers to those contestants with some contest experience but without winning an expert-rated prize; the high-experienced refers to those contestants who have won at least one expert-rated prize. We find that the distribution of contestants between the two contests is significantly different (p=.018). Compared to the first contest, the second one attracts more high-experienced and inexperienced contestants and less low-experienced contestants. Overall, the findings above demonstrate a moderation effect of prize design on the relationship between winning determinants and winning probability. Of course, such a moderation effect is required to test by a big sample in the future.

Contest	Inexperienced	Low-experienced	High-experienced	Grand Total
Contest 1	52%	35%	13%	100%
Contest 2	62%	11%	27%	100%

Table 7. Distribution of Contestants

CONCLUSIONS AND DISCUSSIONS

Our study is the first to compare winner determinants in expert-rated and crowd-rated contests. We identify three types of winner determinants: expertise, submission timing, and social capital. Our initial findings suggest that winning crowd-rated prizes and winning expert-rated prizes are almost independent events. In addition, all three types of winner determinants have a different relationship with winning a crowd-rated prize and winning an expert-rated prize. Therefore, findings derived from expert-rated contests may not apply to crowd-rated contests.

Past winnings experience, rather than past submission experience, is a good predictor of winning a prize. More specifically, past winnings in crowd-rated contests predict success in winning a future crowd-rated prize, while past winnings in expert-rated contests predict success in winning a future expert-rated prize. We also find a U-Shaped relationship between submission time and winning a prize, either an expert-rated prize or a crowd-rated prize. Social capital promotes the probability of winning a crowd-voting prize, only if social capital is accumulated to a great level. Our study is the first to test the influence of social capital on winning crowdsourcing contest. Moreover, we also explore the potential moderation effect of prize design on the relationship between winner determinants and winning a prize.

This study suffers from several limitations. As a preliminary investigation, we only select one crowdsourcing site to collect our data and our preliminary results are based on a small sample. Both may lead to biased results. Moreover, due to the small sample size, we fail to conduct a regression analysis. However, as an exploratory study, our research reveals several future research avenues. First of all, we could collect more data from this site or some other crowdsourcing sites to increase the robustness of our findings. Secondly, we identify the potential moderation effect of rating type on the relationship between winner determinants and winning a prize. Future research could test the moderation effect. Thirdly, some other characteristics of contests such as prize structure (e.g., winner-take-all prize vs. multiple prizes) should be considered in future research.

Finally, as the first study on crowd-rated contests, we anticipate that it is necessary to study how to design an effective rating system to promote popularity and quality at the same time. Although the crowd-rating mechanism can bring many values such as promoting viral marketing and saving rating cost, it sometimes may generate fake votes, leading to a low reliability and fairness in practice. For instance, Zooppa, where our preliminary data were collected, only used a crowd-rating system before 2009. Realizing the problem of this system, Zooppa, in October 2008, published an announcement "Let's go free with viral behaviors! No spamming." on its online community. However, it seems that this announcement did not work effectively, so Zooppa had to add expert-rated awards in the contests. Meanwhile, Zooppa members also realized this problem, so they published a poster "voting system needs adjusting". It is clear that crowdsourcing websites, seekers, and honest participants require a subjective rating system. Therefore, how to build a good crowd voting system is a challenge for practitioners and a research opportunity for academics.

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