

What Determines the Successfulness of a Crowdsourcing Campaign? A Study on Attributes of Crowdsourcing Campaigns

Completed Research

Hui Xu

Shanghai Maritime University
huixu@shmtu.edu.cn

Nannan Xi

University of Turku
nannan.xi@utu.fi

Yang Wu

Shanghai Maritime University
yangwu@shmtu.edu.cn

Juho Hamari

Tampere University
juho.hamari@tuni.fi

Abstract

Due to the advent of internet-based microlabour marketplaces, crowdsourcing (CS) has risen as a prominent way to match workers and employers. However, the successfulness of these crowdsourcing campaigns on the market depends upon what factors and their combinations are used by crowdsourcing platforms to stimulate user engagement. Therefore, this study investigates what factors of CS campaign profiles (gamification, transparency, and experience) and level of monetary compensation predict crowdsourcee participation and consequent campaign success. This study analyzes data from a popular Chinese crowdsourcing platform “Xiao Yuer” of 101 crowdsourcing tasks (including successful and unsuccessful crowdsourcing campaigns) by using Structural Equation Modelling (SEM) and fuzzy set Qualitative Comparative Analysis (fsQCA). The results of the SEM analysis show that gamification is positively associated with the popularity of the campaign and further successfulness of the campaign. Furthermore, the results of the more exploratory analysis (fsQCA) reveal that four combinations of the factors sufficiently explain crowdsourcing success.

Keywords

Crowdsourcing success, Gamified element, Monetary compensation, PLS-SEM, fsQCA.

Introduction

As means of open innovation, crowdsourcing has been widely employed by many organizations in different fields (Morschheuser et al. 2017), e.g. in product design, advertising, quality monitoring, and the solution of specific technical problems (Kleemann et al. 2008). For the sake of reducing cost (Morschheuser et al. 2016 & 2017), handling tasks (Morschheuser et al. 2017), improving company innovation systems (Jespersen 2018), acquiring and sharing knowledge (Ghezzi et al. 2018), 84% of the world’s prestigious companies including SAP, Dell, Google, General Electric, Fiat, LEGO, and Procter & Gamble, have started to use crowdsourcing platforms (Blohm et al. 2018). However, it is evident that not all crowdsourcing campaigns are successful (Brabham 2008). Due to a lack of better understanding of factors that determine the successfulness of crowdsourcing campaigns, many organizations and companies are facing challenges of using crowdsourcing to sustain their ventures (Kohler & Nickel 2017).

Existing research indicates that many factors influence the performance of crowdsourcing campaigns such as attributes of tasks (Morschheuser et al. 2017 & 2019; Kohler & Nickel 2017), public profile of crowdsourcees (Poetz & Schreier, 2012), and the management ability of the crowdsourcing platform (Kohler & Nickel 2017; Jespersen 2018). However, there is still a lack of discussion of factors that lead to successfulness of crowdsourcing from the standpoint of the crowdsourcee’s attributes (Pollok et al. 2019; Acar, 2018a & 2018b; Daniel et al. 2018; Coronado et al. 2014). More importantly, the extant studies draw only a very partial picture in the sense that the success of crowdsourcing can only be influenced by the

singular factor (Durward & Blohm 2018); whereas the combination of different factors deserves further discussion given that crowdsourcing platforms usually involve multiple factors. Thus, this study addresses the following research question: What factors and its combinations should crowdsourcers consider to ensure successful crowdsourcing? We investigate this problem via data collected from a well-known Chinese crowdsourcing website, and employ confirmatory (SEM-structural equation modeling) and exploratory (fsQCA-fuzzy set qualitative comparative analysis) analysis.

Literature Review and Research Model

Crowdsourcing Successfulness and Task Popularity

Generally, crowdsourcing (CS) refers to the practice of a company or organization to outsource tasks to non-specific (and often large) public volunteers who are recruited through the internet (Howe 2006; Brabham, 2010; Prpić et al. 2015; Zuchowski et al. 2016). Research indicates that attracting people to participate effectively is one of the most crucial factors that makes a crowdsourcing campaign successful (Blohm et al. 2018). The number of people signing up in a crowdsourcing task can represent its *popularity* (Morschheuser et al. 2017; Prpić et al. 2015), and it allows the crowdsourcers to have a higher quality crowdsourtees to choose from to carry out the task and consequently afford better changes of campaign success (Hossain 2012).

As the focal subject of conducting crowdsourcing campaigns, crowdsourcer is a very crucial part in the tripartite relationship of crowdsourcing (crowdsourcer, crowdsourtee, and task platform) (Zhao & Zhu 2014; Jain et al. 2017). First, from designing the task, publishing the task, and evaluating the task, crowdsourcers are the principal beneficiaries and also the primary responsible person (Zhao & Zhu 2014; Daniel et al. 2018). Therefore, the behaviors of crowdsourcers during the process of crowdsourcing will inevitably affect the popularity of the task, and thus affect the success of the crowdsourcing effort (Ghezzi et al. 2018). Second, the crowdsourcers' own attributes influence the task's popularity as crowdsourtees will consider the characteristics of the crowdsourcers when they select which task to participate in (Ye et al. 2015). Based on the above reasons, this paper analyzes how crowdsourcers attributes' displayed in the campaign site in addition to the offered amount of monetary compensation influence on the popularity of the task and the successfulness of a crowdsourcing campaign.

Monetary compensation and task popularity

As an extrinsic incentive, monetary compensation is one of the most common ways that is used to motivate crowdsourtees to participate (Acar 2018b; Wagner 2011) and contribute to the crowdsourcing campaign (Hamari 2013; Zhao & Zhu 2014; Morschheuser et al. 2017). The crowdsourcer's willingness to pay a higher amount also to some extent has an effect on the crowdsourtee's perceptions of fairness and job satisfaction (Durward & Blohm 2018), and may enhance the crowdsourtee's trust in the task itself (Ye & Kankanhalli 2017), which can result in higher levels of participation and higher task popularity. However, the positive impact of monetary compensation on crowdsourcing participation is controversial, with some studies suggesting that extrinsic rewards (such as monetary compensation) can potentially crowd out intrinsic motivation (Deci 1971; Urban et al. 1997), which makes the crowdsourtee's behavioral output less efficient (Hossain 2012). Therefore, many studies have pointed out that monetary compensation does not have a significant effect on participation in crowdsourcing (Alam & Campbell 2017), for example, when the task is complicated, the impact of monetary compensation is neutral (Sun et al. 2012). When a task is dealing with problems about nonprofit or educational issues, money incentive is deemed unnecessary (Estermann 2014), and when the amount of money offered is small, then monetary incentives may even have a negative effect on influencing crowdsourcing participation (Acar 2018b).

Transparency and task popularity

Most studies have pointed out that transparency can increase the crowdsourtee's trust in crowdsourcer (Toma 2014; Colquitt et al. 2012; Simcoe & Waguespack 2011), and reduce risk perception (Toma 2014; Colquitt et al. 2012), thereby facilitating crowdsourtees' potential for participation in the project. However, some studies indicate that the role of transparency in identity has two sides (Arora et al. 2016). transparency can enable the crowdsourtee to find commonality with the crowdsourcer, which in turn will make the crowdsourtee generate a good feeling towards the crowdsourcer and facilitate their cooperation and exchange (Larrimore et al. 2011). However, at the same time, it will raise crowdsourtee bias in their

judgments of crowdsourcees and their tasks, which will dissuade crowdsourcees from participating in tasks they do not like (Larrimore et al. 2011; Pollok et al. 2019). Some studies have indicated that the relationship between transparency and task popularity follows an inverted U shape (Pollok et al. 2019). An appropriate amount of transparency increases information symmetry, the crowdsourcee's perception of fairness, and promotes trust between the crowdsourcer and crowdsourcee (Pollok et al. 2019). However, over-disclosure will increase competition and reduce participation (Lüttgens et al. 2014). Thus, when looked at overall, the impact of transparency on the popularity of the task is not conclusive.

Gamification and task popularity

Gamification has been defined as a process of using gamified elements (motivational affordance) in a non-game context to invoke participants' gameful experiences and further behavioral outcomes (Hamari 2013; Huotari & Hamari 2017). In practice, gamification has become one of the most popular methods by which to motivate crowdsourcees to engage in a crowdsourcing campaign (Hamari et al. 2019; Hamari et al. 2017; Seaborn & Fels 2015). While as a matter of fact, gamification can also be used to motivate the crowdsourcer when used a way to show information about the crowdsourcer (Martinez 2017). In this context, the information can be used to prove the reliability of the crowdsourcer (Khazankin et al. 2012; Ye & Kankanhalli 2015). For example, badges, levels, and avatars can be used to prove whether a crowdsourcer has published more tasks, and finished the task more successfully, which may make them more reliable to potential crowdsourcees (Ye & Kankanhalli 2015), and thus the crowdsourcees will be more motivated to participate in the task. The information can also be used to convey interestingness (Hamari & Koivisto 2015). When the crowdsourcees see the badges or avatars that the crowdsourcers have, they can feel good about the crowdsourcers because of their interesting avatars or badges and thus participate in the task. As a result, the gamification mechanism which acts on the crowdsourcer will also motivate crowdsourcees to participate in tasks and increase the task popularity. However, some scholars have pointed out that there are also failures in gamification incentives (Hamari 2013; Raftopoulos 2014), in the case of low-goal commitments, gamification incentives are seen to be ineffective (Klein et al. 1999). Therefore, the effect of gamification on the popularity of a task is not conclusive.

Experience and task popularity

The impact of experience on people's decision-making behavior also has two sides (Görzen 2018). On the one hand, more experience means that the crowdsourcers have published more tasks, make more tasks finished successfully (Daniel et al. 2018), which can help to enhance the crowdsourcees' trust in the crowdsourcer, and influence their choice to participate in tasks that are published by crowdsourcers with more experience (Littlepage et al. 1997; Wilson et al. 1996). On the other hand, experience does not fully represent a person's ability (Enough & Mussweiler 2001). Research indicates the anchoring effect to be a robust factor in human decision making regardless of the experience of the decision maker (Görzen 2018), which means that even an experienced person may still make a wrong decision (Mussweiler 2000). When crowdsourcees are aware of that, the experience of crowdsourcers may not influence on the crowdsourcees' choice of participation.

From the above literature review of four factors, we can see that their influence is not consistent. The reason for this is mainly because existing research analysis examines the influence of these four factors independently, but in reality, incentives for task participation often use multiple factors simultaneously. Some studies have pointed out that gamification in combination with financial rewards can increase participation when compared to gamification alone (Deng et al. 2016; Morschheuser et al. 2017). Therefore, this paper will examine the above factors individually, and then consider the combination of them to affect the success of crowdsourcing. Given the above literature, we investigate the below research model (see Figure 1).

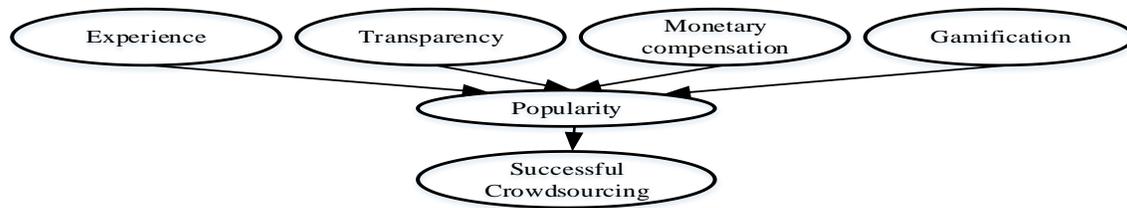


Figure 1. Research Model

Research Methods

Sampling and Data Collection

We employed data (N = 101, with 77 successful finished crowdsourcing campaigns and 24 unsuccessful finished crowdsourcing tasks) gathered from the crowdsourcing campaigns of the Xiao Yuer Crowdsourcing platform (<https://www.xiaoyuer.com/>) during the period from 1/2016 to 4/2018. This platform is a popular crowdsourcing platform in China that includes the four attributes of crowdsourcers under study. Gamified elements, monetary compensation, crowdsourcer's transparency, and crowdsourcer's experience.

Measurement

The data we collected from Xiao Yuer Crowdsourcing platform is second-hand data. Therefore, the types of data are numerical or dichotomous. Monetary compensation can be measured by the amount of money that the crowdsourcer pays for finishing the task (Acar 2018a, 2018b). Transparency can be measured by crowdsourcer authentication and autonomy (Zhang et al. 2017; Blohm et al. 2018). Gamification can be measured by badges, level, and avatar that the crowdsourcer has (Hamari et al. 2019). Experience can be measured by the numbers of tasks that crowdsourcer has done before (Daniel et al. 2018). Adapt to (Logue & Adolfo 1987), the popularity of the task can be measured by the numbers of qualify participants/registerers. Crowdsourcing successfulness is whether the task has been finished on time.

Data Analysis

This paper brings together PLS-SEM and fsQCA to analyze the successfully driven factors of crowdsourcing. The integration of the above two methods provides both precise information about the significance test of hypothetical paths, and also the complex causal structure of the configurations. The analysis follows two steps. First, developing the descriptive analysis, calculating numerical values, and, analyzing the effect of four factors (gamification, monetary compensation, transparency and experience) and the popularity of the campaign (qualify participants / registers). Second, matching the results to crowdsourcing successfulness by using two methods: a path analysis by using PLS-SEM and an analysis of the conjunctions of all logically possible combinations of conditions by adopting fsQCA (Eng & Woodside 2012). For the fsQCA, the study turns raw data responses into fuzzy-set responses. First, the study ignores all missed data and calculates constructs (variables) by multiplying their item scores. Then, in the study the values of each variable (except results matching 0 [unsuccessful finished campaign]) are recalibrated, 1 (successful finished campaign) considering the three thresholds (Woodside 2013): 5% (low agreement or fully outside the set), 50% (intermediate level of agreement, neither inside nor outside the set), and 95% (high agreement or fully in the set). Finally, necessary and sufficient condition tests evaluate the effect of the different variables on successful and unsuccessful crowdsourcing tasks. The fsQCA generates three possible solutions: complex, parsimonious, and intermediate.

Results

Descriptive Statistics and Correlations

Construct	Indicator	Mean	SD	1	2	3	4	5	6	7	8
Gamification	1.Avatar	0.16	0.367								
	2.Badge	1.53	1.404	.358**							
	3.Level	2.83	1.582	0.046	.356**						
Monetary	4.Payment	11600	16580	-	-0.104	.366**					
Transparency	5.Anonymity	0.58	0.495	0.091	.208*	.242*	0.17				
	6.Authentication	1.44	0.684	.320**	.265**	0.04	-0.04	0.038			
Experience	7.Finished	70	206	0.011	.331**	.621**	0.026	0.116	-0.112		
Popularity	8.Gualify/Registers	0.649	0.427	-	0.082	.437**	.220*	0.09	-	0.178	
Output	9.Successfulness	0.76	0.428	0.051	0.014	.310**	.218*	.237*	-0.019	0.013	.771**

** . Correlation is significant at the 0.01 level (2-tailed). * . Correlation is significant at the 0.05 level (2-tailed).

Table 1. Descriptive Statistics and Correlations Among Study Variables

Table 1 shows the results of the descriptive statistics and correlations for each of the observed variables of interest. The means and standard deviations are manifested in the first two columns. All the parameters of correlation greater than 0.2 are statistically significant. Level and Payment are significantly correlated with Popularity, and there is a significantly positive relationship between Popularity and Output.

Path Analysis (SEM)

The proposed model explained 59.4% of the variance in whether a campaign was successful or not, incorporating four predictors and one mediator. A bootstrap resampling method (5000 resamples) was used to determine the significance of path coefficients in the structural model. The standardized path coefficients, standard errors, 95% confidence interval, and p-values are shown in Table 2. Gamification increased the popularity of a campaign ($\beta=0.509$, $p<0.001$) which in turn enhanced the probability of the success of the crowdsourcing campaign ($\beta=0.771$, $p<0.001$). That indicates the existence of a mediated mechanism between gamified design and crowdsourcing results via popularity ($\beta=0.393$, $p<0.001$). However, Monetary compensation, Transparency, and Experience were not significantly related to Popularity ($p>0.05$), so we failed to find the support that the above three factors can contribute independently to campaign success. Therefore, it was necessary to carry out further investigations on the relation of a combination of these conditions to the success of a crowdsourcing campaign.

Path	Standardized Estimate	S.E.	95% C.I.	p
Direct Effect				
Gamification → Popularity	0.509	0.132	[0.283 , 0.728]	<0.001
Monetary compensation → Popularity	0.011	0.101	[-0.182 , 0.213]	0.916
Transparency → Popularity	0.038	0.131	[-0.261 , 0.223]	0.769
Experience → Popularity	-0.130	0.093	[-0.316 , 0.047]	0.163
Popularity → Output	0.771	0.056	[0.649 , 0.866]	<0.001
Indirect Effect				
Gamification → Popularity → Output	0.393	0.106	[0.209 , 0.576]	<0.001
Monetary compensation → Popularity → Output	0.008	0.078	[-0.14 , 0.166]	0.916
Transparency → Popularity → Output	0.030	0.101	[-0.197 , 0.179]	0.769
Experience → Popularity → Output	-0.100	0.073	[-0.249 , 0.036]	0.170

Output = successfulness of crowdsourcing

Table 2. Summary of Path-Analytic Model Results

Fuzzy-set Qualitative Comparative Analysis (fsQCA)

Based on the direct method of calibration described by Ragin (2008), all of the continuous measures were calibrated by using the 95th percentile value as a full membership, 5th percentile as full non-membership, and the 50th percentile value (i.e., median) as the crossover point. Table 3 presents the fsQCA analysis results according to the notation of Fiss (2011). Four configurations were consistently linked to the cases featured in the set of successfulness for crowdsourcing (consistency \geq 0.80). The first configuration (Solution 1a) combined the presence of Gamification and Transparency with the complementary condition of rich Experience and sufficiently led the crowdsourcing project to completion. Note that for this solution,

Monetary compensation is not a necessary condition. The second configuration (Solution 1b) indicates an interesting channel for project achievement in the presence of Gamification and Transparency, despite a lack of Monetary compensation. The third configuration (Solution 2) suggests that in the absence of Gamification and Experience, the publisher must pay the participants considerable amounts of money and exhibit plenty of private information to guarantee success. The latter two solutions (1b and 2) also show a clear trade-off relationship between Gamification and Monetary compensation. The final configuration (Solution 3) suggests that proper historical transaction records can offset a deficiency of payment amount and Gamification.

Configuration	Solution			
	1a	1b	2	3
Gamification	●	●	⊗	⊗
Monetary compensation		⊗	●	⊗
Transparency	●	●	●	
Experience	●		⊗	●
Raw coverage	0.312	0.226	0.177	0.193
Unique coverage	0.088	0.015	0.014	0.059
Consistency	0.897	0.832	0.840	0.870
Overall solution coverage: 0.422				
Overall solution consistency: 0.886				

● = core causal condition present; ⊗ = core causal condition absent; ● = periphery causal condition present; ⊗ = periphery complementary causal condition absent; Blank spaces = “don’t care.”

Table 3. Configurations for Success of Crowdsourcing Projects

Conclusions

Among the four attributes of crowdsourcees, only gamification the credentials provided by the gamification had a significant influence on the success of crowdsourcing by influencing the popularity of the task. Most studies on crowdsourcing and gamification focus on how gamification of the crowdsourcees tasks affect successfulness of crowdsourcing (Morschheuser et al. 2017), this study, however, focuses primarily on how gamification can be used to effect crowdsourcees, and therefore, the likelihood at which crowdsourcees would accept tasks. When crowdsourcees see that a crowdsourceer gets more badges, they are likely to perceive the crowdsourceer as more trustworthy or attractiveness and are likely to be more willing to participate in the task posted by the crowdsourceer (Hamari 2013; Hamari 2017; Ye & Kankanhalli 2015; Martinez 2017). Therefore, gamification can be seen as a way of transmitting information to people (Martinez 2017), and of enhancing the recipient’s perception of the information provider. In the context of our study, the Xiao Yuer crowdsourcing platform applies badges, level, and avatar as the gamification element to motivate crowdsourcees. Badges and avatar are designed in the form of adorable comics, which can attract crowdsourcees’ attention via interesting and fun cognitive perception (Prestopnik et al. 2017), thus enhancing their participation.

Except for gamification, the other three factors had no significant impact on the popularity or success of the task. As summarized in the literature review, these factors have inconsistent results relating to task popularity. From a methodological perspective, we collected the objective data from a crowdsourcing platform, and therefore the positive and negative effects of these factors tend to be more offset by each other (Eischeid et al. 1995). A high monetary reward can attract more participants (Sun et al. 2012; Acar 2018a; Liu et al. 2014), but also entails a more rigorous selection of qualified crowdsourcees and implies a more difficult task, which will hinder the participation of the crowdsourcees to a certain extent. Transparency and previous experience can increase trust in crowdsourcees, thus promoting crowdsourcees' participation in the task (Toma 2014; Colquitt et al. 2012), but it is very likely that when crowdsourcees are not rewarded with enough money, they will not care whether the crowdsourceer is openly identifiable and whether they have had more prior experience. Moreover, the effects of factors such as money, transparency, and experience are mutually affected, causing their singular effects to be weakened. In the data, it can be seen that the singular influence of monetary compensation, transparency, and experience on task popularity and crowdsourcing successfulness is weak.

In comparison to the above combinations, we can attribute the four factors as having three primary functions: competence attraction, fun attraction, and trust attraction. Monetary compensation mainly

rewards the crowdsourcer who is capable of completing the task (Hamari 2013; Straub et al. 2015; Morschheuser et al. 2017), so it evokes the crowdsourcers' competence consciousness, thereby attracting them to participate in the task. Gamification mainly plays a role in enhancing the perception of fun and trust among crowdsourcers (Martinez 2017; Prestopnik et al. 2017), thereby attracting them to participate in the task. Transparency and experience mainly play a role in evoking the trust perception of crowdsourcers, and then attracts crowdsourcers to participate in the task. The three functions can complement and compensate for each other in achieving success in a crowdsourcing task.

Future Research Directions and Limitations

Two aspects detract from the presented research. First, the total amount of data is relatively small, although fsQCA analysis is suited to small sample analysis, and the time span of data collection (2 years) has compensated for the small amount of data to a certain degree. Extending the volume of data would further increase the reliability of the conclusions reached in this paper. Therefore, in future research, data collection can be further increased from horizontal and vertical data perspectives. Second, this paper explores four attributes of crowdsourcers. However, the attributes of crowdsourcers are constantly expanding with the on-going development of crowdsourcing campaigns (Zhao & Zhu 2014). The specific measurement for these attributes may also be expanded (Daniel et al. 2018). For example, in addition to badges, levels, and avatar, a platform can also use points, role-play and other elements to measure gamification. Therefore, future research will further study the attributes of crowdsourcers, and the influence of these attributes across more crowdsourcing platforms, so that the research connotations and extensions of the factor determinates on crowdsourcing successfulness presented here can be enriched and expanded. Third, through the SEM, this paper analysis linear relationships among the variables, future study can also examine the non-linear impacts of crowdsourcer's attributes on the successfulness of crowdsourcing.

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