Configurational Path to Financing Performance of Crowdfunding Projects Using Fuzzy Set Qualitative Comparative Analysis

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Different from most of the existing studies, this paper analyzes the financing performance of crowdfunding projects in an asymmetric way. First of all, 14 antecedent conditions of the project performance are extracted through the review on the existing research. Secondly, a cross-tabulation analysis is carried out to explore the main and contrarian effects of the antecedent conditions based on the data obtained from the Chinese leading crowdfunding platform, JingDong Crowdfunding. In the following section, the qualitative comparative analysis process is conducted for the antecedent conditions, followed by the test on the predictive validity of the configurational models. Finally, the implications for both research and practice have been discussed. We find evidence that each antecedent condition exercises both main and contrarian effects on the financing performance. And the influence stemming from a single antecedent factor is confirmed to depend on the attribute combination it exists rather than remains stable. Furthermore, the number of progress updates and the number of history investments are the most important positive factors, while the financing goal and the minimum pledge amount are the most important negative ones. This study helps expand the crowdfunding performance research field by adopting the qualitative comparative analysis method on the one hand, while on the other hand, it provides a clearer understanding about the configurational impact on the financing performance from the asymmetrical perspective. The findings can help guide the development and operation of crowdfunding projects and platforms.

Keywords: *Asymmetric Analysis; Antecedent Condition Configuration; Crowdfunding; Financing Performance; fsQCA.*

Introduction

Crowdfunding, which stems from the conceptions such as micro-finance and crowdsourcing, aims to help entrepreneurs fund their enterprises by drawing on relatively small contributions from a large number of individuals via the internet. As a new kind of financing channel, crowdfunding (CF) possesses a series of merits compared with traditional financing methods; it has made a rapid development on a global scale since emergence. For the entrepreneurs planning to launch a new business or expand the operating business, financing problem is often inevitable. It is feasible to raise funds through this emerging financing channel. Once an entrepreneur launches a CF project on the CF platform, the founders will become the most concerned about the financing performance because the direct purpose of a CF project is to raise funds. Given the great significance that the CF performance possesses, scholars have worked hard to discover its influencing factors.

As the research on the determinants of CF performance rapidly increases, we are surprised to find that they often come to totally contradictory conclusions. First of all, the selections of influencing factors differ greatly from each other. For example, Zheng *et al.* (2014) claim that the financing goal, duration, social network ties, obligation and shared meaning can exert significant influence on the CF performance. Mollick, (2014) regards CF goal, duration,

project update and the number of Facebook fans as influencing factors of CF performance. Nevertheless, Cordova *et al.* (2015) believe that the performance of a CF project is closely related to the CF goal, duration and the number of investors. Secondly, scholars have different opinions about the impact of the determinants. For example, "CF goal" is considered to have both significantly positive (Huang *et al.*, 2015; Zheng *et al.*, 2015) and negative (Mollick, 2014) impact on the financing performance, and such problem also appears in the "social media fans number". Research done by Mollick (2014) and Zheng *et al.* (2014) shows that the number of social media fans affects the performance of the CF projects positively, while Liao *et al.* (2015) claim that the financing performance is negatively correlated with the number of the fans. These contradictions give rise to the central questions of our research: What effect do the influencing factors exactly have on CF performance? In what ways will the determinants impact the CF performance?

According to Xu *et al.* (2015), in addition to the different research backgrounds and perspectives, the limitations of symmetric analysis contribute greatly to the above-described problems. The existing research on the influencing factors of CF performance mostly adopt symmetric analysis such as multiple regression analysis (MRA) and structural equation model (SEM), which focus on the "net effect", while ignoring the asymmetry effects

between variables (Woodside, 2014). Woodside (2013) points out that focusing on "net effect" is often partial since there will almost always be cases counter to the observed "net effects" in the data. Therefore, it will be reasonable to take all the condition combinations into consideration and investigate the influencing mechanism of the determinants on CF performance in an asymmetry way, namely the qualitative comparative analysis (QCA) in this work.

We extract 14 antecedent conditions from the existing research, including preparation time, financing goal, updates number, images number, video length, fans number, staff number, initiated number, supported number, concerns number, praise number, topics number, investments number, minimum pledge and appoint over funding rate as the outcome of CF performance. The data set used in this study is the information of the successfully financed reward-based projects collected from a Chinese leading crowdfunding platform, JingDong Crowdfunding (JD Crowdfunding). According to the results of the cross-tabulation analysis, all the antecedent conditions have both the main and contrarian effects on the financing performance. Then, qualitative comparative analysis is conducted for the antecedent factors, obtaining 6 high performance configurations and 4 low performance configurations with strong predictive power.

The obtained configurations demonstrate that financing goal, updates number, supported number, and minimum pledge exert influence mainly on the financing performance, which is the most important, while others exercise both main and contrarian influences over the CF performance. The impact of each antecedent condition on the financing performance depends on the attribute combination it exists rather than remains stable. Every factor configuration affects the outcome as a whole, which indicates that the adjustment of one single factor does not necessarily improve the financing performance. In addition, the models for high and low financing performance are not simply mirror opposites of each other.

Literature Review

With the rapid development of the CF industry, financing performance has attracted the increasing attention. Researchers have conducted many studies of CF performance and made a lot of achievements. The literature about influencing factors of CF performance can be divided into two groups: research on determinants of the CF performance and research on determinants of the investor behavior. Table 1 summarizes the studies that investigate the determinants of the CF performance and the investor behavior.

Table 1

Summary of Research on Influencing Factors of CF Performance

Research focuses	Authors	Project types	CF platforms	Main Conclusions
Determinants of the CF performance	Mollick, 2014	Reward-based	Kickstarter	Personal networks, underlying project quality and geography are significantly associated with the successful fundraising.
	Colombo *et al.*, 2015	Reward-based	Kickstarter	Proponents' internal social capital inside the CF community will exert positive influence on the CF performance.
	Pitschner & Pitschner-Finn, 2014	Reward-based	Kickstarter	Non-profit projects are significantly more likely to reach funding goals and receive more average investment per provider.
	Meer, 2014	Donation-based	Donorschoose	The increased price of donation will lower the CF performance.
	Lin *et al.*, 2013	P2P	Prosper	Deeper friendships are associated with higher success funding probabilities, lower interest and ex post default rates.
	Huang *et al.*, 2015	Reward-based	ZhongchouNet	Service and image value affect the success of projects significantly.
	Liao *et al.*, 2015	Reward-based	ZhongchouNet	The proponent's external social capital is closely related to the success of a campaign.
	Zheng *et al.*, 2015	Equity-based	Dajiatou	Project updates, project valuation, staff number and stakeholder number are significantly predictors for the CF success.
	Zheng *et al.*, 2014	Reward-based	Demohour and Kickstarter	Social network ties, obligations and the shared meaning of the CF project significantly affect the CF performance
Determinants of the investor behavior	Allison *et al.*, 2015	P2P	Kiva	Project narratives highlighting different opportunities will lead to different lender reactions.
	Zhang & Liu, 2012	P2P	Prosper	There are rational herding effects among lenders on the P2P platform.
	Allison *et al.*, 2013	P2P	Kiva	The characteristics of entrepreneurial narratives have a significant effect on the investment behavior.
	Burtch *et al.*, 2014	P2P	Kiva	Lenders prefer culturally similar and geographically proximate borrowers.
	Agrawal *et al.*, 2014	Reward-based	Sellaband	Geography distance will still affect the investors' behavior significantly in the CF context
	Moss *et al.*, 2015	P2P	Kiva	The project narrative will signal valuable characteristics and behavioral intentions.
	Burtch *et al.*, 2013	-	-	The amount and timing of prior contributions will influence the behavior of the following crowdfunders.
	Burtch *et al.*, 2015	-	-	Reducing privacy controls will increase the investing willingness and decreasing the average contribution.

Determinants of the CF Performance

In the literature investigating the direct determinants of the CF performance, empirical evidences shows that, in general, the social network relationships possessed by the sponsor can be directly associated with the financing performance of the campaign. Based on the study on the underlying dynamics among CF projects where the project data have been employed on the Kickstarter, personal networks are significantly associated with the successful fundraising (Mollick, 2014). Similarly, the research carried out by Zheng *et al.* (2014) shows a close relationship between an entrepreneur's social network ties and CF performance. Moreover, the proponent's social capital inside the CF community, which comes from social network ties,

has been verified to be closely related to the CF performance (Colombo *et al.,* 2015; Liao *et al.,* 2015). Furthermore, in a study focusing on P2P projects, closer social network friendships are confirmed to be associated with higher success funding probabilities (Lin *et al.,* 2013).

Economic purpose of a CF project has also been proved to be a key determinant of financing performance. In a study investigating the relative funding performance of for-profit and non-profit campaigns, Pitschner & Pitschner-Finn (2014) find that, in contrast to the for-profit projects, non-profit ones are significantly more likely to reach funding goals and receive more average investment per provider; meanwhile, it will attract fewer funding providers and lower total funding amounts. This indicates the economic purpose of the project will exert influences on the performance.

In addition, other studies have also indicated that the service and image value in reward-based CF (Huang *et al.,* 2015), staff number, stakeholder number in equity-based CF (Zheng *et al.,* 2015) and the donating price in donation-based CF (Meer, 2014) are all closely related with the CF performance.

Determinants of the Investor Behavior

Except for the direct research on the CF performance mentioned above, a substantial number of empirical studies focus on the investigation on the determinants of the investor behavior.

First of all, researchers find that the project narratives affect the investor behavior to a great degree. In the context of microlending, narratives higher in language indicating blame and present concern will lead to more rapid investment behaviors, while narratives higher in accomplishment, tenacity and variety lead to slower investment behaviors (Allison *et al.,* 2013). In another study, lenders are proved to respond positively to narratives highlighting the venture as an opportunity to help others, and less positively when the narrative is framed as a business opportunity (Allison *et al.,* 2015). Furthermore, the study conducted by Moss *et al.* (2015) verifies the signaling

function of the narratives to the investment decisions of microlenders.

Secondly, the geographic factors are also confirmed to have direct influence on the investor behavior. Research carried out by Burtch *et al.* (2014) reveals the dual roles of geographic distance on lenders' decisions about which borrowers to support. The authors declare that lenders prefer culturally similar and geographically proximate borrowers. As Agrawal *et al.* (2014) believe, although the online CF seems to diminish the distance-sensitive frictions of traditional financing channels, it does not eliminate them all.

Finally, herding effect is proved to exist in the process of project development, which plays an important role in affecting the investor behavior. Two research conducted by Burtch *et al.* (2013, 2015) state that both the amount and timing of prior contribution and privacy control mechanisms can influence the funding behavior of the following investor. Similarly, Zhang & Liu (2012) verify the existence of rational herding among lenders.

As described above, great progress has been made in the research on the influencing factors of the CF performance. Meanwhile, it can be noticed that nearly all of them adopt the symmetric analysis method like MRA, which purses the "net effect" between the antecedent conditions and outcomes and can be easily misled by the imperfect data (Woodside, 2013). In order to overcome this defect, we use the asymmetric analytical method to investigate the influencing mechanism of the determinants on the CF performance.

Methodology

Configuration Model of the Financing Performance

In order to eliminate the one-sidedness of previous studies and more fully explore the determinants, 14 constructs have been extracted as antecedent conditions from the existing research and appoint over funding rate as the outcome of CF performance. The description information of the constructs is shown in Table 2.

Table 2

Measures and Scales

Construct	Code	Explanation	Source
Preparation time	pre	Duration from the initial idea to the CF project	(Zheng *et al.*, 2015)
Financing goal	goa	Requested amount of investment	(Ahlers *et al.*, 2015; Belleflamme *et al.*, 2014; Colombo *et al.*, 2015)
Updates number	upd	The number of updates of the project progress	(Balboni *et al.*, 2014; Cordova *et al.*, 2015; Mollick, 2014)
Images number	img	The number of description images of the project	(Colombo *et al.*, 2015)
Video length	vid	The length of description video of the project	(Colombo *et al.*, 2015; Cordova *et al.*, 2015; Mollick, 2014)
Fans number	fan	The number of the sponsor's social media fans	(Cordova *et al.*, 2015; Mollick, 2014; Zheng *et al.*, 2014)
Staff number	sta	The number of the sponsor staff	(Huang *et al.*, 2015)
Initiated number	ini	The number of projects that the sponsor has initiated	(Huang *et al.*, 2015)
Supported number	sup	The number of projects that the sponsor has invested	(Zheng *et al.*, 2014)
Concerns number	con	The number of people that clicks the concern button	(Cordova *et al.*, 2015; Huang *et al.*, 2015)
Praise number	pra	The number of people that clicks the like button	(Huang *et al.*, 2015)
Topics number	top	The number of topics written by people	(Cordova *et al.*, 2015; Mollick, 2014)
Investments number	inv	The number of funders that have invested	(Ahlers *et al.*, 2015; Belleflamme *et al.*, 2014; Cordova *et al.*, 2015)
Minimum pledge	min	The minimum amount of investment	(Huang *et al.*, 2015)
Over funding rate	perf	The ratio of financing amount exceeds the goal	(Cordova *et al.*, 2015; Zheng *et al.*, 2014)

We posit a configuration model of project financing performance adapted from the research made by Xu *et al.* (2015), with proper changes to tailor it to the research context of this article, as shown in Figure 1. As we can see from Figure 1, the configuration model consists of 14 antecedent conditions, each of which possesses two possible scores, namely high or low. Therefore, the 14 antecedent

conditions will compose $2^{14}=16384$ kinds of complex recipes, namely configuration models, for high or low value of CF performance. Furthermore, we will explore which configurations are sufficient conditions to cause high or low financing performance of CF projects.
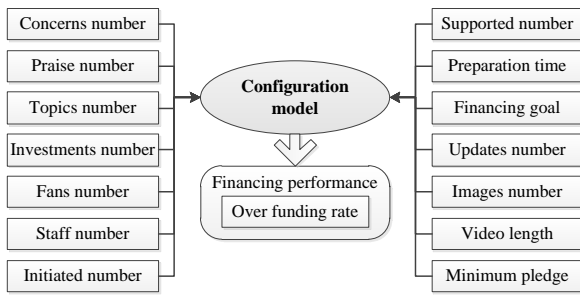
Figure 1. Configuration Model of CF Performance

Data Collection

1. Research object

As an important part of the world CF markets, Chinese CF industry grows rapidly despite of the late appearance. JD Crowdfunding, officially launched on July 1, 2014, has been ranked in the leading position of Chinese CF market, relying on its powerful electronic business platform JD.COM. Therefore, it can fully represent the Chinese CF market. In addition, we believe that a qualified CF project should achieve its financing goal. Moreover, as the fastest growing and most important mode, reward-based CF is the closest to CF's nature (Lehner, 2012) and the most representative on JD Crowdfunding platform. Therefore, this study designates the successfully financed reward-based CF projects on JD platform as the research object.

2. Data acquisition and pre-processing

The data sample employed in this article consists of modeling sample and verifying sample. On November 23, 2015, we collected the information of 406 successful financing projects on JD Crowdfunding platform with the Web crawler software GooSeeker and pretreated the raw data as follows: removed 13 projects of house purchasing type, 22 projects of public good type, 2 projects with the financing goal of 1 yuan, 2 projects with missing information and 3 projects with extremely high goal completion rate. The modeling sample is composed of the remaining 364 valid projects. In addition, the information of updated successfully financed projects was collected on

January 3, 2016. After the pretreatment, 107 valid items were preserved, constituting the verifying sample. In the two research samples, intelligent hardware related projects account for about 60 percent, health 15 percent, culture 15 percent, and public welfare 10 percent. The summary statistics for these data are presented in Table 3, from which it can be seen that the over funding rate ranges from 0.08 to 6604.61 percent. The major part of projects over fulfilled the target by less than 90 percent. The shortest preparation time of the observed CF projects is one month, and longest 73 months, with the average of about 10 months. Over half projects have a preparation time of 10 months. The minimum financing goal is 100 yuan, while the maximum being ten million. Goals of about 60 percent projects are between 10,000 and 100,000 yuan. As to the update number, some projects have never updated the progress information, with the only project fulfilling it for 18 times during its financing time. Projects with 1 to 5 times of updates are the most common ones, accounting for about 60 percent of the total. In terms of the personal information of the sponsor, the smallest fans number of Weibo, one of the most popular social media platforms in China, is zero, and the largest is 4,333,185. Most sponsors have Weibo fans fewer than 100. Nearly 75 percent sponsors have never invested in other projects and launched only one. Next comes the dynamic information of the CF projects. Concern number of the samples ranges from 12 to 40,000, praise numbers 36 to 150,000, topics numbers zero to 5576 and investments numbers 14 to 409,249. Most projects have obtained 100 to 1000 concerns, 50 to 2000 praises, triggered fewer than 500 topics and attracted 100 to 3000 investors. The minimum investment scale ranges from 1 to 799 yuan, with 1 to 10 yuan being the most frequent. From Table 3, it can be seen that the values of all constructs in the two samples are almost indistinguishable and consistent with each other. Furthermore, the results of homogeneity of variance test and T test confirm the variances homogeneity, which further proves the equality of the two populations.

Table 3

Description Statistics of Sample Projects

Construct	Modeling sample				Verifying sample			
	Min	Max	Mean	SD	Min	Max	Mean	SD
Preparation time (months)	1	73	10.92	7.55	1	68	9.17	5.81
Financing goal (yuan)	100	10000000	242891.69	958534.84	500	8000000	261185.70	1188583.20
Updates number	0	18	2.04	2.79	0	16	1.87	3.06
Images number	1	51	10.54	8.47	2	47	11.05	9.66
Video length (seconds)	0	594	64.67	94.41	0	588	59.92	119.90
Fans number	0	4333185	62762.43	308088.37	0	3466548	58209.94	329654.56
Staff number	1	200	7	14.08	1	180	5.32	11.26
Initiated number	1	20	1.51	1.97	1	30	1.83	1.48
Supported number	0	38	1.09	3.26	0	43	0.76	4.21
Concerns number	15	30000	1645.32	4405.46	12	40000	1727.59	4229.24
Praise number	36	120000	3950.05	12040.98	41	150000	4937.56	10836.88
Topics number	0	5576	286.6	698.54	1	4460	341.05	705.53
Investments number	19	359592	5026.86	21403.9	14	409249	5177.67	27396.99
Minimum pledge (yuan)	1	799	9.41	61.01	1	599	8.94	56.74
Over funding rate (%)	0.11	6604.61	398.07	829.57	0.08	4755.32	465.74	746.61
Observations			364				107	

Cross-Tabulation Analysis

Cross-tabulation analysis refers to jointly describing the antecedent condition and outcome in a cross-tabulation, so that the main and contrarian effects between the two types of variables can be explored.

Table 4, the schematic diagram of cross-tabulation, can be divided into four quadrants based on the low or high values of antecedent condition and outcome.

Table 4

Schematic Diagram of Cross-Tabulation

		Outcome	
		Low	**High**
Antecedent	Low	Quadrant 1	Quadrant 2
condition	High	Quadrant 4	Quadrant 3

Quadrant 1: Low values of antecedent condition leads to low values of the outcome.

Quadrant 2: Low values of antecedent condition leads to high values of the outcome.

Quadrant 3: High values of antecedent condition leads to high values of the outcome.

Quadrant 4: High values of antecedent condition leads to low values of the outcome.

The antecedent condition has main effects on the outcome for the cases in quadrant 1 and 3, but negative contrarian effects in quadrant 2 and positive contrarian effects in quadrant 4 (Wu *et al.*, 2014; Xu *et al.*, 2015). The process of cross-tabulation is conducted through SPSS.

Qualitative Comparative Analysis

According to Woodside (2013), in case of existence of symmetric relations between the independent variable X and the dependent variable Y, then high values of X indicate high values of Y while low values of X indicate low values of Y. Nevertheless, the asymmetric relations indicate that Y scores are both low and high whether the scores of X are low or high. Symmetric analysis mainly explores the degree of symmetric relationship, while asymmetric methods consider both symmetry and asymmetry presented by the variables. Since there will always be cases counter to the observed "net effect" in reality, the conclusions from symmetric analysis are certain to be partial (Xu *et al.*, 2015) and less informative (Woodside, 2013). As an asymmetry analysis method, QCA can not only fully consider the relationship between the variables, but also reduce limitations that symmetric methods impose on the data set (Ragin, 2006; Woodside, 2013). Therefore, in this study, we discuss the influencing mechanism of antecedent conditions on the financing performance with the employment of QCA.

The main purpose of QCA, first proposed by Ragin (1987), is to describe the influence of the attribute combinations on a specific outcome in a concise logical way (Ragin, 2008). Regarding QCA, Boolean algebra has been used to examine the sufficient or necessary conditions that antecedent condition combinations act as, instead of focusing on each separate condition (Fiss, 2011). More than an alternative to the quantitative analysis, QCA has a different analytical logic and understanding about the causality from the quantitative analysis, which thus assumes that the causality between the antecedent conditions and the outcome is complex and substitutable. Therefore, researchers are concerned with multiple conjectural causes

of social phenomena, which means the effect of a condition on the outcome depends on other conditions and the same result may be caused by several different concurrency causes (Ragin, 2000). Compared with the traditional quantitative analysis, QCA possess a series of merits; however, it also has certain limitations. For example, this method cannot effectively deal with time series data and panel data, and its prerequisites and multiple conjectural causes, are not always met.

According to Ragin (2008), the original data need to be calibrated before the Boolean operation. That is to say, we need to convert the original score-based dataset to fuzzy-set membership values. In this study, the original data are calibrated in two steps, namely the nondimensionalization and membership calculation.

As we can see from Table 3, the values of different constructs vary widely in the original data set. To eliminate the influence of different dimensions on the analysis results, we adopt Equation (1), which was once used by Liao *et al.* (2015) to nondimensionalize the original values.

$$x'_{ij} = \ln(x_{ij} + 1) \text{ for i=1, 2, } \cdots \text{, m; } \text{j=1, 2, } \cdots \text{, n} \qquad (1)$$

In Equation (1), x_{ij} stands for the original value of the ith antecedent factor of the jth case; m and n stands for the total number of antecedent factors and cases respectively; x'_{ij} represents the nondimensionalized value of x_{ij}.

This article adopts continuous fuzzy sets and assigns continuous memberships between 0 (full non-membership) and 1 (full membership). The research on CF is still in its infancy (Schwienbacher & Larralde, 2010), for which the substantive and theoretical knowledge base that an ideal calibration of degree of membership needs (Ragin, 2000) does not exist. Therefore, we take the ratio of case value to the highest value of a construct as the degree of membership in the set of high performance, as shown in Equation (2).

$$x''_{kj} = \frac{x'_{kj}}{\max x'_{kj}} \text{ for j=1, 2, } \cdots \text{, n} \qquad (2)$$

In Equation (2), x''_{kj} stands for the calibrated value of the kth antecedent factor, in other words, the degree of membership in the set of high performance of the kth indicator.

The fuzzy set qualitative comparative analysis process in this study was implemented using the fsQCA software developed by Ragin & Davey (2014). During the operation of the software, cutoff values of three parameters need to be specified, namely membership score of the causal set in the outcome set, frequency number and consistency. Fuzzy sets permit membership scores in the interval between 0 and 1. A membership score close to 1 indicates strong but not quite full membership; scores less than 0.5 indicate weak membership "in" the set (Ragin *et al.*, 2010). Therefore, 0.5 is an important threshold to assess whether a case is more "in" or "out" of a set (Ragin, 2008), and it is reasonable to select 0.5 as the membership cutoff (Hsiao *et al.*, 2016). Ragin (2007) claims that a relative small value (*e.g.*, 1) should be set as the frequency cutoff in case of small number of cases (*e.g.*, less than 100 cases), while a higher frequency threshold (*e.g.*, 5 or higher) should be established when the number of cases is large (*e.g.*, hundreds of cases). Considering the number of projects in our research, 364 in the modeling sample and 107 in the verifying sample, we set

5 as the frequency cutoff. According to Ragin (2009), the cutoff value of consistency should not be less than 0.75, with 0.80 being generally recommended. For this reason, 0.80 is set as the consistency cutoff.

Ragin *et al.* (2010) state there are two kinds of fuzzy-set algorithms, namely the "inclusion" algorithm and the "truth table" algorithm. The "inclusion" algorithm is currently blocked and being overhauled to make it more robust. The "truth table" algorithm, which is used in this work, has proven to be more robust and is the preferred approach. In addition, Ragin (2007) points out that log-transforming the variables, which we have conducted in this work, is an effective way to guarantee the robustness of a model. Therefore, it is reasonable to believe that the fsQCA approach in our research is robust.

Results

Since all the correlation coefficients are below 0.7 in the correlation analysis results for all the antecedent factors and the outcome, space lacks for a detailed description, which shows that the constructs are mutual independent and sustains asymmetric relationships between the antecedent conditions and the outcome (Woodside, 2013).

Table 5 shows the cross-tabulation results of 14 kinds of antecedent conditions and the outcome. The Cramer's V measures indicate strong effects of goa, upd, sup, min, medium effect of fan, ini, con, pra, top, inv and weak effect of other 4 antecedent conditions on perf. In addition to the main effects, negative and positive contrarian cases occur in all crosses of the antecedent conditions and the outcome.

Table 5

Cross-Tabulation Results of the Antecedent Conditions and the Outcome

No.	Antecedent condition	Main effect cases number	Positive contrarian effect cases number	Negative contrarian effect cases number	Cramer's V
1	pre	79	49	50	0.217
2	goa	156	17	23	0.509
3	upd	164	26	15	0.513
4	img	67	106	21	0.212
5	vid	81	68	39	0.255
6	fan	106	18	41	0.328
7	sta	89	26	89	0.213
8	ini	98	49	32	0.316
9	sup	143	11	25	0.463
10	con	119	24	41	0.356
11	pra	121	52	23	0.326
12	top	113	57	39	0.375
13	inv	107	42	64	0.349
14	min	147	29	15	0.493

Configurations for Financing Performance

1. Configurations for high CF performance

Table 6 shows the antecedent configurations for high CF financing performance. Here, 0.8 was given as the consistency cutoff, and the lowest actual value above 0.8 is 0.862. It can be seen that the solution consistency value is 0.832 > 0.75, which indicates that the antecedent factor combinations meet the requirement of sufficient-

conditionality of the outcome (Ragin, 2006). Since all the consistency values exceed 0.8, we assert that these configurations act as sufficient conditions leading to high financing performance (Xu *et al.*, 2015). In addition, it can be illustrated from the high values of raw coverage and solution coverage that, the 6 models explain the high CF financing performance in a large proportion.

Table 6

Configurations for high CF Financing Performance

No.	Model	Raw coverage	Unique coverage	Consistency
1	pre*~goa*upd*fan*~sta*ini*sup*con*pra*top*inv*~min	0.567	0.012	0.869
2	~pre*~goa*upd*~img*fan*sta*ini*sup*~con*~pra*~top*~inv*~min	0.471	0.015	0.867
3	~goa*upd*img*~vid*fan*sta*~ini*sup*~con*~pra*~top*~inv*~min	0.465	0.007	0.853
4	pre*~goa*upd*img*~vid*fan*~sta*ini*sup*con*pra*inv*~min	0.476	0.001	0.865
5	pre*~goa*upd*img*vid*sta*ini*sup*con*pra*top*inv*~min	0.262	0.016	0.893
6	pre*~goa*img*vid*~fan*~sta*ini*sup*con*pra*top*inv*~min	0.271	0.025	0.899

Solution coverage: 0.689
Solution consistency: 0.832
Frequency cutoff: 5.00；Consistency cutoff: 0.862

Antecedent contributions ~goa (negation of financing goal) together with sup (supported number) and ~min (negation of minimum pledge) are contained in all of the configurations, which proves their being the most important causes of high financing performance.

Antecedent factors upd (updates number) and ini (initiated number), contained in 5 of 6 configurations, are also very important in bringing about the high financing performance. However, ~ini (negation of initiated number) appears in model 3, verifying the contrarian cases to the main effect of the initiated number.

Antecedent conditions pre (preparation time), img (images number), fan (fans number), con (concerns number), inv (investments number), pra (praise number), vid (video length), top (topics number), sta (staff number) and their negations are contained in all the configurations. It is reasonable to believe that in addition to main effects, these conditions also have contrarian effects on high CF performance.

Furthermore, 4 theoretically existing antecedent factors goa (financing goal), ~upd (updates number), ~sup (negation of support number) and min (minimum pledge) are not

actually introduced into the configurations, certifying that they exert almost no positive impact on the high CF performance.

2. Configurations for low CF performance

Table 7 shows the antecedent configurations for low CF financing performance. It can be seen that the solution consistency value is 0.861 > 0.75, revealing that the antecedent factor combinations meet the requirement of sufficient-conditionality of low financing performance. All the consistency values of the configurations are higher than 0.8, which manifests that these antecedent condition combinations are sufficient conditions of low financing performance. High values of raw coverage and solution coverage show that the configurations can explain the low financing performance in a large proportion.

Antecedent contributions goa (financing goal), ~upd (negation of updates number), ~ini (negation of initiated number), ~sup (negation of supported number) and min (minimum pledge) are contained in all of the configurations. Hence, we are sure that these 5 attributes

contribute the most to the low financing performance.

Antecedent factors sta (staff number) is contained in 3 of 4 models, indicating that it is a very important cause of low CF performance. However, ~sta (negation of staff number) arises in model 3, which means the team size of the sponsor makes both main and contrarian impacts on the low financing performance. In addition, pre (preparation time), img (images number), vid (video length), con (concerns number), fan (fans number), pra (praise number), top (topics number), and inv (investments number) will exercise the same influence.

There are also theoreticall existing antecedent factors which are not actually contained in the configurations, such as ~goa (negation of financing goal), upd (updates number), vid (video length), ini (initiated number), sup (supported number), ~min (minimum pledge). It can be concluded that they can hardly contribute to the low performance of CF projects.

Table 7

Configurations for Low CF Financing Performance

No.	Model	Raw coverage	Unique coverage	Consistency
1	pre*goa*~upd*~fan*sta*~ini*~sup*con*pra*top*inv*min	0.561	0.048	0.859
2	~pre*goa*~upd*~img*fan*~sta*~ini*~sup*~con*~pra*~top*~inv*min	0.507	0.023	0.933
3	goa*~upd*img*~vid*~fan*sta*~ini*~sup*~con*~pra*~top*~inv*min	0.508	0.014	0.931
4	pre*goa*~upd*img*~vid*~fan*sta*~ini*~sup*con*pra*inv*min	0.498	0.003	0.907

Solution coverage: 0.671
Solution consistency: 0.861
Frequency cutoff: 5.00；Consistency cutoff: 0.843

Predictive Validity Test

In order to ensure the predictive abilities of the configurations, Xu *et al.* (2015) divide the data set into a modeling sample and a holdout sample. The data of modeling sample were analyzed using QCA, and the predictive validities were tested by calculating the consistency and coverage for the configurational models tested with the holdout sample. Here, this method is adopted to test the predictive abilities of the configurational models, with the consistency and coverage shown in column 3-4 of Table 8. As we can see from the test results, the models tested with verifying sample have

high values of consistency and coverage, which means that the models have high predictive abilities. Furthermore, to inspect the prediction accuracies of the configurations more intuitively, a comparative analysis has been conducted on the predicted CF performance and the actual CF performance. The analytical results, shown in column 9-10 of Table 8, indicate that all the prediction accuracies are higher than 90 %, except for the 4th and 5th models for high performance and the 1st model for the low performance. The overall prediction accuracy of high and low performance configurations are up to 91.67 % and 91.25 %, respectively.

Table 8

Predictive Validity Verification Result

Model	No.	Consistency	Coverage	Predicted performance		Actual performance		Prediction accuracy	
				Case number	Prediction result	High	Low	Model	Overall
High financing performance	1	0.909	0.471	21	High	20	1	95%	91.67%
	2	0.926	0.545	20	High	18	2	90%	
	3	0.976	0.344	16	High	15	1	94%	
	4	0.993	0.274	13	High	11	2	85%	
	5	0.996	0.331	9	High	8	1	89%	
	6	0.960	0.373	5	High	5	0	100%	
Low financing performance	1	0.945	0.545	29	Low	2	25	86%	91.25%
	2	0.932	0.297	25	Low	2	23	92%	
	3	0.974	0.297	19	Low	1	18	95%	
	4	0.997	0.529	7	Low	0	7	100%	

In the light of the obtained configurations, the project funding goal has significantly negative effect on the financing performance. This finding agrees with the study made by Liao *et al.* (2015) and Zheng *et al.* (2014) based on the conventional symmetric thinking. The minimum pledge amount of a CF project also exhibits significant

negative effect on the financing performance, which is in consistency with the customer delivered value theory proposed by Kotler (2003) that investors' perception of CF project value is negatively correlated with the cost they need to pay. Moreover, the CF project updates number has strong positive effect on the financing performance, which has been

confirmed in studies made by Mollick (2014) and Zheng *et al.* (2015). Similarly, the number of the projects that the sponsor has invested can also bring about positive effects. Zheng *et al.* (2014) have also come to the same conclusion.

Except for the above-mentioned 4 ingredients, other antecedent conditions have both main and contrarian effects on the CF performance. For example, a large number of social network fans may be associated with high and low financing performance. Studies made by Liao *et al.* (2015), Mollick (2014) and Zheng *et al.* (2014) have confirmed the existence of the contradiction influences. Moreover, as Ragin (2000, 2008) once emphasized, the effect of a single antecedent condition on the outcome does not always remain stable; instead, it depends on its ingredient combination. In addition, the findings back up the conclusion Ragin (2008) made that the configurations for high financing performance are not simply mirror opposites of the ones for the low financing performance, which indicates that the reasons for the appearance or absence of an outcome are totally independent of each other.

Implications and Limitation

Different from most of the existing research on the financing performance of CF projects, this study analyzes it in an asymmetric way. Our findings thus provide a clear picture as to how the attribution configurations influence the CF performance, further confirming the integrity of antecedent conditions when affecting the financing performance. Finally, this study helps expand the crowdfunding performance research field by adopting the QCA method; meanwhile, it provides a clearer understanding about the configurational impact on financing performance from the asymmetrical perspective. From a practical perspective, this study verifies the foremost effects of the project funding goal, the minimum pledge amount,

the number of project updates and projects that the sponsor has invested, as well as the contradiction influences of other antecedent conditions, on the financing performance. In order to improve the project performance, sponsors should do their best to reduce the financing goal and the minimum pledge amount, update the project progress more often and support other sponsors' CF projects. Considering the adjustment of the attributes that exhibit contradiction influences, entrepreneurs should focus on the combination, and make it match with the configurations for high rather than low financing performance. Indeed, the present study, for which data were collected from the JD Crowdfunding, should be regarded in that light. In the application process, the features of different CF platforms should be fully considered.

There are two limitations in this study. First, we select only the successfully financed projects on JD Crowdfunding platform as targets. Future researches can expand the research scope to other Chinese or foreign platforms, and incorporate the cultural factors and legal factors into the antecedent conditions. Second, the selection of antecedent conditions is based on the existing studies. With the continuous development of CF related research, follow-up studies can make selection from a broader range.

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