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Recommended Citation

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UNDERSTANDING THE ROLE OF COMMITMENTS IN EXPLAINING CROWDFUNDING INVESTING WILLINGNESS: ANTECEDENTS AND CONSEQUENCES

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Abstract

Crowdfunding is a new financing channel for small- and medium-sized enterprises and start-ups to raise funds for innovation projects online. Despite its rapid development, few empirical research has been performed to identify individuals' motivations to continuously invest in crowdfunding. The high practical significance and lack of research indicate the importance of the present study. This study aims to apply Meyer & Allen's three-component model of commitment to construct a research model, incorporating context-specific antecedents. The results of our survey of 186 actual funders of the crowdfunding platforms in China indicated that affective and calculative commitment are the main drivers of funders' continuous investments in crowdfunding. Calculative commitment was proved to have a positive influence on affective commitment. Further, perceived self-worth and trust performed well as antecedents of both affective and calculative commitment, though trust played a negative role in the latter, which differed from the three other paths. And also, perceived critical mass was significantly associated with calculative commitment. The results of this research provided theoretical implications for future research and practical implications for the success of crowdfunding platforms.

Keywords: crowdfunding, affective commitment, calculative commitment, continuous use

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1 INTRODUCTION

In recent years, crowdfunding has become a valuable alternative source of funding for entrepreneurs and start-ups seeking external financing. It is rapidly expanding in many countries and it is seen by many as a hope to fund innovative projects that would not be carried out otherwise (Belleflamme *et al.*, 2015). Crowdfunding refers to the efforts by entrepreneurial individuals and groups to fund their ventures by drawing on relatively small contributions from a relatively large number of individuals using the internet, without standard financial intermediaries (Mollick, 2014). As the economic potential of these markets has become more apparent, they have boomed, gaining attention from both entrepreneurs and backers. For example, since KickStarter's launch on April 28, 2009, more than 272,000 projects have been launched on KickStarter, over 10 million people have backed a project, around \$2.13 billion have been pledged to those projects and nearly 100,000 projects have been funded successfully (KickStarter.com, 2015). On Indiegogo, another successful crowdfunding platform, campaigns from more than 220 countries and territories are running and 15 million people from all over the world visit it each month. According to the report of the World Bank (2013), the total market potential by 2025 is estimated to be up to US\$90-96 billion per year.

The new strategic capabilities for entrepreneurs offered by crowdfunding have significant disruptive potential for existing models of entrepreneurial financing (Lasrado & Lugmayr, 2013). It offers businesses the opportunity to obtain funding directly from the public. The popular practice of crowdfunding has drawn attention from the research community. Some studies have explored under what conditions entrepreneurs would adopt crowdfunding rather than other fundraising approaches (Schwienbacher & Larralde, 2012; Belleflamme *et al.*, 2010). Some studies examined factors affecting crowdfunding performance in capital raising (Lambert & Schwienbacher, 2010; Mollick, 2014; Zheng *et al.*, 2014), which is how to attract sponsors to invest money. However, to date few researches have paid attention to funders' continuous investing behavior. Meanwhile, the instability of investment resources has been a challenge for both crowdfunding platforms (CFPs) and projects on them to survive a long period because the low barrier to pledge money in the projects has attracted a large amount of immature funders who have few investment experience. As many scholars note, the long-term viability of an information technology/information systems and its eventual success depend on its continued rather than first-time use (Bhattacharjee, 2001; Zheng *et al.*, 2013). Therefore, understanding what motivates individuals to invest in crowdfunding platform continuously is important. Such an effort will not only contribute to the IS literature but also shed light on promoting crowdfunding investment.

Based on continuous use literature, in this paper we define continuous investment as individual repeated act of investing to a crowdfunding platform, including but not limited to investing to the project they choose at the first time. According to the prior research, there are two sorts of literature that have explored continuous use: satisfaction research and commitment research. Satisfaction research has shown a satisfied customer is more likely to stay with a business (Abdinnour-Helm *et al.*, 2005). However, to predict continuous use behavior only based on satisfaction is not reliable since it is not able to explain why some users discontinue using an information system even if they have initially expressed satisfaction towards the system (Hsu *et al.*, 2004). Commitment research has shown users' commitment to continuous use is significant to providers in the Internet context (Li *et al.*, 2006) because the Internet context is one in which individual use is primarily voluntary rather than compulsive (Gefen *et al.*, 2003). Based on the above discussions, our paper first proposes commitment theory in the context of crowdfunding in order to understand funders' intention of continuous investment.

To achieve this objective, a literature review was conducted to identify the constructs examined in our research model. Since research on continuous investment in crowdfunding is still in a preliminary stage, there is few empirically validated research on it. Therefore, an extended range of relevant studies was reviewed, including literature on continuous usage, commitment, peer-to-peer lending, and crowdfunding. After that, the three-component model of commitment which includes affective, continuous and normative components of commitment was employed as the basic theoretical foundation to construct a theoretical framework. To test the model, The Partial Least Squares (PLS) approach was

used to analyze data collected from 186 respondents. This study should be of interest to both academics and industries. From a theoretical perspective, we complement the literature on the effects of commitment in crowdfunding. From a practical perspective, our model offers insights into how perceived self-worth, trust, perceived critical mass, quality of alternatives and sunk cost can play a role in funders' continuous investment intention on CFP. Our conclusions provide advice for crowdfunding project founders on how to attracting funders investing money continuously to support their projects.

The remainder of this paper is organized as follows. . We first provide a literature review of the current research in crowdfunding and the theory of commitment. We then develop a research model and the corresponding research hypotheses, specifying the factors determining individuals' behavioral intentions. Next, we provide the results of empirical tests, followed by a summary of the findings and a discussion of the implications of the research. Finally, limitations and suggestions for future research are identified in the last section.

2 THEORETICAL BACKGROUND

2.1 Crowdfunding

Crowdfunding is a new financing channel through which firms or entrepreneurs can obtain capital from crowd online (Howe, 2008). Crowdfunding helps entrepreneurs adopt new approaches of undertaking entrepreneurial projects and managing ventures, which in turn leads to new forms of business development in which the "ordinary" crowd gets more closely involved in these firms, as active consumers, investors, or both.

According to the report of the World Bank (2013), crowdfunding can be divided into two models, investment-based and donation-based. Funders in investment-based CFPs may mostly be concerned about the probability that a funded project will provide positive returns. This kind of model offers a claim to a debt or a share of equity (or a portion of profit or revenue) in exchange for the contribution of the investor (Belleflamme *et al.*, 2015). Donation-based models are either set up to facilitate philanthropic giving or to provide nonmaterial rewards to the donors (Turan, 2015). On donation-based CFPs, fundraisers do not offer monetary returns or in-kind payments apart from recognition within a community (Belleflamme *et al.*, 2015). Sponsors' participation takes various forms, such as contributing ideas, testing early prototypes and viral marketing (Lehner, 2012). Most CFPs, including Kickstarter and Demohour, have developed online virtual communities for entrepreneurs and sponsors to share ideas with each other to support their coproduction behavior (Yi & Gong, 2013).

Although crowdfunding is relatively new, it has been paid considerable attention from the research community. Several studies have showed the value of small donations (Firth, 2012) and the potential of crowdfunding to contribute to different aspects such as entrepreneurial financing, scientific research (Wheat *et al.*, 2012), and individual cooperative housing (Liu *et al.*, 2014). Mollick (2014) explored descriptive patterns and the factors associated with success and failure among crowdfunded projects and found among these projects, failures happen by large amounts, successes by small amounts. Kuppuswamy & Bayus (2013) examined funded projects listed on Kickstarter and showed social information (i.e. other crowd funders' funding decisions) plays a key role in the success of a project. Ahlers *et al.* (2012) stressed in turn the importance of information going from the entrepreneur to the crowd.

2.2 Commitment

Commitment is described as a "force that binds an individual to a course of action of relevance to one or more aims" (Meyer & Herscovitch, 2001). Adapted from a single-dimensional construct and a two-dimensional model, Allen & Meyer (1990) synthesized the concept of organizational commitment by proposing a three-component conceptualization: affective, continuance, and normative components.

In an organizational context, affective commitment refers to an individual's emotional attachment to,

identification with, and involvement with the organization (Lin & Fan, 2012). Calculative or continuance commitment can be defined as the continued membership in an organization because of perceived cost of leaving the organization and the lack of alternative opportunities (Allen & Meyer, 1990). Normative commitment, understood as a sense of moral obligation to pursue a course of action (Meyer & Herscovitch, 2001), alludes to an obligation in terms of justice and duty. Based on its definition and implications, we consider normative commitment to be less concerned in the relationship between a funder and a fundraiser than in other relationships such as business-to-business relationship. Therefore, we elide normative commitment from this study.

Previous study in area of Information System has employed the three-component commitment model to examine users' commitment toward Information System usage (Li *et al.*, 2006). For example, Chen *et al.* (2013) discussed what effects that commitments could make on users' content creation behaviors on SNSs and found both affective commitment and calculative commitment were positively associated with the dependent variable. Hashim (2015) examined the mediating role of affective commitment on members' continuous knowledge sharing intention within business online communities.

In addition, researchers have further explored the antecedents of these two kinds of commitment. Lin & Hwang (2014) showed in their research that perceived self-worth is positively related with affective commitment. Cater & Zabkar (2009), Li *et al.* (2006), Morgan & Hunt (1994) reported that trust leads to a high level of affective commitment or, in other words, a strong desire to maintain a relationship. Hsu & Lu (2004), Chen *et al.* (2013) pointed out that perception of critical mass is rapidly strengthened as more people participate in network activities. What's more, the quality of alternatives and sunk cost are also confirmed to be relatively important to both affective and calculative commitment (Chen *et al.*, 2013; Li *et al.*, 2006).

3 RESEARCH MODEL AND HYPOTHESES

Based on the literature review, we develop our theory by anchoring on the dedication-constraint framework of commitment (Bendapudi, N., 1997), which is also the theoretical base introduced by Kim & Son (2009). However, we substantially extend this framework by adapting it to the crowdfunding context. Figure 1 summarizes our research model.

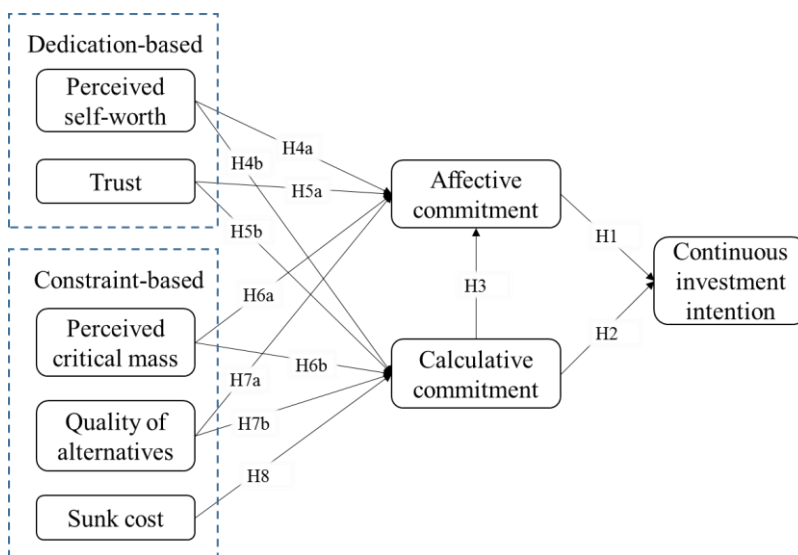


Figure 1. The research model

3.1 Affective commitment

A number of researchers in diverse fields have argued that the affective dimension of commitment best

describes the emotional component of information technology adoption, and that increases in affect should lead to increases in behavioral intention and ultimately behavior. For example, Davis-Sramek *et al.* (2009) found that affective commitment strongly influences loyalty intention. Further, the positive effect of affective commitment on system usage has been demonstrated in IS research. Li *et al.* (2006) examined the positive significant effect of affective commitment on users' behavioral intention of using websites. Chen *et al.* (2013) showed the strong influence of affective commitment on users' content creation behaviors on an SNS. CFP can also be regarded as a SNS in some way, since users on the platform can easily connect with others by different methods (e.g. the website, BBS, WeChat). In this way, people may develop useful relationships with others on the CFP, for example, the project founder, and emotionally bond with the CFP. Moreover, if they get return on their investment to the CFP, it would satisfy the users as well, which can also arouse affective commitment. Thus, people may also develop affective commitment to the CFP during their usage, then a feeling of continuous investment intention. Thus, we predict the following relationship between those two factors in crowdfunding.

H1. Affective commitment is positively associated with continuous investment intention in crowdfunding.

3.2 Calculative commitment

Calculative commitment, also referred to as continuance commitment, is defined as an individual's awareness of the benefits associated with investing in crowdfunding and the costs associated with not investing in crowdfunding. Consider the relationship between calculative and affective commitment first. As Davis-Sramek *et al.* (2009) stated, calculative commitment, which implies a dependency on the manufacturer, builds over time as retailers engage in a long-term relationship. Chiou & Droge (2006) argued that this long-term orientation and dependency influenced attitudinal loyalty in luxury products context. In crowdfunding, funders are likely to be more dependent on the CFP because their costs (e.g. time and effort they spend searching for a good project) reduce as they keep investing in it, leading to stronger calculative commitment. The investors would be more and more familiar with how to use the CFP as their investment experiences increase so that they can save time and efforts to seek for another project next time. Thus, we hypothesize that:

H2. Calculative commitment is positively associated with affective commitment.

In IS research, results have also supported the positive effect of calculative commitment on system and Web usage (e.g. Li *et al.*, 2006). In crowdfunding, an investor may have made various investments such as time and money to make it clear how the platform works, whether the project is worth investing and so forth. Thus, an individual's previous investment will serve as a powerful psychological inducement to persist in the relationship and help lock him into his current investment in one particular CFP. Therefore, the following hypotheses can be formulated:

H3. Calculative commitment is positively associated with continuous investment intention in crowdfunding.

3.3 Dedication-based factors

Self-worth is the intrinsic benefit individuals experience when they perceive their investment behavior provides positive contributions to the organization (Brock *et al.*, 2005; Lin & Hwang, 2014). A person with a high sense of self-worth usually believes his investment adds value to the organization by helping others solve problems and increasing productivity and efficiency (Lin & Hwang, 2014). Therefore, a greater sense of self-worth are more likely to lead to a more favorable attitude toward investment behaviors in crowdfunding. Moreover, as individuals with high self-worth believe their behavior is beneficial to the organization, they feel it is worth spending time and money funding the projects on the CFP. Thus, perceived self-worth should be positively associated with calculative commitment as well. Based on the on the above discussions, we hypothesize that:

H4a. Perceived self-worth is positively associated with affective commitment.

H4b. Perceived self-worth is positively associated with calculative commitment.

Trust has been conceptualized as the confidence that relationship partners have in the reliability and integrity of each other (Morgan & Hunt, 1994; Anderson & Narus, 1990). If a person feels that a relationship can be counted on to support his interests and will be responsive to his needs, he is more likely to be dependent on and bonded to the relationship (Li *et al.*, 2006). Several empirical studies have found a positive influence of trust on commitment that was implicitly conceptualized and measured as the affective component (e.g. Ruyter *et al.*, 2001; Morgan & Hunt, 1994; Tellefsen & Thomas, 2005). In crowdfunding, people with stronger trust in the CFP would be less worried about their investment, and thus they are more likely to pledge money in it. However, the effect of trust on calculative commitment was found in the direction. Gounaris (2005) reported that the more the customer trust its service provider, the less the former will be calculatively committed to the latter. It may also happen in crowdfunding context. Therefore, we establish the following hypotheses:

H5a. Trust is positively associated with affective commitment.

H5b. Trust is negatively associated with calculative commitment.

3.4 Constraint-based factors

Hsu & Lu (2004) defined perceived critical mass was the fact that the value of a technology to a user increased with the number of its adopters. Rogers (1995) proposed that an individual will be more likely to adopt an innovation as the number of adopters in his/her personal network increases. Previous research has established that perceived critical mass may affect information system usage intention. Cho (2011) found that perceived critical mass strongly influences behavior intention to use 3G mobile service. Shen *et al.* (2013) indicated that perceived critical mass influences we-intention to use instant messaging. On crowdfunding, if a funder perceives that most of his partners are using this platform for investment, he may develop an intention to keep investing in crowdfunding as well. Therefore,

H6a. Perceived critical mass is positively associated with affective commitment.

H6b. Perceived critical mass is positively associated with calculative commitment.

In the context of Web site use, quality of alternatives is the perceived desirability of the best available alternative website that provides similar technologies and services as compared to the website currently used by a user (Li *et al.*, 2006). Without alternatives available, a funder is likely to believe that current CFP can satisfy his or her needs so that he or she may be more willing to increase the investment into that platform. By contrast, if an individual is aware of many alternatives, he or she may be biased by the relative advantages of these alternatives and thus devalue her previous inputs into the current CFP (Chen *et al.*, 2013). Thus, we posit the following hypotheses:

H7a. Quality of alternatives is negatively associated with affective commitment.

H7b. Quality of alternatives is negatively associated with calculative commitment.

The sunk cost effect is manifested in a greater tendency to continue an endeavor once an investment in money, effort, or time has been made (Arkes & Blumer, 1985). For example, people who contemplate whether or not they should make a monetary investment to complete an ongoing project with a pessimistic future are more likely to throw in the money if they have previously invested money into the project than if they did not (Kwak & Park, 2012). On a CFP, users may have to invest much time and effort in searching for a promising project, since there are so many choices that they cannot decide at once. Compared with the traditional investments, investing to crowdfunding projects needs the funders to pay more attention to distinguish the good from the bad as there has not been an ordinance to standardize the information disclosure system of crowdfunding so that the information about a crowdfunding project that investors can find is more likely to be exaggerated or fraud than that disclosed by a public company. Those irretrievable investments of time and efforts enter individuals' behavior decisions such that high investments increase individual calculative commitment (Kale *et al.*, 2000). We thus hypothesize:

H8. Sunk cost is positively associated with calculative commitment.

4 RESEARCH MEASUREMENT

4.1 Measurement development

All measurement items included in Appendix were adapted from prior literature that examined the continuous phenomenon. We only did minor modifications in wording to make them relevant in the context of crowdfunding. The measurement items were formulated by a seven-point Likert scale, ranging from 1 “strongly disagree” to 7 “strongly agree”.

Before posting formal survey, the survey was examined by bachelor’s degree students (n=20) in a MIS program who have experience of crowdfunding to reduce possible ambiguity in the questions. Respondents were asked about any problems they may have encountered in the survey. Comments and suggestions on the items’ contents were solicited.

4.2 Survey procedure

This research took China as the site of the empirical investigation because the supporting infrastructure required for crowdfunding has been put in place. To date, crowdfunding in China has gone on the track of rapid progress. Up to the end of July 2015, the amount of investments in Chinese crowdfunding market has exceeded 4.67 billion RMB. Large corporations such as Alibaba, Tencent and JD have set foot in crowdfunding one after another. To test the hypotheses, we conducted a web-based survey with users who have experience of investing in crowdfunding. In order to find our respondents, we posted the questionnaire on sojump.com, an online survey platform. We then post the link of the questionnaire to several typical crowdfunding user groups, for example, groups of which members have invested in hi.taobao.com (a CFP run by Alibaba), z.jd.com (a CFP run by JD) and zhongchou.com (a famous CFP in China). In order to extend the coverage of experienced funders as big as possible, we tried many ways to connect with them, including QQ group, WeChat, tieba.baidu.com, BBS about crowdfunding, etc. We even tried to attract them to reply to our questionnaire by lottery. Finally, 227 questionnaires were collected in total between December, 2015 and January, 2016. After deleting incomplete questionnaires, 186 questionnaires were left for empirical analysis. The sample demographics are provided in table 1. Our sample comprised 55.83% male and 44.62% female respondents. This ratio is similar to the gender structure of Chinese net citizens. The age structure in our sample also conforms to Chinese net citizens’ age structure. It indicates our sample is representative.

Category	Items	Percentage	Category	Items	Percentage
Gender	male	55.38%	Crowdfunding investment experience	Less than 1 year	23.66%
	female	44.62%		1-3 years	39.78%
Age range	18~25	23.12%	3-5 years	19.35%	
	26~30	28.49%	5-7 years	15.05%	
	31~40	39.78%	>7 years	2.15%	
	41~50	6.99%	Overall	Less than 1 year	16.13%
	51~60	1.08%	investment	1-3 years	24.73%
	Older than 60	0.54%	experience	3-5 years	32.80%
Monthly income (CNY)	None	6.45%	5-7 years	9.68%	
	Less than 2000	5.91%	>7 years	16.67%	
	2000-3000	17.74%	Times of crowdfunding investment	1-2	38.71%
	3001-5000	33.87%	3-5	37.10%	
	5001-8000	22.04%	6-7	13.44%	
	8001-15000	11.29%	More than 7	10.75%	
Internet experience	15001-50000	2.69%			
	3-5 years	26.34%			
	6-10 years	40.32%			

More than 10 years	33.33%
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Table 1. Demographic statistics

5 DATA ANALYSIS AND RESULTS

5.1 Measurement model development

The measurement model is evaluated based on its reliability and validity. We assessed the reliability of eight constructs with Cronbach's α , composite reliability (CR) and the average variance extracted (AVE). For a construct with good reliability, Cronbach's α should be at least 0.7, CR should exceed 0.5, and the AVE should be larger than 0.7 (Hair *et al.*, 1998). Furthermore, the loadings of all the items should be above 0.7 to show good validity. As shown in Table 2, all values are larger than the generally accepted values, representing good reliability and the high convergent validity of the data.

Constructs	Items	Factor loading	Means	Standard deviation	CR	AVE	Cronbach's α
Continuous investment intention (CII)	CII3	0.710	5.647	0.909	0.923	0.800	0.876
	CII2	0.674					
	CII1	0.621					
Affective commitment (AC)	AC1	0.749	5.711	0.822	0.888	0.725	0.810
	AC3	0.731					
	AC2	0.678					
Calculative commitment (CC)	CC3	0.806	5.111	0.915	0.868	0.686	0.771
	CC2	0.658					
	CC1	0.654					
Perceived self-worth (PSW)	PSW2	0.796	5.434	0.839	0.897	0.744	0.829
	PSW1	0.710					
	PSW3	0.661					
Trust (TRU)	TRU1	0.758	5.550	0.876	0.915	0.782	0.860
	TRU3	0.751					
	TRU2	0.702					
Perceived critical mass (PCM)	PCM3	0.863	4.925	1.343	0.960	0.889	0.938
	PCM1	0.837					
	PCM2	0.812					
Quality of alternatives (QAL)	QAL3	0.862	4.901	1.151	0.935	0.828	0.897
	QAL1	0.837					
	QAL2	0.813					
Sunk cost (SCO)	SCO1	0.805	5.104	0.982	0.860	0.673	0.760
	SCO3	0.801					
	SCO2	0.652					

Table 2. Construct reliability and convergent validity

Meanwhile as for discriminant validity, it is evaluated using one of the most commonly used criteria in PLS: the square root value of the AVE for each construct should be greater than the inter correlations between constructs in the model (Chin, 1998). Table 3 reports the correlation matrix of key constructs and AVE square root values (bold diagonal value). The analysis shows all AVE square root values are greater than the inter correlation values between constructs. Hence the criterion for discriminant validity is satisfied.

Construct	CII	AC	CC	PSW	TRU	PCM	QAL	SCO
CII	0.894							
AC	0.715	0.851						

CC	0.538	0.557	0.828					
PSW	0.682	0.574	0.430	0.863				
TRU	0.665	0.579	0.492	0.659	0.884			
PCM	0.477	0.474	0.580	0.471	0.555	0.943		
QAL	0.345	0.279	0.308	0.406	0.335	0.479	0.910	
SCO	0.364	0.297	0.256	0.373	0.367	0.332	0.564	0.872

Table 3. Discriminant validity: the square roots of AVEs and factor correlation coefficients.

5.2 Test of structural model

To test how well the model represents the data, we employed AMOS 21.0 to evaluate ‘goodness of fit’ indices. We found most of the model fit indices ($\chi^2/df=1.89$, RMSEA=0.06, GFI=0.86, AGFI=0.83, CFI =0.91, NFI=0.85 and IFI=0.92) are within the commonly accepted thresholds suggested in the literature (Fornell and Larcker 1981, Hair *et al.* 1998). The fit indices indicate that the model provides a reasonably good fit to the data.

5.3 Hypothesis testing

The research model for this study is validated using a Partial least squares – Structural Model Equation technique. The software SmartPLS 2.0 was utilized to test our structural model. Results of the structural model are presented in Table 4.

	Hypothesized Path	Standard error	t	Result
H1	Affective commitment →Continuous investment intention	0.075	8.083	***
H2	Calculative commitment →Continuous investment intention	0.079	2.679	***
H3	Calculative commitment →Affective commitment	0.127	2.365	**
H4a	Perceived self-worth →Affective commitment	0.110	2.570	**
H4b	Perceived self-worth →Calculative commitment	0.137	1.795	*
H5a	Trust →Affective commitment	0.135	1.664	*
H5b	Trust →Calculative commitment	0.137	-1.669	*
H6a	Perceived critical mass →Affective commitment	0.142	0.418	Insignificant
H6b	Perceived critical mass →Calculative commitment	0.125	3.484	***
H7a	Quality of alternatives →Affective commitment	0.089	0.278	Insignificant
H7b	Quality of alternatives →Calculative commitment	0.113	0.036	Insignificant
H8	Sunk cost →Calculative commitment	0.107	0.083	Insignificant

Notes: *** represents $p < 0.01$; ** represents $p < 0.05$; * represents $p < 0.1$

Table 4. Hypothesis testing results

Overall, the model explains 55.0% variance of the dependent variable (continuous investment intention). 42.3% of the variance in affective commitment is explained by perceived self-worth and trust; and 39.4% of the variance in calculative is explained by perceived critical mass. From the analysis, the paths H1, H2, H3, H4a, H4b, H5a, H5b and H6b are significant in the expected directions, while others are rejected. The path coefficients of hypotheses 1, 2, and 6b are significant at a level of $p < 0.01$, indicating support for these hypotheses. The path coefficients of hypotheses 3 and 4a are significant at a level of $p < 0.05$, thus indicating support for these hypotheses. The path coefficients of hypotheses 4b, 5a and 5b are significant at a level of $p < 0.1$ which is marginally accepted.

6 DISCUSSIONS AND IMPLICATIONS

As shown in the path analysis results, both affective commitment ($p < 0.01$) and calculative commitment ($p < 0.01$) are good predictors of funders' continuous investment in crowdfunding. Consistent with the commitment literature (Allen & Meyer, 1990; Li *et al.*, 2006; Meyer & Herscovitch, 2001), emotional aspects of users' feelings are more significant than cognitive analyses of costs and benefits. Moreover, calculative commitment is supported to have a positive impact on affective commitment.

Regarding the two dedication-based factors, perceived self-worth and trust both have a significant effect on affective commitment. This result indicates that funders care about their perceived self-worth and trust to the platform during online investing process. The more they perceive self-worth and trust, the more they are willing to invest. Furthermore, those two factors also play a significant role in calculative commitment, though in opposite directions. Perceived self-worth is proved to have a positive effect on calculative commitment, which is consistent with previous literature (Lin & Hwang, 2014). It indicates that people with the feeling of perceived self-worth would be more likely to keep the relationship, invest more and expect greater feedback. As for trust, it is shown to be negatively related to calculative commitment and agree to the hypothesized direction. It indicates that if people trust the crowdfunding project and CPF they invest in, they tend to care less about the possible loss.

In the constraint-based factors, perceived critical mass showed great impact on calculative commitment but was not significantly related to affective commitment. The reason may be the demographic distribution of current crowdfunding investors. As most of investors are young and middle-aged, they are more likely to behave based on their own feelings rather than others'. Thus, perceived critical mass would not have a great impact on their emotional feeling about continuous investment in a CFP. But if they hear most people can make money by some way, they may be interested to follow the public. Contrary to previous studies (Li *et al.*, 2006), quality of alternatives has no significant effect on affective commitment as well as calculative commitment. We speculate the explanation is that the existing CFPs are similar so that they do not have so much attraction to attract funders to switch from one platform to another. Also, a committed individual may even not be aware of such alternatives and may be less motivated to seek alternatives, which may cause dissonance in his or her cognition (Rusbult *et al.*, 1998). This lack of motivation, coupled with a limitation on cognitive capacity (Sheth & Parvatiyar, 1995), may cause the funder to simply stick to his or her use of the current platform. Moreover, our study found no evidence of a statistically significant relationship between sunk cost and calculative commitment. A plausible explanation is also due to the demographic distribution of current crowdfunding investors. Young and positive to accept new staff, most of them are familiar with the Internet and it would not take much time and efforts to find a promising project. Due to their rich experience on the Internet, they can tell the truth from the fraud without so many difficulties, which is helpful to reduce the time and effort they spend in searching for useful information. Also, as crowdfunding aims to raise financing from a large audience (the "crowd") and each individual only provides a very small amount, the funders' sunk cost of capital is not unaffordable as well. This may cause the funders to care less about their sunk cost when they are considering whether to invest in one CFP continuously or to switch to a new platform.

6.1 Theoretical implications

This study makes three important contributions to the research literature. First, although commitment theory has been widely used to explain continuous technology use in the IS literature, few studies have focused on its applications in crowdfunding. By applying commitment-based research model in crowdfunding context, our research fills this knowledge gap and it is one of the first study to empirically test the funders' continuous use in crowdfunding. We also extend the existing literature on users' adoption behavior in a crowdfunding, which has been focused on primarily on users' decision making process or factors that affect the funding success.

Second, we provide insights into the antecedents of commitment to crowdfunding, which would enhance our understanding of the development of different commitments. Although the antecedents of

commitment have already been examined in other context by prior research, we apply this knowledge by reexamining the importance of these existing antecedents in crowdfunding context. For instance, we find that perceived self-worth plays an important role in influencing funders' continuous investment in CFP.

Third, this research has also shown the different roles of the two components of commitment. In different context, calculative commitment and affective commitment have different levels of effects on behavioral intention (Li *et al.*, 2006). In the context of crowdfunding, affective commitment has the larger influence on users' continuous investment behavior, while calculative commitment's impact is moderate, consistent with results from previous research (Chen *et al.*, 2013).

6.2 Practical implications

From a practical perspective, the findings of this study will provide strategies for CFPs to stimulate funders' intention to continue investing by increasing their affective commitment and calculative commitment. First, CFPs should try to increase the emotional attachment to the funders. To achieve this goal, CFPs can take actions to fulfill funders' feeling of self-worth and be trustworthy themselves as well. Moreover, from a calculative commitment standpoint, several strategies can be pursued. One of them may be to facilitate users to recommend friends to each other. Emphasizing funders' perceived critical mass will also enhance the calculative commitment and stimulate continuous investment behaviors.

Meanwhile, both platform designers and project founders can also obtain benefits by applying our model in the practical context. For platform designers, they can increase funders' trust in the platforms by paying more attention on platform assurance. One possible method is to provide detailed policy regulations and law protections to facilitate funders' commitment toward crowdfunding and enhance platform assurance. Also, effort can be made to improve funders' perceived critical mass. To achieve this goal, platform designers could encourage the investors to recommend good projects to other funders by providing some rewards to them.

From the project founders' point of view, their projects can be made to arouse funders' self-worth, for example, by showing how important role funders' investment can play in the project. Our results demonstrate that individual feelings significantly influence the commitment of individuals' continuous investment intention. As users build up more self-worth through investment activities, they are more likely to develop a long-term investment intention to the platforms.

7 LIMITATIONS AND SUGGESTIONS

Inevitably, this study contains some limitations. These limitations indicate avenues for further research. One limitation of this study is that the research model does not examining the relationship between intention and actual behavior. By not examining the actual behavior of continuous investment in a CFP, this potential effect still remains unclear. Therefore, measuring actual behavior to continuous investment in CFP may reveal interesting findings. In addition, the focus of our research is to explore the roles of commitment on funders' continuous investment intention. The current study did not include other factors that may influence commitment and continuous investment intention which may increase the explanatory power of the model. Further research is needed to extend the research model to examine the antecedents to commitment. The third limitation originates from the biases inherent in most online survey-based research. Although we tried to minimize nonresponse bias by using multiple firms and striving for a larger sample, we acknowledge that nonresponse bias may not be completely eliminated.

8 APPENDIX

Construct	Items	References
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Continuous investment intention	I plan to keep investing in crowdfunding in the future. I intend to continue using crowdfunding in the future. I expect my use of crowdfunding to continue in the future.	Agarwal & Karahanna (2000)
Affective commitment	I enjoy discussing the good aspects of crowdfunding with other people. Crowdfunding has a great deal of attraction for me. I feel emotionally attached to crowdfunding.	Allen & Meyer (1990); Li <i>et al.</i> (2006)
Calculative commitment	I am afraid something will be lost if I stop using crowdfunding. It would be very hard for me to stop using crowdfunding right now, even if I wanted to. The total cost to change to another investment platform would be too high.	Allen & Meyer (1990); Li <i>et al.</i> (2006)
Perceived self-worth	My investment would help the members on the CFP solve problems. My investment would improve work processes of the projects on the CFP. My investment would increase productivity of the projects on the CFP.	Bock <i>et al.</i> (2005)
Trust	In your relationship with crowdfunding, crowdfunding: Can be counted on. Has my confidence. Has high integrity.	Allen & Meyer (1990); Li <i>et al.</i> (2006)
Perceived critical mass	Most people in my group invest in crowdfunding frequently. Most people in my community invest in crowdfunding frequently. Most people in my class/office invest in crowdfunding Frequently.	Hsu & Lu (2004)
Quality of alternatives	An alternative CFP is appealing. An alternative CFP is better than the platform used now. To my knowledge, another CFP is close to ideal.	Li <i>et al.</i> (2006)
Sunk cost	Searching for a promising project on CFP took me a lot of time and effort. There was a lot involved for me to understand the CFP well. I spent a lot of time and effort to learn how the project that I'm going to invest in works.	Kim & Son (2009)
Perceived self-worth	My investment would help the members on the CFP solve problems. My investment would improve work processes of the projects on the CFP. My investment would increase productivity of the projects on the CFP.	Bock <i>et al.</i> , (2005)

Appendix. Measurement items

ACKNOWLEDGMENTS

This work has been supported by the National Natural Science Foundation of China (71502145, 71473206, 71371157), the Fundamental Research Funds for the Central Universities (JBK120505, JBK160932, 268SWJTU15WCX02).

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