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Understanding the determinants of funders' investment intentions on crowdfunding platforms

A trust-based perspective

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Abstract

Purpose – The purpose of this paper is to identify funders' motivations for investing in crowdfunding. It applies trust theory to propose a research model including three subject measures – fundraiser-related, project-related and platform-related factors. Trust has been categorized into cognitive and affective dimensions to specifically analyze the influential factors.

Design/methodology/approach – Bootstrapping is employed to analyze data collected from respondents with investment experience on equity crowdfunding projects. Structural equation modeling techniques are adopted to examine the factors that influence trust between funders and crowdfunding as well as the outcomes of this trust.

Findings – The results indicate that calculus trust and relationship trust collectively or separately transmit the effect of some antecedents to investment intention. However, there is no evidence indicating the mediating effects of calculus trust and relationship trust on the relationship of structural assurance and value congruence to investment intention.

Practical implications – This paper provides insights for crowdfunding fundraisers on how to build a strong relationship with funders, and it also gives crowdfunding designers advice on how to improve and perfect the platform functions.

Originality/value – This study contributes to a better understanding of the driving forces of calculus and relationship trust and their influence on investment intention. It is also the first to address a funder's trust using a theoretical model describing the investor intention in crowdfunding and thereby extending the knowledge base of trust theory.

Keywords Trust, Crowdfunding, Mediation effect, Investment intention

Paper type Research paper

1. Introduction

In recent years, a new source of financing, crowdfunding, employed by creative founders, allows an individual to raise funds for a project from the general public, while the crowd receives certain perks such as discounts on future purchases, shares of the company or any other perk that may entice the crowd to submit money (Belleflamme *et al.*, 2014; Mollick, 2014). The startling growth of crowdfunding has entered the realm of both industrial and academic research. It is now widely agreed upon that crowdfunding should become the next big investment trend. Crowdfunding is also praised in the media



narrative for its multifaceted potential (Lehner, 2013). Massolution (2015) reports that crowdfunding platforms raised \$6.1 billion and successfully funded more than 1 million campaigns in 2013, and this number exceeded \$16 billion in 2014, a 167 percent increase. The organization also forecast that in 2015, the total amount of world crowdfunding would surpass 34 billion. A World Bank report indicates that global crowdfunding is expected to reach \$96 billion annually by 2025, and the greatest potential lies in China, which accounts for up to \$50 billion of that figure.

Crowdfunding provides exciting opportunities for both fundraisers and funders. Crowdfunding also raises a number of important concerns (e.g. risk of fraud, misleading advertising, etc.) (Belleflamme *et al.*, 2014). Till now, no empirical study has been written about funder investing behavior in crowdfunding. The current literature mostly focuses on describing the concept of crowdfunding (e.g. Belleflamme *et al.*, 2014) and identifying factors influencing the performance of crowdfunding projects (e.g. Gleasure, 2015; Mollick, 2014; Zheng *et al.*, 2014), showing a lack of theoretical support of funders' behavior in the fundraising process. Like any investment activity, crowdfunding comes with risk to the investor. According to a poll taken by Kickstarter in 2013, the number one reason why Americans do not donate more is because of a fear that the money that they give will not be used wisely. The concerns described above reduce the funder's trust in both crowdfunding projects and platforms. Without trust, there would be fewer funders, and crowdfunding would be ineffective as a financing platform. There is thus an urgent need to address this void in the literature to set forth an appropriate regulatory framework to propose future research themes of building and maintaining trust in a crowdfunding context. This will also shed light on the development of effective strategies to promote crowdfunding investment.

This paper has two main objectives. First, drawing on the existing literature, it identifies potential factors underlying funder investment intentions and suggests a trust model that includes project-related, platform-related and fundraiser-related characteristics to understand a funder's intentions in crowdfunding investment. Second, different types of trust enter into the relationship between individuals and organizations, so it classifies trust into calculus and relational dimensions. In the prior literature, calculus trust has a positive impact on relationship trust. The present study will further examine if the effect exists in the context of crowdfunding.

To shed light on these two issues, this paper first presents a review of the theoretical literature on trust. Next, it describes the nature of sample to study trust in crowdfunding. From these theoretical perspectives, this study develops hypotheses regarding the antecedents and outcomes in the level of funder trust that focus on three dimensions: project-related, platform-related and fundraiser-related characteristics. To test the model, structural equation modeling techniques are employed to examine the factors that influence trust between funders and crowdfunding as well as the outcomes of this trust. Data from 487 respondents with experience in crowdfunding have been analyzed. This study should be of interest to both academia and industry. From the theoretical perspective, this study contributes to a better understanding of the driving forces of calculus and relationship trust and their influence on investment intention. It is also the first to address funder trust using a theoretical model describing the investor intention in crowdfunding and thereby extending the knowledge base of trust theory. From a practical perspective, this paper provides insights for crowdfunding fundraisers in how to build a strong relationship with funders, and it also gives crowdfunding designers advice on how to improve and perfect the platform functions. From a methodological perspective, the findings show that the bootstrapping method can offer more convincing

results than conventional methods such as the Sobel's test. This study argues that bootstrapping is a viable methodological alternative that can help in further advancing of the knowledge in the field of mediation analysis.

2. Theoretical background

2.1 Trust

Although scholars have used a variety of definitions and operational measures for trust, nearly all research has at least implicitly accepted the definition of trust as “when one party has confidence in an exchange partner’s reliability and integrity,” which was proposed by Morgan and Hunt (1994) during the emergence of the internet. Trust is an essential component in any relationship: in social structures, as well as in business and interpersonal relationships. The multidimensional nature of trust has made it difficult to define, with definitions ranging from a commodity to an emphasis on a social reality, vulnerability and a basis for bargaining (McCabe and Sambrook, 2014). Of the numerous trustor/trustee relationships, it is obvious that not all forms of trust relationships can be described by a single definition (Burke *et al.*, 2007). Therefore, the present study restricts the definition of trust to one form of relationship, namely, the trust that an individual person has in a specific crowdfunding platform.

Trust plays an important role in many social and economic interactions such as crowdfunding that involve uncertainty and dependency. Funders have limited information and cognitive resources available and thus seek to reduce the uncertainty and complexity of online transactions by applying mental shortcuts (Yu *et al.*, 2015). Therefore, understanding how trust is created and maintained can lead to an improved rate of successful crowdfunding projects (Shankar *et al.*, 2002). Consumer trust can be distinguished into general trust and specific trust (Mayer *et al.*, 1995). General trust is one of the 20 important personality factors and is developed in the first years of childhood. The main focus of this paper is specific trust, which, in contrast to general trust, can be more easily influenced by organizations. Liu *et al.* (2010) measured two distinct components of trust: goodwill trust and competence trust. Hooghe *et al.* (2012) classified trust as generalized or political in the context of education. Schee *et al.* (2007) identified two distinct forms of trust: interpersonal and public trust. Synthesizing the viewpoints presented in previous studies, this paper distinguishes trust as calculus trust and relationship trust to study relationships between a platform and users (Bartle *et al.*, 2013). Calculus trust has been labeled as “trust from the head.” Calculus-based trust, based on the conditions of economic exchange, is an ongoing market-oriented economic calculation whose value is derived by determining the outcomes resulting from creating and sustaining a relationship relative to the costs of severing it (Ba *et al.*, 2003). This is the most fragile type of relationship – it resembles the early stage of a conditional bond (Chen *et al.*, 2014). Relationship trust has a more relational orientation and refers to “trust from the heart.” Forms of relationship trust were identified, in which trust is derived from repeated interactions between the funder and fundraiser over time and is due to the funder’s care and concern, which arises from emotional bonds and social identification between the parties (Urban *et al.*, 2009).

2.2 Crowdfunding

Crowdfunding has recently emerged as a novel way of financing new ventures. Belleflamme *et al.* (2014) extend the definition of crowdsourcing provided by Kleemann *et al.* (2008) by describing crowdfunding as “an open call, essentially through

the internet, for the provision of financial resources either in form of donation or in exchange for some form of reward and/or voting rights in order to support initiatives for specific purposes." In simple terms, crowdfunding is the financing of a project or a venture by a group of individuals instead of professional parties, allowing the founders of for-profit, cultural or social projects to request funding from many individuals, often in return for future products or equity (Mollick, 2014).

This research found that studies on crowdfunding were generally limited to two areas: crowdfunding conception and IS success research. For instance, Belleflamme *et al.* (2015) provide a description of the crowdfunding sector. Belleflamme *et al.* (2014) compare two forms of crowdfunding, in which entrepreneurs solicit individuals either to pre-order the product or to advance a fixed amount of money in exchange for a share of the future profits (or equity); Xu *et al.* (2016) investigate investor satisfaction from asymmetry perspectives. Gleasure (2015) discusses the potential resistance funders will face with a case study. Zheng *et al.* (2014) verify the effects of multidimensional social interaction ties on the performance of crowdfunding.

As the provision of capital can take the form of donations, sponsoring, pre-ordering or pre-selling, fees for membership in clubs, crediting or lending and private equity investments, the complexity of crowdfunding varies greatly (Zheng *et al.*, 2014). Four types of crowdfunding models have been identified by Massolution (2015). First, crowdfunding can take the form of donations, where individuals give money to a given project and are not promised anything in return. Second, the lending-based model offers the possibility for entrepreneurs to act as borrowers, and contributors take the position of lenders. Third, the equity-based model is a particular form of crowdfunding model in which contributors receive a share in the profits of the business or royalties of the artist. The last model is reward-based, offering contributors non-financial benefits in return for their funding. This paper mainly focuses on equity-based crowdfunding since equity crowdfunding owns the highest social network and capital requirements compared to other types of crowdfunding. Trust concern would be more prominent in this type of crowdfunding. According to Massolution, equity-based crowdfunding produces the largest amount of funds raised on a per-project basis. Across all regions, crowdfunding expanded at a 63 percent compound annual growth rate, while equity-based platforms exhibited an annual growth rate of 114 percent, which is double that of crowdfunding as a whole. Thus, equity-based crowdfunding can be regarded as representative of crowdfunding as a whole.

To delineate the unique characteristics of equity crowdfunding, it would be interesting to compare crowdfunding with some similar concepts. Crowdfunding is not the same as crowdsourcing. Crowdsourcing is defined by Kleemann *et al.* (2008) as "the process of obtaining needed services, ideas, or content by soliciting contributions from a large group of people, and especially from an online community, rather than from traditional channels like oneself, friends, employees or suppliers." Crowdfunding is distinguished from crowdsourcing in that the capital comes from an undefined public rather than being commissioned from a specific intermediate platform; likewise, a public company is not the same as equity crowdfunding in that public companies receive more and stricter government supervision and public monitoring. Their disclosed accounting information is more complete, sufficient and canonical. A comprehensive regulatory structure significantly eliminates the uncertainty surrounding the stock for investors. However, on crowdfunding platforms, whether a fundraising project can be trusted mainly depends on funders' sole judgment, online intermediate platforms and third parties' safeguarding measures; peer-to-peer (P2P) lending and crowdfunding also have clear differences in

terms of whether the contributor's primary motivation for participating is the expectation of a financial return. P2P lending expects that the original principal will be repaid, along with some fixed interest. Lenders only need to connect with the platform, and they often do not even know the exact contact information of the borrowers. On the other hand, crowdfunding offers investors an interest in the venture in the form of equity or some sort of profit-sharing agreement (Gleasure, 2015). Sponsors may also further their connection to the fundraisers by allowing them to participate in the project design and development process.

3. Research model and hypothesis

This paper applies trust theory to propose a research model including three subject measures: fundraiser-related, project-related and platform-related factors. Trust has been categorized into cognitive (calculus) and affective (relationship) dimensions to specifically analyze the influential factors. The proposed research model is presented in Figure 1.

3.1 Project-related characteristics

3.1.1 Network externality. Network externality is defined as the characteristics of project value changing with the number of users (Pae and Hyun, 2002). With an increasing number of funders, the risk decentralization will reduce the uncertainty. Thus, individuals may be more likely to invest in a crowdfunding project if they perceive that many people in their social circles are funding this fundraising project. Many of the fundraisers' friends, family and work acquaintances will have also taken part in the funding of the project (Hsu and Lu, 2004), which obligates the fundraiser and decreases the likelihood of fraud. Uncertainty reduction and fraud decrease can enhance the calculus trust, as has been supported by some scholars (Wang *et al.*, 2005). Calculus trust affects the attitude and risk perception which, in turn, influences the investment intention in crowdfunding (Fang *et al.*, 2009). Funders can help the fundraiser improve and perfect the project by participating in the project in different ways, which reduces the concern about the project and facilitates relationship trust (Kim *et al.*,

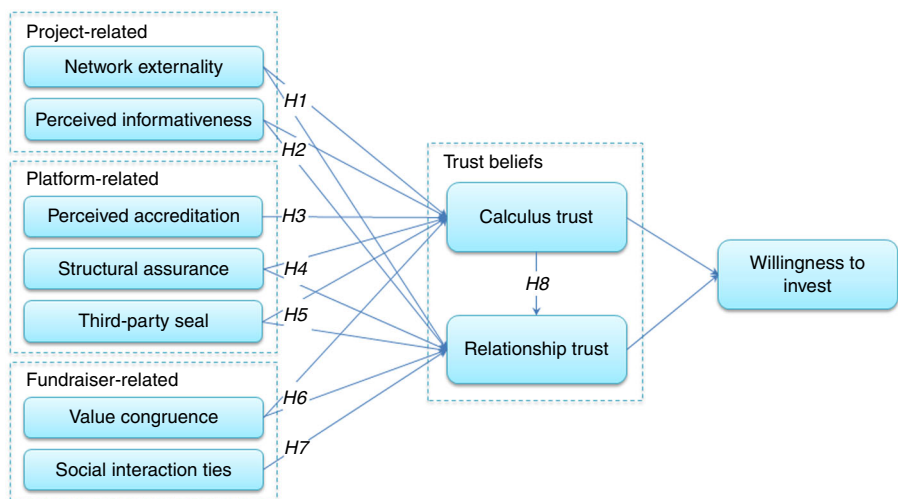


Figure 1.
Research model

2008). Relationship trust creates a positive expectation of the outcomes of the actions of the fundraiser, thus creating a positive attitude and enhancing the willingness to invest through crowdfunding (See-To and Ho, 2014). Thus, this paper argues that a high level of network externality can help to achieve a high level of calculus and relationship trust, which in turn increases the investment intention. Based on this line of reasoning, this study proposes the following hypothesis:

- H1.* The relationship between network externality and the willingness to invest is mediated by calculus trust and relationship trust.

3.1.2 Perceived informativeness. Perceived informativeness is defined as the ability to provide necessary information to target customers (Kim *et al.*, 2010). A crowdfunding campaign with high degree of informativeness usually presents individuals with sufficient and diverse information, such as hidden costs in future operation (such as commissions, certifications and labor costs), audio or visual media, and rapid updates, etc. With that, funders could know more about the crowdfunding project (Kim *et al.*, 2008). On the one hand, prior research identified informativeness as a significant predictor of trust (Littlewood *et al.*, 1995). If crowdfunding websites provide informativeness to the funder via bulletin boards by offering information regarding completion, timeliness and accuracy, the level of a funder's calculus trust toward both crowdfunding and crowdfunding platforms can be enhanced (Kim *et al.*, 2008). As funders perceive a higher level of informativeness, they will perceive that the fundraiser is interested in maintaining the accuracy and currency of the information, and will therefore be more inclined, and in a better position, to fulfill its obligations (Li *et al.*, 2015). Relationship trust can be formed through fundraisers' positive behavior (Kim *et al.*, 2010). On the other hand, previous studies have examined the theoretical mechanisms that explain the effects of calculus trust and relationship trust on funders' willingness to invest (See-To and Ho, 2014). Thus, this paper contends that the more a fundraiser exhibits informativeness, the more calculus and relationship trust the funder will feel and the more likely they will invest in a crowdfunding project. Therefore, this paper proposes the following hypothesis:

- H2.* The relationship between informativeness and willingness to invest is mediated by calculus trust and relationship trust.

3.2 Platform-related characteristics

3.2.1 Perceived accreditation. Accreditation is described as the scope of efforts undertaken to verify the capital of a project as needed and the ability of a fundraiser to perform as expected (Pavlou, 2002). Accreditation, when performed by an independent authority, such as the management of a crowdfunding platform, may be a reliable way to evaluate fundraisers' competence. According to the largest equity crowdfunding platform, Crowdcube, only 6 percent of the funds raised on equity-based crowdfunding platforms were raised for projects that drew less than \$10,000 of funding in total. Meanwhile, 21 percent of the funds raised by equity-based platforms were raised for projects that drew \$250,000 or more in funding. Funders believe that the accreditation mechanism is able to verify the real fundraiser requirements and provide reliable information about the capacity of fundraisers to perform as expected (Pavlou, 2002). They essentially draw on "proof sources" to form their trust beliefs based on the

accreditation outcome. Based on a rational assessment, funders may build calculus trust because rigorous accreditation by crowdfunding platforms is an important effort to ensure the competency of a new fundraiser and project (Pavlou, 2002). In addition, research has shown that people who perceive much calculus trust from fundraisers report greater investment intention (McKnight *et al.*, 2002). This paper proposes that when funders perceive greater accreditation, calculus trust and further willingness to invest increase. This leads to the following hypothesis:

- H3.* The relationship between perceived accreditation and willingness to invest is mediated by calculus trust.

3.2.2 Structural assurance. Structural assurance means the belief that a platform has protective legal or technological structures (e.g. encryption or SSL) that assure the safety and security of crowdfunding (such as promises, contracts, regulations and guarantees that are in place) (Bock *et al.*, 2012). Kim *et al.* (2010) argued that structural assurance is a major issue for online innovations. Since the internet is an open network with no direct human control over individual transactions, the legal or technological structures that support online crowdfunding campaigns must be resistant to security attacks. Protection mechanisms that are devised to reduce this kind of risk need to be taken into consideration before the problem of funders' trust is addressed (Kim *et al.*, 2010). A high level of structural assurance may create an environment that feels safe and secure to participants. Technological safeguards such as encryption, specific system development processes and procedures, and feedback mechanisms have been found to facilitate calculus trust in crowdfunding websites (Lu *et al.*, 2010). Legal safeguards like regulations, laws and contracts facilitate funders' beliefs that the platform will maintain crowdfunding rules and manage the projects well. Funders may have better confidence and relationship trust in crowdfunding as a result of the technological and legal safeguards that the platform takes (Bock *et al.*, 2012). Both the calculus and relationship trust significantly affect the funder intention to invest (Fang *et al.*, 2009). If structural assurance allows the level of trust surpass the threshold of perceived risk, the funder will invest. Therefore, this paper proposes the following hypothesis:

- H4.* The relationship between structural assurance and willingness to invest is mediated by calculus trust and relationship trust.

3.2.3 Third-party seal. The presence of a third-party seal refers to an assurance of a crowdfunding project provided by a third-party certifying body such as a bank, accountant, consumer union or computer company (Kim *et al.*, 2008). Crowdfunding may require the use of a third-party technology platform or website for setting up and managing crowdfunding projects or campaigns and accepting funds. For example, accepted funds are not usually given to fundraisers at once. Instead, third parties manage these funds and give it to the fundraisers at different stages. A third-party seal may reduce perceived information asymmetries and lower the importance of pseudo-personal communication by the venture. Prior research has demonstrated that funders utilize information provided by the third parties to facilitate investment decisions (Laureano Paiva *et al.*, 2014; Ponte *et al.*, 2015). A third-party seal significantly reduces funders' concerns through the promulgation and enforcement of explicit rules and increases the funders' calculus trust. If funders continue to perceive this, then, with extensive interaction, relationship trust in fundraisers can be gained. Calculus and

relationship trust create a positive expectation about the outcomes of the actions of the trustee, thus affecting the investment intention of the trustor (See-To and Ho, 2014). A third-party seal will build a trust relationship with the fundraiser, which in turn leads to willingness to invest. Taken together, the following hypothesis will be tested in this research:

- H5.* The relationship between a third-party seal and willingness to invest is mediated by calculus trust and relationship trust.

3.3 Fundraiser-related characteristics

3.3.1 Value congruence. Value congruence is operationalized as the degree to which the values a funder holds match the fundraisers' values, namely, that they have collective goals (Burke *et al.*, 2007). Williams *et al.* (2012) declared that value congruence embodies the collective goals and aspirations of the members of an organization (Williams *et al.*, 2012). They also found that managers and subordinates who perceive greater similarity between each other evaluate each other more favorably. In the context of crowdfunding, potential funders will be motivated by the vision of the attractive fundraisers when there is value congruence between the funders and fundraisers. By focusing on the benefits that accrue to the funder, the focus is shifted away from the fundraisers' own profit motive. Value congruence is a key component of calculus trust (Burke *et al.*, 2007). When a fundraiser is transparent and authentic in their expression of values, value congruence may develop during the time funders have greater access to the fundraiser's "true self." In this way, value congruence can stimulate the establishment of emotional bonds between funders and fundraisers, forming relationship trust (Jung and Avolio, 2000). Several trust researchers have shown a direct relationship between trust and willingness to invest on the internet (Kim *et al.*, 2008). Value congruence contributes to the fostering of calculus and relationship trust in the fundraisers, and they therefore contribute to the investment intention. In light of this, this paper proposes the following hypothesis:

- H6.* The relationship between value congruence and willingness to invest is mediated by calculus trust and relationship trust.

3.3.2 Social interaction ties. Social interaction ties are channels for information and resource flows. It is a combination of the strength of the relationship and the amount of time spent and communication frequency among participants (Lin and Lu, 2011). Many researchers believed that the crowdfunding platform is an online information intermediary which allows people to establish interpersonal networks since many crowdfunding platforms provide users with communication tools (e.g. SNS, online forums, etc.) so that the fundraisers are capable of interacting and communicating with potential funders to maintain and expand social networks (Li *et al.*, 2015; Xu *et al.*, 2016; Zheng *et al.*, 2014). Frequent social interaction leads to fundraisers sharing more project information with funders and creating trusting relationships (Chang *et al.*, 2015). Moreover, many crowdfunding projects provide potential funders with opportunities to visit their physical stores that they have interests in, and in many cases these field visits will help build trust between fundraisers and funders (Li *et al.*, 2015). Numerous studies have suggested that relationship trust generally results from strong, symmetrical interaction ties (Hsiao and Chiou, 2012). In addition, research has shown that investment

intention is cemented by relationship trust (Kim *et al.*, 2008). Relationship trust can be accessed through social interaction ties, leading to funder investment willingness. Based on that theory, this paper proposes the following hypothesis:

- H7.* The relationship between social interaction ties and willingness to invest is mediated by relationship trust.

3.4 Relationship between mediators

Calculus trust is based on an individual's accumulated knowledge about a service provider's competence and reliability, while relationship trust is more subjective in nature and is built through social exchange that includes understanding accumulated in a relationship (Ranganathan *et al.*, 2013). Scholars argue that calculus trust may also serve as a foundation for relationship trust. A higher level of calculus trust in crowdfunding will serve to reduce uncertainty on the part of the funder about the reliability of a fundraiser (Johnson and Grayson, 2005). Calculus trust represents an initial cognition based on a rational assessment that allows the funder to determine whether to believe in a fundraiser, which makes the fundraiser creditable and builds a high-quality exchange relationship between the funder and fundraiser (Ranganathan *et al.*, 2013). This, in turn, will provide encouragement for the funder to develop closer emotional ties to the fundraiser. Thus, calculus trust provides a base for relationship trust and should therefore exist before relationship trust develops. Only when a baseline level of calculus trust is met will the funders be ready to form the emotional attachments with the fundraiser that relationship trust represents. Then, calculus trust can be converted to relationship trust (Saparito *et al.*, 2002). Recent empirical studies at both the team and the individual level provide evidence that calculus trust positively relates to relationship trust. This leads to the following hypothesis:

- H8.* Calculus trust is positively related to relationship trust.

4. Research design and methodology

4.1 Measurement development

To test the aforementioned hypotheses, this research undertook a large-scale quantitative study. Each construct in the model is measured using a multiple-item measurement scale. Established measures were adopted from relevant previous studies and used with minor modifications to suit the study context. All of these measures use a five-point Likert-type response format, with "strongly disagree" and "strongly agree" as the anchors to reduce the common method bias. A small number of funders ($n = 20$) pre-tested the questionnaire to refine the wording, readability and clarity of the measures before conducting the final survey. Slight wording changes were made to reduce confusion among funders about the questions (Table I).

4.2 Survey procedure

This research used China as the site of the empirical investigation because the supporting context required for crowdfunding development had been put in place. Internet finance is a hot topic in China during the last two years. Crowdfunding, as a type of financial innovation, has grown rapidly in China. According to a World Bank report, China, with the greatest potential in crowdfunding, will account for up

Construct	Items	References
Network externality	Most people are funding in this crowdfunding platform A growing number of funders increase the benefit to a fundraising project	Pae and Hyun (2002)
Perceived informativeness	Many people are funding this fundraising project This fundraising project provides relevant project information This fundraising project provides timely project information This fundraising project provides accurate project information	Kim <i>et al.</i> (2010)
Perceived accreditation	Assessing the competency of a new fundraiser and fundraising project is an important part of the crowdfunding selection process I believe that this crowdfunding platform undertakes a thorough screening process to determine who is allowed to fund there I believe that this crowdfunding platform makes a substantial effort to assess a fundraising project's real competence	Pavlou (2002)
Structural assurance	This platform has appropriate legal safeguards (such as, contracts) put into place to ensure me of a successful funding relationship with the fundraiser I am assured that security technologies (such as encryption) adequately protect me from hacking or leakage I feel safe communicating with fundraisers because platforms provide safety protections	Bock <i>et al.</i> (2012) and Lu <i>et al.</i> (2010)
Third-party seal	Third-party seals make me feel more comfortable Third-party seals make me feel that this platform is secure Third-party seals make me feel safer in terms of the funding	Kim <i>et al.</i> (2008)
Value congruence	I really support the core value of the fundraiser There is a great deal of agreement on core values between me and fundraiser The fundraiser and I share the same goal for the fundraising project	Williams <i>et al.</i> (2012)
Social interaction ties	I spend considerable time participating in this fundraising project I engage in a high level of interaction with fundraisers I have frequent communication with fundraisers	Lin and Lu (2011) and Hsiao and Chiou (2012)
Calculus trust	I can rely on the crowdfunding project and platform The crowdfunding project and platform have my confidence The crowdfunding project and platform have high integrity	Ranganathan <i>et al.</i> (2013)
Relational trust	I would feel a sense of personal loss if I could no longer crowdfund I can talk freely with fundraisers about my problems and know that he or she will want to listen If I share my problems with fundraisers, I feel he or she would respond caringly	Johnson and Grayson (2005)
Willingness to invest	I am likely to fund this project I am likely to recommend this project to my friends I am likely to fund another project on the platform if I am in demand	Kim <i>et al.</i> (2008)

Table I.
Measurement items

to \$50 billion a year by 2025. These favorable conditions provide a solid foundation for the investment in crowdfunding by Chinese citizens.

Angelcrunch (www.angelcrunch.com) and Zhongchou (www.zhongchou.cn) were adopted as the target platform for the questionnaire survey for two reasons. First, they are the largest equity crowdfunding platform and largest comprehensive crowdfunding platform in China, respectively, and more than 7,000 projects have been successfully funded there. Taking members from them as respondents can therefore ensure strong representativeness. Second, Angelcrunch and Zhongchou have their huge user groups that can help to fill in questionnaires efficiently. The questionnaire link was put on their website and forum. To enhance the response rate, the present study asked the websites to distribute internal messages to notify their members, the purpose of this survey was briefly explained in the message, and the questionnaire link was attached. In addition, pre-paid mobile phone cards (CNY 20) were given to 300 randomly selected respondents. A survey methodology was employed because the variables in the research model, including perceptions of network externality, informativeness, accreditation, structural assurance, third-party seal, value congruence, social interaction ties, calculus trust, relationship trust and willingness to invest, are the respondents' feelings and beliefs; therefore, they can be measured through the respondents' self-reporting. Individuals with investment experience on equity crowdfunding projects were invited to participate in the survey; participation was entirely voluntary.

The survey was conducted over a one-month period from November 2015 to December 2015. A total of 649 completed online questionnaires were returned. After eliminating questionnaires from which excessive amounts of data were missing, the final sample consisted of 610 respondents. A balanced male/female ratio (52 percent female, 48 percent male) in the sample was achieved. According to Crowdfunding White Paper 2014, the largest portion (79 percent) of crowdfunding users is between 29 and 65 years old. The respondent age in this investigation ranged from 25 to 65 years, with a mean of 44.24. Respondents were from 53 different cities distributed uniformly throughout China. The projects they funded were mainly in the following industries: technology business (38 percent), internet business (20 percent), IT and telecommunications (9 percent), consumer products (10 percent), and food and drinks (5 percent), which is generally consistent with the data published by the white paper. Thus, the responses seem to be appropriate to the present study.

5. Data analysis and results

5.1 Measurement model

Assessment of the measurement model involved evaluations of reliability and construct validity. Cronbach's α scores were calculated to determine the reliability of the constructs. These values range from 0.791 to 0.850. The Cronbach's α value for each construct surpasses the recommended value of 0.60 or 0.70 (Nunnally, 1978). The reliability was also evaluated by the use of average variance extracted (AVE) and composite reliability (CR). The CR is higher than the 0.60 cut-off value. All constructs also exceeded the recommended AVE value, 0.50 (Fornell and Larcker, 1981). All values exceeded the generally accepted values, indicating good reliability, as shown in Table II.

Content validity and construct validity are often used to measure validity. The variables in this study were derived from the existing literature, thus exhibiting their strong content validity. The construct validity was examined by investigating the discriminant validity and convergent validity. In Table III, the square root of the AVE

Construct	Loading	CR	AVE	α	Construct	Loading	CR	AVE	α	Determinants of funders' investment intentions
Network externality	0.874 0.900 0.787	0.891	0.731	0.829	Value congruence	0.853 0.874 0.905	0.910	0.770	0.850	
Perceived informativeness	0.880 0.835 0.882	0.900	0.750	0.843	Social interaction ties	0.840 0.849 0.884	0.893	0.736	0.831	1811
Perceived accreditation	0.885 0.877 0.805	0.892	0.734	0.840	Calculus trust	0.849 0.853 0.731	0.853	0.661	0.791	
Structural assurance	0.866 0.852 0.908	0.908	0.767	0.847	Relational trust	0.778 0.791 0.836	0.844	0.643	0.797	Table II. Construct reliability and convergent validity
Third-party seal	0.835 0.861 0.876	0.893	0.735	0.833	Willingness to invest	0.845 0.864 0.866	0.894	0.737	0.863	

Construct	NE	PI	PA	SA	TPS	VC	SC	CT	RT	WTI
NE	0.855									
PI	0.085*	0.866								
PA	0.103*	0.145*	0.857							
SA	0.032*	-0.004*	-0.012*	0.876						
TPS	0.022*	0.138*	0.053*	0.029*	0.857					
VC	0.077*	-0.019*	0.102*	0.202*	-0.012*	0.877				
SC	0.087*	0.041*	0.031*	0.027*	0.118*	0.040*	0.858			
CT	0.233*	0.160*	0.302*	0.011*	0.168*	0.049*	0.114*	0.813		
RT	0.190*	0.205*	0.164*	0.012*	0.222*	0.003*	0.278*	0.284*	0.802	
WTI	0.127*	0.131*	0.130*	0.025*	0.128*	0.018*	0.128*	0.360*	0.382*	0.858

Note: * $p < 0.01$

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

extracted from each construct is greater than the correlations between the construct and the other constructs, confirming the discriminant validity of the constructs (Fornell and Larcker, 1981). The convergent validity of each construct can be assessed by applying principal component analysis. A measurement item is considered to load highly if its loading coefficient is above 0.6 and its cross-loading coefficient is below 0.4 (Fornell and Larcker, 1981). Based on these criteria, all of the factor loadings for the items exceed the recommended level of 0.6 and are significant at $p < 0.001$; no items have cross-loadings above 0.4. Thus, all the constructs in the model have adequate convergent validity.

5.2 Structural model

To identify the best model, this paper assessed two alternative models. First, a partially mediated model (model 1) with two mediators (calculus trust and relationship trust) and seven direct paths, including network externality, perceived informativeness, perceived accreditation, structural assurance, third-party seal, value congruence and the social interaction ties to willingness to invest, were revealed to exhibit a good fit to the data. However, the path coefficients of network externality ($\beta = -0.014$, $t = -0.242$, $p = 0.808$), perceived informativeness ($\beta = -0.005$, $t = -0.101$, $p = 0.920$), perceived accreditation

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($\beta = 0.016$, $t = 0.296$, $p = 0.767$), structural assurance ($\beta = 0.013$, $t = 0.365$, $p = 0.715$), third-party seal ($\beta = 0.006$, $t = 0.129$, $p = 0.898$), value congruence ($\beta = -0.006$, $t = -0.192$, $p = 0.848$) and social interaction ties ($\beta = -0.008$, $t = -0.180$, $p = 0.857$) to willingness to invest were not significant. Thus, a fully mediated model (model 2) was subsequently tested with these seven paths constrained to 0. The minimal acceptable values of each indicator are listed in Table IV. Compared to model 1, model 2 has better AGFI, CFI, TLI, RMSEA and a significantly higher χ^2/df ; thus, it was selected as the final model.

5.3 Hypothesis testing

This paper tested a multiple mediation model by using a bootstrapping approach, as suggested by Preacher and Hayes (2008). This method allows for the simultaneous testing of more than one mediator. Several recent papers provide conceptual and empirical evidence for the superiority of this test over Baron and Kenny's (1986) widely used procedure and highlight that a significant indirect effect is the only requirement for mediation (e.g. Preacher and Hayes, 2008). This study used Amos 17.0 to bootstrap the direct and indirect effects existing in the model. The bootstrap estimates were based on 5,000 bootstrap samples. When the interval of a mediating effect contains no zeros, then the indirect effect is significant with a 95 percent confidence level (Preacher and Hayes, 2008). Tables V and VI display the direct and indirect effects and their

Table IV.
Fit indices between
two alternative
models

Items	Model 1	Model 2	Acceptable fit
χ^2	505.453	505.784	$\chi^2/\text{df} < 3$ (Fornell and Larcker, 1981)
df	383	390	$\chi^2/\text{df} < 3$ (Fornell and Larcker, 1981)
GFI	0.948	0.948	> 0.9 (Fornell and Larcker, 1981)
AGFI	0.937	0.938	> 0.9 (Fornell and Larcker, 1981)
NFI	0.942	0.942	> 0.9 (Fornell and Larcker, 1981)
CFI	0.985	0.986	> 0.9 (Fornell and Larcker, 1981)
TLI	0.983	0.984	> 0.9 (Fornell and Larcker, 1981)
RMSEA	0.023	0.022	< 0.05 (Fornell and Larcker, 1981)

Table V.
Hypothesis testing
for direct effects

Influence relation	Hypothesized path	Estimate	SE	CR	p
Direct	Calculus trust \leftarrow Network externality	0.385	0.069	5.610	0.000***
Direct	Calculus trust \leftarrow Perceived informativeness	0.167	0.055	3.037	0.002**
Direct	Calculus trust \leftarrow Structural assurance	0.025	0.042	0.600	0.549
Direct	Calculus trust \leftarrow Third-party seal	0.206	0.051	4.059	0.000***
Direct	Calculus trust \leftarrow Perceived accreditation	0.392	0.064	6.154	0.000***
Direct	Calculus trust \leftarrow Value congruence	0.031	0.040	0.779	0.436
Direct	Relational trust \leftarrow Perceived informativeness	0.138	0.041	3.348	0.000***
Direct	Relational trust \leftarrow Structural assurance	-0.004	0.031	-0.139	0.890
Direct	Relational trust \leftarrow Third-party seal	0.155	0.039	4.028	0.000***
Direct	Relational trust \leftarrow Value congruence	-0.015	0.029	-0.512	0.609
Direct	Relational trust \leftarrow Network externality	0.152	0.051	2.978	0.003**
Direct	Relational trust \leftarrow Social interaction ties	0.240	0.040	6.033	0.000***
Direct	Willingness to invest \leftarrow Calculus trust	0.226	0.036	6.263	0.000***
Direct	Willingness to invest \leftarrow Relational trust	0.419	0.059	7.090	0.000***
Direct	Relational trust \leftarrow Calculus trust	0.140	0.031	4.477	0.000***

Notes: ** $p < 0.005$; *** $p < 0.001$

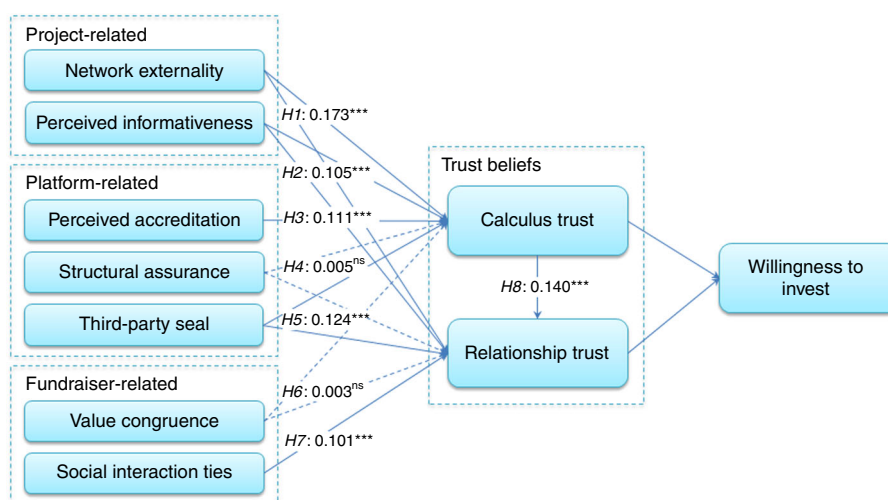
Table VI.

Bootstrap results for
indirect effects

Influence relation	Hypothesized path	Testing result 95% CI ^b		
		B ^a	Lower	Upper
Indirect	Network externality ← Willingness to invest	0.173***	0.117	0.243
Indirect	Perceived informativeness ← Willingness to invest	0.105***	0.060	0.161
Indirect	Perceived accreditation ← Willingness to invest	0.111***	0.065	0.167
Indirect	Structural assurance ← Willingness to invest	0.005	-0.029	0.043
Indirect	Third-party seal ← Willingness to invest	0.124***	0.080	0.176
Indirect	Value congruence ← Willingness to invest	0.003	-0.033	0.036
Indirect	Social interaction ties ← Willingness to invest	0.101***	0.064	0.150

Notes: ^aPath coefficients; ^b95 percent confidence interval; confidence intervals are bias-corrected and accelerated. *** $p < 0.001$

associated 95 percent confidence intervals. In Table VI, the indirect effects of network externality, perceived informativeness, perceived accreditation, third-party seal, social interaction ties on willingness to invest via calculus trust or relationship trust (or both) are positive and significant, with 95 percent confidence intervals, excluding 0, providing support for *H1*, *H2*, *H3*, *H5* and *H7*. However, the indirect effects of structural assurance and value congruence on willingness to invest via calculus trust and relationship trust are not significant, providing no support for *H4* and *H6*. These findings emphasize the importance of calculus trust and relationship trust because they fully mediate the positive effects of network externality, perceived informativeness, perceived accreditation, third-party seal and social interaction ties on willingness to invest. Moreover, in Table V, the direct effect of calculus trust on relationship trust is found to be significant, providing support for *H8*. This finding is in accordance with the results presented by Saporito *et al.* (2002) (Figure 2).



Notes: ns, not significant. * $p < 0.01$; ** $p < 0.005$; *** $p < 0.001$

Figure 2.
The structural model

6. Discussion and implications

The current study was designed to explore the factors identifying funders' motivations for investing in crowdfunding through trust theory. Hypothesis testing (illustrated in Tables V and VI) shows that six of the eight hypotheses are supported. As expected, calculus trust and relationship trust collectively or separately transmit the effect of network externality, perceived informativeness, perceived accreditation, third-party seal and social interaction ties to investment intention, which is in line with previous literature (Hsiao and Chiou, 2012; Kim *et al.*, 2008; Littlewood *et al.*, 1995; Pae and Hyun, 2002; Pavlou, 2002). However, the present study did not find any evidence for the mediating effects of calculus trust and relationship trust on the relationship of structural assurance and value congruence to investment intention. It may be unsurprising that structural assurance did not influence investment intention in terms of a platform's safety precautions and the user's online experience. A large proportion of extant websites have paid much attention to security, and there exist few security holes because of the improved safety precautions. Also, most crowdfunding users already have rich online experience; they can be aware of the few security risks and high level of protection of their capital and private information, and so the security of online trade and online investment is not a concern for them. The most possible explanation for the rejection of value congruence might be that the short-term interaction cannot completely acquaint funders with fundraisers. They require constant contact to examine whether the value congruence is uniform between them. Thus, value congruence may not be an independent variable in the model of investment intention toward crowdfunding projects.

6.1 Theoretical implications

The proposed research model indeed seems highly applicable to the context of crowdfunding, and its consideration leads to a number of important theoretical implications.

First, although behavioral intention is an important research issue and has been extensively studied in the IS literature, this is a topic that has not been studied in the context of crowdfunding in the past. The present study fills this knowledge gap. It is among the first that has contributed to an understanding of funders' investment willingness in the context of crowdfunding.

Second, in the IS literature, trust was often examined as a key antecedent for evaluating online vendors and buying tangible online products. This paper extends this line of research to the role of trust in crowdfunding by examining their impact on funders' intentions. The present study has produced moderate evidence in favor of conceptualizing trust as having calculus and relational dimensions in crowdfunding. Though the two dimensions are highly correlated, they are empirically distinguishable. Trust might be seen as a tablet with an affective coating (relationship trust) and a cognitive center (calculus trust). In addition, most studies analyze direct effects among variables and ignore the transitivity of mediators. This paper has tested the mediation effects of trust and empirically tests a theory-grounded model of trust. After a comparison between model 1 and model 2, this study reveals that calculus trust and relationship trust exert fully mediating effects on the relationship between independent variables and the dependent variable. This study extends the trust theory by investigating the mediating effects of calculus trust and relationship trust on funders' investment willingness.

Third, this study analyzes the factors that influence funders' perceived trust in crowdfunding. Although trust predictors such as project-related (network externality and perceived informativeness), platform-related (perceived accreditation, and third-party seal) and fundraiser-related (value congruence) antecedents have been

examined separately in various fields, this is the first time that an integrated theoretical framework incorporating all these predictors has been developed and empirically validated. This investigation extends the management information system literature by providing a more comprehensive view of the formation of funders' investment willingness via a mediation effect of calculus and relationship trust.

6.2 Managerial implications

The study also has important managerial implications. It provides guidance for both practitioners and crowdfunding fundraisers in their quest to promote funders' investment intentions and to improve the management of crowdfunding industry.

Specifically, service providers should acknowledge the importance of network externality and a third-party seal. Collaborating with a well-respected third party (e.g. a bank or a funds custodian) is an avenue to increase funders' trust because such an effort can be useful in avoiding moral hazard, which in turn will increase funders' investment intention. Platforms can also put the latest information somewhere visible to inform funders that third-party assurance exists for this project and that many people (e.g. fundraisers' acquaintances) have already funded this project. This can help increase funders' perceived trust in the project. When delivering important crowdfunding-related information via the platform, information providers should be cognizant of the effects that message structure and content ultimately have on funders' trust. Providing clear credentials is another way to legitimize the provider of the message and increase the likelihood that a funder will trust and ultimately fund based on the information. The results suggest that platform designers need to pay attention to perceived accreditation. Funders will have high level of trust if a platform evaluates fundraisers' credit via an industrial and national credit assessment system. For example, the mispricing of fundraising projects is a common phenomenon that can be observed on most crowdfunding platforms; so it is important for crowdfunding platforms to audit this information, especially when a fundraising project is overpriced. They can also invite funders and fundraisers to negotiate the fundraising price together.

Fundraisers should emphasize frequent interaction with funders on crowdfunding platforms. To do this, formal communication and informal communication could be simultaneously adopted. In terms of formal communication, fundraisers can divide their project into several parts and raise funds for each part at different times. Funders could provide or receive feedback information from prior projects and would thereby be more likely to trust and fund this project. This can also attract more users to participate. In terms of informal communication, inviting some funders to visit or experience the project results, such as physical stores or products, can also allay funders' uncertainty (Bock *et al.*, 2012).

Besides, to solve the problem of market mechanism, governmental guidance and supervision should be strengthened, such as mandatory information disclosure, consumer equity protection, etc. Specifically, it is important for government and industry groups to set up a crowdfunding information disclosure mechanism. Such an effort would be effective in protecting investors and establishing public confidence. Furthermore, as an effective means to ensure capital safety, government regulators should promote the use of third-party funds' custodians in crowdfunding campaigns. If necessary, they may also consider offering subsidies to reduce the fees charged by third-party intermediaries. The government may also take the leading role in setting up a database of experts. Through this, during the project evaluation process, some advice from specialists in related field is expected to significantly improve the project quality and success rate (e.g. set the right funding target).

6.3 Methodological implications

This study also provides important methodological implications to the area of mediation analysis. There are several methods for finding a confidence interval for an indirect effect or for testing an indirect effect for significance (Preacher and Hayes, 2008). Although a growing body of statistical simulation literature calls into question traditional mediation analysis methods such as causal steps approach tests (e.g. Baron and Kenny's test) and tests that make distributional assumptions (e.g. Sobel's test), mediation continues to be frequently determined using the logic of Baron and Kenny or the Sobel test (Baron and Kenny, 1986; Preacher and Hayes, 2008). This paper recommends using bootstrapping because this method does not assume that the sampling distribution of the mediated effect is normal and thus has high statistical power. The bootstrapping method is a non-parametric test and it involves repeatedly randomly sampling observations with replacement from the data set to compute the desired statistic in each resample. As such, this method does not require the normality assumption to be met and can be effectively utilized with smaller sample sizes. Meanwhile, this method allows for the simultaneous testing of more than one mediator. Thus, bootstrapping is appropriate for the present study and therefore is employed to test for the mediating effect, which is believed to be more accurate than the standard intervals obtained using sample variance and assumptions of normality. This paper uses Amos to investigate multiple mediation effects based on bootstrapping procedures. The Amos output provides the results of a bootstrap test of all direct and indirect effects in the estimated model including the three-path mediational chain (e.g. network externality→calculus trust→relationship trust→willingness to invest). Given the facts above, compared to traditional mediation analysis methods such as causal steps approach test and Sobel's test, the bootstrapping method is more convenient and the results calculated by it are considered to be more convincing.

7. Limitations and suggestions

This study is not free from limitations. First, the approach of using groups of antecedents narrows the research view because only a limited number of variables could be specified as antecedents. Future research should be directed at including other aspects of relationships between funders and fundraisers, such as social closeness and price. Second, this study is based on survey data, which suffer from the usual limitations associated with the cross-sectional survey method. Future studies may adopt a longitudinal study design, which can help to simultaneously examine the incremental developmental processes of funder trust in crowdfunding. Third, the sample size is relatively small and limited in scope to one country. Although appropriate statistical methods have been applied to the data, the generalizability of the findings would be strengthened if they were to be replicated with a larger sample. Cross-cultural studies may also be conducted to shed light on the extent of impact of trust on funder willingness to invest through crowdfunding, in particular on the differences between relational and calculus trust.

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