Effect of Success Probability Perceived from Features of Project and Social Trends on Investment Decisions in Crowdfunding

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Abstract: Many previous studies have investigated the effect of trust on funders' investment decision and the factors which influence the success probability of a project in crowdfunding. However, few works have analyzed the effect of perceived success probability of a project on funders' investment decision yet. Especially, few researchers have studied the success probability perceived from social trends, which has dynamic features, and the dynamics of its effect on funders' investment decision. This paper analyzes the crowdfunding campaigns by stages focusing on the success probability perceived from social trends. The analysis shows that the success probability perceived from social trends affects funders' investment decision and the effect is moderated by stages in campaign. The result gives some implications for developing crowdfunding theory and improving crowdfunding platform service.

Keywords: crowdfunding, fundraising, success probability, social trends, funding decisions, platforms.

I. Introduction

Crowdfunding is a significant alternative means of funding small and medium-sized enterprises (SMEs), and so has attracted much attention from researchers [1]-[3]. In recent years, crowdfunding is rapidly growing in the world [4]-[7]. It has become one of the largest sources of financing for SMEs and is expected to reach an annual volume of US$ 100 billion by 2025 [8].

The main idea of crowdfunding is to raise external finance from a large number of usual consumers contributing small sums, instead of soliciting a small group of sophisticated investors [9], [10]. So the task of transforming many consumers into investors in limited time is assigned to fundraisers in crowdfunding, and it cannot be done without IT and social networks [11]. Psychological problems as well as economic and legal ones are raised in transforming many consumers into investors by using social networks. Consumers' thought is multifarious and their purposes are also different. In order to persuade consumers with different interests to share the same goal, fundraisers must consider what they want, what they prefer and what they are in fear of, and launch and manage projects meeting them.

In previous studies, many works have investigated the antecedents of crowdfunding success [12]-[21]. Liang, et al.

[22] divided the antecedents of crowdfunding success into three types: creator-related factors, projects' internal characteristics and information description. The creator-related factors include creators' experience, expertise, group size, composition, social capital and human capital; the projects' internal characteristics include goal, duration, category, rewards and so on. Information description has three dimensions, including information quantity, information quality and the frequency of information update. The creator who has rich experience, plenty of social capital and human capital is likely to have high success probability in crowdfunding. The projects that have reasonable characteristics such as funding goal, duration, category, rewards and so on have high success probability and otherwise are likely to fail. Information quantity, information quality, and information attitude of project description have different effects on crowdfunding; therefore, it is also an important factor to set these dimensions reasonably for crowdfunding success.

Many studies [23] indicated that the antecedents of crowdfunding success affect the consumers' investment decision via trust and perceived success probability. Although trust is the first factor for consumers to decide investment, success probability is also an important factor that affects their investment decision. Consumers first notice the success probability of project from its features in the startup of campaign and ultimately judge it via social trends for the project in the later stage of campaign. Success probability perceived from the features of project is completely decided in the early days of campaign, but the success probability perceived from social trends constantly changes during the entire campaign of the project.

The effect of trust on funders' investment decision in crowdfunding has been fully verified in previous works. Trust for creators positively affects the investment intention of funders [23], [24]. Trust can be considered as the judgment of funders on the trustworthiness of creator and mainly comes from creator-related factors such as past experience and expertise [25], reputation [24], value similarity [23], personal network [26], [27] and so on [28]. Zhou et al. [25] found that creators' past experience and past expertise are the important

antecedents of projects' success by using the unimodel theory of persuasion. Besides, several literature indicated that creators' past success experience [29], [30], expertise [31] and trustworthy appearance [32] are the important factors related positively to crowdfunding success. Nguyen [33] and Lax [34] argued that creator-related information such as reputation and value similarity increases trustworthiness perceived to investors. Mollick [35], Chan et al. [24] and Dragojlovic et al. [36] found that creators' human capital and social capital are the important factors to achieve crowdfunding success. Some researchers focused on the gender of creator and identified that females have higher success rates in crowdfunding compared to males [37], [38]. Liang et al. [23] and Yang et al. [28] found that value similarity between creators and funders is positively related to the trust of funders to creators. Trust has critical effect on investment decision because this makes consumers believe that the creator has the ability and willing to fulfill his/her promise related to project [39]. In this sense, trust can be called a subjective factor of project success.

In order to persuade consumers to invest in a crowdfunding project, the creator has to meet not only the subjective factors but also the objective factors. The most critical objective factor would be the success probability of project. Although a creator has high ability and willing to fulfill his/her promise, if the success probability of the project has not been identified, consumers would be difficult to decide investment.

Success probability of project has also attracted significant attentions of researchers. In general, the success rate of a crowdfunding project is related to its internal characteristics including the category of project, funding goal, duration, creativity, quality of rewards, quality of project, quality of project description and so on [40], [41]. First, almost all studies identified that the funding goal and minimum investment are the important factors related to crowdfunding success [42]. A project that has a higher funding goal is likely to have lower possibility of crowdfunding success [9], [43]-[46]. Second, many studies indicated that the projects' timing characteristics affect the success probability of crowdfunding. Some literature suggested that long duration is positively related to crowdfunding success [44], while others argued that long duration is negatively related to success [46], [47] or has no significance [48]. Crowdfunding projects are likely to receive higher number of contributions on weekdays compared to weekends and collect the highest donation amounts on weekends [47]. Third, many researchers suggested that the quality of project description is an important factor related positively to the success possibility of crowdfunding [49]. The fundraising performance of a crowdfunding project can be predicted by using the information including the semantics [50], emotion (pleasure, sorrow and empathy) [51], [52], reciprocity [53], objectivity and interactivity [54] extracted from the words and phrases of its text description. Liang et al. [22] identified three dimensions of information quantity, information attitude and information quality and examined their effects on crowdfunding success. Some other factors including readability [25] and the number of videos [55] also affect crowdfunding success. Fourth, some literature suggested that the quality of rewards has the positive effect on crowdfunding success. If the funders can choose the wider range of rewards

and the more categories of rewards, the project is likely to have higher success possibility. Fifth, the success probability of crowdfunding is moderated according to the project type. Liang et al. [23] suggested that the effect of different features of project on success probability is moderated by their types. Chan et al. [24] identified that there exist systematic variations in funding activities across project types. Saman et al. [58] argued that green projects delivering an economic benefit to the society are more likely to reach the target funding.

Success probability of crowdfunding is not associated only with the features of project but also with social trends for it [55], [59]. According to Kraus et al. [60], the communication between the creators and funders is positively related to crowdfunding success. Communication and interaction between creators and funders are conducted by using the comments and replies [61]. Although the features of project are excellent, if the responses of consumers on the project are insignificant, it is vague to hope the success of project [62], [63]. Therefore, consumers identify the success probability of project not only from the features of project but also from the responses of other consumers [64]. According to Evers [65], the knowledge that others have invested in a project creates pressure on a person to do the same. Bilau et al. [44] and Kabylka [63] reported that crowdfunding projects that receive support from a large number of backers are more likely to be successfully funded than the projects that receive support from fewer backers. Ralcheva [66] argued that large investor backing is positively associated with crowdfunding success. Petrova [67] and Kabylka [63] identified that the average amount pledged by backers is an important factor in crowdfunding success. Etter et al. [68] proposed a method for evaluating the success possibility of crowdfunding projects by analyzing the time series of money pledges. Some studies indicated that crowdfunding projects that have received early funding have a higher success probability than projects which have not and crowdfunding projects that have already reached a critical mass and are close to their funding goals are more likely to succeed [45], [47], [48]. According to Onnée et al. [56], early funders' support acts as a signal to creators' social networks, which will form a broader circle of funders. Crosetto et al. [62] argued that early pledges do anticipate project success, but projects' communication efforts also play an important role. Chung [69] proposed a model to predict the success of a crowdfunding project by using temporal features (cumulated pledged money over time and cumulated number of backers over time) and twitter features (number of tweets, number of followings, number of followers, number of favorites and so on). Moisseyev [70] analyzed the effect of social trends such as the number of social media followers and social media seals of approval on fundraising performance.

Perceived success probability is no less important on consumers' investment decision than trust [67], [71]. Success probability perceived to consumers is not the same as the actual success probability of the project. Harboe [40] and Zhao et al. [72] analyzed the effect of the success probability of project perceived to consumers on fundraising performance. It depends on the quantity, correctness and frequency of information provided to a consumer whether he/she feels the success probability of project or not, and the role of

crowdfunding platform is important in this aspect [73], [74]. Veuger [75] found that larger and more stringent platforms have a higher project success rate and platforms with an All-or-nothing funding model have a higher project success rate than ones with a Keep-it-all funding model. Similarly, Cumming et al. [76] also identified that All-or-nothing campaigns are more successful than Keep-it-all campaigns and projects with high goals are more likely to opt for All-or-nothing campaigns. Onnée [56] indicated that it is important to choose a platform that has the ability to attract users with high performance potential in order to create a positive herding effect to achieve project success. Heerink [74] demonstrated that on-platform updates promote the success of a crowdfunding project.

Previous studies have paid significant attention to the success probability of project but have not to the success probability perceived to consumers. Especially, few works have studied the success probability perceived from social trends (the responses of other consumers), which has dynamic attributes, and the dynamics of its effect on the investment decision.

In this paper, we analyze crowdfunding campaigns by stages focusing on success probability perceived from social trends. We consider not only trust but also perceived success probability (from features of project and from social trends) as the critical factors that affect consumers' investment decision in crowdfunding and evaluate their effects on project success. Experiments are performed by three stages of campaign duration in order to analyze the effect of success probability perceived from dynamic social trends on investment decision. To our best knowledge, this study is one of the first works to investigate the success probability perceived from social trends with the probability perceived from the features of project together.

The remainder of this paper is organized as follows. Section II sets up our theoretical research model and hypotheses. We describe our research method in section III and do data analysis in section IV. Section V discusses findings from the data analysis and section VI gives a conclusion.

II. Theoretical framework and hypotheses

A. Components of crowdfunding

Stakeholders are generally classified into crowdfunders, beneficiary-investees, crowdfunding platforms and other service providers, and sponsors in crowdfunding [8]. This classification involves all the human components in crowdfunding, but doesn't involve all the factors influencing the success of project. We divide components of crowdfunding into project creators, crowdfunding projects, social trends, crowdfunding platforms, consumers and social network. Figure 1 shows these components.
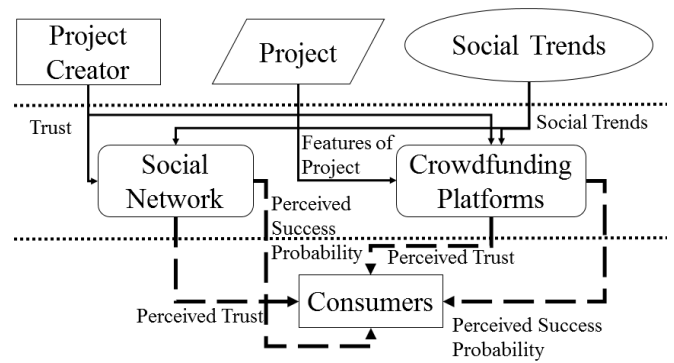

Figure 1. Components of crowdfunding

Project creators, crowdfunding projects and social trends affect consumers via social network and crowdfunding platforms as shown in Figure 1. Consumers perceive trust towards project creators via social network and crowdfunding platforms and perceive success probability from the features of crowdfuding projects and social trends towards the projects. It depends on the combination of perceived trust and perceived success probability whether consumers would be transformed into crowdfunders or not.

B. Perceived success probability and trust

1) Perceived success probability

Trust is perceived from the subjective features of project creator, while success probability is perceived from the objective features, i.e. the crowdfunding project and social trends surrounding it.

Perceived success probability of crowdfunding project is influenced by its characteristics. Project type might moderate the investment intention of consumers and a higher funding goal might make consumers have lower expectations for success of project [23], [43], [48]. The features of project such as the number of pictures and number of videos might bring consumers a higher expectation for success of project.

Success probability of crowdfunding project is also influenced by social trends. If consumers hesitate to invest in the attitude as bystanders, the success probability of project would decrease; if consumers take active part in investment, the success probability of project would rise. If a lot of consumers have already invested significant amount of money in a crowdfunding project, other consumers might also think that the success probability of the project is high and, therefore, make their decisions to invest.

Perceived success probability comes from the features of project and social trends towards it and these two factors have different natures. Success probability perceived from the features of crowdfunding project is almost constant during the entire campaign of the project. The feature factors of project such as project type, funding goal, duration, the number of pictures, the number of videos, the estimated delivery date and the gender of project creator are all specified in the early days of crowdfunding campaign. Greenberg et al. [77] proposed a machine learning classifier that uses the features of project including project type, funding goal, the number of videos and the number of rewards to predict the success probability of project at the time of project launch and the accuracy of the classifier reached to 68%. Success probability perceived from the features of project, therefore, is also decided in the early days of project. Success probability

perceived from social trends constantly changes during the entire campaign of the project. Funding performance factors such as amount pledged and percentage of money pledged and social-communication factors such as social media mentions and the number of funders constantly change during the entire campaign of the project. Success probability perceived by funding performance and social-communication factors, therefore, also changes.

So the success probability of project is influenced by the static factors decided in the early days of the campaign and the dynamic factors ever-changing during the entire campaign. Perceived success probability, therefore, would constantly change during the entire campaign of the project.

2) The relationship between perceived success probability and trust

Trust comes from such subjective factors as the features of project creator, while perceived success probability comes from such objective factors as the characteristics of project and social trends. It depends on consumers' disposition to the investment whether they focus on trust or on success probability. If a consumer attaches importance to the character and ability of the project creator, his/her investment decision would be influenced by perceived trust rather than perceived success probability; if the consumer prefers to avail himself/herself of social trends, his/her investment decision would be influenced by perceived success probability rather than perceived trust.

Of course, consumers would make decision to invest believing the project creator rather than social trends, and would focus on subjective factors rather than objective factors. The effect of trust on the success of project might be larger than the effect of perceived success probability. However, the investing psychology of consumers cannot be explained only with trust.

The investing psychology of consumers can be divided into two categories in crowdfunding. First category is the psychology to contribute to prosocial activities and second one to expect rewards. The first category can be seen as the personal responsibility of a bystander [78]. When consumers with this category of psychology consider the investment in a crowdfunding project, diffusion of responsibility effects will occur. If consumers know that others could instead contribute to the project, their willing to invest will be reduced. The second category can be seen as consumers' expectation of additional utility [9]. Consumers with this category of psychology will have stronger willing to invest as more consumers invest in the project and amount pledged gets higher. When more funders invest in project and higher amount is pledged, the success probability of the project gets higher, and, therefore, funders' expectation of additional utility gets more promising. Therefore, we propose the following hypothesis:

H_1: Consumers' perceived success probability of crowdfunding project has a positive impact on their investment decision.

Trust has a positive impact on the consumers' investment decision regardless of the category of consumers' psychology. Because all the consumers want their investment to be really put to a good use, regardless of whether they make decision to invest according to the responsibility or expecting additional utility. However, perceived success probability has different impacts according to the categories of consumers' psychology. When perceived success probability of a project is high, consumers with psychology of bystanders are less willing to invest and ones who expect additional utility are more willing. This paper doesn't consider the consumers with psychology of bystanders. We only discuss the consumers who expect additional utility and have stronger willingness to invest in the project with higher perceived success probability.

C. Moderation of success probability perceived from social trends

1) The dynamics of the effect of success probability perceived from social trends on investment decisions

Trust and success probability perceived from the features of project are decided in the early days of the campaign of crowdfunding project, while success probability perceived from social trends constantly changes during the entire campaign of the project. In the early days of crowdfunding campaign, any project has no or very small money pledged, and, therefore, the funding performance factors including amount pledged, percentage of money pledged, and number of funders would be near to zero and the social-communication factors including social media mentions and crowdfunding platform mentions would have no significance. In this situation of the project, no matter how significant the factors such as average amount pledged per day and average amount pledged per funder are, they cannot greatly influence the investment decision of consumers. So the investment is usually driven by the responsibility effect in the early days of campaign [78]. As the project is launched and time goes by, the factors such as amount pledged and percentage of money pledged gradually have significant values; if social media and crowdfunding platforms mention the project, consumers can have some expectations for the success probability of the project. In this situation, the diffusion of responsibility effects diminishes and the positive effect of project updates increases [78]. As the project is heading towards the end of its duration, consumers can almost definitely expect the final amount pledged and the social concerns for the project would be clear. In this step of the campaign, success probability perceived from social trends will have the greatest effect on the investment decision of consumers. Therefore, we propose the following hypotheses:

H_2: In the campaign of a crowdfunding project, as time goes by, the effect of success probability perceived from social trends on consumers' investment decision increases.

As the success probability perceived from social trends varies, consumers' willing to invest in crowdfunding project might also do. If the percentage of money pledged, average amount pledged per day or average amount pledged per funder have high values in the early days of the campaign, consumers would feel that the success probability of the project is high. This positive trend would get growing as the amount pledged grows and the project is heading towards the end of its duration. When the duration of project is almost over and the amount pledged gets close to the funding goal of project (i.e. more than 90%), consumers would consider the

success of project as an established fact and strive to attend the funding of project. On the contrary, if the average amount pledged per day or the number of funders remains low even after some time has passed from the launch of project, consumers will feel that the project is not promising and its success probability is low. If the amount pledged or average amount pledged per day still remain low even though the duration is almost over, consumers would consider the failure of project as an established fact and give up funding. Like this, consumers' willing to invest changes according to the dynamics of success probability perceived from social trends.

H_3: If the success probability perceived from social trends increases, consumers' investment decision is positively moderated.

H_4: If the success probability perceived from social trends decreases, consumers' investment decision is negatively moderated.

2) The role of crowdfunding platforms in moderating the success probability perceived from social trends

The social trends influencing the perceived success probability include the funding performance factors such as amount pledged, percentage of money pledged and average amount pledged, and the social-communication factors such as social media mention, crowdfunding platform mention, and number of funders. The funding performance factors mainly come from the crowdfunding platforms and become public to consumers through them. The social-communication factors mainly become public to consumers through social network. It is impossible to moderate the success probability perceived by consumers from social network, but it is possible to moderate one from crowdfunding platforms. Mekerishvili [79] found that it may rather be the optimal option that a crowdfunding platform doesn't provide funders with complete understanding of project and a crowdfunding platform can increase the investment intention of funders in this way.

Crowdfunding platforms are a kind of service systems supporting crowdfunding. An important role of crowdfunding platforms as a kind of service systems is to help consumers perceive enough the success probability of projects. If the crowdfunding platforms rationally control the process of calculating and representing the funding performance of projects, the success probability perceived by consumers might increase. Crowdfunding platforms can moderate the success probability perceived by consumers by actively representing the pledge performance factors when they can have a big positive impact and not representing when they can have a negative impact. And they can selectively represent the factors which can have positive impact on consumers' investment decision among the funding performance such as amount pledged, percentage of money pledged, average funding speed per day (percentage of money pledged vs. number of days passed) and so on. Like this, crowdfunding platforms can promote the positive investment decision of consumers. Therefore, we propose the following hypothesis:

H_5: If crowdfunding platforms only represent the positive funding performance factors of projects, they can positively moderate consumers' investment decision.

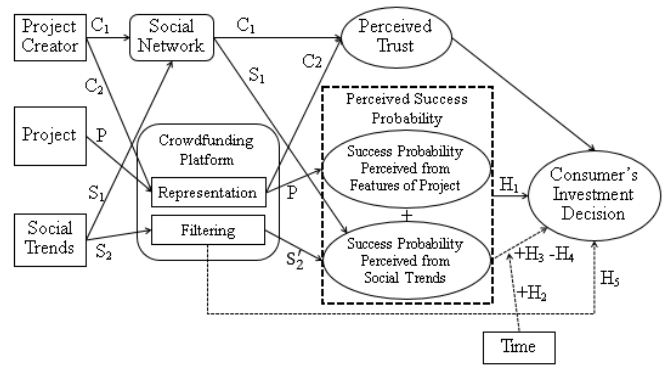Figure 2 shows our research model based on above theoretical framework.

Figure 2. Research model of the effects of perceived trust and perceived success probability on consumers' investment decision

C_1: Information on the trust of project creator represented through social network (i.e. ability of project creator, reputation of project creator and etc)

C_2: Information on the trust of project creator released through crowdfunding platforms (i.e. quality of project description, ability of project creator, value similarity and etc)

P: Information on the features of project (i.e. project type, project duration, number of pictures, number of videos, the estimated delivery date, gender of project creator and etc)

S_1: Social trends represented through social network (i.e. social-communication factors such as social media mentions, number of funders and etc)

S_2: Social trends collected to crowdfunding platforms (i.e. funding performance such as amount pledged, percentage of money pledged, average amount pledged and etc)

S_2': Social trends passed to consumers through crowdfunding platforms (i.e. the social trends filtered by crowdfunding platforms)

III.   Research method

A.   Experimental task and model

Experiment is conducted in two steps in order to validate the proposed hypotheses.

First step is a pilot test and evaluates the effects of the trust and success probability perceived from the features of project on the investment decision.

In order to verify that perceived trust and perceived success probability have effects on the investment decision, that is, verify H_1, we apply the following LPM (linear probability model) [80]:

$$decide = \beta_0 + \beta_t trust + \beta_p possible + \varepsilon_t \qquad (1)$$

where *decide* is a binary variable representing investment decision(*decide* = 1 for invested, *decide* = 0 for uninvested), *trust* is the indicator of the trust perceived by consumer towards the project creator, and *possible* is the indicator of the success probability of project perceived by consumer. ε_t is an error term that is a white noise.

Second step is the formal experiment and analyzes the dynamics of success probability perceived from social trends during the campaign of the project and its effect on the investment decision. We employed 2×3 factorial design to analyze the effect of the success probability perceived from

social trends [81]. The treatments are the control of social trends (presented, and not presented), the stage of campaign (early, middle, and end). For simplicity, all the durations of projects are set to 30 days, and the first 10 days of campaign are named "early stage", the second 10 days "middle stage", and the third 10 days "end stage".

This second experiment was conducted in two ways. First, the information on the social trends towards crowdfunding projects was not presented and only the description of project given to subjects. We asked 50 subjects to evaluate the projects and decide whether to invest in or not at the early stage, middle stage, and end stage, respectively.

Second, the information on the social trends towards projects (i.e. social network response, percentage of money pledged, funding speed) as well as the descriptions of projects are provided to subjects together. Funding speed is the percentage of money pledged divided by the number of days passed. Funding speed can be seen as the speed of the project to reach its funding goal. Here 50 subjects were asked to evaluate the projects and decide whether to invest in or not at the early stage, middle stage, and end stage, respectively, too.

In order to study the dynamics of the effect of the trust and success possibility perceived from the features of project, and the success possibility perceived from social trends on consumers' investment decision, we apply the following LPM:

$$decide = \beta_0 + \beta_t trust + \beta_p possible + \beta_s social + \varepsilon_t \quad (2)$$

where *decide* is a binary value representing investment decision (*decide* = 1 for invested, *decide* = 0 for uninvested), *trust* is the indicator of the trust perceived by consumers towards the project creator, *possible* is the indicator of the success probability perceived from the features of project, *social* is the indicator of the success probability perceived from social trends, and ε_t is a residual item that is the white noise.

Also, in order to study how the success probability perceived from social trends changes as time goes by, we apply the following linear regression model to estimate the relationship between the success probability perceived from social trends, social network response, percentage of money pledged, and funding speed (percentage of money pledged per day).

$$so = \beta_0 + \beta_a anno + \beta_l level + \beta_v velocity + \varepsilon_t \quad (3)$$

where *so* is the success probability perceived from social trends, *anno* is the social network response (i.e. advertising, news, and etc) during the campaign, *level* is the percentage of money pledged, and *velocity* is the funding speed.

B. Data collection

We built an experimental webpage that has 9 experimental projects and recruited 400 students as participants. In first experiment, we asked 100 participants to visit the experimental website and read 9 projects in order to collect the data for estimating the model (i.e. trust indicator, success probability indicator, and investment decision). Then, we instructed them to complete a questionnaire representing whether they are willing to invest in or not.

In second experiment, 300 participants were divided into 2 groups (150 participants, respectively); each group was divided again into 3 subgroups (50 participants for early, middle and end stage, respectively). Two groups started

experiment at the same time. Information on social trends at the time was provided to participants of the second group but not to the first. Everyday 5 participants took part in the experiment. Participants read the description of project and social trends, answering the questionnaire and declaring whether to invest in. Through the experiment, we received 450 responses for each treatment cell of factorial design; each response is a triple composed of 3 values: *trust*, *possible*, and *social*. Participants who had taken part in the first experiment were removed to ensure the objectivity of the second experiment.

In this experiment, data is collected by asking 400 students of different personality and interests to answer a questionnaire for 9 crowdfunding projects with different trusts and success possibilities. Therefore, this data can be considered as relatively comprehensive data in respect of size and quality.

C. Measurement

In first experiment, we made a questionnaire as shown in Appendix 1. The items for perceived trust have been well described in previous studies, and, therefore, we used them to word questions [82], [83].

In second experiment, a questionnaire was made as shown in Appendix 2. Also, the indicator values such as social network response, funding speed, amount pledged, and percentage of money pledged are collected for the analysis of social trends. Social network response indicator was evaluated by using Appendix 3.

IV. Data analysis and results

We applied Ordinary least squares (OLS) analysis to estimate and analyze the research model [80]. R^2 and F-value are analyzed to test the statistical significance of the model and t-values for all coefficients to assess its adequacy. The validity of the model indicates that the factors of model have impact on the investment decision. We analyze the coefficients to evaluate the effect of the factors on the decision-making of investment. In this case, analysis was done by considering the characteristics of particular coefficients and by comparing the characteristics of the same kind of coefficients. We used EVIEWS, a statistical software package to estimate the research model.

1) The effects of perceived trust and perceived success probability on investment decision

First experiment employed 100 students to collect data and applied the model described in section III to conduct analysis. We had the following regression equation by conducting regression analysis on the data which was collected for 9 projects.

$$decide = \frac{0.213992}{(1.367)} + \frac{0.063786\,trust}{(1.663)} + \frac{0.063786\,possible}{(1.663)}$$

$$(4)$$

Table 1 shows t-value, F-value, and R^2 for coefficients of the above regression equation.

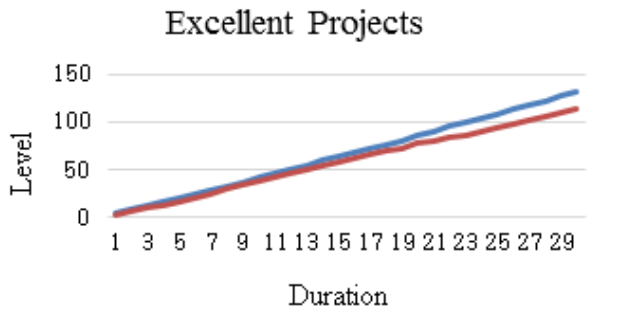|	β_0	β_t	β_p	F	R^2
ex(4)	0.24	1.663	1.663	2.324	0.072

Table 1. Results of first experiment.

As shown in Table 1, *t*-values for the constant term, the coefficient of perceived trust, and the coefficient of perceived success probability, and *F*-value didn't exceed their critical values even at the 10% level of significance. And R^2 is also very small. Therefore, we concluded that this model was not adequate.

B. *The dynamics of the effect of the success probability perceived from social trends on the investment decision*

In second experiment, data was collected respectively in the case where we show the information on social trends and the case where we don't, as proposed in section III. The comparison of the data showed that amount pledged and funding speed are different between the two cases.

For the effectiveness of experiment, we classified projects into 3 categories: excellent, usual, and poor. Figure 3, 4, and 5 show the funding indicators respectively for 3 types of projects, subject to whether the information on social trends is presented or not. Blue lines show the case where social trends are presented and red ones show the case where social trends are not presented.
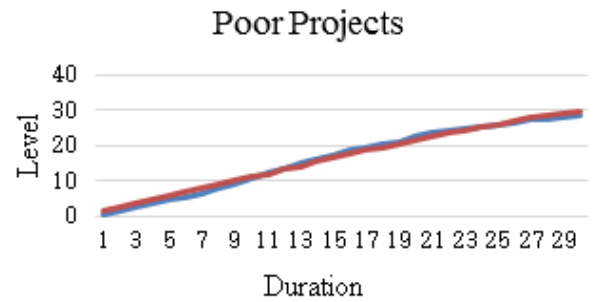
a) Percentage of money pledged indicator
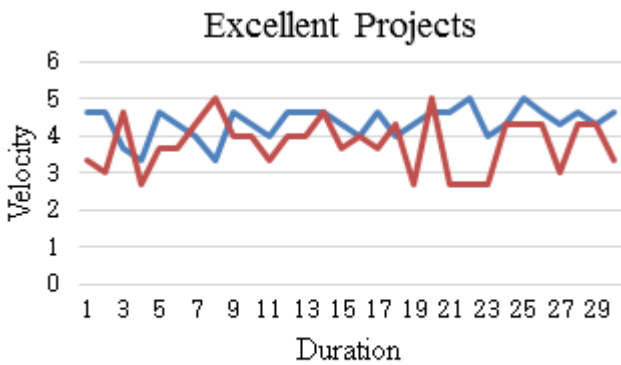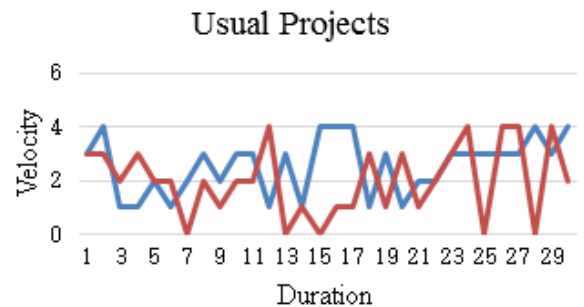
b) Funding speed indicator
Figure 3. Funding indicators for excellent projects

a) Percentage of money pledged indicator

b) Funding speed indicator
Figure 4. Funding indicators for poor projects

a) Percentage of money pledged indicator

b) Funding speed indicator
Figure 5. Funding indicators for usual projects

As shown in Figure 3, percentage of money pledged indicator for excellent projects increased when information on social trends was presented. And funding speed for excellent projects had a little increasing trend from early stage to end stage when the information on social trends was represented and highly fluctuated without any special trend when the information on social trends wasn't represented.

As shown in Figure 4, percentage of money pledged for poor projects was similar regardless of whether the information on social trends was represented or not. When the information on social trends was represented, funding speed increased a little and decreased again at the middle stage, and significantly decreased as campaign was heading towards the end stage. However, when the information on social trends was not represented, funding speed had no special change at the early and middle stage and had decreasing trend at the end stage.

Percentage of money pledged for usual projects was higher in the case that the information on social trends was represented than in the case that the information on social trends was not represented. When the information on social trends was represented, funding speed significantly increased at the middle stage and remained relatively high without fluctuation at the end stage, too. However, when the information on social trends was not represented, funding speed decreased a little at the middle stage, and had a little increasing trend despite of fluctuation as campaign was heading towards the end stage.

The results above show that consumers' investment decision changes when the information on social trends is represented to them.

In order to analyze the effect of information on social trends on consumers' investment decision, we conducted regression analysis. We applied the LPM shown in expression (2) of section III to the data collected from the second group of participants. Expression (5), (6), and (7) are the estimated regression equations, respectively for the early, middle, and end stages. And Table 2 shows the t-values, F-values of the coefficients, and R^2.

$$decide = \underset{(-0.08583)}{-0.0056} + \underset{(7.17077)}{0.100756\,trust} + \underset{(5.6574)}{0.078751\,possible}$$
$$+ \underset{(7.05844)}{0.100153\,social}$$
(5)

$$decide = \underset{(-3.603897)}{-0.250817} + \underset{(8.85887)}{0.124192\,trust} + \underset{(8.663422)}{0.122410\,possible}$$
$$+ \underset{(6.092597)}{0.087182\,social}$$
(6)

$$decide = \underset{(-7.376825)}{-0.480953} + \underset{(6.891911)}{0.091388\,trust} + \underset{(6.113998)}{0.079892\,possible}$$
$$+ \underset{(-7.376825)}{0.15377\,social}$$
(7)

Also, we applied a linear regression model shown in expression (3) of section III to estimate the relationship between the success probability perceived from social trends, the social network responses, the percentage of money pledged and funding speed (the percentage of money pledged per day). As the result of regression analysis, we had the following regression equation.

$$so = \underset{(2.6738)}{0.628} + \underset{(-2.967)}{-0.1407\,anno} + \underset{(12.6412)}{0.0379\,level} + \underset{(5.842)}{0.27633\,velocity}$$
(8)

	β_0	β_t	β_p	β_s	F	R^2
ex(5)	-0.08583	7.17077 ***	5.6574 ***	7.05844 ***	38.59 ***	0.28
ex(6)	-3.603897 ***	8.85887 ***	8.663422 ***	6.092597 ***	52.97 ***	0.36
ex(7)	-7.376825 ***	6.891911 ***	6.113998 ***	-7.376825 ***	65.64 ***	0.44
	β_0	β_a	β_l	β_v		
ex(8)	2.6738 ***	-2.967 ***	12.641 ***	5.842 ***	68 ***	0.687

Table 2. Results of second experiment.

In expression (5), t-value of the constant term doesn't reach its critical value even at the 10% level of significance, but t-values of other coefficients and F-value are much greater than their critical values at the 1% level of significance, and R^2 is comparatively great; therefore, this expression can be seen as an adequate model.

T-values of all the coefficients and F-values in expression (6) and (7) are greater than their critical values at the 1% level of significance and the values of R^2 are also great enough; therefore, they can also be seen as adequate models.

T-values of all the coefficients and F-value in expression (8) are greater than their critical values at the 1% of significance and R^2 is comparatively great; therefore, this expression can be seen as an adequate model.

V. Discussion and implications

This paper studies the effect of perceived success probability on consumers' decision to invest in crowdfunding projects and represents how the effect of the success probability perceived from social trends on investment decision changes from the launching of project to the end.

First, perceived success probability was found to have positive effect on the success of crowdfunding projects.

In first experiment, we hypothesize that perceived trust and perceived success probability have effect on the success of crowdfunding, and apply a LPM (linear probability model) to test that. The result of first experiment has shown that our LPM in expression (4) cannot explain our hypotheses. However, this does not mean that our hypotheses are false.

Prior literature has already shown that perceived trust and perceived success probability have effect on the success of crowdfunding. The reason why our model doesn't explain this relationship may be that there are other factors influencing the consumers' investment intention.

Although the first experiment rejects our models, the second one shows that the impact of perceived success probability on the investment decision is significant. That is to say, our hypothesis H_1 has been verified.

And, as shown in the regression equations of second experiment, the coefficients of the success probability perceived from social trends are all positive. This indicates

that a higher success probability perceived from social trends leads to the higher investment decision and a lower one leads to the lower investment decision. That is, our hypotheses H_3 and H_4 have been verified to be true.

Second, we found that the success probability perceived from social trends increases as time goes by.

The coefficient of social network response indicator is negative in expression (8); this can be explained as follows:

If funding performance of a project is not significant when the social network response indicator towards it is significant, consumers think that the success probability of the project is low; therefore, the perceived success probability indicator is evaluated as a low value. On the other hand, if the funding performance of a project is significant when its social network response indicator is not significant, consumers find that the project is prosperous and evaluate the perceived probability indicator as a high value. That is, the social network response indicator rather has a negative effect on the success probability perceived from social trends; therefore, the coefficient of the social network response is negative. But as the funding performance constantly increases, the negative impact of social network response indicator is compensated and the success probability perceived from social trends gradually increases. That is, our hypothesis H_2 has been verified.

Third, it has been shown that consumers' investment intention in the case that the social trends information is represented differs significantly from the case that the social trends information is not represented.

When the social trends information is represented, the coefficients of success probability perceived from social trends decrease at the middle stage, increase at the end stage, and increase on the whole, too. The fact that the coefficients of the success probability perceived from social trends decrease at the middle stage means that the effect of the success probability perceived from social trends is not strong at the middle stage. This fact can be explained as follows:

At the early stage of campaign, consumers often rely on the social network response information, because the funding performance information is less than the social network response information. However, at the middle stage of campaign, the social network response information might rather have negative impact. Because at the middle stage, the funding performance isn't still high and doesn't reach the level that consumers expect from the social network response. Therefore, in this time, consumers don't rely so much both on social network response and funding performance, so they often depend on perceived trust and the success possibility perceived from the features of project to make decision to invest in. This just leads to the small coefficient of the success probability perceived from social trends.

At the end stage of campaign, consumers often rely on the funding performance. Though perceived trust and perceived probability is high, if the funding performance is low, consumers do not invest; though perceived trust and perceived probability is low, if the funding performance is high, consumers make decision to invest. This means that consumers often rely on social trends to make decision to invest; therefore, at this time, the coefficient of the success probability perceived from social trends is significantly high.

This gives us a managerial implication. The crowdfunding platforms can strengthen consumers' investment intention by representing the social network response rather than funding performance at the early and middle stage, and mainly representing funding performance at the end stage.

Besides, when the social trends information is not represented, the funding performance of excellent projects has certainly high value at the early stage and decreases after that; that of usual projects has certainly high value in the early stage, decreases at the middle stage, and increases again at the end stage; that of poor projects consistently decreases little by little during the entire campaign of the project.

Then, the following question is raised. If the social trends information is not represented, the factors influencing the investment decision only include perceived trust and perceived success probability and these two factors are decided at the startup of campaign. Then, the funding speed should be fixed, shouldn't it? Why does it decrease from the early stage to the middle stage and increase from the middle stage to the end stage? This may be due to the other factors (e.g. number of updates) not included in our study. Although there is no impact of social trends, the subjective role of project creator still remains, therefore, consumers' investment decision does not maintain the fixed level.

This study has some limitations. First, participants are limited to students and we assume that the purchasing power of all students is the same. Second, we use the experimental web site but not real web site and assume that the durations of all projects are the same and the number of students visiting the web site is fixed. For these limitations, our result might deviate from the reality.

Future research may study the dynamics of the success probability perceived from the actual social trends by using actual crowdfunding projects and platforms and employing several kinds of participants. Future research could also analyze the effect of the success probability perceived from social trends on the investment decision for the actual crowdfunding projects. It could also model the success probability perceived from social trends and its effect on the investment decision and analyze their characteristics. This paper contributes to crowdfunding theory in that this conceptualizes the affective determinant that consumers feel about the success probability of project as the "perceived success probability" and analyzes its effect on the investment decision in detail. And this paper gives managerial implications to improve the service of crowdfunding platforms by explaining the dynamics of the success probability perceived from social trends.

VI. Conclusion

This study has shown that the perceived success probability is a significant factor affecting the investment decision and social trends have the dynamic effect on it. The result of this study gives an implication for developing crowdfunding theory and improving crowdfunding platform service. The implication is that crowdfunding platforms can strengthen consumers' investment intention by adequately representing social trends information to consumers in the stages of project campaign. This study has shortcomings in that the experimental environment and participants have limited

condition. Future research might analyze the dynamics of the effect of perceived success probability in much less limited environment and develop relevant mathematical modelling.

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Appendix 1. List of survey items used to measure the effect of the perceived trust and perceived success probability on consumers' investment decision

Construct	Items	Source
Investment Intention	1. Invest – Don't Invest	Wooldridge [80]
Perceived Trust	1. The project creator is trustworthy. 2. The project creator is evidently intends to keep his/her promises and commitments to sponsors. 3. I believe that the project creator has my best interests in mind. 4. Even if not monitored, I'd trust the project creator can do the job well.	Gefen [82]; Kim, Ferrin, and Rao [83]
Perceived Success Probability	1. I believe that the project is so excellent to achieve the success. 2. I feel the self-confidence of the project creator from his project. 3. I believe that many consumers will sympathize with the idea of the project. 4. I believe that this project can complete its funding.	

Appendix 2. List of survey items used to measure the effect of the success probability

perceived from the features of project and from social trends on consumers' investment decision

Construct	Items	Source
Investment Intention	1. Invest – Don't Invest (1 or 0)	Wooldridge [80]
Perceived Trust	1. The project creator is trustworthy. 2. The project creator evidently intends to keep his/her promises and commitments to funders. 3. I believe that the project creator has my best interests in mind. 4. Even if not monitored, I'd trust the project creator can do the job well.	Gefen [82]; Kim, Ferrin, and Rao [83]
Success Probability Perceived from the Features of Project	1. I believe that the project is so excellent to achieve the success. 2. I feel the self-confidence of the project creator from his project. 3. I believe that many consumers will sympathize with the idea of the project. 4. I believe that this project can complete its funding.	
Success Probability Perceived from Social Trends	1. I believe that the fervent trends of investment in the project will be sustained by the end. 2. I believe that the project will complete the funding at the end of campaign. 3. I believe that consumers' interest in the project will rise as time goes by.	

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